

A large, billowing mushroom cloud from a nuclear explosion, with a bright orange and yellow fireball at the top, serves as the background for the document cover.

VENTURA COUNTY NUCLEAR EXPLOSION RESPONSE PLAN

Version **3.0**
August 8, 2011

ACKNOWLEDGEMENTS

This Plan was written, compiled and edited by Robert M. Levin, MD, Health Officer, Ventura County Department of Public Health, and Steve Johnston, Administrative Assistant to the Disaster Management Unit of Emergency Medical Services, Ventura County Department of Public Health. This document contains original written material and is also a compilation of other manuals, plans, articles and electronic documents. Where sources are known, we attribute them in the text. In some cases original sources have been lost. If you recognize a source we have failed to attribute appropriately, please contact us so that we may correct our oversight.

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August 8, 2011



Preface

This is Ventura County's Plan for responding to a nuclear detonation set off by terrorists in its neighboring county to the south, Los Angeles. It presents *a specific scenario*, anticipates the likely results of such a destructive act and details the response that should be made here in Ventura. It is meant to prepare and protect the residents of Ventura County but if it is successful, its chief beneficiaries will be the citizens of Los Angeles County. It should mesh well with Los Angeles County's plan for the same event but it has a different focus.

This Plan is intended to be both educational and directive. It can be used in three different ways. Sections 1 through 23 provide a thorough overview and education specific to both a nuclear detonation and to its impact on Ventura County. An individual can also use this plan by selectively reading the sections that focus on his or her own area of interest. Finally, Sections 24 through 29 are intended for use during the stresses of an actual event. The various sections dedicated to the EOC and its operations and other departments, agencies and organizations contain priority ordered checklists specific to this event.

Developing a plan for a potential disaster is the first step in any response. The more detailed the plan, the better the ultimate preparation. However, developing all of the individual elements of a response takes resources in time, personnel and cooperation (with the State and Federal governments) that are beyond the capacity of any county to achieve. As a result, complete preparation for any disaster is an approachable but unachievable goal.

This Plan should be considered a work in progress and not a final draft.

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SECTION 1. GENERAL THREAT SCENARIO INVOLVING A NUCLEAR BOMB

(also known as Suitcase Nuclear Device or Improvised Nuclear Device or IND)

With the aim of terrorist organizations, especially Al Qaeda, to damage the economic infrastructure of the United States and to create terror in the American population, the possibility of there being one or more attacks with nuclear detonations on our soil has become very real.

For the purposes of this Plan, a hypothetical nuclear detonation will be set off in our neighboring county, Los Angeles. We have selected this as a more probable event than a blast occurring in our own county because significantly greater economic damage would be affected with this strategy. Using a best guess, the size of the device would cause direct physical damage which would be limited to Los Angeles, but our county (Ventura, the neighboring county to the west and north) would experience major disruptions as an indirect result of such an attack. Radioactive fallout could affect residents of our county depending on the direction of the prevailing wind. There would likely be a mass exodus of people from Los Angeles County. Major traffic challenges would result, as well as issues related to external contamination of victims and numerous injuries which would need to be addressed. Significant psychological issues from the blast itself and from exposure and feared exposure to radiation could be expected. It is also likely that many of our local resources would be seen as valuable assets to the EOC in Los Angeles and would be called upon, thus having an impact on our own available resources.

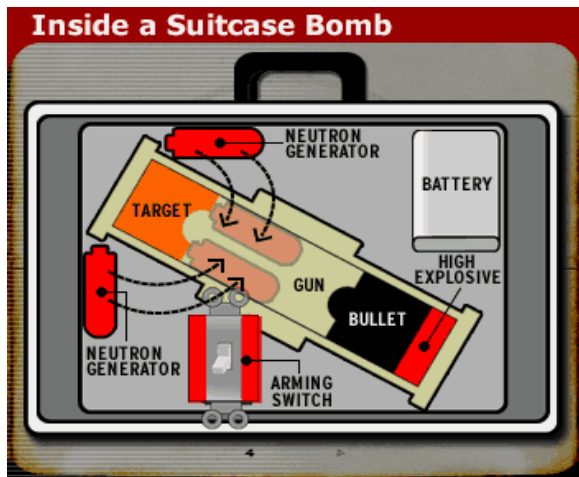
In terms of the applicability of this Plan, it is important to realize that there is no such thing as target counties versus non-target counties. The only distinction of value is between affected areas and unaffected areas. Areas unaffected by either direct damage from an IND or from the fallout will respond much as described in this document. Some of these unaffected areas will be in Los Angeles County and some affected areas will likely be in Ventura County.

SUITCASE NUKES

The likely mechanism by which a terrorist would deliver a nuclear bomb in Los Angeles would be as a suitcase nuclear device:

A suitcase nuclear device is a very compact and portable nuclear weapon and could have the dimensions of 60 x 40 x 20 centimeters or 24 x 16 x 8 inches. The smallest possible

bomb-like object would be a small nuclear weapon of plutonium at maximum density under normal conditions.



Suitcase nuclear devices could yield anywhere from 0.1 to 20 kilotons. The Hiroshima bomb probably had a 10 kiloton yield.

The warhead of a suitcase nuclear bomb theoretically consists of a tube with two pieces of either uranium or plutonium, which, when rammed together, would cause a nuclear blast. Some sort of firing unit and a device that would need to be decoded to cause detonation might be included in the "suitcase".

There is clear evidence that some terrorist groups have been trying to obtain nuclear materials, primarily from the enormous stockpiles of the former Soviet Union. In December 1994 Czech police seized 4 kg of highly enriched uranium. During that same year German police seized more than 400 g of plutonium. In October 2001 Turkish police arrested two men with 1.16 kg of weapons grade uranium. Also in October 2001 the Russian Defense Ministry reported two recent incidents when terrorist groups attempted to break into Russian nuclear storage sites but were repulsed. Since 1993 the International Atomic Energy Agency has reported 175 cases of nuclear trafficking, 18 involving highly enriched uranium or plutonium. Even more alarming are reports that small, fully built nuclear weapons are missing from the Russian arsenal. In 1996 the Russian general Alexander Lebed claimed that 40 of these so called suitcase weapons were unaccounted for. He subsequently retracted the claim but in a manner that failed to reassure many experts.

The efforts of the Al-Qaeda network to obtain nuclear weapons or weapons grade nuclear materials are particularly worrying. Al-Qaeda agents have tried to buy uranium from South Africa, and have made repeated trips to three central Asian states to try to buy weapons grade material or complete nuclear weapons. Sultan Bashiruddin Mahmood, a leading Pakistani nuclear engineer, made repeated visits to the Taliban stronghold of Kandahar between 1998 and 2001, leading the Pakistan government to place him and two other nuclear scientists under house arrest. More recently there have been speculative reports that Al-Qaeda has purchased 20 of the Russian suitcase weapons from Chechen sources for a reported \$30 million dollars.

It may be that nuclear devices small enough to be carried in a suitcase do not exist. However, a 10 kiloton nuclear device could be assembled in a box the size of a foot locker and could be moved around in a van. If it were detonated at ground level in downtown Los Angeles, the blast and thermal effects of such an explosion would kill at least 9,000 people immediately, and 45,000 people would die within 24 hours. There would be 138,000 injured, 131,000 by fallout. There would be 99,000 deaths due to all causes by 8 weeks.

With a ground detonation and a wind speed of 10 miles per hour, the explosion would have the following physical characteristics: The radius of the fireball would be 323 feet. The cloud top would stabilize at 25,000 feet and the bottom would be at around 14,000 feet. The mushroom cloud would have a radius of 2.7 miles. At 1 mile in height, the wind speed pushing the cloud would be 140 miles per hour. The crater would be 215 feet across and 47 feet deep if it were on solid granite and twice that on softer materials. Thirty percent of the fallout would be trapped in the upper atmosphere and be deposited over a period of years.

EFFECTS

- Exposure occurs when either part of or all of the body is exposed to and absorbs external radiation, such as when a person is standing near the site where a suitcase nuclear device is set off and he or she is exposed to radiation, which can be absorbed by the body or can pass completely through it.
- Contamination occurs when radioactive materials in the form of solids, liquids or gases are released into the air and contaminate people externally, internally or both. This happens when body parts such as the skin become contaminated with radioactive fallout and/or if the harmful material gets inside the body via the lungs, gut or wounds.
- Incorporation of radioactive material occurs when body cells, tissues and organs such as bone, liver, thyroid or kidney, are contaminated with and take up the radiation.
- Gamma radiation can travel many meters in the air and many centimeters once in human tissue; therefore this represents a major external threat. Dense material is needed as a shield. Beta radiation can travel meters in air and can penetrate human skin moderately well but will not pass very much further into the body. Clothing affords some protection. Alpha radiation travels a very short distance through the air and can't even penetrate the skin, but can be harmful if inhaled, swallowed or absorbed through open wounds.
- Radiation, in the first hour after an explosion, falls to about 90 percent of the initial level, decreasing to about 1 percent of the original level after two days. Radiation drops to trace levels after about twelve days.
- Trauma results from the blast wave's direct effect on the human body and the tremendous winds generated by the explosion which can send projectiles that strike and sometimes penetrate the body or displace or blow the body against other objects or structures with tremendous force.
- Burns follow a thermonuclear blast as a result of the fireball associated with the explosion or associated with the fires that are ignited in structures near the explosion.

- Psychological stress will accompany the trauma associated with a nuclear blast. People who were personally untouched by the blast may suffer psychological sequelae. Loss of family, friends, property and personal health can cause feelings of fear, disorientation and disruption.

SYMPTOMS

People in the immediate vicinity of an improvised nuclear device detonation would likely die from the force of the conventional explosion itself. Some survivors of the blast might die of radiation poisoning in the weeks afterward. Those farther away from the explosion might suffer radiation sickness in the days and weeks afterward, but recover. Over time, risks of cancer in the affected area would rise, but perhaps only slightly.

A mix of physical symptoms must be used to judge the seriousness of exposure. Impact of radiation poisoning also changes if the body has experienced burns or physical trauma. In the case of treatable victims, extensive medical treatment may still be required for more than two months after exposure.

Some symptoms may include vomiting, headache, fatigue, weakness, diarrhea, thermal burn-like skin effects, secondary infections, recurring bleeding and hair loss.

TREATMENT

If detection and decontamination occurs soon after exposure, about 95 percent of external radioactive material can be removed by taking off the victim's clothing and shoes and rinsing the body with water. Further decontamination may require the use of soap or specific decontamination solutions.

Blast injuries occur from the force of the explosion. Concussive injuries occur when bodies are thrown by the force of the blast. Shearing injuries are seen as organs (liver, heart, brain) accelerate and decelerate at different speeds. Crush injuries happen with the collapse of structures. Shrapnel injuries occur when objects propelled by the blast strike people. These will be treated by Emergency Room physicians much as they treat the victims of falls, automobile accidents or penetrating injuries. Shrapnel that is radioactive will be handled with appropriate precautions.

Medical personnel will treat victims for hemorrhage and shock. Victims will also be expected to require treatment for burns. Open wounds will be irrigated to cleanse them of any radioactive traces. Amputation of limbs may occur if a wound is highly contaminated and functional recovery isn't likely.

If radioactive material is ingested, treatment is given to reduce absorption and enhance excretion and elimination. It includes stomach pumping or giving the victim laxatives or aluminum antacids, among other things.

If radioactive material has gotten into a victim's internal organs and tissues, treatment includes giving the patient various blocking and diluting agents. Mobilizing agents such as ammonium chloride, diuretics, expectorants and inhalants are given to a patient to force the tissues to release the harmful isotopes. Other treatments involve chelating agents. These agents bind with some metals more strongly than others to form stable complexes that, when soluble, are more easily excreted through the kidneys. Potassium iodide taken by mouth just prior to exposure binds to sites in the thyroid to keep other radioactive compounds from attaching to the thyroid.

Treatment of a victim within the first six weeks to two months after exposure is vital and is determined by the types of radioactive isotopes to which the victim was exposed.

Post-event “debriefing”, counseling and psychological and psychiatric intervention may be necessary for those both directly and indirectly effected by the explosion.



The purpose of the scenario is to prepare Ventura County's response to the impact of a thermonuclear attack in Los Angeles County by efficient deployment of County and other resources. The planning should include the following functions:

- organize and control the excessive traffic on county highways;
- acquire and apply accurate and timely information on the attack;
- apply intelligence learned about the thermonuclear attack, including consequent fallout plume, to predict consequences to Ventura County and its citizens;
- determine management of incoming contaminated vehicles and individuals;
- monitor health and environmental affects, and communicate these to the public to maximally inform and to minimize panic and unwarranted fear;
- meet increased healthcare and psychological needs;
- respond to social disorder and panic.

SECTION 3. ASSUMPTIONS

Responding to a thermonuclear attack will not be business as usual. Maybe not all, but from the perspective of planners and first responders, many bets are off. Many responses will need to be improvised. The following assumptions will need to be addressed.

- Based on the anticipated size of an improvised nuclear device, and the most likely sites where it might be detonated, it will be assumed that **direct** concussive effects from the blast on Ventura County will be limited. The device will be assumed to be ten (10) kilotons. The site of detonation will be at the Civic Center in downtown Los Angeles. It will be assumed that 45,000¹ people will die from the blast in the first day.
- A nuclear incident in Los Angeles County will have major impacts on Ventura County. An uncontrolled mass evacuation could be anticipated and lead to hysteria, gridlock on our roadways, additional injuries, economic disruption, and inflict environmental and property damage and significant clean-up costs in the County of Ventura. Two million people may be anticipated to head in the direction of Ventura County. Many of these people will be headed to points north of Ventura County. It is also likely that some Ventura County residents will flee because they fear nuclear fallout. **Figure 2** shows the main points of entry into Ventura County from Los Angeles County.
- Some people in Ventura County will try to enter the Los Angeles area for reasons related to loved ones, property or even pet animals.

¹ Even in Hiroshima and Nagasaki there were occasional survivors within five city blocks of the nuclear detonation. These individuals were likely to find themselves in one of the few, modern concrete structures within the blast radius. In Hiroshima, almost 100% of people died within a five block radius (approximately 0.8 square mile) and 80% died between six and ten blocks (an additional 2.3 square miles). This document assumes there will be approximately 2,500 people in every square block in downtown Los Angeles on a busy weekday morning. There are one hundred square blocks in the average city square mile. Due to the more substantial buildings in modern Los Angeles and their associated protective effect, it is assumed that in this scenario, 95% of people will die within 4 ¼ blocks, 28% from there to 5 blocks and 1% more out to 6 blocks.

- As shown below in Figure 3, per meteorological estimates, based on the prevailing winds, there is some likelihood for a contaminated radiological cloud from this suitcase nuclear device detonation to reach Ventura County. This is most likely for residents of the southern coastal sections of Ventura County including Malibu, Point Mugu and perhaps Thousand Oaks. Some protection may be afforded these areas by the coastal range of mountains. It is just as likely that prevailing winds will push the cloud to the east and miss Ventura County altogether. Local authorities should be prepared for a major exodus of northbound Los Angeles County residents and some Ventura County residents as well.
- 40,000 injured people will be entering Ventura County in need of some kind of medical attention, from cuts and bruises, to heart attacks, as well as burns, broken bones and imbedded objects (shrapnel-type injuries). Most of these will have been “injured” from fallout.
- Many people will be exposed to radiation.
 - People will want to decontaminate: internal/external.
 - Some people will get radiation sickness within minutes, others days and weeks later.

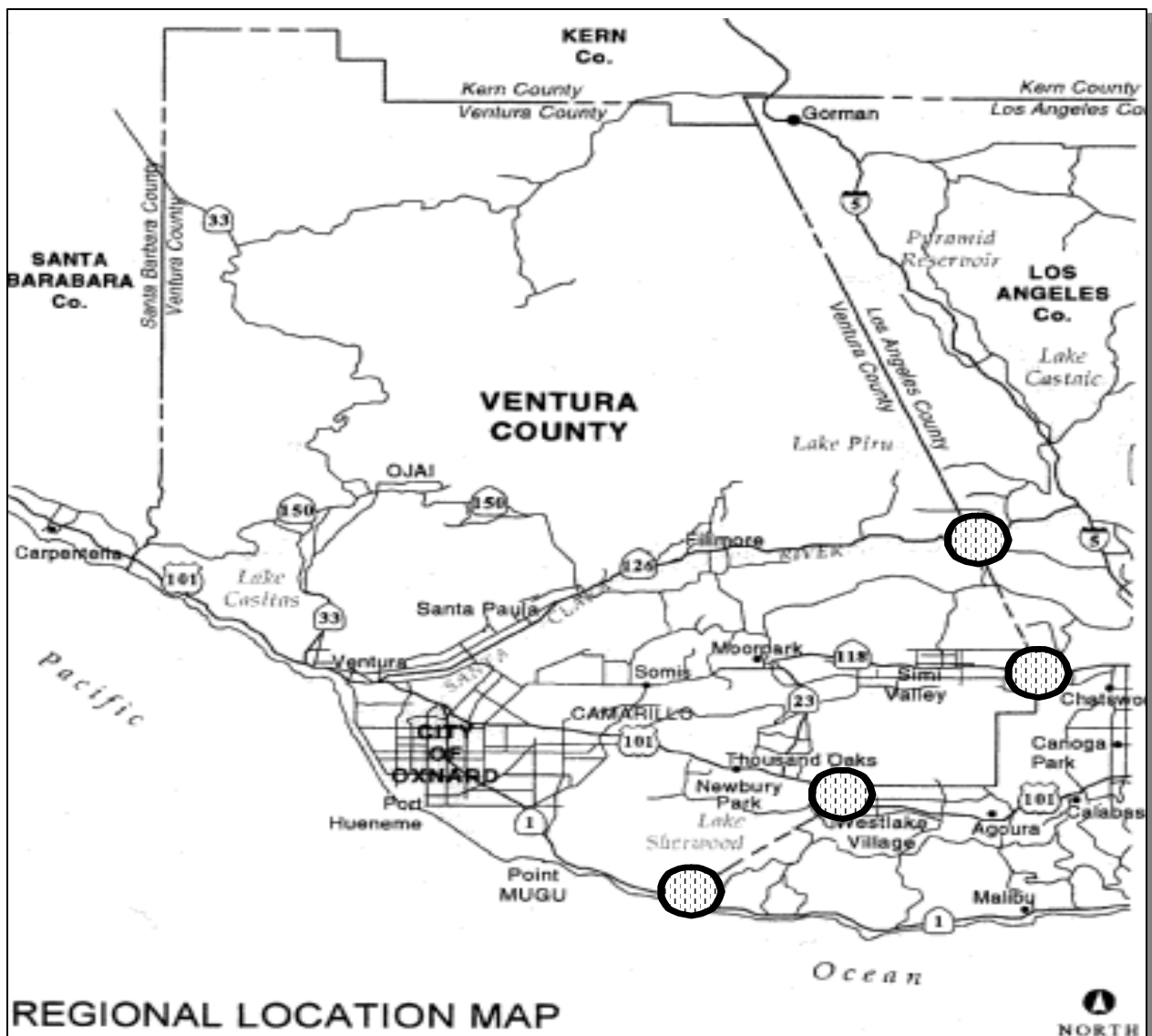


Figure 2. Main Points of Entry into Ventura County by the Population Fleeing Los Angeles County

**PREVAILING WIND DIRECTIONS, ASSOCIATED MEAN SPEEDS, AND
ASSOCIATED PERCENT FREQUENCY CONTOURS
- LOS ANGELES INT'L AIRPORT (LAX) -**

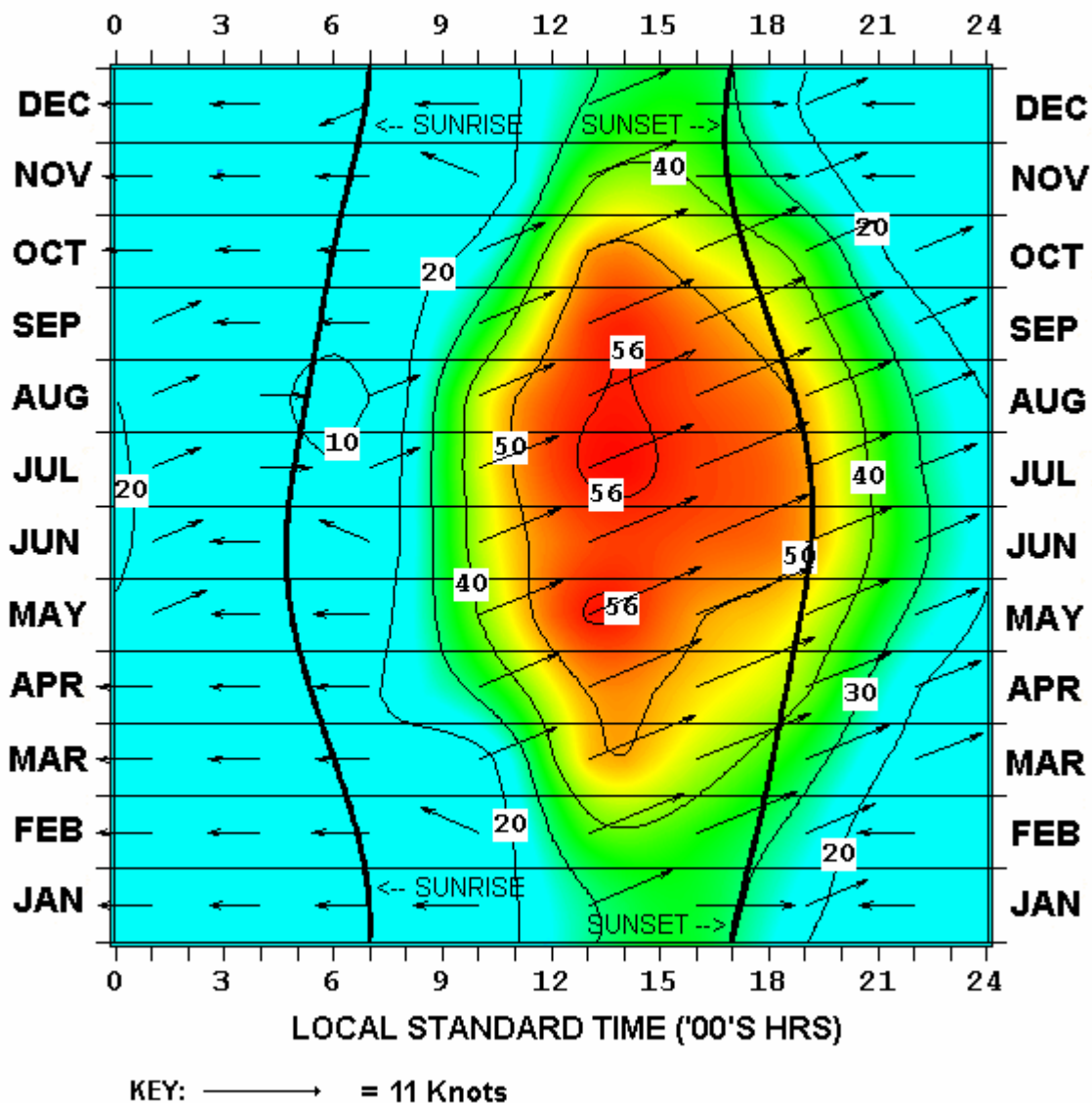


Figure 3. Prevailing wind direction and speed for Los Angeles International Airport

Although this wind direction figure (Figure 3) is not a map of downtown Los Angeles, this graphic provides information of the type that is useful for planning. The prevailing wind diagram for Los Angeles International Airport (above) shows that wind speeds (southwest or onshore winds) generally increase late in the morning, peak in the afternoon, and decrease around midnight. Lighter offshore winds are typical late at night until just after sunrise.

- The public will need post-event messaging including:
 - Who is in authority?
 - Education related to radiation exposure
 - Should I evacuate or shelter-in-place?
 - Tracking loved ones
 - Where to find medical care
 - How to assist others
- Mass confusion, anxiety and some panic will likely occur. Immediate psychological support will be needed (see chapter on Mental Health and Traumatic Stress).
- Long-term psychological support will be needed.
- Ventura County would be called upon to provide mutual aid to Los Angeles. Our response will be limited since our first responders will have been well-trained in responding to this type of event in Ventura County and our response provides aid, first and foremost, to fleeing L.A. County residents.
- Los Angeles won't be able to give anything to meet Ventura County's needs as expected under our mutual aid agreement.
- Ventura County's deep water port and 4 airports (3 public and 1 military) will be largely unaffected from the blast but will experience greatly increased utilization.
- Assumptions made about outside support and mutual aid agreements may not materialize.
- Television, radio and communication may be limited.
- Information about the event may be delayed.
- Food supplies in Ventura County will become limited.
- Food re-supply to Ventura County may be problematic.
- Unanticipated spot or widespread power failures may occur due to damage to the regional power grid.
- Water shortages may occur in Ventura County due to damage to the Metropolitan Water District.

- Spontaneous volunteers will arrive to offer assistance.
- There will be a shortage of radiation protective equipment both overall and for first responders.
- There will be a great shortage of radiation monitoring devices.
- There will be a shortage of first responders trained in and knowledgeable about testing for and working around radioactive contamination. This will be particularly true for food and agriculture related issues.
- About 30% of our total first responders will be on duty at the time and 50% of the remainder will be available within 2 hours.
- There will be no effort to stop or turn back traffic coming from Los Angeles.
- There will be no effort to screen vehicles for radiological contamination before or as a condition for entering Ventura County. (This will slow traffic and the amount of radiation on moving vehicles is usually not significant.)
- There will be no effort to wash off or otherwise decontaminate vehicles passing into or through Ventura County from overpasses or otherwise. (This will slow traffic.)
- Southbound traffic lanes will not, at least initially, be converted to northbound flow (contraflow).
- Citizens who are determined to return to Los Angeles will not be prohibited from doing so. Law enforcement will not use force to prevent individuals returning to Los Angeles.
- Roadside assistance to cars that are broken down or out of gas should not be relied upon. Such vehicles will be pushed off the road.
- Note: Ventura County will abide by any declaration made by the Governor or President of the United States that overrule any of Ventura County's strategy decisions.
- Major highways will likely experience severe gridlock. People stuck in their vehicles will experience thirst, hunger, the need to eliminate, and gasoline shortages.
- Mass triage for injured people who arrive in Ventura County will occur in Assessment Centers established on the fringes of local hospitals.
- People triaged into the hospitals will first undergo decontamination (except the critically ill. The critically ill will be treated first and decontaminated later.).

- Public anxiety regarding the catastrophic incident will require effective public information and risk communication as a response, and may also require appropriate mental health and substance abuse services.
- During a catastrophic incident, medical support will be required not only at medical facilities, but at casualty evacuation points (Oxnard Airport), Reception Centers (evacuee shelters), and to support field operations.
- In a mass casualty emergency, additional medical personnel will be needed in the County.
- Under some scenarios (e.g., a simultaneous, multi-city, terrorist attack), it may not be possible to draw resources from outside of the Ventura Operational Area (VOA) for several days.
- Hospitals, clinics, urgent care centers and private physicians' offices throughout the VOA will be responsible for using existing staff, drug and medical supplies to treat initial victims until mutual aid and federal personnel arrive to assist in dispensing, treatment, and in-patient care sites.
- Using SEMS, the overall response will be managed using the Incident Command System (ICS), and each individual site (Field/Fixed Hospitals, etc.) will also be organized using ICS or Hospital Emergency Incident Command Systems (HEICS).
- The decision regarding where to locate the incoming State and Federal medical personnel will depend on an assessment conducted by County HCA based on the patient load, staffing, capacity, safety, and logistical support available at each treatment or medical care site or facility.
- National Disaster Medical System (NDMS) and Commissioned Corps Readiness Force (CCRF) assets will be the first Federal health and medical assets to arrive on the scene of a catastrophic event.
- The Disaster Healthcare Volunteer (DHV) Program has the capacity to pre-register physicians, nurses, and other health care providers. Additionally, medical responders can be registered on-site in response to an incident. This system is maintained by the Ventura County Medical Reserve Corps (MRC) as part of a statewide data base. The Ventura County Medical Reserve Corps can provide credentialed health care workers and volunteers. These volunteers are sworn in as Disaster Service Workers (DSW) and are covered by state insurance programs.
- There will be patient access problems at many health care facilities.
- Any first responder at any time could run into an important clue as to the perpetrators of this crime.

SECTION 4. RESPONSE COORDINATION

Many of the actions which will require coordination between various agencies are taken by the chiefs of Operations, Plans/Intelligence, Logistics and Finance. Management is provided by Unified Command.

Coordination of the response effort must be established early on. Coordination promotes professionalism, accuracy, inspires confidence in government response by our local population, provides assets to our County, establishes which, if any, of our resources will be sent to other jurisdictions and identifies and creates the available and functioning communication needed to efficiently respond to a disaster (e.g. satellite phones, the Auxiliary Communications Services or ACS (previously known as RACES), placement of liaison personnel). Volunteers and donations should be screened and assigned for effective use. The disaster response must be documented to provide maximum reimbursement.

The following discusses some of the areas where coordination may be useful.

Coordination will be needed between **Ventura County** Operational Area and:

- Los Angeles Operational Area (LA County EOC) Region, for the purpose of:
 - Remind L.A. County that it would be preferable not to use Ventura County assets for mutual aid since personnel have been specifically trained to respond to the needs of LA County residents who have fled or are transported to Ventura County..
 - Sharing situation status.
 - Receiving LA County's plume maps.
 - It may be possible that we would "absorb" a portion of the LA OA if they cannot function due to destruction of their capability.
- State, for the purpose of:
 - California Highway Patrol (CHP) will monitor traffic for flow along Highways 101, 118, 126 and 1 and coordinate traffic flow in affected areas. Work with the Caltrans to accomplish this.
 - The Ventura County Sheriffs Department and city police departments will coordinate with CHP to manage traffic problems and general back-up, and mutual aid. The CHP

may be needed to assist with Intel, evacuation, emergency notifications and providing information on radiation to the first responders.

- The State OES provides information systems, OASIS and RIMS, as well as staff to assist in the County EOC. OES administers the structure of mutual aid and response coordination for our state. They can provide additional expertise in overall coordination with federal agencies.
- Requesting various agencies to provide expertise in radiation, environmental health, utilities, water supply, construction, legal and political issues.
- Federal, for the purpose of:
 - Exchanging situation/status information. The FBI will be the lead agency in the response. The Department of Energy (DOE) will play a major role in providing support and technical advice during any radiological event.
 - During most disasters, the military cannot be expected to participate in the response. Therefore, local civil authorities are unacquainted with military assets. A nuclear detonation by a terrorist organization may allow for such a response. To facilitate and legalize the military's involvement, **a state of war will need to be declared**, authorizing the military to assume broad powers. The Naval Base in Ventura has extensive resources including an airport; construction equipment; medical capacity, mostly in the manner of personnel; berthing and staging areas; and policing capability. These need to be catalogued, requested and utilized. Pre-approval for the Navy's participation should be sought and they should be included in all exercises related to nuclear detonation response.
 - Various and numerous agencies, departments and offices within the Federal Government are mandated to perform specific duties during disasters. These resources will be ample and will support but may not displace the need for a significant Ventura County response in certain areas (e.g., handling of dead bodies, stabilization of sick and wounded at an airport staging site for transport to distant medical facilities, etc.)
 - Arrange liaison between the Federal (Regional or Los Angeles EOC) and Ventura County's EOC. An effort should be made to have national ESF #8 deploy liaison to Ventura County's EOC and vice versa.

RESPONSE PHASES

The following section is borrowed liberally from the Federal Register, Volume 71, January 3, 2006 "Preparedness Directorate; Protective Action Guides for Radiological Dispersal Device and Improvised Nuclear Device Incidents; Notice" Part II, Department of Homeland Security.

The early phase of the response will be run at the scene by local (and possibly State) responders, who will make protective action decisions for the protection of public health, property, and environment early in the incident based on judgment, protocol, and what limited data are available. As Federal response assets arrive on scene, they will be incorporated into the on-scene incident command established by local officials and then become part of the unified command structure. Other Federal assets will be located in the Joint Field Office (JFO), collocated with a State/local Emergency Operations Center (EOC), if possible, to support the local incident management activities. All of this is predicated on what and whether Federal assets are made available to the Ventura County EOC, given the great need that the bombed area will have and that some other nearby EOC may be chosen by the Federal government to be their primary seat of activities.

The following information details available Federal assets and reveals the Federal perspective and expectations during a disaster caused by a nuclear detonation.

A timeline for response and recovery activities can be outlined but should be seen as neither exhaustive nor specific:

(A) Early Phase

0–3 hours

- Detonation of a nuclear device detected and Ventura County OES notified. Terrorism incident recognized
- OES notifies plume mappers, the individual members of the Unified Command (Sheriff, FBI, Public Health and Fire Department/Hazmat), and opens EOC
- DHS Homeland Security Operations Center (HSOC) notified of incident and mobilized to provide support and coordination until JFO is operational
- DHS determines incident is an Incident of National Significance, as defined in the NRP
- Initial protective actions ordered (shelter-in-place, KI recommendations)

Comments:

- Some Federal assets will self-deploy under their own authority (HHS, FBI, OSHA, Environmental Protection Agency [EPA], DOE)
- Protective actions by locals will be taken before Federal assets arrive
- County requests, and is granted, a major or disaster emergency declaration

6 hours

- DHS designates a Principal Federal Official (PFO)

- Nuclear Incident Response Team (NIRT) activated by DHS (i.e. Radiological Assistance Program (RAP), Aerial Measuring System (AMS), Federal Radiological Monitoring and Assessment Center (FRMAC), Radiation Emergency Assistance Center/Training Site (REAC/TS), Radiological Emergency Response Team (RERT))
- Additional dispersion plots (plume maps) developed, other analyses done, and Federal protective action recommendations provided
- Domestic Emergency Support Team (DEST) deploys (the DEST is a technical advisory team designed to pre-deploy and assist the FBI Special Agent in Charge and the PFO.)

Comments:

- The PFO is responsible for coordinating Federal assets in collaboration with other Federal officials

6–12 hours

- Initial Joint Field Office (JFO) established to include FBI Joint Operations Center (JOC)
- Advance FRMAC stood up (a coordinating center for Federal, State and local field personnel performing radiological monitoring and assessment – specifically, providing data collection, data analysis and interpretation, and finished products to decision makers. The FRMAC is a deployable asset of the Nuclear Incident Response Team [NIRT]). Field measurements being taken
- Aerial Measuring System (AMS) arrives, provides initial deposition data to JFO

12–24 hours

- JFO operational
- Federal teams in place (NIRT, DEST, Advisory Team for Food and Health)
- Protective Action Guides (PAG) being provided by JFO to State and local decision makers
- State requests, and is granted, a major disaster or emergency declaration
- Early phase activities are expected to proceed as described under existing plans and agreements. If DHS declares an Incident of National Significance, the PFO will coordinate Federal activities from the JFO and integrate Federal activities in support of the State and local response. A Robert T. Stafford Disaster Relief and Emergency Assistance Act declaration will facilitate funding for public and individual assistance, and for recovery operations.

In general, the primary agencies expected to be represented in the Unified Command for an improvised nuclear device (IND) response incident are the agencies with primary response authority and include DHS, FBI, DOE, Environmental Protection Agency [EPA], and other Federal, State, and local government agencies, as appropriate. Other Federal agencies (e.g., NRC, OSHA, U.S. Army Corps of Engineers, and DoD) will be requested to support the

response in accordance with the National Response Plan (NRP) and NIMS. The Unified Command referred to here would be based in the EOC that is running the whole event. Normally that would be the Los Angeles County EOC and probably will be the case here as well. However, due to the immensity of this event, and the possibility of significant degradation of Los Angeles County's capability, it is possible that the EOC will be located elsewhere. For the purpose of this document it will be assumed that that site will be in Los Angeles County or elsewhere (other than Ventura County) in Southern California. In that case, Ventura County will place a liaison at that EOC. It is also possible that Ventura County will be named the site of the event's EOC. That would change the nature of our response and the constitution of our Unified Command as described earlier in this paragraph. It is also possible that space will be requested elsewhere in Ventura County to be used as the EOC for the event.

(B) Intermediate Phase

During the intermediate phase, actions initiated in the early phase will continue as needed, such as lifesaving, fire suppression, perimeter security, and field data collection

and analysis. Preliminary shelter-in-place orders will be given within the first minutes at the order of Ventura and Los Angeles' Incident Command, but as data become available, Federal, State, and local officials will have better information with which to make protective action decisions, assist emergency workers, and inform the public. Federal protective action recommendations will be provided to State and local governments on public dose limits, restrictions regarding consumption of food and water, and dose reduction actions. Intermediate phase actions may include relocation, control of public access, decontamination of persons, decontamination/removal of "hot spots", response worker dose monitoring, population monitoring, food and water controls, and clearance of personal property. Public information and communication programs should be implemented as soon as practicable. Federal officials will work with State and local officials to develop information for the public in coordination with the regional JIC.

(C) Late Phase—Recovery and Site Restoration Activities Process Overview

The long-term recovery process should be initiated during the intermediate phase. This process is interrelated with the ongoing intermediate phase activities, and the intermediate phase protective actions continue to apply through the late phase until cleanup is complete. However, the long-term recovery phase is likely to involve separate individuals who can focus on long-term restoration issues while others continue working on intermediate phase activities.

Cleanup planning and discussions should begin soon after the incident to allow for selection of key stakeholders and subject matter experts, planning, analyses, contractual processes, and cleanup activities. Ventura County may choose to pre-designate stakeholders. These activities should proceed in parallel with ongoing intermediate phase activities, and coordination between these sets of activities should be maintained. Preliminary remediation activities carried out during the intermediate phase—such as emergency

removals, decontamination, resumption of basic infrastructure function, and some return to normality in accordance with intermediate phase guidelines—should not be delayed for the final site remediation decision.

A process for addressing environmental contamination that applies an optimization process for site cleanup may be found in “Preparedness Directorate; Protective Action Guides for Radiological Dispersal Device and Improvised Nuclear Device Incidents; Notice” Part II, Department of Homeland Security, Federal Register, Volume 71, January 3, 2006. The extent and complexity of the process for an actual incident should be tailored to the needs of the specific incident -- for nuclear detonations which have little direct radiological impact on Ventura County, the process discussed may not be necessary.

ORGANIZATIONAL RESPONSIBILITIES

Non-Governmental Organizations (NGO’s)

- The Red Cross will be the lead agency for coordination of the response by NGO’s. Consider including them in the Unified Command.
 - The Red Cross has the structure and nationwide capability to accept donations, direct and register volunteers and provide many forms of support on an individual basis. Determine where and how these services will be provided and place Logistics and the PIO in charge of disseminating this information and making the public aware of how to access these services. A part of the evaluation of individual volunteers is an assessment of their skills and a screening for normal mental health.
 - The Red Cross will set up Reception Centers (mass care shelters) in pre-arranged locations and send representatives to the EOC for liaison. Ask the PIO to disseminate the location of these sites to the public.
- Many other established faith-based charity groups self-deploy to disasters and provide services to those affected by the disaster. See the list in “They will come” OES publication. Be prepared to provide space and coordinate their efforts. Place an individual from Ventura County, preferably from our Red Cross, in charge of designating and listing these volunteer and donor intake sites and assign that person to Logistics. Have the PIO work with this Head of Volunteers and Donations to publicize these intake sites as indicated.

Ventura County Internal Coordination

Law Enforcement, including City Police and Sheriff’s Department, will be the lead for crisis management activation at the local level that includes:

- Crowd control/rioting/looting. The local military base may be involved in this activity as well. Work with the military.
- Evacuations and notifications

- Assist with decontamination process as necessary
- Intelligence gathering and sharing
- Education and protection of officers related to radiological exposure

Fire Departments, including City and County, will be the lead agency for the decontamination operation and support, as necessary, law enforcement for crisis management. Activities will include:

- Monitoring and decontamination of people (and very rarely, vehicles) where appropriate. This will be provided by Hazmat in three major types of settings: at 5 Red Cross Reception Centers; at Assessment Centers located at the county's 8 hospitals; and at 3 independent sites in the County.
- In addition to the above, place portal monitors at Reception Centers (care shelters) and follow established MOU's for their use.
- Perimeter and access control decisions made in conjunction with Federal Radiological Monitoring and Assessment Center (FRMAC).
- Evaluate public safety concerns, in conjunction with public health and environmental health. Make recommendations to law enforcement regarding evacuations.
- Notifications (e.g., of a neighborhood that needs to be evacuated).

Environmental Health Division responsibilities:

- Oversight and declaring clear those sites that require hazardous material/radiological agent clean up/decontamination.
- Arrange for funding to clean up hazardous material.

Public Works responsibilities:

Public Works serves as the lead for structural/infrastructural needs assessment for County property and roadways and will refer calls to the appropriate agency for other problems they encounter (eg., Southern California Edison for downed power lines). They will also assist with access based on the direction of law enforcement. For instance, they will put up barricades but not man them. Public Works has several hundred barricades. These would be quite useful at sites in the County that are set up for decontamination of the public and in tent clinics. They may also be useful with patient flow at Assessment Centers set up on the fringe of hospitals for patient triage and decontamination. Activities include:

- Provide barricades for checkpoint access control
- Needs assessments

- Assure limited scene safety
- 2 small (10 wheeler) water tankers
- Public Works in Ventura County is generally conceived to have purview over many areas which are actually the responsibility of others. These other entities include public and private utility firms, special districts (water, sanitation, etc.), private contractors, 10 city public works departments, state workers (primarily CalTrans), and Federal resources like the US Navy Public Works Department at the two naval bases, the Corps of Engineers, and Seabee personnel and equipment that are located at the two bases.
- Most large pieces of construction equipment in Ventura County, and the skilled personnel who operate them, are owned or employed by private contractors. While the EOC could commandeer many of these assets during an emergency, it's not clear exactly what these assets are. At this time, the Operations section of the EOC serves as a de facto Public Works Agency as described earlier in this paragraph. Consideration should be given to developing a countywide public/private Public Works DOC which includes all of the above entities.

The Ventura County Public Health Department and Emergency Medical Services (EMS)

Public Health and EMS are responsible for medical response operations; communication with hospitals, ambulance companies and health care providers; and coordination of medical/health resources during emergency response and recovery. Ventura County Public Health will activate the DOC and carry out the following:

- Notify hospitals of threat assessment (e.g., additional threats which the hospital would benefit from knowing about).
- Assist with identifying the radiological contamination, risk definitions and the population most at risk.
- Coordinate polling of emergency rooms for congestion, hospital beds available, etc.
- Ensure hospital/ambulance staff have appropriate plans and resources to prevent contamination of hospitals, ambulance rigs and staff.
- Make sure a decontamination area, treatment areas and a plan for crowd control has been instituted.
- Initiate public health alerts and declare public health emergencies in coordination with the Public Health Officer.
- Coordinate any requests for Critical Incident Stress debriefings for first responders. Coordinate with Mental Health for counseling resources.

- Health Officer or designee will play the lead roll in communicating with media.

General Services Agency (GSA)

- Facilities management
- Repair and maintenance of buildings
- Provision of emergency EOC facility if necessary

SECTION 5. IMMEDIATE SITUATION STATUS

Table 1. Emergency Contact Information shows contact information for relevant agencies as of the time of this publication.

Table 1. Emergency Contact Information

Name or Position	Contact Information
Los Angeles County EOC	XXX-XXX-XXXX
FAA (Federal Aviation Association)	XXX-XXX-XXXX
EAS station KHAY (100.7FM)	XXX-XXX-XXXX
EAS station KVEN (1450AM)	XXX-XXX-XXXX
EAS station KNX (1070AM)	XXX-XXX-XXXX
CHP (CA Highway Patrol)	XXX-XXX-XXXX
FBI (Federal Bureau Investigation)	XXX-XXX-XXXX
EMS (Emergency Medical Services)	XXX-XXX-XXXX
LA County EAS; KFI	XXX-XXX-XXXX
LA County EAS; KNX	XXX-XXX-XXXX
Red Cross	XXX-XXX-XXXX
Auxiliary Communications Service (ACS)	Contact through County EOC: XXX-XXX-XXXX
Local National Weather Service (NWS, a division of NOAA): forecast & weather information – live meteorologist	XXX-XXX-XXXX Satellite phone: XX.XXXX.XXX.XXXXX www.weather.gov/losangeles
Local NWS: Administrative issues	XXX-XXX-XXXX

LOS ANGELES COUNTY STATUS

To determine the status of Los Angeles County, call the Los Angeles County EOC. Ask:

- ☐ Is the DOC activated?
- ☐ Is it capable of activation?
- ☐ Why not?
- ☐ Does it exist?
- ☐ What kind of capabilities does it have?
- ☐ What functions can we perform for them in the first operational period? (We will be

unable to send assets that have been specifically trained to respond to nuclear events.)

- ☐ What do you see needing from us beyond that?
- ☐ Coordinate LA County liaison to come to our EOC.
- ☐ What is their own situation status report?
- ☐ Have dignitaries or individuals who play major response roles been killed, or departments, agencies or buildings been destroyed?
- ☐ Where was the hypocenter of the bomb?
- ☐ How big an area is completely destroyed?
- ☐ Estimated number dead?
- ☐ Estimated number injured?
- ☐ What are the known perimeters of any fires related to the blast?
- ☐ What intelligence do you have? (Who's taking credit for it?)
- ☐ What are you telling your citizens?
- ☐ Does LA County want/need Ventura County to prepare plume maps overlaid on GPS maps for decision makers and for broadcast to LA County residents? (LA County should have its own maps; this is for redundancy only.)
- ☐ What should Ventura County expect post-event in terms of population movement (self-evacuation) and pressure on our health care facilities?

VENTURA COUNTY STATUS

- ☐ Call FAA to see if "no fly zones" are declared and where. Ask about:
 - ☐ Status of airports in LA County
 - ☐ Flight restrictions?
 - ☐ Military operations?
 - ☐ Diversion of commercial airlines?
- ☐ Dispatch County Air Unit to report on:
 - ☐ road congestion
 - ☐ evacuation patterns
 - ☐ fires and fallout plume
 - ☐ early evacuation situation
 - ☐ fires within LA County
 - ☐ location of fallout plume—gauge its size and direction

- ☐ Monitor television, radio and internet:
 - ☐ status of LA based media
 - ☐ content of early reports
 - ☐ are EAS stations working?
- ☐ Activate all information systems:
 - ☐ log on to RIMS—monitor
 - ☐ test OASIS
 - ☐ contact CHP, FBI, EMS: verify phone numbers and radio links
 - ☐ contact NOAA for current weather conditions at the site of the blast: wind speed and direction. (If unable to reach NOAA by any means, try their website to find wind speed and direction at blast site.)
 - ☐ ask NOAA to request HYSPLIT model run from National Centers for Environmental Prediction (NCEP) for dispersion and transport (20 minute turnaround).
 - ☐ ask for predicted plume maps for 6 hours, 12 hours, 18 hours and 24 hours. Request plume maps with outer contour interval of 24 hours with dose lines of 10 rem, 5 rem, 1 rem and 0.5 rem. After 12 hours from detonation, repeat maps with interval changed to 4 days and same dose lines.
 - ☐ ask NOAA to immediately request revised maps from NCEP with any significant change in wind direction or speed.
 - ☐ ask NOAA for weather forecasts for operational period.
- ☐ Ask HazMat to create HotSpot plume map. Compare plume forecasts from HotSpot software (<http://www.llnl.gov/nai/technologies/hotspot/>) to information obtained from helicopter crew
- ☐ Determine Radiation Status:
 - ☐ What type of isotopes?
 - ☐ Expert analysis of information (Federal assets will provide this and this will take some time.)
 - ☐ Determine if fallout will impact parts of Ventura County
 - ☐ Notify our population to shelter-in-place. (“Go inside. Stay inside. Stay tuned.”)
 - ☐ Ask LA County for its IMAAC plume map and its “ground truth” ICBRNE map.
- ☐ Determine if There are any Power Outages:
 - ☐ If out, extent and duration of outage
 - ☐ Will any consequences or actions in LA County affect our power supply?

- ☐ Determine Safety of our Water Supply:
 - ☐ current Status
 - ☐ will any consequence or action in LA County affect our H₂O supply? (Some of our water comes from LA's Municipal Water District. Lake Piru is fed by Lake Castaic. Contact water and sanitation groups for more information.)
 - ☐ liaison with utility people ASAP
- ☐ Evaluate Information System Infrastructure
 - ☐ system status report on telephone (landline and cell), computer links and radio systems within the county
 - ☐ will any of the actions taken in LA County or will the damages they have suffered affect our capabilities?
- ☐ Evaluate Status of our Roads
 - ☐ assess road usage. Count of vehicles per hour entering the County and count of vehicles leaving the county. Set up counting sites at county lines (4 entry points – Highways 101, 118, 126 and 1 – and 5 exit points – Highways 101, 150, 118, 126 and 33.)
 - ☐ contact CalTrans to see if their data collection system can provide information on road usage
 - ☐ establish an incident command post at each entry point to Ventura County to monitor the flow of traffic and estimate the number of people coming into our county
 - ☐ contact Santa Barbara and San Luis Obispo Counties to learn about the traffic situation up there and to coordinate traffic system
- ☐ Determine Extent of Voluntary and/or Panic Flight
 - ☐ assess to see how many Ventura County residents are fleeing north or heading south into LA County.
- ☐ Determine Existence and Extent of Civil Disorder
 - ☐ brief 1st time responders to make a robust response to any disorder, including looting
 - ☐ assign units to make high visibility patrols to saturate areas of concern
 - ☐ remember, any actions taken could be a part of a criminal investigation. Interview people and look at gathering potential evidence to support this effort.

SECTION 6. RADIATION EXPOSURE, MONITORING AND ASSESSMENT

RADIATION EXPOSURE

Aside from the destructive effects of the blast itself, nothing is more problematic and fearsome than the accompanying radiation. Potentially half of both fatalities and casualties following a nuclear blast are due to radiation exposure and not the direct blast effects. Radioactivity will manifest itself in two major ways. The first will be the initial pulse known as *prompt radiation*, defined as the radiation within one minute of the blast. Fatal doses of prompt radiation following a 10 kT blast may be seen out to a mile or more. The second will be the radiation emanating from *fallout*. Fallout is produced when the fission from the blast ionizes dirt, concrete, metal, etc., which then condenses to produce a radioactive mushroom cloud. A ground detonation produces more fallout than an air detonation because of its greater proximity to ionizable solid material.

Prompt radiation has four sub-microscopic components: alpha and beta particles, gamma rays and neutrons. Neutrons are heavy particles released from the nuclei of atoms. These pieces of atomic shrapnel penetrate solid objects. They can damage human organs immediately by wiping out bone marrow, or damage genetic material in cells resulting in mutations for long term damage, leading to cancer or to genetic defects in future offspring.

Gamma rays are essentially the same as X-rays and penetrate the body with much the same effect as neutrons. The beta and alpha particles can only penetrate the body as far as the skin) and so are much less dangerous. They are more likely to cause serious effects in humans when they contaminate someone internally after being swallowed or inhaled.

The long term or delayed effects of radiation, like cancer and genetic abnormalities, are called *stochastic effects*. These effects are “late” and add incremental risks to those that individuals already naturally have. Everyone has some risk of getting cancer or passing on a birth defect. The stochastic effect is the *additional* risk that occurs after exposure to a specific radiological exposure. Much of the cellular damage caused by low dose radiation does not cause acute early effects. Natural cellular repair mechanisms either heal or destroy the effected cells. It is when these repair efforts are incomplete or defective that the cell may become cancerous or malicious in terms of inheritance. Because the impact of radiation-related risks can only be measured in populations not in individuals, it is their frequency, not their severity which is dose dependent.

The short term or early health effects of radiation, like the vomiting seen in early Acute Radiation Syndrome, are called *deterministic effects*. High doses of radiation damage too many cells for the body to repair. Too many damaged cells in the same location may lead to impaired organ function. Low doses of radiation have the potential to cause stochastic effects. Large doses cause acute illness and death. Survivors of large doses are subject to stochastic effects as well.

The unit for measuring the amount of radiation someone has been exposed to is the millisievert (mSv). This is the international term. The older American term is still in common usage and is referred to as rem. Ten mSv equal 1 rem.

In the average year, most humans throughout the world receive about 0.35 rem (3.5 mSv) from natural background radiation. The majority of humans can tolerate up to 50 rem (500 mSv) per year without any severe effects. Acute doses of radiation up to about 200 rem (2,000 mSv) are tolerated by most people with minimal deterministic effects. Four hundred rem (4,000 mSv) over a short period of time, as with the prompt radiation exposure from a nuclear blast, would be about 50% fatal within 4 to 8 weeks without medical intervention. For children, the elderly and the chronically ill, 200 rem would be 50% fatal. At 800 rem (8,000 mSv) there would be 100% fatality within 1 to 2 weeks without medical intervention. Medical treatment at these levels of exposure carries no guarantee of success.

Table 2. Likely Biological Effects and Outcomes at Various Radiation Exposures

EXPECTED DOSE	BIOLOGICAL EFFECT	LIKELY OUTCOME OF EPIDEMIOLOGICAL FOLLOW-UP
Very low dose: Below ~1 rem	No acute effects; potentially, <i>extremely</i> small long-term enhanced risk of incurring cancer.	Effects likely not to be detected, even if the number of exposed people is large.
Low dose: Towards ~10 rem	No acute effects; subsequent long-term enhanced risk of incurring cancer of about 0.5%.	Possible detection of effects if the exposed population is large (e.g. more than 100,000 people).
Moderate Dose: Towards ~100 rem	Nausea, vomiting possible, mild bone marrow suppression; subsequent long-term enhanced risk of incurring cancer of about 10%.	Likely detection of effects for populations more than a few hundred people.
High dose: Above ~100 rem	Certain nausea, likely bone marrow syndrome, medical evaluation and treatment requirement; subsequent long-term enhanced risk of incurring cancer of about 10% per 100 rem.	50% lethality at about 400 rem of acute whole body dose without medical treatment, 200 rem in children, the elderly and the chronically ill.

(Adapted from; Protecting People Against Radiation Exposure in the Aftermath of a Radiological Attack; A report from a Task Group of the International Commission on Radiological Protection, April 2004)

Fallout radiates alpha and beta particles and gamma rays but not neutrons. Radiation causes ill effects by damaging cells. The most significant damage to cells is done to the cellular DNA. Damage to DNA can lead to cell death or changes which can later lead to the development of cancer or inheritable genetic defects. Most DNA damage is repaired by the cellular systems. If correctly repaired there will be no consequences. An unrepaired or incorrectly repaired cell will either die, be unable to reproduce or remain genetically modified. If many cells in an organ are injured, that organ will either function poorly or not at all. If the organ is the intestinal tract, the individual may have diarrhea, vomiting or bloody stool. If the organ is the brain, there may be confusion or coma. If the organ is the bone marrow, there may be uncontrolled bleeding or infection.

The stochastic effects of cancer and hereditary disease result from individual cells that have survived but resisted repair after radiation exposure. The body has impressive abilities to repair damaged cells. The increased risk of cancer is small. The same can be said for fetal deformities. The vast majority of abortions performed following the Chernobyl incident were unnecessary. Abortion is not recommended for exposures of less than 10 rem (100 mSv), and above this, counseling based on the individual circumstance (such as age of the fetus) is advised. Real risks of cancer and deformity do exist but they tend to be incremental and highly overblown in the popular imagination.

Health officials can work backwards from the patient's symptoms and how long they began after exposure to radiation to estimate what dose of radiation they received. Another technique that may be used to estimate radiation dose takes advantage of how sensitive the lymphocytes in the bone marrow are to radiation.

RADIATION MONITORING

It is important to distinguish between *exposure* to radiation and *contamination*. Exposure occurs when radiation penetrates or passes through the body. Contamination occurs when radioactive material is deposited *on* the body as dust, or *in* the body through breathing or swallowing. The distinction is important because the response to the problems vary.

Monitoring a population for radioactive exposure and contamination rests upon identifying at-risk individuals. Exposed people may be reported by a hospital or their physician. Some may have sought medical care for their symptoms while others may pursue medical care because of a known significant exposure. Public health workers may identify at-risk individuals based on their location at the time of a nuclear event. Other people might be identified by their proximity, time spent and sheltering status in an area with significant concentrations of fallout in the hours after the detonation. Still others could be found at risk due to the ingestion of certain foods or drinks. Those identified to be at risk by public health workers would be sought by press releases, public service announcements and by letter. Additional information comes from the use of hand held meters passed over individuals or portal monitors which individuals or vehicles move through. Specimens of blood, urine and feces may be helpful but are time-consuming to process and not widely available.

Unaffected people may identify themselves as affected out of fear, ignorance or a need for attention.

Early monitoring for immediate health risks must be emphasized. A day or two following a nuclear detonation, the United States Department of Health and Human Services (HHS) and the Centers for Disease Control (CDC) will play important roles in the long term especially, but also short term monitoring process. The HHS is supported in this endeavor by the Department of Energy (DOE) and its Federal Radiological Monitoring and Assessment Center (FRMAC). Through the FRMAC, DOE will assist health and medical authorities in determining radiological dose information; provide coordinated gathering of radiological information and data, consolidated data sample analyses, evaluations, assessments, and interpretations; and technical information. This responsibility is detailed in a document entitled Emergency Support Function #8.

These agencies will assist in:

- the establishment of a registry
- performing dose reconstruction
- assessing medical and public health status and needs
- evaluating request for Strategic National Stockpile deployment (for medications useful in the treatment of internal contamination and other supplies)
- organizing subject matter experts
- performing long term monitoring

The objectives of monitoring are to:

- identify people whose health is in immediate danger and need immediate care or medical attention
- identify people who may soon need medical treatment, be further evaluated, or require short-term health monitoring
- recommend and facilitate practical steps to minimize further risk
- register individuals for long-term monitoring

(from: Preparing for Radiological Population Monitoring and Decontamination, Centers for Disease Control, www.bt.cdc.gov/radiation)

RADIATION ASSESSMENT

Assessments of radiation measurements result in protective actions: these actions must be taken to prevent deterministic effects and minimize stochastic effects in both first responders and local residents. Taking actions which avoid exposure is much more effective than medical treatment after exposure has occurred. Medical actions taken after exposure will reduce health consequences by a factor of perhaps two or three, while *limiting* exposure will reduce these same consequences by multiples of tens to thousands.

Other actions driven by radiation assessments will inform decisions about evacuation, land use, and crop harvest and treatment. Credible estimates of radiation exposure by locale and population group will even affect psychological morbidity. Accurate and complete monitoring and its intelligent interpretation are the basis upon which a restoration of normality rests.

Assessment of dose that an individual has been exposed to will usually be reconstructed, rather than directly measured at the time of the exposure. Those exposed by prompt radiation will have their dose estimated by the symptoms they develop and the time period over which the symptoms develop. Those exposed to radiation from fallout will be exposed both to external radiation from radioactive materials transported by the cloud and deposited on the ground, as well as to internal radiation due to the inhalation or swallowing of radioactive materials. Some experts believe that internal contamination from fallout will be minimal. Accurate estimates of an individual's exposure can be made based on the isotopes identified in the area, the known decay rate of those isotopes, the time of the arrival of the fallout cloud, the time of evacuation of the individual, the time of measuring the quantity of radioactivity and such unique information as the amount of body covered by clothing, when clothing was discarded and if steps were taken to avoid inhalation of the dust (e.g., a wet handkerchief over the mouth).

The absorbed dose of radiation is thought to be approximately twenty times more harmful to the rest of the body, in terms of late (or stochastic) health effects, than it is to the thyroid. This is due in part to the fact that many Americans already have partial "blocking" of their thyroids, much as they would strive to achieve by taking potassium iodide tablets, because of the ubiquitous iodination of table salt and the high levels of iodine in seafood, milk-based products and egg yolks.

Many of the decisions that must be made about radiation exposure and protective actions need not be made urgently. They may be made after consultation with experts and careful deliberation. An example of this kind of decision is a recommendation as to precise areas that will require permanent relocation by its inhabitants.

Other decisions will have to be made immediately. For the health of inhabitants, in order to minimize unnecessary congestion along evacuation routes, and to support trust in the authorities, instructions to shelter in place following a nuclear detonation will need to be made available within minutes of the blast.

SECTION 7. SHELTERING IN PLACE, EVACUATION AND RELOCATION

(This information has been borrowed liberally from; Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, Office of Radiation Programs, United States Environmental Protection Agency, May 1992.)

It is well known that the fallout plume from a nuclear detonation presents a radiation-related danger. In the early or emergency phase immediately following the blast, most members of the public who are near and some who are distant from the hypocenter will desperately look for guidance as to whether to shelter-in-place or evacuate. **The initial instruction for everyone will be to shelter-in-place and listen to EAS radio for specific information as to whether and when to evacuate.** This instruction is contained in the jingle, “**Get inside. Stay inside. Stay tuned.**” If and when instructions come to evacuate, it will likely come after 5 to 48 hours from the time of the explosion and then only for selected populations. Recommendations to evacuate will be based on minimizing the exposure of those who are at risk from the greatest amount of radiation and will be quite specific (such as everyone south of Maple Street and north of Elm between State and Orchard should now evacuate...). If credible direction to get inside, stay inside and stay tuned reaches the public in a timely manner (within minutes after the explosion), it has the potential to keep tens of thousands of people from fleeing their homes and turning what might otherwise be a chaotic situation on Los Angeles and Ventura County highways into a more manageable one. This message should be reinforced by early placement of plume maps on the internet and television. In this way, those who are not in the path of fallout will feel more comfortable with their decision to shelter-in-place and those who are in the path of fallout will be told that it is safer to shelter-in-place than to flee. (While the latter is not intuitive, it can be taught as part of a pre-nuclear explosion public education campaign and reinforced immediately after a nuclear explosion.) Provision of this needed information will pay the dividend of promoting confidence in local government. The absence of this direction may reinforce the belief by some that government is less than useful.

If planning a response to a nuclear explosion is to have a single major benefit, it will be to maximize the number of potential victims whose exposure to fallout is either diminished or prevented altogether. This has the potential to save tens of thousands of lives and prevent radiation-related illness in hundreds of thousands of people. It can be accomplished by a Unified Command that informs those who are being exposed to fallout that are awaiting evacuation orders that they can now leave and have the expectation that the roads will be clear for them to do so. Sheltering-in-place will keep vehicles off the roadways allowing for the orderly evacuation of at-risk populations (and the movement of emergency response vehicles). The chaos that will ensue from massive self-evacuation will lead to unprecedented highway and surface street congealment and prevent the exodus of those

who would most benefit from a timed evacuation. People who might have stayed safely and comfortably in their homes may find themselves stuck for hours or even days in their cars exposed to the groundshine of fallout. If highway and surface street movement is at a standstill, then encouraging the evacuation of individuals who are threatened by fallout puts them in the position of going from bad to worse. They leave the greater protection and comfort afforded them from being in a building to the lesser protection and comfort of an automobile.

In order to provide the most reliable information about the fallout plume to both decision makers and the public, Ventura County has developed a Plume Mappers' Group. Its purpose is **not** to create the most reliable fallout plume map. Its purpose is to create **redundancy** so that if the most reliable plume maps are not available for any one of the many reasons this might be so after a nuclear explosion, that a back-up plume map will be available.

Representatives from a number of disciplines within the county (National Weather Service, HazMat, Air Pollution Control District, Public Health, Office of Emergency Services, Information Technology) have developed a hierarchy of plume maps, how these maps will be acquired, and what maps will be used if these maps are unavailable. Individuals from within this group have been charged, trained and

exercised to rapidly locate the relevant information and to draw plume models over GPS street maps of Ventura County. Upon hearing that a possible or definite nuclear explosion has occurred, these Plume Mappers will initiate either on their own or on the order of the Ventura County Sheriff..

Two kinds of plume maps will be acquired. One is a map which projects the likely position of the plume into the future. Such a map might predict where the plume of radioactive fallout will be over the next four days and delineate where the different rem bands will be (e.g., 10 rem, 5 rem, 1 rem) within that plume. This is a predictive map delineating where the fallout cloud is going to be, based on wind patterns and multiple other factors such as topography, rainfall, etc. The second kind of plume map is a "ground truth" map. This map is based on fixed and portable radiation monitors that constantly transmit their readings to a central location where a map is assembled from the received data. Rem bands are established within this plume map as well. The predictive plume map that Los Angeles will use is the Interagency Modeling and Atmospheric Assessment Center (IMAAC) map produced by the National Atmospheric Release Advisory Center (NARAC) located at the Lawrence Livermore National Laboratory. The ground truth map that Los Angeles County creates is also referred to as the ICBRNE (pronounced "isobirnie") map.

The hierarchy of the plume maps that Ventura County will use is based on an effort to maintain consistency between the efforts of Los Angeles County and Ventura County. Assuming it is available, Ventura County's predictive map will be the IMAAC map produced by NARAC for the Lawrence Livermore Lab. Ventura County will also access Los Angeles County's instantaneous ground truth map.

If the IMAAC map is not available, until such time that it is, Ventura County will utilize the Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) map from the Air Resources Laboratory, a part of the National Oceanic and Atmospheric Administration (NOAA), also known as the National Weather Service (NWS). If, for some reason, the HYSPLIT map cannot be acquired, Ventura County's HazMat will run a HotSpot map, another, but less sophisticated Lawrence Livermore Laboratory plume mapping program.

If Los Angeles County's ground truth map is unavailable, Ventura County will utilize its own radiation detectors (we have approximately 25 of these) to generate our own crude ground truth maps.

Significant redundancy will be practiced in both the acquisition of the mapping information, and in the maintenance and availability of the plume software and the plume mapping personnel. The IMAAC map will be acquired by the Information Technology personnel, the Disaster Preparedness Office of the Public Health Department and by the Unified Command. The ground truth map will be acquired by i-phone link to Los Angeles County's ICBRNE unit. NOAA personnel will request and receive the HYSPLIT map. HazMat will generate Ventura County's own ground truth map and will also develop a plume map from its HotSpot program. It is intended that the HazMat plume mappers work individually, locate the blast hypocenter, the wind speed and direction at that site, plot the plume on their lap top computer, and have the capability of sending this information by multiple modalities. This task will be accomplished within ten minutes of their notification. (It is understood that this time frame is incredibly tight and probably unrealistic but it is a goal that is worth attempting.) All plume mapping information will be sent by the individual plume mappers to the Sheriff's Command Staff, the Health Officer and the Fire Command Staff (Hazmat/Safety Officer) comprising the Unified Command at the EOC.

It will be impossible to know in the first twenty minutes what size the detonation was. Therefore, it will be assumed, based on what terrorists would most likely be able to acquire and position, that the bomb is 10 kT in size. Under normal circumstances, numerous web pages have up-to-the-minute information on wind speed and direction at different locations. For any number of reasons, it may be difficult to get the wind direction and speed at the site of the blast (damaged monitoring devices, communication and/or internet outages, etc.). When it is impossible to determine the wind speed and direction immediately following the blast, the National Weather Service will be able to provide these parameters for the moments before the blast.

The exact site of the blast may not be clear at first. Localizing the blast site can be accomplished by accessing satellite pictures through the National Weather Service. These are updated every fifteen minutes, but during crises, updates can be accelerated to every five minutes. Radar images of the Los Angeles area can also be used to determine the site of the blast. Towers in Ojai and Santa Ana should be functional after a Los Angeles County detonation and could be used. Radar will not be effective until the mushroom cloud reaches 12,000 to 13,000 feet. Since it may be difficult to pinpoint the exact location in the first

minutes following a nuclear detonation, an approximation may need to be made on inexact information. The four most likely sites for terrorists to detonate a nuclear device would be downtown Los Angeles, the airport (LAX), The Port of Long Beach and the Port of Los Angeles.

In order to maximize the chances that the plume mappers will be able to access information via land line, cell phone and the internet at the time of an event, all plume mappers will have GETS/WPS cards (Government Emergency Telecommunications Service/Wireless Priority Service) for their relevant lines.

Once in possession of the plume mapping information, the members of the Unified Command (the Health Officer/Health Department, the Fire and Sheriff's Command Staff) and the Safety Officer/Hazmat will compare the plume maps and prepare shelter-in-place/evacuation advisories for Ventura County residents. These will be sent out to the public by all available modalities (E.A.S., radio, television, reverse 911, 211, the internet). Mariners should also be taken into consideration when informing the public about plume direction both so that they may have the information they need to avoid fallout and because of the unique channels that must be utilized by authorities to reach them.

If, because of diminished capabilities, this information and these advisories are requested to be prepared for Los Angeles County by L.A. County authorities, Ventura County will do so.

Evacuation announcements broadcast to the public will suggest that, time permitting, individuals bring with them food, water, medication, clean clothes, items of personal value (photos, etc.), pillows, blankets and emergency go-bags they may have created.

There are few decisions that a county official may be called on to make that will be so important to so many but based on so few of the necessary facts. The public will crave specific and timely direction but there will inevitably be a lack of complete information, and valuable time will be spent in calculating what the precise instructions are to be.

Shelter-in-place and evacuation are actions that are taken in the early or emergency phase of a nuclear event. *Relocation* is an action that is taken in the intermediate phase, when more information and time is available to make decisions. *Evacuation* is the urgent removal of people from an area to avoid or reduce high-level, short-term exposure from the plume or deposited activity (groundshine). *Relocation* is the removal or continued exclusion of people from contaminated areas to avoid chronic radiation exposure and will likely last for months to years. Not all evacuated people require relocation. During the intermediate phase, many evacuated people may be told that they may return to their homes.

EVACUATION AND SHELTERING IN PLACE

The decision of the Unified Command as to who should evacuate and who should continue to shelter-in-place is a relatively rapid action intended to protect people based on experienced and predicted levels of exposure to radiation. The first orders to evacuate

would not likely occur before 5 hours from the time of the nuclear explosion. This has been well described and justified by the Lawrence Livermore Laboratory. Their work shows that in the first 5 hours, the amount of radiation that someone would experience exceeds the amount that would be experienced in the same location by someone who was sheltering-in-place. At various times after that first five hours, taking into consideration the decay in radioactivity of the fallout, there may be some slight advantage to evacuation into another area with little or no fallout. Again, it would be of the utmost importance to know that traffic conditions were favorable as time spent in any shelter, even a wood frame single story home, would be more protective than being stuck in a car that wasn't moving out of the fallout plume.

The levels of exposure to radiation which would initiate protective actions were established by the former Federal Radiation Council in the 1960's and are referred to as Protective Action Guides (PAGs). The intent of the PAGs was to delineate projected doses of radiation above which evacuation would be recommended. However, current thinking promotes sheltering, at least initially, as the protective action of choice in almost all situations, even at projected doses above the PAG. It is possible that evacuation may be recommended at projected doses below the PAG if, for instance, large doses of radioactive fallout are predicted hours hence. Decisions will require judgments by those responsible for protective actions at the time of the incident.

Some guiding principles in deciding between evacuation and sheltering in place are:

- Evacuation will provide total protection from any airborne release if it is completed before arrival of the plume.
- Evacuation may increase exposure if carried out *during* the plume passage. Any calculation of exposure from evacuation must be offset by the exposure that would have occurred during sheltering and later evacuation.
- At sites nearer to the center of the blast, the plume is narrower. Thus, a relatively short distance perpendicular to the wind direction (determined by looking up at trees, flags or feeling the sensation on a moistened finger) should remove one from danger.
- Evacuation (as directed by authorities) is appropriate for protection from groundshine (deposited fallout) in areas with high exposure rates from deposited materials.
- Sheltering is appropriate for areas not designated for immediate evacuation since it positions the public to receive additional instructions and it may provide protection equal to or greater than evacuation.

- Evacuated individuals should go to a site where evacuation has not been ordered and only seek medical attention if care is required. Bring an uncontaminated change of clothes if available (double bagged in plastic), and remove outer garments when out of the area effected by fallout. Place the bagged contaminated clothing in the trunk of the car to be disposed of more appropriately at the next opportunity. People should decontaminate on arrival at their destination.
- Sheltering may not be appropriate where very high doses are projected.
- The ideal place to shelter is in a multistory structure in the center of floors that are not too near the ground and not too near the roof.
- There is little advantage to sheltering in a place where the windows have been blown out and cannot be covered air tight before the arrival of the plume.
 - Because sheltering may be implemented in less time than evacuation, it will be the temporary protective action of choice if rapid evacuation is impeded by a) severe weather or floods; b) health constraints such as patients and workers in hospitals or nursing homes (however, if the general public is evacuated and those in institutions are sheltered, there is a risk that attendants at these institutions may leave and make later evacuation of residents/patients difficult); c) long mobilization times, e.g., certain industrial and farm work, or prisoners and guards; d) physical constraints to evacuation such as inadequate roads or traffic congestion.
 - If inhalation is the major criterion for protective action, a) breathe air filtered through common household items (folded wet handkerchiefs or towels), but be aware of suffocation risk in the infirm, the young and the elderly; b) after the plume has passed, await instructions to leave high exposure areas to avoid exposure to groundshine; c) consider prophylactic administration of potassium iodide (KI) as a thyroid-blocking agent.
 - Moving vehicles provide little protection from exposure to inhaled contaminants so filtering breathed air as described above is desirable until emergence from the plume.
 - Withdrawal of evacuation orders from areas where they have already been implemented is not advisable during the early phase because of the potential for changing conditions and confusion.

PAGs do not imply an acceptable level of risk for normal, non-emergency situations. Neither do they represent the boundary between what is safe and what is unsafe. PAGs are the approximate levels at which the recommended protective action is justified. See Figure 4. Evacuation Model.

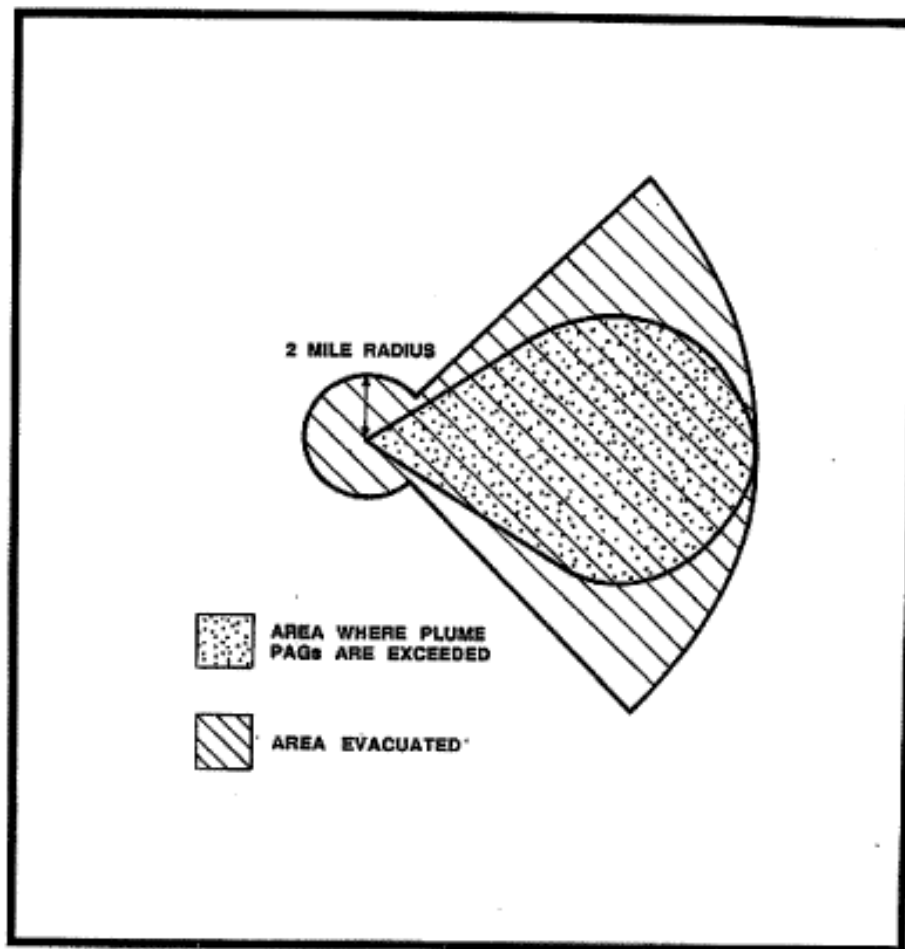


Figure 4. Evacuation Model

Source: Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, Office of Radiation Programs, United States Environmental Protection Agency, May 1992.

Evacuation of the public *could* be justified when the projected dose to an individual is 5 rem in 4 days. In the emergency phase, at this radiation dose, the risk **avoided** by leaving is usually much greater than the risk incurred from the evacuation. Plume mapping software allows the user to program concentric ellipses (isodose rate lines) which correspond to projected doses (e.g., 25 rem, 5 rem, 1 rem). When overlaid on a map with street detail, taking into consideration other information such as radioactive decay of the fallout, specific instructions may be given as to who should evacuate and who should continue to shelter-in-place.

The PAG Manual (pg. C-17-19) **from the 1960s** states, based on an acceptable risk of delayed health effects, that **everyone within the 0.5 rem isodose rate line should be evacuated**. "The choice of 0.5 rem avoided dose (as opposed to 5 rem) as an appropriate criterion for an acceptable level of risk during the early phase is a subjective judgment that

includes consideration of possible contributions from exposure during other phases of the incident, as well as the possibility that risk estimates may increase moderately in the near future as a result of current reevaluations of radiation risk. ...this choice also satisfies the criterion for acceptable risk to the fetus of occupationally exposed mothers (as well as falling well below dose values at which abortion is recommended).” Those outside the 0.5 rem isodose line should shelter-in-place unless notified otherwise at a later time. The projected dose should be calculated as the cumulative amount of exposure over *the first four days*. (For another perspective, the International Commission on Radiological Protection recommends sheltering in place with projected exposure of less than 1 rem in 2 days and evacuation at 10 rem projected dose in 2 weeks.).

The Department of Homeland Security now states that the projected 4 day dose of radioactivity outside of which people should shelter in place is 5 rem.

Examples of situations or groups for which evacuation may not be appropriate at 5 rem include: a) the presence of severe weather, b) institutionalized persons who are not readily mobile, and c) local physical factors which impede evacuation.

For all groups, in general, sheltering should be preferred to evacuation whenever it provides equal or greater protection. But, except in very unusual circumstances, sheltering should not be relied upon at projected doses greater than 10 projected rem exposure in 2 weeks.

Evacuation based on projected dose is driven by gamma radiation measurements. Although it is possible to detect beta radiation, for complicated reasons it is not practical. Using conservative assumptions, it has been determined that skin beta dose should seldom, if ever, be a controlling decision-making pathway during the early phase.

Within 6 to 12 hours, information related to ground contamination by fallout will become more refined. The Department of Energy’s (DOE) Radiological Assistance Program (RAP) and their Remote Sensing Laboratories (which has planes and helicopters that measure radiation contamination) are charged with responding to a nuclear emergency resulting from a terrorist attack. The RAP team is expected to arrive at the site of an emergency within 4 to 6 hours and conduct an initial radiological assessment of the area. There are a total of 8 DOE regions and each region has at least three RAP teams. RAP team assistance is intended to minimize immediate radiation risks to people, property, and the environment. In responding to an emergency, they use radiation detectors and air-sampling equipment to measure contamination and help state and local officials reduce the spread of contamination. See Figure 5. Ground Deposition Contour Levels. The rectangles show the areas covered by each aerial survey. The ovals show ground deposition levels of radioisotope.

Due to the size of the area that would be affected by the fallout plume from a nuclear detonation and its dynamic nature, land-based evaluation will be limited in its value.

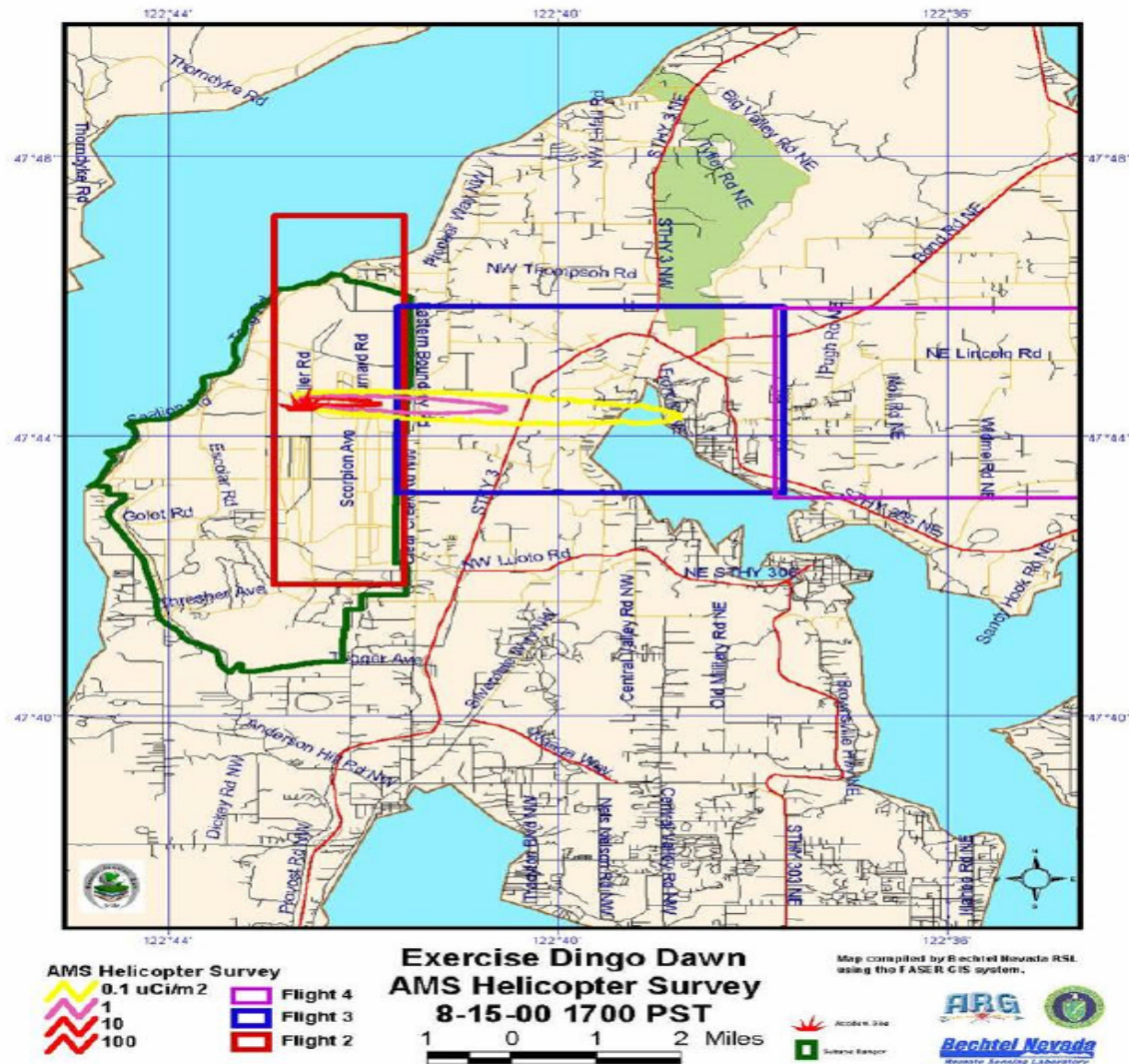


Fig. 4: Ground deposition contour levels (ovals) for Am-241 measured with the helicopter system (Dingo Dawn exercise). The rectangles indicate the area covered during each helicopter flight.

Figure 5. Ground Deposition Contour Levels

Figure 5 & 6 Source: Bowman, DR and Daigler, DM. NNSA/NV Consequence Management Capabilities for Radiological Emergency Response Remote Sensing Laboratory-Nellis Air Force Base, Bechtel Nevada, Las Vegas, NV 89193 National Nuclear Security Administration Nevada Operations Office, Las Vegas, NV 89193.

Large-scale contamination from a nuclear device will require deployment of consequence management teams from the Remote Sensing Laboratory at Nellis Air Force Base. These teams are responsible for setting up an operations center near the site of the emergency to

coordinate environmental monitoring and assessment activities, conduct monitoring and assessment activities with specialized equipment, and collect and analyze data from the field on the type, amount, and extent of radiological release. This information would be used by the State and Ventura County (and Los Angeles County) to determine what further areas should be evacuated. These teams would monitor the area where radioactivity was released until the area was fully evaluated and the effects known. See Figure 6.

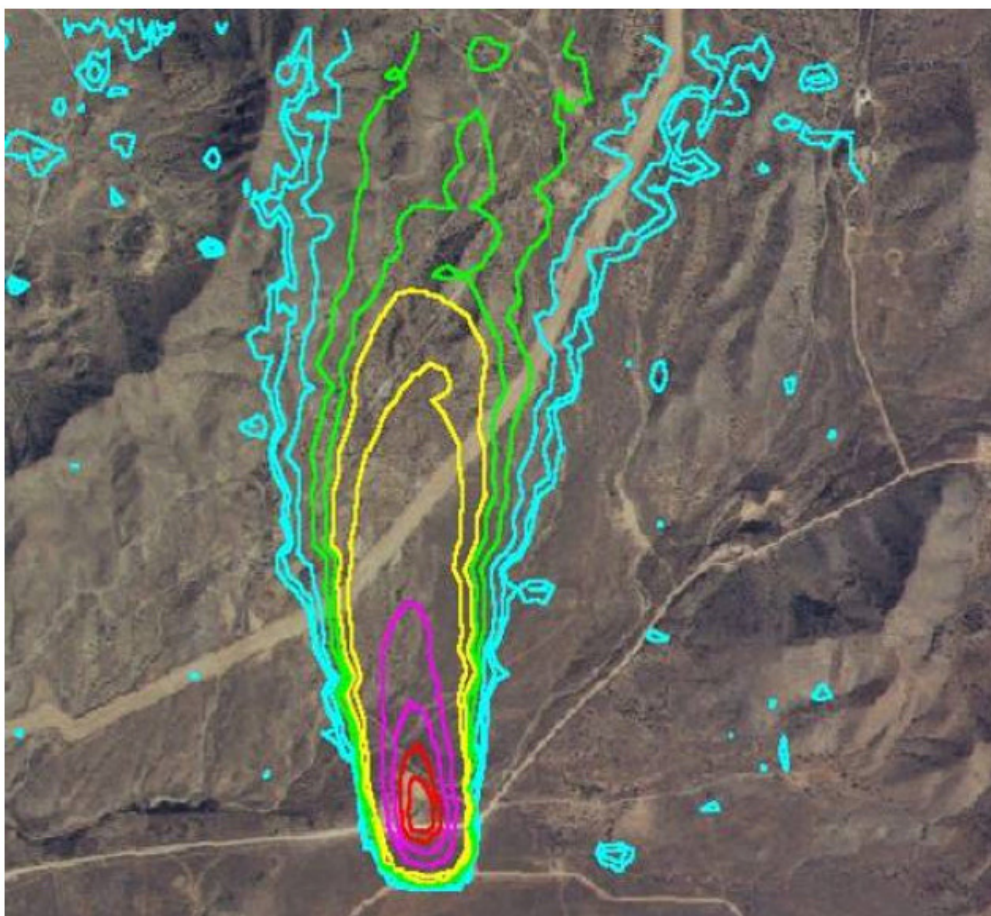


Figure 6. Graphical Information System data fusion product. Radiation contours measured with the helicopter system overlaid on a digital photo

The DOE emergency response teams will enter their monitoring data into computer models developed by the Lawrence Livermore National Laboratory to predict the consequences of a radiological release by modeling the movement of hazardous plumes. Based on the time, location, type of accident, and weather conditions, the model can predict the extent to which the material can spread and estimate the amount of the release. As technicians receive information from field teams, they can update the model.

(The above three paragraphs are borrowed liberally from: Combating Nuclear Terrorism: Federal Efforts to Respond to Nuclear and Radiological Threats and to Protect Key Emergency Response Facilities Could be Strengthened, U.S.GAO, September, 2006.)

The State Dose Assessment Center (SDAC) determines the radiation dose to the general public and provides recommendations to the Ventura County EOC to protect public health and safety. The SDAC may take as long as 8 hours to become functional. During this time, the CDHS will provide estimates of the public radiation dose and evacuation/shelter recommendations. When SDAC becomes operational, CDHS will hand off responsibility for these functions. As Ventura County sees it as critical to provide its own evacuation/shelter recommendations within 20 minutes of the detonation and the State cannot be counted on to meet that stringent objective, CDHS and SDAC recommendations will be used to fine tune evacuation and shelter-in-place orders as the event evolves.

RELOCATION

Since a decision to evacuate is made urgently, on incomplete evidence and in a rushed time frame, the boundaries of the evacuation order will be imprecise. While inconvenient to the individuals involved, it will tend to err on the side of safety. This action may be reversed at a later time based on more sophisticated data. The decision as to who must *relocate* permanently is a profound one, both emotionally and financially, but can be made with less urgency and more data. This determination will be made during the intermediate phase of the disaster.

DOE, through its RAP program, has a limited number of planes and helicopters at the Remote Sensing Laboratories that detect, measure, and track radioactive materials to determine contamination levels. The aircraft can provide real time measurement of low levels of ground contamination. They can also provide detailed imagery analysis of an accident site. The planes are deployed first to determine the location and extent of ground contamination. The helicopters are then used to perform detailed surveys of any ground contamination. This information is used to decide where to send ground monitoring teams. Based on information from the aircraft, scientists are able to develop maps of the ground hazards. Within hours of the blast, the DOE's Atmospheric Release Advisory Capability (ARAC), working with RAP, should be able to provide real time transport, dispersion and dose predictions of atmospheric releases of radioactive materials that can be used by authorities in taking protective actions related to relocation of people.

The PAGs for relocation are based on estimates of doses due to exposure during the first year after the incident. The relocation PAG for the general public is set to incorporate the higher risk of health effects from a radiation dose on children and fetuses. Exposure pathways taken into consideration in the development of the PAGs for relocation include external exposure to radiation from groundshine and inhalation of resuspended radioactive materials.

Relocation is warranted when the projected sum of the doses from external gamma radiation and from the inhalation of resuspended radionuclides exceeds 2 REM in the first year. Methods that can reduce ongoing exposure include scrubbing and/or flushing surfaces, soaking or plowing soil, removal and disposal of small spots of soil found to be highly contaminated (as from drained and settled water) and spending more time in lower

exposure areas such as the indoors. While residents can carry out most of these steps, response officials will focus their efforts on areas where first year projected dose will exceed 0.5 REM and place additional priority on the cleanup of homes of pregnant women. Depending on the radionuclides involved, radioactive decay will lead to faster or slower diminution of exposure in subsequent years.

It is a goal of the PAGs to assure that 1) doses in any year after the first will not exceed 0.5 REM, and 2) the cumulative dose over 50 years will not exceed 5 REM.

While the homes in an area designated for relocation will not be allowed continuous use, an office building or a factory in the same area could continue to be used because occupancy times are shorter. In the same way, a highway running through an area where the occupants have been relocated could be used because exposure time spent in travel would be so much less than time spent in the surrounding homes.

Since relocation is an intermediate phase action, further non-urgent aspects can be addressed elsewhere. The emergency planner is referred to the Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, Office of Radiation Programs, United States Environmental Protection Agency, *Chapter #7*, May 1992, for further information.

Table 3. Public Health Guidance by Radiation Dose.

PUBLIC HEALTH MEASURE	RADIATION DOSE^
Shelter-in-place	<5 rem in 4 days
Temporary evacuation	= or >5 rem in 4 days*
Relocation	>2 rem in first year >0.5 rem in any year after the first >5 rem over 50 years

^subject to judgment of local officials based on such things as road conditions, weather, etc.

*at a time determined by the County's Unified Command.

WATER-BORNE TRAFFIC AND DECONTAMINATION

Vessels should be given the coordinates of where the plume is expected to be and when. They should also be given the web address where a constantly updating plume map may be found. Vessels should be reminded that it only takes a few miles of movement at right angles to the direction of the plume drift to be out of harm's way. If the plume does settle over them, individuals should shelter in place on the boat or ship. Twenty minutes after they are out of the plume they should come on deck with an N95 or better mask and wash the boat off, paying particular attentions to horizontal surfaces. There should be no concern about the water running into the ocean.

Small boats have a number of options as to where they can put in. Three of the nearest places are Channel Islands Harbor, Ventura Harbor and Santa Barbara Harbor. Port Hueneme Harbor is restricted. The Channel Islands themselves are National Parks and may

be utilized. Boats may also anchor along the coast wherever it's not restricted. Most of the coast is not restricted.

It is also possible that boats may tie up to oil platforms. As part of emergency planning, consideration should be given to hiring barges as floating ports.

Harbor Masters should have a Hazmat plan describing how to safely decontaminate arriving boats and individuals.

SECTION 8. SAFETY, PROTECTION AND DECONTAMINATION OF FIRST RESPONDERS

This chapter contains important information that first responders might need in the aftermath of a nearby nuclear detonation. Protective Action Guidelines (PAGs) as they pertain to the health and safety of our first responders are included as well as personal health risks associated with various degrees of radiation exposure, etc. It is assumed that the more basic information about radiation exposure and risks is already included in the basic training of our first responders. Nevertheless, for those who are interested, this information may be found in the chapters related to [Hospital Response](#), [Health Care Providers](#), and [Radiation Exposure and Decontamination of the General Public](#).

- First Responders are a finite resource. They must be properly protected, educated and managed. They are the tip of the response spear. Their questions and concerns must be addressed. The response to the disaster depends on their personal comfort level in dealing with the invisible threat of radiation.
- Hazmat and other emergency workers who anticipate responding to radiological materials incidents are required by OSHA to acquire training at various competency levels. These levels are Awareness, Operations and Technician/Specialist, and may be met by trainings from FEMA, DOE, USEPA, CSTI, CNG and others.
- Plans must be formulated with first responder protection in mind. The safety officer must review and evaluate all response plans. Environmental and other conditions can alter the safety picture, so timely, frequent and regular reviews of response plans must be made during an incident to assure that plans are applicable to the current state of the event. The situation/status in the field must be constantly monitored and reconciled with what is displayed in the EOC and with the response plans. For instance, there may be elements in the response plan that are not applicable to the current event or there may be components of the event which had not been considered and addressed in the plan.
- Separate medical sites or “sites within sites” for first responder needs will be designated for their use only, and allow for rapid treatment and access to Critical Incident Stress Management (CISM) services.
- All first responders will be given a thorough briefing on the situation, including the following:

- Current situation; event history and duration; location of any “Hot Spots”; or movement of atmospheric plumes.
- If warranted, the proper medical prophylaxis to be issued to first responders, and signs and symptoms of radiation exposure and contamination to be monitored.
- Avoidance of external/internal contamination. Do not eat or drink in a hot zone.

Specific procedures developed to safely decontaminate people and vehicles.

- Communications plan.
- Chain of command.
- Separate resources related to treatment and decontamination both for first responders and for the public.
- Basic guidance on how to recognize a potential radiological emergency, the initial actions to take and how to obtain timely radiological assessment support.
- How to use radiation dosimeters.

RADIATION AVOIDANCE

Taking actions to prevent exposures is much more effective than medical treatment after exposure has occurred. Treatment after an exposure is likely to reduce the negative health effects by only a factor of a few (perhaps two to three times). Preventing exposure is likely to reduce negative health consequences by factors of tens to thousands.

Specialized emergency workers from State and Federal sources will arrive later. Among them, the radiation protection specialist will be able to characterize radiological hazards that may be present and provide guidance to on-scene emergency response officials.

DETERMINATION OF THE EXCLUSION AREA (HOT ZONE)

Determination of exclusion areas (“hot zones”) within the County will be made by the Radiological Assistance Program (RAP) of the DOE and the California Radiological Emergency Strike Team (CREST). The Department of Energy’s (DOE) RAP and their Remote Sensing Laboratories (which has planes and helicopters that measure radiation contamination) are charged with responding to a nuclear emergency resulting from a terrorist attack. The RAP team is expected to arrive at the site of an emergency within 4 to 6 hours and conduct an initial radiological assessment of the area.

An additional asset is the California Radiological Emergency Strike Team (CREST). The CREST Team Leader, as State Radiation Safety Officer, will offer advice and assistance to the County Safety Officer. The CREST Team will support work in the exclusion area (“hot zone”)

within Ventura County; conduct surveys and sampling within the exclusion area; analyze survey data for its effect on operations; estimate public radiological exposure in the early phase; take air, water, soil, flora and fauna samples; and analyze these samples.

Another asset comes from the EPA's Office of Radiation Programs (ORP). They provide Radiation Emergency Response Teams (RERTs) that can provide expertise in radiation monitoring, radionuclide analysis, radiation health physics, and risk management. RERTs can provide mobile monitoring laboratories for field analyses and fixed laboratories for radiochemical sampling and analyses. Requests for support may be made around the clock via the NRC or directly to the EPA Radiological Response Coordinator in the Office of Radiation Programs.

EXPOSURE LIMITS

The Safety Officer is trained by the Fire Department's HazMat Unit. During a nuclear disaster he or she has an additional reporting responsibility to the Public Health Officer (or designee) in the Unified Command. The safety officer is charged with reviewing and signing off on all response plans and for the safety of all first responders. He or she will be available to answer all questions that arise during and following the disaster.

Occupational exposure guidelines should be tailored to the situation that first responders face rather than to the workers by category. A number of publications are available for guidance on exposure parameters. The Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (the EPA) and other organizations (the International Commission on Radiological Protection and the National Council on Radiation Protection and Measurements) suggest the following guidelines for exposure limits for emergency first responders (Table 4, Table 5, Table 6).

Table 4. Dose Limits for Emergency Services Workers

Dose Limit (rem)	Activity	Condition
5	all	
10	protecting valuable property of public importance (e.g., water sanitation facility)	lower doses not practicable
25	lifesaving or protection of large populations	lower doses not practicable
>25*	lifesaving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved (see tables below)

(These limits apply to doses incurred over the duration of an emergency. Monitoring must be available to project or measure dose. To assure adequate protection of minors and the unborn during emergencies, the performance of emergency services should be limited to nonpregnant adults.)

*Exposure may exceed 50 rem whole body effective dose for the informed volunteer, but planned exposures should not exceed 75 rem.

Table 5. Prodromal Effects of Whole-Body Absorbed Radiation Doses*

Whole Body Absorbed Dose (rads)	Prodromal Effects** (percent affected)
50	2
100	15
150	50
200	85
250	98

Table 6. Fatal Effects of Whole-Body Absorbed Radiation Doses*

Whole Body Absorbed Dose (rads)	Early Fatalities*** (percent)
140	5
200	15
300	50
400	85
460	95

* Risks will be lowered for protracted exposure periods.

** Symptoms from acute radiation exposure.

*** Supportive medical treatment may increase the dose at which these frequencies occur by approximately 50 percent.

Justification of exposure limits above 5 rem must include the presence of conditions that prevent the rotation of workers or other commonly used dose-reduction methods. Situations may also rarely occur in which a dose in excess of 25 rem for emergency exposure would be unavoidable in order to carry out a lifesaving operation or to avoid extensive exposure of large populations. It is not possible to prejudge the risk that one should be allowed to take to save the lives of others. However, persons undertaking any emergency operation in which the dose will exceed 25 rem to the whole body should do so only on a voluntary basis and with full awareness of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.

Table 7. Cancer Risk to Average Individuals from 25 rem Effective Dose Equivalent Delivered Promptly

Age at exposure (years)	Approximate risk of premature death (deaths per 1,000 persons exposed)	Average years of life lost if premature death occurs (years)
20 to 30	9.1	24
30 to 40	7.2	19
40 to 50	5.3	15
50 to 60	3.5	11

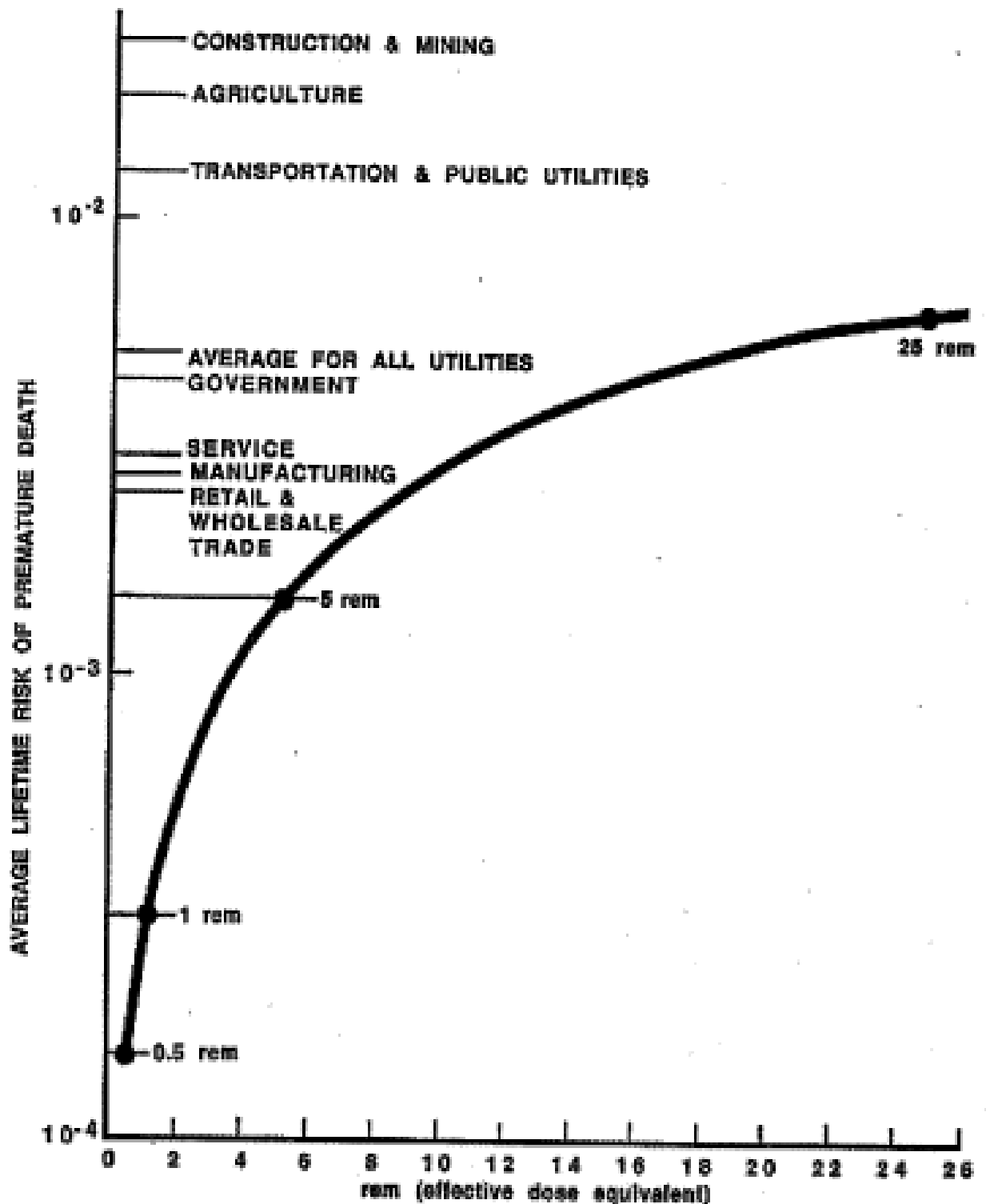


Figure 7. Average lifetime risk of death from whole body radiation dose compared to the average risk of accidental death from lifetime (47 years) occupation in various industries.

Source: Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, Office of Radiation Programs, United States Environmental Protection Agency, May 1992

MONITORING AND SAFETY EQUIPMENT

Subject matter experts will provide training on safety equipment to be used by first responders. Any issuance of equipment must be accompanied by thorough training in its use. Logistics must place a high priority on protective equipment for first responders. Ideally, first responders who are likely to encounter areas that have a high degree of radiation should be provided with alarming dosimeters with preset levels for speedy field dose evaluation. Other first responders that are expected to contact low dose contamination should wear either thermoluminescent devices (TLD) or film badges. In most radiation management environments it is best to wear either a TLD or a film badge **and** a direct reading dosimeter.

All first responders should be protected with respiratory and skin protection. These could be shed after the passage of time and the documentation of low levels of radiation. The decision to do away with protective equipment will be made by the EOC Safety Officer for the event.

First responders who might be exposed to radiation and are trained for such exposures should have a protocol available to them which describes the charging and zeroing of their dosimeter(s). In addition, they should have an Emergency Worker Exposure Control Kit to include a thermoluminescent dosimeter (TLD); a low-range self-reading dosimeter (like a CDV-138), 0-200mR or equivalent; a Field Exposure Log including low-range; a package of potassium iodide (KI) tablets and instructions; a checklist describing the contents of the Emergency Worker Exposure Control Kit; and a plastic bag to contain the above listed items.

DECONTAMINATION

Decontamination presents two challenges. First, decontamination needs to be provided at the end of the first responder's shift. Based primarily upon the level of exposure, there will be different decontamination procedures for different first responders. Second, immediate decontamination will have to be performed if significant exposure occurs in the field. This cannot wait until the end of the shift. Accidents and injuries need to be addressed immediately from a decontamination perspective if there are any open wounds which could lead to internal contamination. First responders must accept that decontamination is necessary and effective. The decontamination itself must be available and thorough.

Hazmat experts will determine how first responder equipment should be decontaminated. Procedures will be established for cleaning radios, cell phones, weapons, clothing, etc. If decontamination requires bagging of uniforms, boots, etc., supplies of these items need to be arranged for immediate issue to first responders. First responders must be advised to minimize personal possessions such as wallets, keys, cell phones, etc., that may have to be disposed of during decontamination.

INFORMATION AND EDUCATION

Draft briefing materials specifically for first responders and their families will be prepared prior to any nuclear event. These materials will address many common questions that can be anticipated to be important to first responders. Additional materials that address issues that arise as the situation evolves will be created both in advance and as the situation changes.

Sample material that may be useful in the preparation of the documents follows:

Protecting Yourself: The First Responder

- Stay away from “hot” (highly radioactive) areas. (This is probably not an issue if the blast site is in Los Angeles.)
- Enter hot areas only to save lives.
- If you encounter areas that are affected by the blast, ensure your own physical safety. Look for fires, exposed high voltage wires, sharp or falling objects, tripping hazards, or hazardous chemicals. Be alert for changing conditions.
- Wear a mask to reduce the dose from inhalation of radioactive dust. Ideally the mask should be a full face mask with a HEPA filter, but even breathing through a wet handkerchief or cloth will help. Radioactive gases are not a byproduct of a nuclear detonation, so a self-contained breathing mask, while effective against contaminated dust, is not necessary.
- Dust may collect on your clothes. Remove and discard your covering garments after you leave the area. If you fail to remove them you will continue to receive radiation and expose others. Wear loose fitting clothes covering as much of your body as possible. Any removable garment that will prevent the dust from coming into direct contact with your skin will suffice. Open wounds or abrasions must be protected from radioactive contamination. If running water or showers are available, full body rinsing with lukewarm water is advised.
- Wash vehicles before permitting them to leave the scene, except for emergency vehicles performing life-saving functions (ambulances with critically ill people on board).
- Do not eat, drink, or smoke while exposed to potentially radioactive dust or smoke. For people working in high temperatures with bulky protective clothing, dehydration may occur. In such situations, water may be necessary. If it is necessary to drink water, drink from a canteen or other closed container.
- Beware of heat stress.

- If radiation monitoring instruments are available, wrap them in plastic bags to prevent their contamination. Use them to map the areas leading up to the highest dose rates. Enter the high dose rate areas only when necessary to save a life; make these entries as short as possible and rotate the personnel who make these entries.
- Record contact information for all exposed workers so they can be given medical examinations later. The Department of Health and Human Services will request this information.
- Wash thoroughly with lukewarm water as soon as possible after leaving the area, even if you decontaminated before leaving the scene.

SECTION 9. PUBLIC HEALTH CONCERNS RELATED TO A NUCLEAR DISASTER

ACTIONS TO TAKE PRIOR TO A NUCLEAR DISASTER

Allocating scarce clinical resources during a nuclear event

Public and private medical providers should develop guidance in specific areas related to allocating scarce clinical resources. Examples include but are not limited to the following:

- Triage guidelines.
- Allocation guidelines for scarce resources, such as ventilators, burn beds, or surgical suites.
- Guidance for the triaging and treatment of children, the elderly, the infirm – specifically the ways in which altered standards of care might differ for special populations.

Address nonclinical issues related to the delivery of health care during a nuclear event

Hospitals should take advantage of the time before the next major disaster to work out some challenging but important issues. Examples of nonclinical issues include but are not limited to the following:

- Move to altered standards of health and medical care in a mass casualty situation.
- Review and document alternative ways to ensure an adequate legal framework, including liability, certification and licensing, and mutual aid agreements for the provision of health and medical care in a mass casualty event.
- Resolve issues of finance and reimbursement issues related to the provision of health and medical care in a mass casualty event.

Risk communication with the public before, during, and after a nuclear event

A unified strategy and tools for public communication around nuclear casualty risk, and health and medical care response are indicated. Part of the challenge is to craft credible messages that the public will perceive as immediately relevant and important to their daily lives without causing undue alarm. Such a strategy should take the form of anticipatory guidance. Messages should be developed collaboratively with various stakeholders (such as the American Hospital Association, the Joint Commission on the Accreditation of Health Care Organizations, and others), that should also participate in their dissemination.

Specific ideas and suggestions made regarding public communication include but are not limited to the following:

- Continue and expand training of journalists to cover health events as a means to partner effectively with the media in reaching the public.
- Find effective ways to communicate clinical information to lay audiences.
- Utilize primary care providers and our local public health department, including public health nurses, in getting out agreed-upon messages in local communities on a one to one basis.
- Provide a communications capability at the level of the individual facility as well as through joint information centers.
- Include communications internal to health care facilities and among system components, such as hospitals and alternate care sites, in communications strategies.
- Build on the CAHAN (California Health Alert Network) to develop an overall communication strategy.

Pre-Event Nuclear Education of the Public

Pre-nuclear explosion education of the public is necessary to maximize the success of any nuclear response plan. A locality cannot expect its population to take maximally effective protective steps if the first time they become acquainted with these protective actions is after the detonation of a nuclear device.

An ample education program must be based on each county's unique populations (including languages and typical methods of information acquisition for each group) and communications assets available in the county (television, radio, internet, social networking, reverse 911, 211, health educators, reaching parents through their school-aged children, etc). Public health information, via public service announcements, press releases, interviews, press conferences and town hall meetings should be directed to the public regarding those things that provide for the general well being of the community.

Participation and consensus from community leaders and other stakeholders in the community must be sought early on in the development of any pre-event public education program. This is important since some of the topics which must be broached may cause public concern. Elected officials and business and religious leaders may play an important role in soothing these anxieties. The news media must also be approached early in the course of developing a media campaign both to incorporate them into the process as allies rather than as critics, and to offer them the opportunity for focused education so that they may be better able to promote helpful messages following a nuclear explosion. The most knowledgeable figure(s) in the county's nuclear response planning should be expected to teach the educational seminar for these reporters and writers.

The focus of the public education initiative is two-fold. The first is to introduce to the public that a nuclear explosion is something that is both possible and survivable, and that people should get inside, stay inside and stay tuned. Ideally, people will find enough of interest in the campaign that they will want to learn more. This should be supported by the presentation of other educational opportunities and by information made available on the county's website. The second goal is for public education about nuclear explosion preparedness to become a part of the canon of disaster topics that are taught in the county in an ongoing manner.

Instructions must be developed for the public on how to protect oneself from fallout (shelters, general considerations and principles) and how to welcome evacuees safely into Ventura County homes..

Verify credentials of medical and other health personnel prior to and on-site during a mass casualty event

In disaster situations, individuals who claim to be qualified providers and who want to volunteer their services typically approach health care facilities. In order to be able to make use of such resources, facility and incident managers need to have protocols and tools, such as searchable databases, for verifying credentials. Efforts are underway at both the State and Federal levels to address this need. Emergency Systems for Advance Registration of Volunteer Health Care Personnel (ESAR-VHP), as outlined in the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188), as well as the Medical Reserve Corps' credentialing efforts, are examples of tools that are expected to be available to our County soon.

Train providers and others to respond locally to a nuclear detonation in a neighboring county

A wide range of provider training is needed to ensure an effective health and medical response to a mass casualty event. Training needs include, but are not limited to:

- General disaster response, including an introduction to altered standards of care and how the move to such standards may affect triage and treatment decisions as well as facility conditions.
- Legal and ethical basis for allocating scarce resources in a mass casualty event.
- Orientation to how an incident management system would work in a mass casualty event.
- How to treat children, the elderly and other groups who may need special equipment or modified approaches to care.
- How to recognize the signs and symptoms of radiation exposure and poisoning.

- How to treat specific medical conditions that might be found following a nuclear detonation.
- How to recognize and manage the effects of stress on themselves and their patients.

Develop surge plans for mass casualty care

Bring together all hospitals in the County to address and plan for a major surge in health care needs.

Events and Concerns Unique to a Mass Casualty Situation

To deal with these eventualities, protocols will need to be developed and practiced before the event, and usual and routine standards and practices will need to be modified at the time of an event based on public health and disaster law.

- *Event specific planning* for each hospital should focus on capability to manage surge, the acquisition of and personnel who know how to use radiation detection equipment, appropriate and adequate personal protective equipment (PPE) for Emergency Department (ED) staff, an exercised plan for a patient Assessment Center outside of the hospital and ED with associated decontamination capability, and a radioactive debris management plan.
- *Triage efforts that will need to focus on maximizing the number of lives saved.* Instead of treating the sickest or the most injured first, triage would focus on identifying and reserving immediate treatment for individuals who have a critical need for treatment and are likely to survive. The goal would be to allocate resources in order to maximize the number of lives saved. Complicating conditions, such as underlying chronic disease, may have an impact on an individual's ability to survive.
- *Triage decisions that will affect the allocation of all available resources across the spectrum of care:* from the scene to hospitals to alternate care sites. For example, emergency department access may be reserved for immediate-need patients; ambulatory patients may be diverted to other care sites including clinics and physicians' offices, or alternate care sites where "lower level" hospital ward care can be provided. Intensive or critical care units may become surgical suites and regular medical care wards may become isolation or other specialized response units.
- Needs of current patients, such as those recovering from surgery or in critical or intensive care units; the resources they use will become part of overall resource allocation. Elective procedures will have to be cancelled, and current inpatients may have to be discharged early or transferred to another setting. In addition, certain lifesaving efforts may have to be discontinued.
- *Usual scope of practice standards that will not apply.* Nurses may function as physicians, and physicians may function outside their specialties. Credentialing of providers may be granted on an emergency or temporary basis.

- Equipment and supplies that will be rationed and used in ways consistent with achieving the ultimate goal of saving the most lives (e.g., disposable supplies may be reused).
- *Not enough trained staff.* Staff will be scared to leave home and/or may find it difficult to travel to work. Burnout from stress and long hours will occur, and replacement staff will be needed. Some scarce and valuable equipment, such as ventilators, may not be used without staff available who are trained to operate them. Out-of-county volunteers and/or mutual aid may need to be utilized.
- *Delays in hospital care due to backlogs of patients.* Patients will be waiting for scarce resources, such as operating rooms, radiological suites, and laboratories. Patients may need to be transported out of County to receive care.
- *Providers that may need to make treatment decisions based on clinical judgment.* For example, if laboratory resources for testing or radiology resources for x-rays are exhausted, treatment based on physical exam, history, and clinical judgment will occur. Good Samaritan laws or other disaster-related indemnification will need to be in effect to reassure practitioners.
- *The psychological impact of the event on providers.* Short- and long-term stress management measures (e.g., Critical Incident Stress Management programs) are essential for providers and their families. This will be provided by the CISM Coalition.
- *Current documentation standards that will be impossible to maintain.* Providers may not have time to obtain informed consent or have access to the usual support systems to fully document the care provided, especially if the health care setting is damaged by the event. HIPAA laws may not be complied with in the usual way.
- *Backlog in processing fatalities.* It may not be possible to accommodate cultural sensitivities and attitudes toward death and handling bodies. Numbers of fatalities may make it difficult to find and notify next of kin quickly. Burial and cremation services may be overwhelmed. Standards for completeness and timeliness of death certificates may need to be lifted temporarily.

Dead Bodies

The Medical Examiner and affiliated personnel will be called on for extraordinary efforts in the days and weeks following a nearby nuclear explosion. In addition to their usual responsibilities, the work of the Medical Examiner's office may extend to evidence collection as victims of terrorism are part of a crime scene. Certain concerns expressed by Medical Examiners can be anticipated and include the following:

- What are the expected case fatality rates and time courses for the victims of radiation exposure?

- How many victims can be expected to be processed in Ventura County as a result of a nuclear detonation in Los Angeles County?
- What protective equipment and procedures are needed to ensure the safety of death investigation and forensic pathology personnel?
- What are the appropriate facilities in which to perform postmortem examinations in cases of nuclear terrorism?
- What are the best methods for ensuring radiation safety while in the mortuary?
- How will hospitals, emergency personnel, health departments, and Medical Examiners/Coroners effectively communicate during a nuclear incident?
- How will local Medical Examiner/Coroner systems interact with the Federal Bureau of Investigation (FBI) and other investigative agencies?
- A complete autopsy will not be required in every case as evidence to support the criminal justice process.
- What pathology-specific tests are available; which ones are the best to use to make an accurate diagnosis; and which ones are the best for making a rapid diagnosis?
- What role does public health law play in determining disposition of bodies?
- What legal authority do public health agencies have in making decisions during nuclear terrorism events?
- What federal resources are available to assist Medical Examiner/Coroners?

These questions are addressed in the chapters entitled *Management of Dead Bodies* and *Health Care Providers and Medical Management Following a Nuclear Disaster*.

Caring for Populations with Special Needs

It is essential that plans for the delivery of health and medical care in a mass casualty event address how the special needs of several groups within the general population can be met. These needs may vary from providing for alternate means of decontamination for babies and other nonambulatory persons, to having translators available at intake centers, to providing mental health assessment resources within the health care setting. Involving organizations and services designed to serve groups with special needs under normal conditions may be a successful approach. As mentioned earlier, a victim's underlying medical condition may affect their survivability, and therefore may be considered negatively in triage. In some cases resources may be diverted away from adults to children because of their greater life expectancy.

Populations recognized as having special needs in a mass casualty event include but may not be limited to the following:

- *Children.* The unique physiology and wide variation in physical and cognitive development by age within childhood requires that triage personnel be trained in pediatric triage standards and other pediatric assessment protocols (e.g., JumpSTART); family care and adult care be available in pediatric settings; appropriately-sized supplies, equipment, and medication doses be available; and safe use of decontamination procedures be ensured. Provisions for treating children whose parents are not present and for treating parents who will not leave their children are important considerations.
- *Persons with physical or cognitive disabilities.* As under normal standards of care, provisions to accommodate the special disability-related needs of some persons are important aspects of the organization of care. These are likely to include issues of physical access to and within care sites, alternative and safe decontamination procedures, enhanced communication, and issues involving informed consent. This group includes the deaf, the blind, and the mentally and physically disabled (such as Tri-Counties clients).
- *Persons with preexisting mental health and/or substance abuse problems.* Preexisting mental health and substance abuse conditions are known to exacerbate an individual's ability to cope with physical and emotional trauma. Provisions should be made for screening and direction to appropriate services as part of triage or other assessment protocols.
- *Frail or immunocompromised adults and children.* Individuals in these groups who are victims may require adjustments in treatment regimens and special monitoring, but these adjustments will be made within the context of any overriding goal to maximize lives saved. This group includes the elderly, those served by in-house support services and board and care residents.
- *Non-English speakers.* Local and regional planning may have to take into account the need for communication tools in languages other than English. Ventura County has sizable populations of people who speak predominantly or only Spanish, Mixtec and Farsi. Over 100 languages are spoken in Los Angeles County. Although printed materials of a general nature may be prepared in advance, printed materials and signs will not be an adequate response for those who cannot read any language. An additional challenge may be present if undocumented individuals fear discovery and reprisal if they come forward for health care in a mass casualty event. Involvement of formal and informal networks, organizations, and media outlets that serve non-English speaking groups is essential.
- *The homeless.* Homelessness will make follow-up less reliable and the purchase of needed prescription drugs less likely.

- *People without cars.* This may include as many as 21% of Latino residents and 15% of black residents in our County.

Transportation of Patients

Addressing issues related to the transportation of patients during a mass casualty event is also important. Roads may be blocked and the emergency transport system will not be adequate to meet the need. Issues to consider include the following:

- Who will accompany patients, since health and medical personnel may be needed elsewhere?
- How should all available public and private transport, including public and school buses, taxis, and limousines, be mobilized?
- What kind of prior agreements can be established to ensure this mobilization can occur?

Public Health Law

The California Health and Safety Code, Californian Emergency Services Act and the California Code of Regulations provide a variety of legal authorities to support the County management of disaster-related medical casualties.

Other relevant laws include, but are not limited to, the following:

- Emergency Medical Treatment and Active Labor Act (EMTALA).
- Health Insurance Portability and Accountability Act (HIPAA).
- Federal Volunteer Protection Act.
- Good Samaritan Law.

Water Supply

Ask the 3 major water wholesalers in Ventura County to educate their call tree (which is composed of approximately 150 individual water vendors) to initiate their reporting of systems integrity to their area captains as soon as they hear of any possible detonation of a nuclear device within one hundred miles. These captains call into the three major wholesalers (Calleguas, United and Casitas Water Districts) who report to their representative at the EOC.

Food Supply

Grocery store or grocery chain managers should work with experienced disaster planners to have a plan ready to ration their stock as soon as a nearby nuclear detonation is reported.

Grocery stores should develop memoranda of understanding with their distributors to dispatch food supply trucks early, frequently and preferentially during a local disaster.

ACTIONS TO TAKE AFTER A NUCLEAR DISASTER

Water supply

Call the three major water districts and ask them to poll their individual vendors as to the integrity of their water systems. (If all is going according to plan, their call tree should already be activated and accumulating this information.) Request that they increase monitoring of their wells and distribution systems. Ask what steps are being taken to shelter and protect their resources from radioactive contamination. Secure good communications with the personnel involved with pumping, testing and repair of their systems.

Table 8. Water Purveyor Contact Information

Selected Water Districts	Contact numbers/Emergency numbers
Association of Water Agencies of Ventura County	XXX-XXXX
Calleguas Municipal Water District*	XXX-XXXX
United Water Conservation District*	XXX-XXXX
Casitas Municipal Water District*	XXX-XXXX
Ventura River County Water District	XXX-XXXX
Meiners Oaks County Water District	XXX-XXXX
Santa Paula City Water	XXX-XXXX

*The three major water districts in the County.

Drinking water

There are three major problems that might occur to the drinking water in Ventura County following a nuclear detonation; radioactive contamination, a physical disruption of the water conduits and an interruption in electrical power. Actual radioactive contamination is not likely to occur, in large part due to the dilutional effect. Should this occur, water purveyors will shut down the supply. A physical disruption in water lines is also unlikely since a blast in Los Angeles County should not deliver a significant percussive effect in Ventura County. If one of these two types of supply interference were to occur, the status of restoration of flow and the potability of the water would be reported frequently on EAS radio stations and other local radio and television stations. Suffice it to say that following a nuclear disaster, if a home faucet is running, the water is almost certainly safe to drink. The third form of problem is an interruption of electricity. Without electricity, water pumps and waste water treatment plants cannot function. A lack of drinking water, poor sanitation and the close quarters offered in an affected emergency shelter could create the conditions for spreading communicable diseases, such as Salmonella, Shigella, E. coli and noroviruses.

Contact the Operations Section of the EOC to report an absence of available drinking water. If this is confirmed, a **water coordinator function** should be located within the Care and Shelter Branch of the Operations Team. Its purpose will be to order and deliver drinkable water to sites where water supplies have been interrupted. Ventura County has the primary responsibility for the purchase and distribution of an alternate source of potable water for populations within its jurisdiction. If the magnitude of the problem requires resources beyond the limits of the operational area, the Ventura County EOC is backed up by the Governor's Office of Emergency Services (OES) which is in turn backed up by FEMA.

The most convenient way to provide water to the public is in one gallon containers. Local vendors known to the Logistics Section of the EOC should be utilized, or a list of approved water vendors can be acquired from the State DHS, Food and Drug Branch through the REOC Operations Section Water Coordinator. Ample quantities of water can usually be provided in this manner. Following the Northridge Earthquake of 1994, a team of 200 people were assembled who worked around the clock for eighteen days to provide two million gallons of bottled water from twenty-three distribution sites to 150,000 people.

If the problem is of such a size that more water is required, bulk potable water may be delivered. Nearby existing potable water systems may be used. Occasionally switching over between systems is achievable. New pipes can be laid, though this takes time. Water buffaloes (500 gallon trailers) or other tankers may be used to transport potable water from nearby vendors. Finally, water purification systems exist when all other options have been exhausted. The National Guard has limited water buffaloes and water purification systems. Water purification will not rid radioactivity from water.

Notify the public as to the location of trucks with drinkable water should this be necessary. Inform them that they may need to bring containers (empty milk cartons, etc.) to fill and bring home.

Announcements should address the following:

- Issue a PSA on how to store and treat water in your home. If there is enough lead-time before the system is shut down, encourage people to fill bath tubs and buckets.
- Maintain stores of bottled water, two gallons per person per day. Store enough for at least two weeks.
- Advise the population to monitor the EAS for any changes in the status of water delivery to their homes. Publish and broadcast announcements about the status of the various municipal water supplies. Information on the EAS stations should publicize problems about even the smallest water districts in the County.
- For smaller water districts, the public should avoid calling their water purveyor unless they have reason to believe there is a problem.

Food safety and supply

There may be disruptions in the normal food distribution channels that could result in rationing. If grocery stores run out of food, arrange for basic food items to be distributed by the County at designated locations and to shelters or special care facilities.

Ask grocery stores to request re-stocking immediately. Hoarding should be anticipated.

Ask grocery stores to implement their disaster rationing plans.

If grocery stores appear to be unable to maintain adequate food stores, order food for distribution through the State **early**, anticipating needs well ahead of time, allowing two or three days for arrival of requested food.

Review Section IV, *Looting, Hoarding and Rage*, for other considerations.

Maintain close contact with law enforcement personnel who are involved in monitoring grocery stores to learn citizen response to adequacy of supplies, hoarding and the potential for rioting and looting.

Announcements should address the following:

- Food contaminated with either sewage or radiation will make people ill.
- A refrigerator will keep foods cool for about 4 hours without power if it is unopened. Add block or dry ice to the refrigerator if the electricity will be off longer than four hours.
- Thawed food can usually be eaten if it is still "refrigerator cold," or re-frozen if it still contains ice crystals. Discard any food that has been at temperatures greater than 40 degrees Fahrenheit for 4 hours or more, and any food that has an unusual odor, color, or texture.
- While the power is out, keep the refrigerator and freezer doors closed as much as possible to keep food cold for as long as possible.
- If the power is out for longer than 4 hours, follow the guidelines below:
 - Use dry ice, if available. 25 pounds of dry ice will keep a ten-cubic-foot freezer below freezing for 3-4 days. Use care when handling dry ice, and wear dry, heavy gloves to avoid injury.
 - For the freezer section: A freezer that is half full will hold food safely for up to 24 hours. A full freezer will hold food safely for 48 hours. Do not open the freezer door if you can avoid it.

- For the refrigerated section: Pack milk, other dairy products, meat, fish, eggs, gravy, and spoilable leftovers into a cooler surrounded by ice. Discard this food if it is held at a temperature greater than 40 degrees Fahrenheit for more than 4 hours.
- Use a digital quick-response thermometer to check the temperature of your food right before you cook or eat it. Throw away any food that has a temperature of more than 40 degrees Fahrenheit and you believe has been so for greater than 4 hours.
- As part of disaster planning, store enough food in your home to last for at least 2 weeks.

Sanitation

Contact Public Works Departments at the County and the cities to determine the integrity of their sewage systems.

Announcements should address the following -

- Sanitation requires a source of water. If the supply is disrupted, the population will have to receive information on alternate methods available to use in their homes. Water is needed to flush toilets. Issue a PSA on how to flush a toilet with a bucket of water when there is no water pressure. If there is no water available, issue a PSA on sanitation and waste storage in the home. Also, issue a PSA on additional water sources in the home, such as in the water heater tank, pool, and spa.

Fallout & contamination issues

Task the Plans section at the EOC to collect data and assemble a real time plume map to post on the Internet.

Announcements should address the following:

- The public will have great interest in radiation contamination issues, fallout protection and health concerns. Issue PSAs on decontamination, avoidance of internal and external contamination, health implications of radiation exposure, plume information, and sheltering techniques.

Prophylactic medication (potassium iodide)

Since self-medicating with potassium iodide (KI) in advance is not likely unless a credible terrorist threat is made *prior* to a nuclear detonation, prophylactic KI will need to be taken, where indicated, in the first few hours after the blast. When used correctly, KI can prevent or reduce the uptake of radioiodine by the thyroid gland. KI provides its best protection when administered immediately prior to or in conjunction with the passage of a radioactive plume.

The risk of thyroid cancer is inversely related to age. Fetuses, infants, and young children are at greatest risk and may be harmed by small amounts of radioiodine. Although caution

should be taken when administering KI to pregnant women and to newborns within the first month of life (monitoring of thyroid function in neonates), the benefits of short-term administration of KI as a thyroid blocking agent far exceed the risks of administration to any age group.

Infants (including breast-fed infants): The thyroid glands of the fetus and infant are most at risk of injury from radioactive iodine. Infants need to be given the recommended dosage of KI. The amount of KI that gets into breast milk is not enough to protect breast-fed infants from exposure to radioactive iodine. The proper dose of KI given to a nursing infant will help protect it from radioactive iodine that it breathes in or drinks in breast milk.

Children: The United States Food and Drug Administration (FDA) recommends that all children internally contaminated with (or likely to be internally contaminated with) radioactive iodine take KI, unless they have known allergies to iodine. Children from newborn to 18 years of age are the most sensitive to the potentially harmful effects of radioactive iodine.

Young Adults: The FDA recommends that young adults (between the ages of 18 and 40 years) internally contaminated with (or likely to be internally contaminated with) radioactive iodine take the recommended dose of KI. Young adults are less sensitive to the effects of radioactive iodine than are children.

Pregnant Women: Because all forms of iodine cross the placenta, pregnant women should take KI to protect the growing fetus. However, pregnant women should take only one dose of KI following internal contamination with (or likely internal contamination with) radioactive iodine.

Breastfeeding Women: Women who are breastfeeding should take only one dose of KI if they have been internally contaminated with (or are likely to be internally contaminated with) radioactive iodine. Because radioactive iodine quickly gets into breast milk, the Ventura County Department of Public Health recommends that women internally contaminated with (or are likely to be internally contaminated with) radioactive iodine stop breastfeeding their infant for 24 to 36 hours, express and discard their breast milk, and feed their child baby formula until they resume breastfeeding. If breast milk is the only food available for an infant, nursing should continue uninterrupted.

Adults: Adults older than 40 years should not take KI unless public health or emergency management officials say that contamination with a very large dose of radioactive iodine is expected. Adults older than 40 years have the lowest chance of developing thyroid cancer or thyroid injury after contamination with radioactive iodine. They also have a greater chance of having allergic reactions to KI.

The protective effect of KI lasts approximately 24 hours. For optimal prophylaxis, *KI should be dosed daily, until a risk of significant exposure to radioactive iodine by either inhalation or ingestion no longer exists.* In virtually all conceivable scenarios following a nuclear

detonation, people will be out of contaminated areas within 24 hours and no longer in need of iodine prophylaxis. Very few people will need more than one dose of KI.

Individuals intolerant of KI at protective doses, and neonates, pregnant and lactating women (in whom repeat administration of KI raises safety issues) should be given priority with regard to other protective measures (i.e., sheltering, evacuation, and control of the food supply). *KI works best if used within 3-4 hours of exposure.* Stability studies over many years have confirmed that *none of the components of KI tablets*, including the active ingredient, *has any significant potential for chemical degradation* or interaction with other components or with components of the container closure system when stored according to labeled directions. In the specific case of KI tablets, a yellowish discoloration would be indicative of stability problems. Since pure KI is known to be very stable (as long as it is protected from moist air), ongoing evaluation and testing of each batch is unnecessary as long as the market package remains intact and continues to be stored under controlled conditions as described in the labeling.

FDA guidance recommends graded dosing by age, with neonates receiving the lowest dose (16 mg daily) and adults receiving the highest (130 mg).

Table 9. Potassium Iodide Dosages

Threshold Thyroid Radioactive Exposures and Recommended Doses of KI for Different Risk Groups				
	Predicted thyroid exposure (rad)	KI dose (mg)	# of 130 mg tablets	# of 65 mg tablets
Adults over 40 yrs	≥500	130	1	2
Adults over 18 through 40 yrs	≥10			
Pregnant or lactating women	≥ 5			
Adolescents over 12 through 18 yrs*		65	1/2	1
Children over 3 through 12 yrs		32	1/4	1/2
Over 1 month through 3 years				
Birth through 1 month		16	1/8	1/4

*Adolescents approaching adult size (≥ 70 kg) should receive the full adult dose (130 mg).

FDA approved KI tablets are available in two dosage strengths: 65 and 130 mg. At a minimum, dosing based on FDA guidance would require either splitting tablets or dissolving tablets in liquid. This may be impractical while responding to a radiological emergency. The Center for Drug Evaluation and Research states that **uniform dosing across all age groups for all people eligible for KI prophylaxis is reasonable and safe.**

The FDA's guidance on dosing KI in radiation emergencies adheres to principles of *minimum effective dose* and therefore recommends graded dosing according to age (and thus, in effect, body size). There is ample evidence that the recommended doses, as well as higher doses (e.g., up to 130 mg), will effectively block thyroidal uptake of radioactive iodine if taken in advance of exposure. Furthermore, particularly among school-age children, higher milligram doses are extremely safe.

While a scheme of graded dosing may be difficult to implement during a radiological emergency involving large numbers of people, it is important to emphasize KI dosing in infants. Excess iodine intake can lead to transient iodine-induced hypothyroidism. Every effort should be made to treat infants under the age of 1 month with lower doses of KI. Where this is impossible, higher doses may be given.

The FDA agrees that if local emergency planners conclude that graded dosing is logistically impractical for populations at risk for radioiodine exposure, the overall benefits of taking up to 130 mg of KI instead of the lower doses recommended for certain age groups far exceed the small risks of overdosing. However, where feasible, adherence to FDA guidance should be attempted when dosing infants.

Among 7 million adults who took stable iodine in Poland following Chernobyl, only two severe adverse reactions were reported, both in persons with known allergy to iodine. Based on these data, even if the risks associated with excess stable iodine are greater in adults than in children, the risk of serious adverse reactions overall is exceedingly small. However, individuals with known allergy to KI or with pre-existing thyroid disease (e.g., Graves' disease, thyroid nodules, Hashimoto's thyroiditis) that might predispose them to adverse reactions should avoid KI. Most likely these will be adults who have little or no risk of developing thyroid cancer from radioactive exposure to the thyroid and who may, in these cases, incur substantial risks from taking KI.

(Borrowed liberally from Guidance for Industry, KI in Radiation Emergencies - Questions and Answers, U.S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research (CDER), December 2002)

Avoidance of carbon monoxide poisoning

Announcements should address the following

- Carbon monoxide is an odorless, colorless gas that is poisonous to breathe. During disasters, operate all gasoline-powered devices such as pumps, generators, and pressure washers outdoors and never bring them indoors. In the absence of heating, electricity and natural gas supplies during a disaster, some people build fires or burn coals in hibachis in small enclosed spaces for warmth. This is one of the most common causes of death due to carbon monoxide poisoning during disasters. Do not build fires in enclosed spaces without proper ventilation. Issue a public service announcement about carbon monoxide poisoning and its prevention.

Displacement

The establishment of Reception Centers (refugee centers) is the responsibility of the Red Cross. Contact Red Cross to discuss demand and response. Establish communication or liaison with that organization.

Announcements should address the following:

- Displacement is an important issue that has an impact on the physical and mental health of refugees. Americans are not accustomed to massive disruptions.
- Evacuation and the disruption of normal routines is stressful and uncomfortable. In addition to this, people don't know how long they will be displaced or where they will be living. For many, displacement is likely to last several months and perhaps longer. Re-establishing routines, providing hope, allowing for opportunities to be productive, giving people a chance to control some of their destiny, stress reduction activities (exercise) and making mental health services available will all contribute to a sense of well-being among the displaced.

Medical Support

Contact EMS to determine the demand, both in volume and severity of problems, being placed on the health care system (hospitals, emergency rooms, urgent care centers, clinics) in Ventura County.

If demand and acuity is high, activate SEMS to utilize emergency contract agreements and the mutual aid system. Contact the Regional Disaster Medical Health Coordinator (RDMHC), Region 1, to determine if RDMHC is operational. If not, call the State Department of Public Health and/or the State Emergency Medical Services Authority (EMSA) to learn the State's hierarchy of back-up.

Normally, the assessment of status of the health care system in Ventura County is a part of the regional assessment of status and need of the Region. The RDMHC is responsible for performing this assessment with Ventura County Health Care Agency's cooperation.

Ventura County's medical and health resource requests go through the RDMHC and will follow the medical and health resource ordering/request flowchart.

Request additional staffing from the Disaster Medical Assistance Teams (DMATs); the Commissioned Corps Readiness Force (CCRF) for the US Public Health Service; the Visiting Nurses Association; students from schools of medicine, pharmacy, nursing and public health; retired and other volunteer healthcare workers; the Medical Reserve Corps; and the American Red Cross. Also, request health staff from the Naval Base Ventura. There is no hospital on the military base so in-patients cannot be managed there. If Ventura County physicians who are knowledgeable about treatment of radiation-exposed patients cannot meet the local need, the Medical Emergency Radiological Response Teams (MERRTs) should be requested from ESF #8.

If the resources required to deal with medical needs of evacuees from Los Angeles are greater than can be provided locally or regionally, ask the Regional Disaster Medical/Health Coordinator (**RDMHC**) for the State Office of Emergency Services (OES) Region I (LAOA and adjacent counties) to call in the **Emergency Support Function (ESF) #8 Health and Medical Services**. ESF #8 provides coordinated Federal assistance to supplement State and local resources in response to public health and medical care needs following a major disaster. Included in the ESF #8 response is triage, treatment and transportation of victims of the disaster and evacuation of victims out of the disaster area. The ESF #8 can deploy the National Disaster Medical System (NDMS), a nationwide medical mutual aid network between Federal and non-Federal sectors that includes medical response, patient evacuation, and definitive medical care consisting of pre-committed, non-Federal, acute care hospital beds. NDMS can provide Disaster Medical Assistance Teams (DMATs) which can assist in the care of victims at the location of a disaster.

Other resources provided by the ESF #8 include; sending into our County an assessment team which assists in determining specific health/medical needs and priorities and an assessment of the health system/facility infrastructure; specialty DMATs which address mass burn injuries and contamination; casualty clearing/staging (by DOD and National Guard units); individual clinical care specialists to work alongside of local doctors (the VA is the usual source for these); and restocking of health and medical facilities with pharmaceuticals, supplies and equipment. All of these are provided by the DHS/NDMS in coordination with the Department of Health and Human Services (HHS) through its executive agent, the Assistant Secretary for Public Health Emergency Preparedness (ASPHEP). The ESF #8 is called in by the State government when the regional medical authority (the RDMHC) asks it to do so.

Other services available through the ESF #8 include monitoring of injury and disease patterns; monitoring the health and well-being of emergency workers; and extensive assistance related to radiological exposures, including assessment of medical effects, collection of relevant samples, advice on protective actions, and provision of technical assistance and consultation on medical treatment and decontamination of victims. These services are provided by the HHS through the CDC.

The ESF #8 ensures the safety of regulated foods, drugs, biologic products and medical devices following a nuclear disaster. It will arrange for the seizure, removal and/or destruction of contaminated products. This service is provided by the HHS through the Food and Drug Administration (FDA).

Be prepared to establish non-hospital facilities (school gymnasias, mobile medical units, warehouses, arenas, etc.) to shelter and treat mass casualties. There may be a tremendous number of burn victims. Given transport problems (congestion on the roads, limited ambulances, limited hospital beds available within driving distance) it may be impossible to move patients in significant numbers for 2 days or more. The average physician's knowledge of burn management is limited. Skilled physicians and nurses will come in from all over the

country. Hospitals will be asked to provide expedited emergency credentialing for these doctors and nurses.

The use of non-hospital facilities to provide treatment to the “worried well” and people who can’t or won’t go home is important to protect the hospitals from a massive influx of non-acute patients which would overwhelm hospital facilities and personnel.

Establish medical facilities at Oxnard Airport to stabilize and decontaminate the sickest patients for airlift transport to other cities for treatment. It is possible that it may take up to two days to establish this field hospital. This site should be established as (what ESF #8 refers to as) a State-operated Regional Evacuation Point (REP). ESF #8 will coordinate the hand-off of patients from this REP to the NDMS patient evacuation system. Arranging for airlift transport is a part of this system. This distributes the most labor intensive medical problems to other jurisdictions which do not have other major system failures to deal with (did not experience a nearby nuclear blast).

Task the Plans section in the HCA DOC with sending medical information to all the clinics, hospitals and offices, and outposts where doctors are providing medical treatment. A special emphasis will be placed on medical information about radiation-related illness, injuries related to a nuclear detonation, as well as steps that health professionals can take to avoid radiation contamination.

The 211 system should answer calls on health concerns from Ventura County residents. Send a liaison (a knowledgeable public health nurse) to the 211 system to provide expertise to the operators in answering questions from the public.

As much as possible, all incoming medical supplies will be transported to the field immediately. Do not inventory in depth if this will interfere with efficient supply distribution.

Assemble a small team of medical professionals (nurses and one physician or pharmacist) to answer telephone calls from front line health care providers regarding specific questions on medications, prescription replacement and technical issues about radiation-related patient management. This group should be located at the Public Health Department. Medical questions from nurses at Reception Centers will also be answered.

Place PSAs for the public on the EAS system that answer questions and concerns about where to find medical care; the triage of patients at hospitals; referrals of the walking injured to clinics rather than to hospitals; information on radiation exposure, poisoning and decontamination, etc.

Ask County and private clinics to expand capabilities to manage the “worried well” and individuals not requiring in-patient services.

Ask County and private clinics to expand their hours of operation.

Send relevant triage and treatment protocols to the clinics.

The county owns 4 mobile clinics that have the space and equipment to provide limited evaluations and treatment. Set these units up where additional medical assets are needed and can provide basic primary and preventative care services to displaced persons.

Note: Announcements should address the following:

- Public Service Announcements will tell the evacuating public where to find medical and other services, both in Ventura County and further north
- PSAs should ask the public to look for information as to whether they should evacuate before they do so. It's a lot more comfortable and safe in your own home
- If you've been exposed to any radioactive dust, take your potassium iodide pills
- Listen to EAS stations for further news. Tell the public their AM and FM locations

SECTION 10. HOSPITAL RESPONSE TO MASS CASUALTIES

NOTIFICATION AND COMMUNICATIONS

It will be important to keep hospitals informed as to the status of the situation. This will help the hospitals plan for staffing, security, decontamination needs, discharge of hospitalized patients who are no longer dependent on in-patient medical services and admission of new patients. Reddinet will be activated in Ventura County to link local hospitals and EMS together to share resources. CAHAN is not as widely subscribed to as a communication platform in Ventura County at this time but is available as an additional method of passing on announcements, alerts and general communications.

Hospitals will be expected to activate their emergency plan – HEICS.

Alternate methods of communication include land line phones, cell phones, satellite phones, VHF radio net as well as RACES volunteers. It is recognized that land line and cellular phones will be severely overloaded during a disaster and radio and satellite phones will be critical in keeping key hospital personnel in communication. Consideration should be given to acquiring GETS/WPS cards for key hospital personnel.

Open, accurate, consistent and immediate messages/written documents should be made available for hospital staff. Topics will include:

- How to avoid contamination
- What to do if you think you are exposed
- Effects of contamination include...
- Reassurance that in a hospital setting it is very unlikely to encounter significant contamination while caring for contaminated patients

MODIFICATION OF HOSPITAL ROUTINE

In response to a major medical disaster that dramatically increases the number of individuals seeking medical care, the HCA DOC will direct hospitals to implement disaster/emergency management plans that include the following:

- The hospital should immediately “lock down”, providing only two entrances:

- An entrance for triage and patients
- An entrance for personnel, staff, press, officials, etc.

The hospital should establish an Assessment Center, separate and away from the emergency department. An appropriate site for an Assessment Center would be on the outer periphery of the hospital's parking lot. The Assessment Center should be used to rapidly screen victims for injury and contamination, as well as to serve as a location where decontamination of victims can take place. The Assessment Center should also be used for observation, limited treatment and evaluation, and reuniting with family members where possible. Patients who require more complex treatment than can be provided at the Assessment Center but who are not sick enough to enter the hospital should be sent to nearby physicians' offices or clinics.

- Discharge hospitalized patients deemed sufficiently stable to be managed at home.
- Cancel elective admissions/surgeries/procedures.
- Activate call-back procedures, calling in off-duty staff and extending existing staff hours.
- Ask the County Public Health DOC to communicate with the Regional Disaster Medical/Health Coordinator (RDMHC) for the State Office of Emergency Services (OES) Region I (LAOA and adjacent counties) to determine inpatient bed availability in nearby counties.
- Ask the County Public Health DOC to request health professionals from other counties to augment local hospital staff.
- Arrange to transfer stable patients to other area hospitals if conditions of the event permit. The ability to transfer patients to other medical sites may be limited due to road congealment.
- Modify and convert large internal spaces as well as existing patient rooms to accept more beds as surge capacity is exceeded. To the extent required, licensure flexibility should be sought.
- Anticipate having to manage unprecedented numbers of burn patients as well as patients with blunt trauma and shrapnel wounds. In addition, there will be patients with Acute Radiation Syndrome. Surge will need to be dealt with internally until the roads clear up for transport to other facilities.
- Very limited helicopter transport may be available.
- Selection of patients for transfer must be based on medical need. Criteria must be completely transparent and may be scrutinized at a later date.

- In large-scale events totally overwhelming local and adjacent county facilities, the National Disaster Medical System (NDMS), DMATs and Commissioned Corps Readiness Force (CCRF) of the US Public Health Service can be requested to bolster personnel and equipment resources or set up freestanding field care sites. This requires a declaration of emergency by the governor and a request for these resources to the Federal government. While under certain disaster situations the U.S. Military medical services cannot be relied upon, as it is a national asset, it is possible that military medical assets will be made available following a homeland nuclear detonation. These services may be accessed through the County Public Health DOC.
- Consider managing patients at home if home visits or contact by health professionals such as DMATs, Visiting Nurse Associations, and CCRF can be arranged. Other options for home management include Citizen Emergency Response Team (CERT) workers, the Disaster Assistance Response Team (DART) and the Medical Reserve Corps (MRC). These services may be accessed through the County Public Health DOC.
- Hospitals need to have the capacity to quickly put back into commission rooms that have been contaminated with radioactive material.

TRIAGE

Expect that a large number of people will self-triage and bypass field triage and treatment areas, whether they are contaminated or not. Expect little or no advance notification of incoming patients. People will most likely relate to their familiar local hospital. Most will be ambulatory, minimally injured and primarily concerned about contamination.

Hospitals will become a critical disaster response resource and must be protected. Entrances must be secured and access severely limited. Hospitals must address the issue of how they will secure doors; will they use locks, guards? Except under unusual circumstances (grave injury, heart attack, etc.) patients will not be permitted entry into the hospital without radiation monitoring clearance through the Assessment Center and decontamination if needed. Sufficient police and security presence will be required at critical entry points.

Contamination of a hospital should be avoided but not overemphasized. Some contamination is inevitable, but with appropriate patient monitoring and decontamination, containment of contamination to reasonable levels is a realistic possibility. Hospital space must be reserved for the most critically injured or ill. Contaminated vehicles should be parked away from the facility. Contaminated dead bodies need not be brought to the facility. Contaminated water should be allowed to enter the usual drainage system. Contaminated pieces of shrapnel or other highly contaminated objects which find their way into the hospital should be handled with tongs, set far aside and turned over to the hospital radiation safety officer for immediate shielding and sequestration. Contaminated human waste should be treated by the routine protocol for ordinary human waste. Human feces as laboratory specimens should be handled as per laboratory protocol.

Of primary importance is establishing an assessment and decontamination center, away and separate from the Emergency Department. This should be set up outside and downwind from the ER entrance, at the hospital periphery. Here victims are rapidly screened for presence or absence of injury. A large controlled area to hold the anticipated victims should be set up and demarcated by tape or ground markings. Access to this area should be restricted. Create a buffer zone around this controlled area. Control waste by using plastic bags and designate a storage area outside the hospital. Notify the hospital Radiation Safety Officer to provide dosimeters for staff. Prepare monitoring instruments and call in nuclear medicine staff to assist with surveys.

ASSESSMENT CENTERS

Hospitals should arrange for limited mass decontamination at their peripheral Assessment Centers with their own equipment and personnel. While HazMat intends to establish and staff these sites, it cannot be absolutely relied upon to provide this service during the chaos of such an event. If local HazMat is unavailable, request out-of-county HazMat Units be brought into the County through collaborative agreements to bolster the hospital response. Expect that this will take 1 to 3 days. Create a mechanism for contaminated patients to be observed while waiting for triage and decontamination with minimal staff contact.

In Ventura County, HazMat units are contained in County Fire, Ventura Fire, Oxnard Fire and Federal Fire.

An Assessment Center is a collaborative effort between each hospital and HazMat. The HazMat installation (a Decontamination Center) is a part of the overall Assessment Center. Hazmat will set up the radiation monitoring and decontamination component while the overall Assessment Center, which involves triage, referral, patient monitoring and perhaps some first aid, will be established by the hospital.

Painted lines, barricade tape or pylons may be used to funnel people into the correct areas. People may arrive for services who speak neither English nor Spanish. Los Angeles county residents speak over 100 different languages. Develop pictorial guides explaining decontamination and triage that will direct patients through this process. Monitors will be set up to screen for contamination levels. Movement of staff may have to be restricted to keep “clean” areas secure. EMS will provide information on how to decontaminate EMS vehicles used to transport contaminated patients.

If there are exceedingly large numbers of people to be screened, it is reasonable to survey just the head, shoulders and face. The handheld probe should be held one to two inches from the body and moved at a rate of about two to four inches per second. Individuals with Geiger count readings of up to 1,000 counts per minute (cpm) may be considered **not** contaminated. Under the pressure of tremendous numbers of people with lengthy lines and long delays, non-contamination may be redefined as 10,000 cpm. Under any circumstances, screened people who are determined to be non-contaminated should still be advised to change their clothing and shower when the next opportunity arises.

When time permits, whole body scanning is preferable. Individuals should stand with their legs and arms apart. The probe should be moved at one to two inches per second and held ½ inch from the body. The probe should be paused for five seconds over areas of the body most likely to be contaminated. Positive readings before the nose and mouth may be an indication of internal contamination and should be noted.

The most common mistakes made in handheld monitoring are; holding the probe too far from the subject; moving the probe too quickly; and using a contaminated probe. It is easy to contaminate a probe in an environment with so much contamination or so many contaminated people. The probe should be wrapped in plastic and the plastic changed frequently. To check for a contaminated probe, check the background radiation. If the probe is reading less than twice the normal background, it may be considered uncontaminated.

Record keeping will be important, although record keeping must not interfere with necessary patient flow and treatment. Hospitals should be prepared to deal with the possibility of a non-functioning electronic medical records system and have an alternate system in place. CDC will require information for their registry and, long term, the effected population will benefit from these efforts. The CDC will follow radiation-exposed individuals over their lives to assure that they are receiving appropriate services.

Triage patients on arrival for serious injuries. Those that have **life-threatening injuries** should be sent directly into the Emergency Room door and **not** be required to pass through radiation screening or decontamination.. All others should be surveyed for radioactive contamination. Following this, they should be surveyed for injuries or symptoms. The **uninjured** and asymptomatic who are unexposed and uncontaminated are sent home. The **uninjured** who **may** be externally contaminated are sent to their lodgings with written instructions as to how to decontaminate. The **uninjured** who may be contaminated but have no place to stay are sent to the decontamination site outside the nearest Red Cross Reception Center (shelter).

Those with injuries or symptoms should be directed to the decontamination area. At the decontamination site, all clothing and personal belongings should be removed under the guidance of staff and placed in a labeled biohazard bag. If open wounds are present, these should be irrigated, then covered with a sterile, waterproof dressing before total body washing. Patients should be resurveyed after decontamination. Those with **minor injury** should be sent to a nearby physician's office or a clinic (if it is early in the disaster and the hospital is very crowded). Those with **illnesses that are not life-threatening but which require hospital attention** should be sent into the Emergency Room.

Once an evacuee has been cleared of any contamination or successfully decontaminated, he or she should be marked as cleared (e.g., wristband).

In evacuees with evidence of or a history of having been exposed to radiation, biological samples (swabs) should be taken of nostrils or throat. Blood should be collected for CBC and

differential. The laboratory must run differentials on these specimens, even if it is out of protocol (e.g., their routine is “no differential run if the WBC is between 5,000 and 10,000”). Past medical history should be recorded, especially for renal disease, allergies or nuclear medicine procedures.

Triage and Dose Assessment

(Source: Protecting People Against Radiation Exposure in the Aftermath of a Radiological Attack, A Report from the Task Group of the ICRP, Final TG Draft, April, 2004)

At the hospital-based Assessment Centers, it is important to quickly classify those who have various levels of radiation exposure into distinct groups, as follows:

- those unlikely to survive as a result of high external exposure who require palliative care only,
- those who are likely to suffer acute radiation syndrome as a result of external exposure and will require hospitalization,
- those with doses in excess of 30 or 40 rem (several hundred mSv) but who do not require medical care,
- those who present with contamination of the skin,
- those with internal contamination
- those with no significant dose.

A rapid radiological triage for medically significant exposures from external sources (prompt radiation, fallout) can be most easily accomplished by documenting the symptoms of nausea, vomiting and diarrhea. Vomiting will be the most useful indicator, depending on the possible complications of other injuries or the (unlikely) presence of chemical or biological agents:

- • Exposed people who experience radiation-induced vomiting within one hour after the event will require extensive and prolonged medical intervention, and an ultimately fatal outcome is expected in many cases.
- • If the time to vomiting is greater than 1 but less than 4 hours, these persons probably will require hospitalization and should be referred for immediate medical evaluation (particularly serial complete blood counts including “differential”).
- • If the time to vomiting is greater than 4 hours, the person should be referred for delayed evaluation (24-72 hours) if no concurrent injury exists. These persons may have received doses up to 100 rem (1,000 mSv) and may have some minimal bone marrow depression and increased risk of cancer but do not require hospitalization.

- For those without vomiting, no medical follow-up is needed in the immediate or urgent phases, but medical evaluation on a less urgent basis may be indicated.

It should be noted that stress reactions can induce nausea and vomiting. However, any person exhibiting these symptoms in the time frames listed above should be assumed to have been exposed until this is excluded by further medical evaluation. Studies of peripheral blood cell counts especially of lymphocytes during the following days can confirm the decisions described above.

PATIENT MANAGEMENT

(For information about radiation-related illness, diagnosis and treatment, see the following chapter, *Health Care Providers and Medical Management Following a Nuclear Disaster*.)

Contamination and Decontamination

The management of patients following a suspected or confirmed radiological event involving mass casualties must be well organized. This includes:

- Determining the signs and symptoms of acute radiation exposure
- Determining the extent of contamination
- Providing external decontamination
- Treating specific injuries
- Collecting specimens for lab testing
- Providing care for special populations (e.g. pregnant women)
- Providing discharge information and follow up care instructions
- Addressing the psychological effects on the patients

Universal precautions utilized for any other type of mass casualty incident is generally sufficient protection from radioactive contamination. N95 masks fitted properly will provide protection. Removing outer clothing from the externally contaminated, whether the patient or the health care professional, will eliminate 90% of the contamination. Washing after removing clothing will eliminate most of the rest of the contamination.

To best utilize the time of trained staff, decontamination should not generally be performed by doctors and nurses. Nevertheless, they should be aware of how the procedure is performed.

Additional information about decontamination may be found under section IV. *Safety, Protection and Decontamination of First Responders*, and *Decontamination of the General Public*.

Remember that the cause of this mass casualty incident is a crime. Clothing removal and medical treatment has to be performed with attention paid to the evidentiary value of all items. This is not to say that all contaminated clothing is evidence that must be preserved, but it is possible that the perpetrator(s) may be among those treated, and evidence may be found in their possessions or on their clothing.

Patient discharge materials should include information on radiation exposure and long-term health effects. Include FAQs as well as expert contacts and phone numbers where accurate information can be obtained. Avoid generalized radiation information that might raise unwarranted concern. Keep verbal information helpful by customizing it to the situation and the individual patient.

Hospitals should seek information from the Health Department DOC on radioisotopes involved and dosage assessments by geographic area. A plume map should appear on the internet with concentric lines showing amounts of radiation overlying a map of Los Angeles and Ventura Counties. This will prove useful in determining the intensity of radiation exposure a particular patient may have experienced.

Healthcare providers should do the proper thing for each patient individually, apply available tests and treatments equally and as appropriate, and avoid “experimentation” without an IRC approval.

Patient mental health concerns

Ensure trained counselors are on site both in the Emergency Room and the hospital and also at the Assessment Center. Brief them on radiological issues so they can use this knowledge in their counseling sessions. Counseling staff that cannot function in high stress situations should not perform these duties.

HEALTHCARE PROVIDER INFORMATION

It is vital that hospitals protect their employees from injury and disease at all times. Activate the radiation portion of the emergency response plan. In a radiological incident, hospital employees will be concerned about radiation contamination. Ongoing training about potential health effects and personal protective equipment that is required will allow them to respond effectively during an incident. Staff needs to be psychologically prepared also.

Take special precautions to protect pregnant employees. Every employee should be instructed in the principles of TIME, DISTANCE and SHIELDING, for minimizing personal exposure to radiation contamination.

Supply specific information to staff to address concerns about radiation.

MENTAL HEALTH CONCERNS OF HEALTH CARE PROVIDERS

With appropriate education of hospital personnel, many of the mental health effects that will plague the general public in the wake of a nuclear detonation may be avoidable. Still, there will still be some employees who encounter some of the same mental health problems.

Some of the more likely psychological consequences for medical staff treating patients of a radiological incident are fear, guilt and apprehension. People know little about radiation and its danger. There may be lingering concerns about long-term side effects such as an increased risk of cancer. Employees will worry about being contaminated and then carrying it home to their family. Some will feel a sense of guilt because they can't save everyone and must make decisions on who to treat and who not to treat. Helplessness, anger and depression may result. Employees may worry that later, after the emergency, higher authorities may second-guess their decisions. All these feelings will be aggravated by fatigue from the demands of the response to the incident.

The physical signs of these psychological effects include vomiting, diarrhea, headaches and nausea, the same symptoms of acute radiation exposure.

Psychological effects will occur in staff who have contact with deceased or dying patients and children and pregnant women. Rotate staff frequently and be aware of fatigue levels of all personnel. Staff may be worried about their families. Appoint a liaison for the hospital staff to use to communicate with their loved ones when their responsibilities won't allow them to do so for themselves.

Set up a critical incident stress management team. Dedicate time with mental health providers for the staff. Do not cross discipline groups. This allows for freedom to express concerns.

LONG-TERM FOLLOW-UP OF INDIVIDUALS FOLLOWING RADIATION EXPOSURE

Long term monitoring of exposed individuals and populations will document health effects of a nuclear detonation. To do this an exposure registry will need to be established which will include the exposed and contaminated and those not exposed or contaminated. This will be a long term process.

The CDC is the lead agency for population monitoring and is responsible for assisting the County and the State in monitoring people for external and internal contamination. Through a process known as dose reconstruction, public health officials working with the CDC, will estimate the amount of radiation to which individuals have been exposed. The CDC will also help the County and State health departments create a registry of people who might have been exposed and then monitor these people for as long as necessary to see whether they are having health effects related either to radiation exposure or the stress of being a victim of the attack.

Records should be user friendly for the practitioner, and utilize technology to facilitate sharing and ease of use in any investigative efforts.

Key data should include:

- Patient demographics
- Patient location at time of incident
- Patient's description of what happened, what they saw, heard and felt
- Details about the conditions at the location when exposed
- Patient's chief complaint
- Record patient contact info for follow up
- Record therapeutic data, including treatment, body location of contamination and isotope information if known

Time permitting, it would be valuable to gather information and summarize the number of patients involved in the incident arriving per hour and their chief complaints.

Hospitals must ensure that their Assessment Center has an efficient record-keeping process to be sure radiologically contaminated persons are not lost to follow-up. (The Armed Forces Radiobiological Research Institute [AFRRI] and the Radiation Emergency Assistance Center/Training Site [REAC/TS] have developed and tested a record-keeping process and system for tagging for triage, AFRRI's Biodosimetry Assessment Tool software application. Software is available to assess dosage and record patient information. It is available at www.afrri.usuhs.mil/www/outreach/batpage.htm)

COUNTYWIDE INTER-HOSPITAL PLANNING

- Review the existing plans to activate the HEICS response plan.
- Establish redundant communication systems with emergency management operations.
- Monitor and staff CAHAN and REDDINET terminals.
- Avoid becoming a second hand casualty—provide for back-up power, supplies, etc.
- Plan for the following situations: there is no running water; no functioning toilets; the hospital is located in an area that is directed to shelter-in-place.
- Coordinate HR issues to accept volunteers. Review insurance to see if extra help is automatically covered.

- Address emergency credentialing issues for trained spontaneous volunteers.
- Plan for a move if the hospital becomes contaminated.
- Consider development of a disaster cache of supplies.
- Review plans for receiving mass quantities of supplies and medications.
- Institute procedures to track and document costs of the incident.
- Conduct briefings with staff to record information for post incident sharing with other hospitals. There is a real need to maximize the lessons we learn from disasters. Render anonymous any information shared to protect patients' privacy.

SECTION 11. HEALTH CARE PROVIDERS AND MEDICAL MANAGEMENT FOLLOWING A NUCLEAR DISASTER

(See Chapter IV. RADIATION EXPOSURE, RADIATION MONITORING AND ASSESSMENT, for related information.)

Source: Material from this chapter was liberally borrowed from; “Medical Management of Internally Radiocontaminated Patients” Marcus, CS, Siegel, JA and Sparks, RB. Sponsored by a grant from the Department of Homeland Security Metropolitan Medical Response System, June, 2006.

CONTAMINATION AND DECONTAMINATION

In preparing for a catastrophic WMD event in Los Angeles, the Los Angeles Operational Area hazardous material task force was capable, in 2006, of decontaminating upwards of 28,000 victims. Even with continued growth in that capacity, it is safe to assume that Los Angeles County EMS and hospital personnel will not decontaminate all victims following a nuclear detonation with its subsequent fallout. Many persons exposed to radiation will leave the scene before the arrival of emergency personnel. Furthermore, some of the Los Angeles County assets may be compromised by the blast, subsequent fires and radioactive contamination. Therefore, decontamination procedures will need to be a part of the operational plan of Ventura County first responders in anticipation of the arrival of contaminated evacuees.

Protecting the injured and exposed requires the following activities:

- Physical injuries are more serious than the radioactive contamination on the injured and exposed. Deal with life-threatening conventional injuries first, whether in the Emergency Room or the field. When the patient is stable, then deal with radioactive contamination. Patients who were treated in the field and are now stable should be evacuated from radiation contaminated areas immediately. The amount of contamination on any one individual is not likely to cause a health risk to another.
- External radiation may cause such problems as skin burns or marrow depression in arriving patients. This exposure will not have made the person radioactive, so even highly exposed patients are no hazard to medical personnel. After decontamination, these victims will be no more contaminated than a nuclear medicine patient and they are encountered everywhere.

- The number of survivors with external radiation contamination, radiation burns, thermal burns, and crush and shrapnel blast injuries will completely overshadow individuals with *internal* radiocontamination.
- Contamination along the medical continuum from stretcher in the field to Emergency Room is inevitable. Deal with disease, not dust. Doses of radiation in these settings tend to be largely insignificant. A radiation safety officer is already a part of the staff of each hospital. His or her job following a nuclear event will be to monitor the patient care and other areas to determine which areas may be developing enough radiation to curtail further utilization until cleared of contamination.
- Medical personnel should protect themselves from radioactive contamination by wearing standard disposable gowns, gloves (two pairs), cap, shoe covers, eye protection if available and a N95 mask. Tape the first pair of gloves to the arm cuff. The second pair can be replaced if they become contaminated.
- Radioactive dust in burns or wounds should be treated just as if it were simple dirt. Metallic objects should be handled with forceps and placed in a shielded container (a “pig”) until or unless documented not to be radioactive.
- When victims of a nuclear blast begin to appear in the Emergency Room, call the Public Health DOC to tell nearby hospitals to expect the arrival of radioactively contaminated and injured people and, based on your patients, what kinds of problems they can expect to see.
- Victims will have radioactive dust on their clothing. If many people are covered with dust, it will not be feasible to conduct a careful radioactivity survey of each person. Assume all of the dust is radioactive. Set up a facility where each person can remove and discard their outer clothing, wash as thoroughly as possible, and don coveralls or wrap in blankets. This facility should be downwind if possible and far enough from the hospital and Emergency Room that a buffer exists for triage, security and limitation of contamination.
- Record keeping is as important for the long term health of the victims as it is for the emergency responders.
- Many people without apparent injuries will self-evacuate from the area of the detonation. Make public service announcements on radio and television advising these people to bag their clothes, place the clothes outdoors, and wash themselves thoroughly. People experiencing nausea, vomiting, reddening of the skin or unexplained lesions should be advised to report to a clinic or an Assessment Center immediately and request a checkup for Acute Radiation Syndrome (ARS).

SCREENING FOR EXTERNAL CONTAMINATION

Uninjured evacuees who come to the hospital should pass through the peripheral Assessment Center. If these people have a place to stay locally, they will be directed to that place after being given written decontamination instructions and told to decontaminate there. They may not be decontaminated at the hospital assessment area if it is busy with sick patients. They should go for screening at a *non-hospital* based site after they have decontaminated themselves. Injured people will be triaged, screened, decontaminated if necessary, and then either referred or treated. (See IV. *Hospital Response to Mass Casualties*.) Seriously injured patients will be triaged directly into the Emergency Room to have their injuries addressed before decontamination. Simultaneous with their treatment, their outer garments will be removed which will remove 90% of their contamination.

Screening equipment, such as Geiger-Muller detectors (Geiger counters), portal monitors, and people trained in the use of this equipment, must be available. Hospitals which have nuclear medicine services have radiation detection instruments and radiation safety officers. Radiation safety officers should screen the Emergency Department on a frequent and regular basis for evidence of excessive levels of contamination. The Emergency Department would be wise to have its own screening equipment and train its own people in its use. Some equipment will be needed in the Emergency Department for screening injured patients. Geiger counters are the cheapest and simplest devices for screening, and the most commonly available. Their limitation is that they only measure gamma radiation. On the other hand, for external contamination, gamma radiation is of the most concern. Geiger counters are calibrated yearly, usually against a cesium (Cs)-137 source of known activity. So, they are most accurate for a Cs-137 event and other sources of pure gamma radiation, but will likely be *inaccurate* for objects and materials contaminated with pure beta emitters, low photon energy emitters, and alpha emitters. Individuals who appear to be contaminated (their levels are at least three times the background levels) by Geiger counter will need to be evaluated with other equipment or by other means if more accurate information is necessary.

Most hospitals in Ventura County have portal monitors to check garbage or garbage trucks before leaving the premises so that the trucks will not be denied access to landfills. These detectors are quite sensitive, and may be used to screen people as well as vehicles. For those hospitals which have them, planning to use them for screening people should be part of their nuclear plan. *People who have decontaminated in their own home may bring their newly-washed clothes and cleaned shoes in a plastic bag to a portal monitor to make sure that they are no longer contaminated.*

Emergency Department screening of the injured includes the following activities.

The treatment of injuries takes precedence over radiocontamination concerns. Besides, removal of all clothing will generally eliminate about 90% of external contamination. It is highly unlikely that residual radiation levels from the patient will constitute a hazard to medical personnel. Staff can protect themselves using standard precautions. The only

exception to this would be if a piece of radioactive metal from the blast penetrated the patient (radioactive shrapnel). Such a seriously injured patient would probably have been triaged past the peripheral Assessment Center without decontamination. Patients in the Emergency Room with penetrating injuries should therefore be monitored quickly with a handheld monitor to make sure that they are not a hazard to others.

*(It is important to remember that Geiger counters are sensitive instruments that flood at significant radiation levels. "Flooding" means that they cannot function properly with the high count-rate presented to them. Most will register "zero". They may thus indicate that no radiation is present, when in fact the opposite is true. When monitoring patients with a Geiger counter, start the monitoring at a significant distance from the patient, and at the highest setting, e.g. "x 100", and then come closer. If the radiation readings **fall** as you get closer, have your hospital safety officer bring an ion chamber that can give accurate readings at high radiation levels.)*

A crude but reasonable technique for rapid radiological triage for admission into the Emergency Room is to determine whether the patient who is vomiting started doing so *less or more* than four hours after his exposure to radiation (to the blast itself or to fallout). Patients who began vomiting within four hours of radiation exposure need to be seen immediately. Persons who began vomiting more than four hours after their radiation exposure may be seen from 24 to 72 hours later assuming there are no other injuries.

Judging **external radiation dose based on time to onset of vomiting** may be refined further using the following table:

Table 10. External Radiation by Onset of Vomiting

Vomiting Post Incident	Estimated Dose	Degree of Acute Radiation Syndrome
Less than 10 minutes	>800 rads	Lethal
10-30 minutes	600-800 rads	Very Severe
Less than 1 hour	400-600 rads	Severe
1-2 hours	200-400 rads	Moderate
More than 2 hours after	<200 rads	Mild

(from; LA County's Response in a Radiological Event, a Power Point presentation, County of Los Angeles Public Health, Day, J., Kaufman, C.)

MANAGEMENT OF EXTERNAL DECONTAMINATION

Skilled personnel (hospital safety officer or Hazmat) should assess for radiological contamination by slowly passing a radiation detector over the entire body. Remove contaminated clothing and place it in marked bags, moving it to a secure location. Wash bare skin and hair thoroughly. Special management of effluent is not necessary. City and county drainage and sewage may be utilized. The dilutional effect of large bodies of water will adequately handle contaminated effluent. Effluent may be safely drained to the ocean.

Assuming that a patient's non-radiation injuries are stabilized, decontamination of the patient's skin should follow. This is done to decrease the risk of acute dermal injury, lower the risk of internal contamination, and reduce the potential of contaminating medical personnel and the environment. After the patient's clothing is removed, gently washing the patient with soap and water is 95% effective because soap emulsifies and dissolves contaminants. Wash the hair with any shampoo without conditioner. The goal of decontamination should be to remove as much contamination as possible, without damaging the skin. Never rub the skin so as to cause an abrasion, because external radioactive material can be absorbed and internalized. Cover open wounds prior to decontaminating surrounding skin. Since, it may prove difficult to remove all contamination, decontaminating to two times background radiation will suffice. If three attempts fail to reduce background radiation to acceptable levels, further efforts may be halted and the patient handled using standard blood borne precautions to minimize the spread of contamination. Try to assure that the same distance from the patient is maintained in all radiation detector surveys. If repeated efforts at external decontamination fail to reduce readings to acceptable levels, consider the possibility that the contamination may be internal.

Decontamination Techniques

To decontaminate hair, use any commercial shampoo without conditioner. For skin and wound decontamination, use a cleaning solution. Suggested solutions are:

- Soap and either water or normal saline;
- Povidone iodine and water; and
- Hexachlorophene 3% detergent cleanser and water.

Use of Mass Action Decontamination Solutions

If soap and water do not remove all the contamination, there is the possibility that the contamination is internal. As most internal contamination comes in through inhalation and swallowing, the main areas of radioactivity will be the chest and abdomen.

If residual radioactivity is on extremities or other areas that appear to represent external contamination, it is recommended that mass action decontamination solutions be used.

These agents have been used to clean contaminated surfaces, and have been approved by the FDA for use on intact skin. There are three different solutions to choose from, and the choice depends upon the radioactive element involved. If the radioactive material has not yet been identified, try all three and see which works.

(A set of the three mass effect decontamination solutions [for halogens, actinides, and transition metals] is available, complete with instructions, from Dr. John Kuperus, a nuclear pharmacist in Tampa, FL. He may be reached at:

John Kuperus, Ph.D., R.Ph.
Radiation Decontamination Solutions, LLC
101A Dunbar Ave.
Oldsmar, FL 33634
Telephones: (800)995-4363 ext. 267
813-854-5100
813-854-8120 fax
(800)697-5250 fax
info@RadDecon.com

At the time of this writing, the mass action decontamination solutions are not in the Strategic National Stockpile.)

PATIENT MANAGEMENT

Patient History

Where applicable, retrieve as much specific information from the evacuee or first responder as possible as to where the patient was found (record street address or cross streets), what type of radiation exposure he may have had (fallout versus prompt radiation) and how close he may have been to the blast. Has the patient developed any symptoms; nausea, vomiting, diarrhea, transient incapacitation, hypotension, others? If the patient has developed symptoms, especially vomiting, localize the time of onset as closely as possible. Determine at what time the patient was exposed to radiation -- the prompt radiation from the blast or to the fallout -- and record this. Radiation assessment and dosage estimates will drive the precautions that medical personnel take and will influence diagnostic considerations.

Clinical Presentation

Whether from prompt radiation or fallout, increasing amounts of radiation will cause predictable disease syndromes in the exposed. This group of illnesses is generally referred to as Acute Radiation Syndrome (ARS). This spectrum of acute illness is caused by radiation to the entire body at a high dose for a short period of time. Depending on how high the dose, and how resistant to radiation the different organs of the body are, different disease syndromes may be seen.

There are three classic ARS syndromes. At the lower range of dangerous doses of radiation is the **bone marrow syndrome**, also called hematopoietic syndrome. This syndrome is seen

beginning at doses of 70 rem (700 mSv). The higher the dose above this, the more likely it is to be fatal. Symptoms begin with decreased appetite (anorexia), nausea and vomiting. These symptoms may last from a few minutes to days. The radiation kills the stem cells in the bone marrow. These die off over a period of one to six weeks. During this period the effected person may appear perfectly well. Then the patient experiences anorexia, fever and malaise. All of the different blood cell lines fall. The absent blood cells lead to infection and hemorrhage. Most deaths occur within a few months. Sometimes the radiation fails to kill all the marrow cells and so they repopulate the bone marrow. Patients whose radiation exposure was limited to only causing the bone marrow syndrome will often completely recover. People who receive 120 rem (1,200 mSv) may die. At a dose of 250 to 500 rem, 50% will die.

The second ARS syndrome is the **gastrointestinal syndrome**. This is seen at about 1,000 rem (10,000 mSv) of exposure. The initial symptoms are anorexia, nausea, vomiting, cramps and diarrhea. These symptoms are seen within a few hours after exposure and last for about two days. Not only are the bone marrow cells killed, but the cells lining the gastrointestinal tract as well. Again, the patient may feel well during this time which lasts less than a week. Then the patient experiences malaise, anorexia, severe diarrhea, fever, dehydration and electrolyte imbalance. The patient dies of infection, dehydration and electrolyte imbalance within two weeks of their initial radiation exposure. At an exposure of 1000 rem, 100% of people are expected to die.

The third and worst ARS syndrome is the **cardiovascular/central nervous system syndrome**. This is seen at an exposure of 5,000 rem (50,000 mSv). Sometimes this is seen at an exposure as low as 2,000 rem. Symptoms include extreme nervousness and confusion, severe nausea, vomiting, and watery diarrhea, loss of consciousness, and burning sensations of the skin. Symptoms develop within minutes of exposure and last for minutes to hours. Occasionally the patient has a partial improvement, but then returns to having watery diarrhea, convulsions and coma. This occurs five to six hours after the initial radiation exposure. Within three days the patient is dead. No one survives.

Skin damage should be expected in a number of patients and will vary depending on the thermal exposure or radiation dose. Skin lesions that appear to be burns of various depths may appear immediately or in hours, days or weeks. Lesions that appear early, remain and resolve at the accustomed rate of thermal burns are probably just that. At radiation doses beginning around 300 rads, erythema may develop in a few hours but can disappear a few hours later and reappear at a later time. Skin lesions that appear *late* are likely to be related to radiation as opposed to thermal causes.

Patients with **trauma**, whether from a burn or the explosion, together with acute radiation exposure, have a worse prognosis than the patient with radiation exposure alone. With exposure doses greater than 200 rads, an effort must be made to close wounds, reduce fractures and complete other surgical procedures within 48 hours. Beyond 48 hours, surgical intervention should be delayed for 2 to 3 months.

Laboratory Evaluation

If significant radiation exposure is a consideration, 3 or 4 blood specimens are collected from the patient in the first 8 to 12 hours after their exposure and several more over the next 2 or 3 days. Blood specimens showing lymphocyte depletion within 10 days following radiation exposure are indicative of a significant absorbed dose. The lymphocyte count can be compared to a graph known as the Andrews Lymphocyte Nomogram. This can be used to estimate the radiation exposure dose.

Cytogenetic bioassay may also be used for determining the absorbed dose of radiation but it is only performed in a limited number of laboratories. If a laboratory is willing to accept a patient specimen, 10 ml of blood should be placed in an EDTA or lithium heparin tube collected at least 24 hours following the exposure and maintained at refrigerator temperature. The Armed Forces Radiobiology Research Institute in Bethesda can perform this study (www.afrrri.usuhs.mil). The current laboratory capacity in the United States for cytogenetic assay would be quickly overrun following a nuclear detonation in this country.

Treatment Issues

Treatment is available but is not likely to be of much help at high levels of radiation exposure. Also, there are limited quantities of drugs for both therapy of ARS and for decorporation, which is the ridding of the body of inhaled or ingested radioactive isotopes in an effort to minimize their negative effects.

Therapy for ARS is aimed at preventing and treating infection; stimulation of hematopoiesis (bone marrow cells) by the use of growth factors; stem cell transfusions; and platelet, white cell and blood transfusions.

Any patient who has had vomiting within 12 hours of exposure, a depletion of peripheral lymphocytes less than 10 days after irradiation or excessive radiation measurements established at the site, should be referred for specialist care for possible bone marrow depletion.

An important drug used in the treatment of bone marrow destruction is filgrastim (Neupogen). It is a human granulocyte colony stimulating factor (G-CSF) that stimulates the growth of white blood cells. This drug should be given at 5 micrograms per kilogram of patient weight subcutaneously or intravenously daily for up to 2 weeks.

The Hematologist-Oncologist is the local specialist most likely to provide insight into the treatment or management of patients with Acute Radiation Syndrome. A fine review article on the treatment of Acute Radiation Syndrome is Waselenko, JK, MacVittie, TJ, Blakely WF, et al; Medical Management of the Acute Radiation Syndrome; Recommendations of the Strategic National Stockpile Radiation Working Group, *Annals of Internal Medicine*, 2004; 140(12) 1037-1051. www.annals.org

The Radiation Emergency Assistance Center/Training Site (REAC/TS), an asset of the Department of Energy, can provide **24 hour direct assistance** or consulting assistance on

the medical effects of radiation exposure and contamination. This can be activated by a physician calling the Public Health DOC (which will call the region, then the State, etc.). REAC/TS will also provide intensive training to health professionals in medical management for radiological exposures.

(Adapted in part from: Radiation Emergencies, Acute Radiation Syndrome: A Fact Sheet for Physicians, the Centers for Disease Control, March 18, 2005)

SCREENING FOR INTERNAL CONTAMINATION

Routes of Radionuclide Internalization

Radioactive material may be inhaled as gases or particulates. It may also be swallowed from mouth contamination, ciliary movement in the bronchial system that moves particulates to the throat, or by eating or drinking contaminated food. In addition, radioactive shrapnel related to a nuclear detonation can become embedded in a wound. Radioactive shrapnel should be surgically removed as quickly as possible. Precise localization with CT or gamma camera should be undertaken to minimize time spent in exploration. The shrapnel should be manipulated with instruments, not gloved hands, and should be placed in a lead container (a “pig”) for shielding purposes. The Nuclear Medicine service should have lead pigs available, or know how to obtain them. While waiting for lead shielding, place radioactive shrapnel where it is at least six feet away from people.

Inhaled radioactive gases may be absorbed into the blood. Inhaled particulates that are not coughed up or swept out by cilia may become solubilized and then be absorbed or deposited in the tracheobronchial lymph nodes, where they may remain indefinitely. Radioactive material that is swallowed may also be absorbed. Unabsorbed radioactive material is excreted in stool. Of material that is absorbed, some will be deposited in various organs and some may be excreted in urine.

Radionuclide Identification

Appropriate selection of decorporation drugs depends on accurate identification of the radionuclides that are present in affected patients. Radiation sources emit at characteristic energies and may be identified by their energy spectrum. While portable spectrometers such as the ICX-400 come with built-in spectra and are able to immediately identify a photon emitter, it should be expected that the radioactive contaminants following a nuclear detonation will contain multiple isotopes. This would be beyond the identification capabilities of most portable spectrometers. There is no fixed spectrum of radionuclides which can be anticipated to be formed following a terrorist’s nuclear detonation. Each nuclear detonation should be expected to have its own unique fingerprint of radioactive by-products.

On the expectation that the contaminants produced following a nuclear event will contain a mixture of radionuclides, simple spectral identification will likely be difficult. The Department of Energy (DOE) has laboratories which operate 24 hours a day and perform

advanced spectral analysis. The ICX-400 spectrum can be converted to a computer file and e-mailed to the DOE laboratory. The DOE Triage Program for Radionuclide Identification can be reached by calling (202) 586-8100 and speaking with the Emergency Response Officer (ERO) in charge of triage information. The spectrum should be emailed to both triage.data@hq.doe.gov and triage.data@llnl.gov. The hospital's Radiation Safety Officer (RSO) or Medical Physicist should be trained and regularly exercised to do this. The appropriate spectrometer should be purchased. Any hospital using radiation producing machines or radioactive material will have RSOs. Hospitals with Radiation Oncology services usually have a Medical Physicist.

The first step in treating patients for internal contamination is to determine which radionuclides are present. The next step is to estimate the activity of internal radionuclide contamination.

Estimation of Internal Contamination

It is important to determine whether internal contamination has occurred and to what degree. Nasal swab samples for radioactivity should be obtained as early as possible. However, under some circumstances, inhalation may not yield a positive nasal swab. If contamination is present, especially in both nostrils, inhalation of a contaminant may be assumed. Collect urine and feces specimens to help determine whether internal contamination has occurred. It is imperative that all specimens be dated and timed due to the unique decay rates of every isotope. Internal contamination may sometimes be detectable by measuring with a surface radionuclide detector if external decontamination has been complete.

More accurate methods of estimating the amount of radiocontamination that has occurred in an individual may be found in "Medical Management of Internally Radiocontaminated Patients" Marcus, CS, Siegel, JA and Sparks, RB., Sponsored by a grant from the Department of Homeland Security Metropolitan Medical Response System, June, 2006.

Those who manifest injuries from the blast itself (e.g., concussive trauma, shrapnel, burns) are more likely to experience a significant internal radioactive burden not only because they were closer to the source of contamination but because they might have been unable to cover their mouth and nose due to debilitation related to their injuries. If it is easy to estimate internal burden with external detectors once the radionuclides are identified, this should be done before deciding whether or not to use decorporation drugs. However, if estimation of internal burden is too time-consuming (e.g., so specialized that it must be sent to an outside lab), once the radionuclides have been identified, the Emergency Room (or other) physician may presumptively treat intensely exposed patients if the risk of the indicated decorporation drug is very low. There is no all-purpose decorporation drug "cocktail" to take that will protect against all internal radiocontamination possibilities.

TREATMENT PROCEDURES FOR INTERNAL DECONTAMINATION

The reason to treat persons with internal contamination is to reduce the radiation dose from absorbed radionuclides and thus the risk of long-term biological effects (i.e., cancer). Minimize internal contamination by 1) reducing the absorption of radionuclides and their deposition in target organs, and 2) increasing excretion of the radionuclides from the body. The benefit of removing the radioactive contaminant using modalities with significant side effects must be weighed against the short and long-term effects of contamination without treatment.

Treatment considerations for internal contamination include:

- Oral potassium iodide (KI) for appropriate populations, if radioiodine is suspected as a potential contaminant.
- Gastric lavage until washings are free of radioactive material (no more than two times background radiation or repeated lavage does not result in further reduction of contamination). This is only effective if done within 1-2 hours of ingestion and should only be used for large single intakes of radioactive material.
- If radionuclides are ingested, antacids (such as over-the-counter aluminum hydroxide/magnesium carbonate-containing formulas) are indicated to reduce gastrointestinal absorption. Aluminum containing antacids are especially effective in reducing uptake of strontium, reducing uptake by 50-85 percent.
- If large ingestions are suspected, cathartics decrease residence time/radiation dose of materials in the bowel. A bisacodyl or phosphate soda enema will empty the colon in a few minutes and should be given primary consideration. Oral agents or suppositories may be used but take one or more hours to act. Magnesium sulfate can be used to produce insoluble sulfate compounds with some radionuclides (such as radium).
- Pulmonary lavage is rarely indicated. It should only be considered after inhalation of very large amounts of long-lived insoluble radionuclides that would be likely to result in major pulmonary compromise if not removed.

Alpha

Although decorporation drugs are most effective if given early, they are also useful if given late, even after a few weeks in some cases. Treatment may need to be prolonged if the drug is started late. One exception to this is the use of potassium iodide (KI) for radioactive iodine internal contamination. If it isn't used within four to six hours, and preferably 1 hour, it will have decreased effectiveness, which will approach zero after about 12-24 hours.

A useful list of radioelements and their corresponding decorporation treatments, followed by specific details about these drugs, follows:

(The following two lists have been taken directly from “Medical Management of Internally Radiocontaminated Patients”, Marcus, CS, Siegel, JA and Sparks, RB. Sponsored by a grant from the Department of Homeland Security Metropolitan Medical Response System, June, 2006.)

ALPHABETICAL LIST OF RADIOELEMENTS

- Americium: parenteral Ca-DTPA, Zn-DTPA.
- Cesium: oral Prussian blue.
- Cobalt: nothing too good, but oral penicillamine worth trying.
- Iodine: KI *within about first 4 hours*. Consider PTU.
- Iridium: unknown; try oral penicillamine.
- Palladium: unknown; try oral penicillamine.
- Phosphorus: oral Na phosphate or K phosphate.
- Plutonium: parenteral Ca-DTPA, Zn-DTPA.
- Radium: oral calcium to reduce gastrointestinal absorption and increase urinary
 - excretion. Alginates are also useful to reduce gastrointestinal absorption.
- Strontium: intravenous calcium gluconate, oral ammonium chloride for acidification.
 - Alginates are useful to reduce gastrointestinal absorption.
- Tritium: force water to promote diuresis.
- Uranium: Ca-DTPA and Zn-DTPA *within 4 hours only*. Na bicarbonate to alkalinize
 - urine.
- Yttrium: parenteral Ca-DTPA, Zn-DTPA.

ALPHABETICAL LIST OF DECORPORATION DRUGS

Ammonium chloride: This orally administered salt causes acidification of the blood, and is useful for the removal of strontium from the body, especially when combined with intravenous calcium gluconate. Ammonium chloride is given p.o., 1-2 gm q.i.d., for up to 6 consecutive days. Check blood pH or serum CO₂ which will be lowered due to acidification. While best results occur if given quickly after intake, some effect is seen if used up to two

weeks afterwards. If used promptly with calcium gluconate, radiostrontium levels can diminish 40-75 %. Nausea, vomiting, and gastric irritation are common. Avoid in patients with severe liver disease.

Calcium (oral): A variety of oral calcium supplements are available. One that is commonly used is TumsR. There are numerous others. Calcium is an alkaline earth, as are strontium, barium, and radium, and a mass effect from calcium can interfere with absorption of the other alkaline earths, and compete with their deposition in bone. In the event of internal contamination with Sr-90 or Ra-226, generous doses of oral calcium preparations should be beneficial.

Calcium-DTPA: This is a powerful and stable chelating agent, which has been used primarily to remove plutonium and americium. It chelates transuranic ($Z > 92$) metals (plutonium, americium, curium, californium, and neptunium), rare earths such as cerium, yttrium, lanthanum, promethium, and scandium), and some transition metals (such as zirconium and niobium). In normal, healthy, nonpregnant adults with normal bone marrow and renal function, the dose to use is 1 gm in 250 ml normal saline or 5% dextrose in water, iv over 1 hour. No more than 1 dose per day should be used, and the dose should *not* be fractionated. May use for several days to a week in most cases without toxic effects. Toxicity is due to chelation of needed metals, such as Zn and Mn. Toxicity includes nausea, vomiting, chills, diarrhea, fever, pruritus, muscle cramps, and anosmia. After a couple of doses, the less toxic Zn-DTPA should be used instead. Zn-DTPA should be used exclusively in pregnant patients, if available. The same dose and dose schedule is used for Zn-DTPA as for Ca-DTPA. While the DTPA compounds are best used as quickly as possible after internal contamination, they are effective if given later, but therapy may go on for months or even years. The DTPA compounds are only effective if the metals one wishes to chelate are in ionic form. They are useless for highly insoluble compounds.

Calcium gluconate: Intravenous calcium gluconate is indicated for Sr-90 contamination, and probably Ra-226 contamination as well. Five ampoules, each containing approximately 500 mg calcium, may be administered in 0.5 liter D5W over a 4 hour period. This treatment may be administered daily for 6 consecutive days. It is contraindicated in patients who have a very slow heart rate, those on digoxin preparations, and those on quinidine.

Dimercaprol (British antilewisite, BAL): This agent effectively chelates radioactive and stable nuclides of mercury, lead, arsenic, gold, bismuth, chromium, and nickel. It is quite toxic, however, with about 50% of patients given 6 mg/kg IM developing reactions. These include systolic and diastolic hypertension, tachycardia, nausea, vomiting, chest pain, headache, and sterile abscess at the injection site. The dose to use is 2.5 mg/kg (or less) q4h x 2 days, then bid for 1 day, and then qd for days 5-10. It is available as 300 mg/vial for deep IM use (suspension in peanut oil).

D-Penicillamine: This drug chelates nuclides of copper, iron, mercury, lead, gold, and possibly other heavy metals. The chelated metals are excreted in the urine. While this drug is relatively non-toxic, it probably has only limited usefulness for radionuclide

decorporation, saving perhaps only 1/3 of the total radiation absorbed dose that would have occurred without treatment. The adult dose is 250 mg p.o. qd between meals and at bedtime. May increase to 4 or 5 g qd in divided doses. Be very cautious if patient has a penicillin allergy.

Potassium iodide: Useful for blocking radioiodine uptake by the thyroid, but needs to be administered almost immediately after intake. It is virtually useless after 12 hours following a contamination event. Adult dose is 130 mg p.o. ASAP and repeat dose daily as long as the contamination lingers in the environment. For children 4 to 18y, the dose is 65 mg p.o.; 1 month to 3y, 32.5 mg, and <1 month, 16.25 mg mixed with a liquid such as low fat milk.

Potassium phosphate: Used to block uptake of radioactive phosphate. K-PhosR Neutral contains 250 mg phosphorus per tablet. Usual adult dose is 1-2 tabs p.o. qid, with full glass of water each time, with meals and at bedtime. Pediatric patients over 4y, 1 tab qid. Contraindicated in hyperphosphatemia, renal insufficiency, and infected phosphate stones.

Propylthiouracil: Used to decrease thyroid retention of radioiodine, and may be considered if it is too late for KI to be effective. The adult dose is 50 mg tabs, 2 p.o. tid x 8 days.

Prussian blue: This oral ion-exchange drug is indicated for decorporation of cesium, thallium, and rubidium, and has been shown to be highly effective for Cs-137 contamination. It is benign, with the exception of occasional constipation. Stool turns blue. Usual dose starts at 0.5 g capsule, 2 caps p.o. tid for up to 3 weeks or longer as required. Doses up to 10-12 g/day for significantly contaminated adults may be used.

Sodium alginate: A derivative of kelp used in the manufacture of ice cream. Oral alginates efficiently bind strontium in the gastrointestinal tract, and prevent its absorption. The dose is 10 gm powder in a 30 cc vial, add water and drink.

Sodium bicarbonate: Used to alkalinize the urine after uranium intake, which protects the kidneys from uranium deposition. Oral or intravenous, take as needed to maintain alkaline urine. The intravenous formulation is 8.9%, 100 or 200 cc vials.

Sodium phosphate: See potassium phosphate. Also used for radioactive phosphate decorporation.

Zinc-DTPA: See Calcium-DTPA.

ACQUIRING DECORPORATION DRUGS AND/OR EXPERTISE IN THEIR USE

While there are no significant stockpiles of decorporation drugs in Ventura County, physicians should call the Ventura County Public Health Departmental Operating Center (DOC) if they are in need of either these drugs or specialized medical expertise and consultation. The DOC can call the Department of Energy (DOE) which can mobilize medical personnel (from REAC/TS) to treat injuries resulting from radiation exposure. Medical radiation experts are on call 24 hours a day and can provide medical and radiological advice

to state and local governments or deploy directly to a radiocontaminated site. These experts (the Federal Radiological Monitoring and Assessment Center [FRMAC]) also track the treatment of radiation accident patients and conduct medical follow-ups.

The DOC will also make an attempt to obtain these drugs from Los Angeles County by calling the Medical Alert Center (MAC) (assuming it is not degraded) at (XXX) XXX-XXXX or (XXX) XXX-XXXX and speaking with the Medical Officer on call. The Medical Officer may be willing to authorize drug delivery out-of-county from the Los Angeles County stockpile which could be delivered by County ambulance or other rapid means.

Additional material for this chapter was borrowed from the Department of Homeland Security Working Group on Radiological Dispersal Device (RDD) Preparedness, Medical Preparedness and Response Sub-Group, 5/1/03 Version.

FURTHER INFORMATION

Further information about initial treatment of radiation effects may be found on pages 117-127 of “Protecting People Against Radiation Exposure in the Aftermath of a Radiological Attack”, A Report from a Task Group of the ICRP, Final TG Draft, April 2004, and pages 51-70 of Department of Homeland Security Working Group on Radiological Dispersal Device (RDD) Preparedness, Medical Preparedness and Response Sub-Group, 5/1/03 Version.

Radiation medical management guidance may be found at the Radiation Event Medical Management/US DHHS site: <http://remm.nlm.gov> or at the Radiation Emergency Assistance Center/Training Site (REAC/TS): www.orau.gov/reacts/ . REAC/TS may be called at XXX-XXX-XXXX.

Additional consultative resources may be found at The Armed Forces Radiobiology Research Institute, Medical Radiobiology Advisory Team (MRAT): www.afrrri.usuhs.mil/ . MRAT may be called at (XXX) XXX-XXXX.

Additional educational sources include:

- “Medical Treatment of Radiological Casualties”, Koenig, et al, Annals of Emergency Medicine, 2005; 45:643-652.
- “Nuclear/Radiological Terrorism: Emergency Department Management of Radiation Casualties”, Bushberg, et al, Journal of Emergency Medicine, 2007; 32:71-84.

Other websites with educational materials include:

- The Conference of Radiation Control Program Directors at www.crcpd.org .
- The Centers for Disease Control and Prevention Radiation Emergencies page. The video, “Medical Response to Nuclear and Radiological Terrorism”, broadcast date 2/10/04 is particularly recommended.

SECTION 12.MANAGEMENT OF DEAD BODIES

OVERVIEW

Immediately after a disaster, emergency response is often chaotic and uncoordinated. Coordination is needed at several levels: national, regional and local. Early coordination is vital to manage information and coordinate assessment activities, and identify required resources (e.g., forensic teams, morgues, body bags, etc.). Early coordination is also vital for implementing an action plan for management of dead bodies and finally, to disseminate accurate information about how human remains are managed.

EFFECTIVE LOCAL COORDINATION

As soon as possible, and in accordance with existing disaster preparedness plans, designate the Medical Examiner from the County Medical Examiner's Office as the local coordinator with full authority and responsibility for the management of dead bodies.

- Establish communication, liaison if possible, with regional and national coordinators with authority for management of the dead.
- Appoint individuals to be in charge of one or more function(s) and give them the corresponding section in this chapter:
 - Storage
 - Identification
 - Information and communication
 - Disposal
 - Support for families
 - Logistics and communication
 - Security

INFECTIOUS DISEASE RISKS

Overview

After most natural disasters, there is fear that dead bodies will cause epidemics. This is wrongly promoted by the media, as well as some medical and disaster professionals. The political pressure caused by these rumors causes authorities to use unnecessary measures like rapid mass burials and spraying 'disinfectants'. The consequences of mismanagement of the dead include mental health impacts and legal problems for relatives of the victims. Dead bodies do not cause epidemics after natural disasters. The surviving population is much more likely to spread disease.

Infections and dead bodies

- Victims of a nuclear detonation are killed by injury, fire or radiation exposure – not disease.
- At the time of death, victims are not likely to be sick with 'epidemic causing infections' (plague, cholera, typhoid and anthrax).
- A few victims will have chronic infections in their blood (hepatitis or HIV), tuberculosis, or diarrheal disease.
- In a dead body, most infectious agents die within 48 hours and decline in numbers during this passage of time.

Risk to the public

- The risk to the general public is negligible because they do not touch dead bodies.
- Drinking water with dead bodies in it can cause diarrhea due to fecal contamination.

Risk to body handlers

- Individuals handling human remains are at minimal risk through contact with blood and feces (bodies may leak feces after death). Possible contaminants include
 - Diarrheal disease.
 - Hepatitis B & C (much less likely)
 - HIV (much less likely)
 - Tuberculosis (extremely unlikely)
- Body recovery teams work in hazardous environments (collapsed buildings and debris) and may also be at risk of injury and tetanus (transmitted via soil).

Safety precautions

- Simple precautions will considerably reduce any risk to body handlers.
- Basic hygiene protects workers from exposure to diseases spread by blood and certain body fluids. This includes:
 - Use gloves if available
 - Wash hands with soap and water after handling bodies and before eating
 - Wash and disinfect all equipment, clothes and vehicles
- Face masks for protection against infectious diseases are unnecessary, but should be provided if requested to avoid anxiety. Face masks (N95 or better) should be worn if bodies are still contaminated with radioactive dust.

RISKS ASSOCIATED WITH RADIATION

Bodies that arrive at the Medical Examiner's office from medical settings have almost certainly been *decontaminated*. Bodies that arrive covered in dirt and dust directly from the field are likely to be contaminated. However, in the absence of pieces of radiocontaminated shrapnel, the contaminated dust from fallout is not likely to radiate pathologically significant amounts of radiation. For example, physicians and nurses are advised to address victim's *serious* wounds before decontaminating their patient. Having said this, use common sense precautions to minimize worker exposure to radiation.

A Disaster Mortuary Operational Response Team (DMORT) should be requested if a significant increase in dead bodies comes to Ventura County. The DMORT program has two Disaster Portable Morgue Units (DPMUs). While one is on the east coast, the other is located in San Jose, California. This portable repository contains a complete morgue with designated workstations for each processing element and prepackaged equipment and supplies. Request the Weapons of Mass Destruction (WMD) DMORT Team which has the capacity to decontaminate between 5 to 50 deceased persons per hour.

Also, the Radiation Emergency Assistance Center/Training Site (REAC/TS), an asset of the Department of Energy (DOE), can provide technical advice and assistance regarding the handling and disposition of radiologically contaminated remains. REAC/TS can be accessed through the Public Health DOC (which calls the Region, then the State, etc.).

Once a victim has been removed from the site where he has been contaminated, it is unlikely that radioactive dust will present any significant hazard to body handlers who are wearing protective gear. Doses to individuals who performed these functions at Chernobyl were in the range of 1 rem (10 mSv).

Internal contamination may occur through inhalation, ingestion or wounds. Radiotherapy patients with a comparable degree of internal contamination have shown little capacity to harm health care workers as long as protective clothing is worn. Following autopsy performance on such patients, pathologists have received doses of less than 0.5 rem (5 mSv).

Highly radioactive shrapnel presents a potential risk to body handlers. The Medical Examiner should arrange to have assigned to him, and train with, a local radiation safety specialist(s) who would be available during a radiation disaster. The radiation safety specialist's job would be to screen incoming cadavers for the presence and degree of radiation contamination (as well as take measurements around the morgue area for contamination). Radioactive shrapnel should be handled with instruments only, deposited in shielded containers ("pigs") and kept in secure locations.

Autopsies of highly contaminated cadavers should be limited to the absolute minimum. When near-surface measurements are in the range of 0.1-1.0 mGy/hour, it is advisable to split autopsies up among several individuals.

Remember to use Time, Distance and Shielding when handling, recovering and storing dead bodies.

Minimize time spent in contact with radioactively contaminated bodies.

Always maintain distance from bodies, and storage areas of contaminated bodies.

Utilize shielding to create a barrier between yourself and contaminated bodies. The danger of radiation is primarily on the dust that may coat the deceased.

Removing the clothing from a body will remove 90% of external radiocontaminants. Washing a body's hands, head and hair, will remove most of the remaining contamination.

Bodies may be covered with radioactive dust and debris or contain embedded shrapnel that is radioactive. Plastic, sheets, body bags all provide protection from having the dust and debris spread onto you. PPE utilized for protection from normal infection vectors will provide protection to the worker from contamination with radioactive dust and debris (from inhaling it or getting it on your skin) as well, though it will not keep radioactivity emanating from a source from reaching your body. Storage areas may be contaminated from storage of nuclear blast victims. Water used to clean victims, or laboratory and storage area surfaces should be allowed to drain in the usual manner.

The handling of radioactive bodies should be performed by a minimum number of personnel. This group will require monitoring by dosimeter and records kept on cumulative as well as daily dosages received. Body handlers will be considered occupationally exposed and should be limited to the occupational dose limit of 5 rem per year (50 mSv). Just in Time (JIT) training will be provided to all personnel assigned to these tasks. Job Aids will be

distributed that outline individual safety precautions, as well as follow up testing for exposure.

The radioactivity of dust and debris diminishes rapidly. The radioactivity of dust from fallout decreases by 90% after just seven hours. After two days, there should only be 1% of the original radiation remaining. After two weeks, areas in the morgue that have been contaminated by dust from victims exposed to radioactive fallout should be habitable again.

All the accepted procedures for recovery, identification and disposal of remains shall be utilized. The WHO (World Health Organization) and The Pan American Health Organization have created these procedures in reaction to many natural disasters that occur around the world.

BODY RECOVERY

- This part of the process can be key to identification.
- Body recovery often lasts a few days or weeks, but may be prolonged following very large disasters.

STORAGE OF DEAD BODIES

Overview

- Without cold storage, decomposition advances rapidly
- Within 12-48 hours in hot climates, decomposition will be too advanced for facial recognition
- The objective of cold storage is to slow the rate of decomposition and preserve the body for identification
- Note: It may be more important to use refrigeration for food storage than for dead bodies when resources are limited

Storage options

Whichever storage option you use, each body or body part should be kept in a body bag or wrapped in a sheet before storage (for example a plastic sheet or bed sheet).

Refrigeration

- Refrigeration is the best option
- Refrigerated containers can be used to store up to 50 bodies
- Enough containers are seldom available at the disaster site and alternative storage options should be used until refrigeration becomes available

- Bodies should be kept between 2°C and 4°C (35.6F to 39.2F)

Temporary burial

- Temporary burial provides a good option for immediate storage
- Temperature underground is lower than the surface, thereby providing ‘natural refrigeration’
- Temporary burial should be done by:
 - Digging a trench at least 5 feet deep and at least 50 yards from water sources
 - Leave 2 feet between bodies
 - Lay bodies in one layer only (not on top of each other)
 - Clearly mark their position (and identification number) above ground

Ice

- Normal ice (frozen water) should be avoided where possible because:
 - In hot climates ice melts quickly and large quantities are needed
 - Melting ice produces large quantities of waste water that may create environmental concerns due to diarrheal disease. Treating this waste will create additional management issues
 - The water may damage bodies and personal belongings (e.g. identity cards)

Dry Ice

- Dry ice (frozen carbon dioxide CO₂) should be avoided where possible because:
 - Large quantities are needed (more than 20 pounds per body per day)
 - It can damage the body because it is much colder than normal ice (minus 78.5°C)
 - It can cause ‘cold burns’ if touched without proper gloves.

IDENTIFICATION OF DEAD BODIES

Overview

- Mobilizing forensic resources may take several days. This means that early opportunities to identify bodies may be lost as the bodies decompose.

- Visual identification or photographs of fresh bodies are the simplest forms of identification and can maximize early non-forensic identification.
- Forensic procedures (autopsies, fingerprinting, dental examinations, DNA) can take over after visual identification of bodies or photographs becomes impossible.
- The early work of non-specialists will determine much of the success of future identifications by forensic specialists.
- Assistance in providing victim identification will be available from the DHS/NDMS in coordination with the HHS/ASPHEP which will provide fingerprinting, forensic dental, and forensic pathology/anthropology methods.

General principles

- Sooner is better for victim identification: Decomposed bodies are much more difficult to identify and may require forensic expertise.
- The key steps are unique reference, label, photograph, record and secure.
- It should be appreciated that visual identification and photographs, while simple, can result in misidentification following mass fatality natural disasters.
- Injuries to the deceased, or the presence of blood, fluids or dirt, especially around the head, will increase the chance of misidentification.
- Any separate body part, recognizable as coming from a specific part of the body, should be managed as though it is a whole body

Processes

Unique reference (mandatory)

- Assign a sequential unique reference (number, place and date) to each body (or body part). Reference numbers must not be duplicated. The place and date refer to the where and when the body is found.

Label (mandatory)

- Write the unique reference on a body tag (or card) with a permanent marker then securely attach it to the body (or body part).
- The same unique reference must be written on the container for the body (or body part) e.g. body bag, cover sheet or bag for the body part.

Photograph (mandatory)

- The unique reference must be visible in all photographs.

- If available, digital cameras allow for easier storage and distribution of photographs.
- Clean the body sufficiently to allow facial features and clothing to be properly represented in the photographs.
- In addition to the unique reference, the photographs should include at least:
 - A full length of body, front view
 - Whole face
 - Any obvious distinguishing features
- If circumstances permit, or at a later time, additional photographs can be included, with the unique reference:
 - Upper and lower part of the body
 - All clothing, personal effects and distinguishing features
- When taking photographs, the following should be specified:
 - Blurred photographs will not be useful
 - Photographs must be taken close to the body; when photographing the face, it should fill the whole view finder
 - The body should be at right angles to the camera. For example, a photograph of the whole body taken from the feet will be distorted. A photograph of the whole body should be taken from beside and above the body.
 - **The photograph must include the visible unique reference (number and place and date)** or an identification made using the photograph may not be matched with the correct body
 - If available, digital photographs are easier to store and distribute

Record (mandatory)

- If photos have been taken, record the following data together with the unique reference. (A form should be secured or developed for use by body recovery workers, ambulance and hospital workers):
 - Gender (confirmed by look at the genital organs)
 - Approximate age range: infant; child; adolescent; adult; elderly

- Personal belongings (jewelry, clothes, identity card, driver license, etc.)
- Obvious specific marks on the skin (e.g., tattoos, scar, birthmark) or any obvious deformity.
- If no photos have been taken, also record:
 - Race or skin color, if not altered by decomposition
 - Height
 - Color and length of hair
 - Color of eyes

Secure

- Personal belongings should be securely packaged, labeled with the same unique reference and stored with the body (or part). (mandatory)
- Clothing should be left on the body

IDENTIFICATION AND RELEASE OF BODY TO RELATIVES

- To increase the reliability of visual identification, the viewing conditions should try to minimize emotional stress.
- Although there may be no alternative following large disasters, the psychological impact of viewing dozens or hundreds of bodies may reduce validity of the identification.
- Viewing photographs of the highest possible quality may be a better approach.
- Release of a body:
 - A body should only be released under conditions which will not present a radiation-exposure threat to anyone
 - A body should only be released when identification is certain
 - Visual identification should be confirmed by other information such as identification of clothing or personal effects
 - Information collected about missing people can be used to cross-check visual identification
 - A body should only be released by the responsible authority, who must also provide documentation of the release (a letter or death certificate)

- Record the name and contact details of the person or relatives who claimed the body together with the body's unique reference
- Bodies that cannot be recognized by visual identification, should be properly stored until forensic specialists can investigate
- Care should be taken before releasing bodies which are not whole as it may complicate subsequent management of body parts

INFORMATION MANAGEMENT

Overview

Local authorities bear primary responsibility for the proper handling of information on the dead and missing in disasters.

A large amount of information is collected about the dead and missing, even after relatively small disasters. Necessary resources (human, technical and financial) for the management of this information must be provided.

Management of information is a key role for coordination.

Organizational arrangements

- Information centers should be established at regional and/or local levels.
- Local centers act as focal points for the attention of the public, particularly for receiving tracing requests, leaving photographs and information about the missing and for release of information on persons found or identified.
- A national system for management and coordination of information should centralize all information on the dead and missing in disasters.
- Data should flow in both directions between the national and local level.

Information for the public

- The population should be promptly informed about the response:
 - Searching for the missing
 - Recovery and identification of the dead
 - Collection and release of information
 - Support for concerned families and communities
- Data can be provided through the local or regional centers

- A wide range of media can be used:
 - The Internet
 - Notice boards
 - Newspapers, television, radio

Information about the deceased

- Basic information must be collected about all human remains when possible. Early data collection may use paper forms and may be entered into an electronic database at a later stage.
- Information is likely to include valuable personal items and photographs
- A chain of custody is required to avoid misplacement and availability of evidence.
- Centralization of information on the dead and missing in disasters is essential for increasing the possibility of finding a match between tracing requests for the missing and available/known information on the dead.

LONG TERM STORAGE AND DISPOSAL OF THE DEAD

Overview

- All identified bodies should be released to relatives for disposal according to local custom and practice.
- Long term storage will be required for remaining unidentified bodies.

Method of disposal

- Burial is the most practical method as it preserves evidence for possible future forensic investigation
- Embalming by injection is generally not a hazard to the embalmer if there has been no autopsy. Embalmers should wear protective clothing and radiation safety staff should be present
- Cremation of unidentified bodies should be avoided for several reasons:
 - Cremation will destroy evidence for any future identification
 - Large amounts of fuel are needed (usually wood)
 - Achieving complete incineration is difficult (partially incinerated remains often have to be buried)

- It is logistically difficult to arrange for a large number of dead bodies
- Cremation carries the potential to release radiocontaminated materials into the environment
- If the radionuclide has a short half-life, cremation in a few weeks may be an option

Location of burial site

- Careful thought must be given to the location of any burial site.
- Soil conditions, water table level and available space must be considered
- The site should be acceptable to communities living near the grave.
- The site should also be close enough for the affected community to visit
- The burial site should be clearly marked.

Distance from water sources

- There are no standard recommendations for distance of graves from water sources.
- A proposed minimum distance is 50 yards from ground water sources (e.g wells). This may have to be increased based on local topography and soil conditions
- Studies of cemeteries suggest that graves present a low risk of groundwater pollution.

Grave construction

- If possible, human remains should be buried in clearly marked individual graves.
- For very large disasters, communal graves may be necessary but every effort should be made to avoid this.
- Prevailing religious practices may indicate preferences for the orientation of the bodies (i.e. heads facing the East, or Mecca, etc.).
- Communal graves should be a trench with bodies placed in one layer, 2 feet apart.
- Each body must be clearly marked at ground level.
- Although there is no standard recommendations for grave depth, some suggest:
 - Trenches or graves should be between 5 feet and 9 feet deep
 - There should be at least 5 feet between the bottom of the grave and the groundwater table

- These distances may have to be increased depending on soil condition

COMMUNICATIONS AND THE MEDIA

Overview

- Good public communication contributes towards a successful victim recovery and identification process.
- Accurate, clear, timely and up-dated information can reduce the stress experienced by affected communities, defuse rumors and clarify misinformation.
- The news media (TV and radio, newspapers and Internet) are vital channels of communication with the public during mass disasters. Journalists, both local and international, often arrive soon after the disaster.

Working with the media

- Generally, most journalists want to report responsibly and accurately. Keeping them informed will minimize the likelihood of inaccurate reporting.
- The Medical Examiner does not have an independent responsibility to deal with the media. **All** contacts with the media must be *cleared* and *coordinated* in advance with the Joint Information Center (JIC) located at or through the EOC.
- Engage creatively with the media:
 - a PIO will be appointed locally by the EOC

Working with the public

- An information center for relatives of missing and deceased should be set up as soon as possible.
- A list of confirmed dead and alive should be made available, and details of missing individuals recorded by Red Cross.
- Information should be provided about the processes of recovery, identification, storage and disposal of human remains.
- Arrangements for death certification may also be explained.

Working with relief agencies

- Humanitarian workers and relief agencies, including the United Nations, have direct contact with affected communities and act as a source of local information.
- Aid workers are not always well informed and may give conflicting information, especially about the infectious risks of dead bodies.

- Providing correct information to aid agencies will further help reduce rumors and misinformation.

Information management

- Care is needed to respect the privacy of victims and relatives.
- Journalists should not be allowed direct access to photographs, individual records or the names of victims. However, authorities may decide to release this information to help with the identification process.

Soon after the disaster, a decision must be taken whether to provide information about the number of victims or not. The disadvantage of this is that these estimates will undoubtedly be wrong. The advantage is that 'official' statistics may prevent exaggerated reporting by the media.

Principles of Support to Families and Relatives

- The deceased and the bereaved should be respected at all times.
- The priority for affected families is to know the fate of their missing loved ones.
- Honest and accurate information should be provided at all times and at every stage.
- A sympathetic and caring approach is owed to the families throughout.
- Mistaken identification should be avoided.
- Psychological support for families and relatives should be considered.
- Cultural and religious needs should be respected.

Identification of victims

- A family liaison focal point should be established, to support relatives.
- Families should be informed about findings and identification of their loved ones before anybody else.
- Families of the dead and missing must be given realistic expectations of the process including recovery and identification of remains, methods and timeframes.
- Identifications should be conducted as speedily as possible.
- Children should not be expected to aid in visual identification of corpses.
- The need for relatives to view the bodies of their loved ones as part of the grieving process should be respected.

- Once identified, bodies should be released as swiftly as possible to their family's next of kin.

Cultural and religious aspects

- Advice and assistance from religious and community leaders may be sought to improve understanding and acceptance of the recovery, management and identification of the dead. Fire and law enforcement chaplains and trained clergy may be used for this.
- Undignified handling and disposal of human remains may further traumatize relatives and should be avoided at all costs. Careful and ethical management of human remains, including disposal, should be ensured. Every effort should be made to respect religious and cultural sensitivities.

Emotional support

- Psycho-social support should be adapted to needs, culture and context and should consider local coping mechanisms;
- The County's Trauma Response Network is available to counsel family members of the deceased;
- Fire and law enforcement chaplains and trained clergy are available to assist the Medical Examiner's office in performing death notification;
- Local organizations such as the Red Cross, NGOs and faith groups, often can provide food, medical and emergency psycho-social care for those affected;
- Priority care should be given to unaccompanied minors and other vulnerable groups. Where possible, they should be reunited and cared for by members of their extended family or community.
- Material support may be necessary for funerary rituals, such as burial shrouds, coffins etc.
- Special legal provisions for those affected (i.e., speedy issuing of death certificates) should be publicized within the affected communities.

(From: Management of dead bodies after natural disasters: A field manual for first responders; Editors: Oliver Morgan – London School of Hygiene and Tropical Medicine, Dana Van Alphen – Pan American Health Organization/World Health Organization; July 2005)

SECTION 13. MENTAL HEALTH AND TRAUMATIC STRESS FOR FIRST RESPONDERS, HEALTH CARE PROVIDERS AND THE GENERAL PUBLIC

(Borrowed liberally from “Psychological Aspects of a RDD/IND Event”, Department of Homeland Security Working Group on Radiological Dispersal Device Preparedness, Medical Preparedness and Response Sub-Group, 5/1/03 Version)

An attack involving the release of radiation will create uncertainty, fear, and terror. Following the intentional detonation of a nuclear bomb, the management of acute psychological and behavioral responses is likely to be second in importance only to the direct effects of the nuclear explosion itself.

Radiation, an invisible, odorless, and poorly understood threat, has been a cause of extreme public anxiety in the past, as demonstrated by the public’s response to the Three Mile Island, Chernobyl and Goiana, Brazil accidents. In the aftermath of the event, the public must rely on health care providers and scientists to determine who has been contaminated. The effects of radiation can manifest in individuals years after the exposure and may have consequences for future generations, though for the most part these two concerns are often exaggerated and misunderstood. Those who have been exposed or fear they may have been exposed may experience feelings of vulnerability, anxiety, and lack of control.

Affected individuals fall into one of three groups: those who are distressed; those who manifest behavioral changes; and those who may develop psychiatric illness. *General health care providers should manage these patients.* Some individuals may exhibit behavior changes such as decreasing travel, staying home, refusing to send children to school, and increasing substance use and abuse. Fortunately, for the vast majority of people, distress and psychological and behavioral symptoms related to the exposure will diminish over time.

In the aftermath of the Oklahoma City bombing, nearly 40% of those who developed post-traumatic stress disorder and depression had no previous psychiatric disorder.

Following the Chernobyl accident there has been a continual decline in the health and psychological well-being of the local people that is not radiation related. Non-cancer health effects seem to be related to the physical and psychological stresses that remain from the accident. Many unrelated major and minor health problems can be anticipated to be blamed on radiation effects following a nuclear event.

The severity of the psychological effects of the accident is worsened by the public's mistrust of politicians, government and scientists. Skepticism is worsened by the failure of experts to convey information about the health risks of radiation in a way that is both factual and comprehensible. These feelings are further magnified by the concern that living and future offspring are at increased risk for genetic disorders and cancers. Both duration and intensity of stress and anxiety following the Chernobyl accident have been shown to be correlated to the presence of contamination. This is further intensified by the disruption experienced from evacuation and relocation.

The significance of non-radiation effects cannot be overstated. In a study about the psychological development of Byelorussian children exposed in utero to radiation in the Chernobyl accident compared to children from non-contaminated areas, no differences could be related to the radiation itself but a significant correlation was found linking emotional stress in children to anxiety among parents.

Local, State and Federal spokespeople may play a major role in diminishing psychological trauma in the population if, from the very beginning, they can provide credible, consistent and comprehensible information concerning the event.

Prior technological disasters, terrorist attacks, and use of novel weapons in the context of war suggest that healthcare providers' offices, medical clinics, and hospitals will be deluged with symptomatic and asymptomatic patients seeking evaluation and care for possible contamination following a radiation event.

Following a radiological event, people will turn to their own healthcare providers for information and guidance. Healthcare providers will play a key role in determining how patients and the general public respond to a radiological event. A well-organized, effective medical response will instill hope and confidence, reduce fear and anxiety, and support the continuity of basic community functions.

By agreement, if agencies, hospitals, or employers do not have their own internal response structure, the psychological support systems for first responders, including health care professionals, will be made available and coordinated by the CISM (Critical Incident Stress Management) Coalition. On the other hand, the psychological needs of the general public will be met by the Ventura County Behavioral Health Department with an assist, when requested, by other community agencies participating in the Department's Trauma Response Network.

FIRST RESPONDERS

Guidance for Managing Stress

First responders may also experience fear. There may be: absenteeism, flight and dereliction of responsibility. Many first responders will feel that they need to protect or evacuate their families. Ensuring that first responders understand radiation, how to protect themselves, and the available medical countermeasures, can minimize role abandonment.

The various first responder agencies should have dedicated liaisons between their officers and workers, and their families. The Red Cross has booklets targeted toward responders' families.

Pre- and post- event educational documents outlining the common symptoms of stress and stress-induced behaviors should be distributed to supervisors to alert and remind them of stress-related symptoms among staff. The pre-event materials should be distributed on an on-going educational basis and should be incorporated into the educational curriculum at orientation training for new supervisors and managers in all first responder organizations.

Post-event, the materials for distribution should go to supervisors and managers at the sites listed in Table 11. Ventura County and City First Responders FAX #s.

Table 11. Ventura County and City First Responders FAX #s

<u>First Responders</u>	<u>Fax #, usual</u>	<u>Fax # during event</u> (if changed)
County Fire	XXX-XXXX	
Sheriff's Department	XXX-XXXX	
Simi Valley Police	XXX-XXXX	
Oxnard Police	XXX-XXXX	
Ventura Police	XXX-XXXX	
Port Hueneme Police	XXX-XXXX	
Santa Paula Police	XXX-XXXX	
Oxnard Fire Department	XXX-XXXX	
Fillmore Fire Department	XXX-XXXX	
Thousand Oaks Police	XXX-XXXX	
Camarillo Police	XXX-XXXX	
Moorpark Police	XXX-XXXX	
Ojai Police	XXX-XXXX	
Santa Paula Fire Dept.	XXX-XXXX	
Ventura City Fire Dept.	XXX-XXXX	
Port Hueneme Federal Fire	XXX-XXXX	
American Medical Resp.	XXX-XXXX	
Lifeline Medical Transport	XXX-XXXX	
Gold Coast Ambulance	XXX-XXXX	

Activation of CISM

Critical Incident Stress Management (CISM) interventions can be provided via different structures depending on the size of the event and needs of the first responder and his affiliated agency. These include provision of educational materials designed to frontload individuals on the impact of stress, individual counseling, group demobilizations, defusings and formal debriefings. All interventions under CISM must be available at non-traditional hours to best meet the needs of first responders who are subject to such factors as shift work and staffing variations.

First responders who require CISM or feel that a co-worker is in need of CISM should contact their department director, manager or supervisor.

Department directors, managers and supervisors bear the responsibility for identifying/recognizing significant incidents that may qualify for stress management services of first responders. When an incident is identified as a critical incident or crisis, a request for debriefing or other level of intervention should be made as soon as possible to **Ventura County Fire Protection District's dispatch at XXX-XXXX**. The dispatcher will take the information and notify a program coordinator immediately.

Table 12. Mental Health Contacts

Lead agency backup:	Phone
Behavioral Health	XXX-XXXX
CISM Lead Chaplains/Critical Incident Responder	XXX-XXXX or 911
Ventura County EAP Program Administrator	XXX-XXXX

Ventura County Emergency Medical Services (EMS) will serve as the Lead Agency for the CISM Program during a disaster. The phone number of EMS is XXX-XXXX. If all else fails, CISM can be contacted by calling the Departmental Operating Center of the first responder, or the EOC. The designated CISM Program Coordinator and/or CISM Clinical Director will work directly with the requesting party to establish the appropriate level of response, activate the plan and coordinate resources.

The job description of the CISM Program Coordinator during an event is to:

- Oversee the functioning of the CISM Program
- Represent the CISM Program before service and community organizations, and the news media
- Answer requests for CISM assistance or other programming
- Evaluate requests for debriefings (counseling, or better said, unburdening or listening to) of first responders
- Dispatch the CISM Team
- Provide debriefing of the debriefers when necessary or requested
- Solicit support from appropriate agencies including those within the County system and neighboring counties
- Hold periodic team meetings

- Maintain quality control
- Maintain records of team activity
- Update lists of CISM resources during an event
- Provide for the instruction of stress management training for volunteer emergency service providers during event

The Clinical Director is responsible for overseeing the delivery and quality of the counseling services. The clinical director's specific job description is to:

- Offer quality assurance for professional CISM Team members
- Represent the CISM program before the public, professionals and governmental agencies
- Monitor the debriefing process
- Assist the Program Coordinator in establishing protocols and acceptable intervention strategies for all levels of response
- Review reports and records of the team
- Arrange follow-up debriefing services as necessary
- Offer clinical support and guidance to the Program Coordinator and Team members.
- Assure the proper level of service delivery to each location requested
- Maintain an up-to-date referral network of community mental health professionals with the experience to provide appropriate care to first responders. Coordinate access to care as necessary
- Respond to EOC or DOC requests as necessary

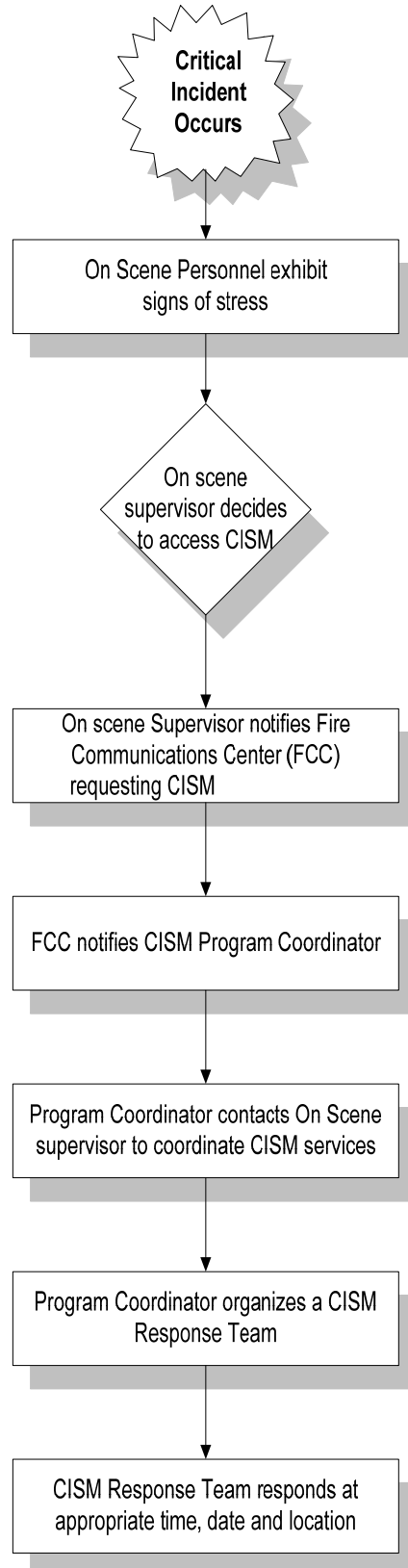
Guidance for Supervisors

- Supervisors and personnel going off shift should prepare the workers on the new shift for what they will see, hear, smell, feel, and touch.
- “Capture” the name of everyone who sees remains in mass settings like the morgue, including visitors, dignitaries, outside supervisors and consultants for later contact and follow-up.
- It diminishes psychological stress of seeing children’s bodies if visible reminders (e.g., toys, drawings) can be removed first.

- First responders who have emotional difficulty with their task often do not want to be dismissed, which may contribute to a sense of failure in an activity for which they felt a “calling”. Assign them to another task in which they can contribute, but do not use the individual’s desire to continue to work as the sole factor determining assignment of duties.
- Send workers home for food and sleep whenever possible.
- Pair workers with a buddy to help combat potential overwork and provide mutual, ongoing support.
- Every individual has different motivations and a different way of approaching the task of working with the burned and wounded, and handling bodies. Supervisors should not require the same actions of everyone.
- As much as possible, allow people to work in an area of their choosing and, if desired, to vary their tasks so they can adjust their exposure to the stress of seeing and handling the burned, wounded and the dead.
- Workers may be fearful of radiological contamination and diseases that might be carried by the exposed -- living or dead. Supervisors should discuss protective measures against radiological hazards as well as protection from diseases.
- Monitor the type and length of exposure to the many morbid things one might encounter in such an event. Recommend rest periods for volunteers and professionals. Do not allow an individual to work longer than 12 hours except in an emergency.
- Watch for workers who become overly zealous or dedicated to their task, working to exhaustion; they are at increased risk for later disability.
- Provide a rest area with food and beverages, shade with facilities for rest, washing and showering, and protection from news media and onlookers.
- Encourage workers literally to get off their feet during breaks.
- Diminish stress by engaging workers in conversations of their choosing – not necessarily concerning their feelings about their workplace or of the disaster scene. Talking about the events of life, not death, is central to mental health recovery.
- There should be a medical follow-up procedure for all workers to check for signs of disease or effects of unknown hazards and, most important, to learn of workers’ concerns about such effects.

- Encourage workers to develop a mindset in which they do not personalize the ill and the dead they are working with or identify with them. Dealing with personal effects of victims' family photographs in a purse, for example, is one of the most difficult aspects of body management.
- Advise workers – especially those who have volunteered for the task with minimal training – not to personalize or identify with the bodily remains of victims or with the circumstances or environment in which the tragedy occurred. Human faces and hands tend to evoke strong personalization. Therefore, it is better for personnel to focus their gaze on other parts of the body such as the chest.
- A routine psychological assessment at three months in seemingly well workers is advisable.
- Workers should be warned that reminders of the dead may be disturbing to them for a while and that this is natural.
- Opportunities to educate supervisors and the spouse and significant others about the experience of those working with the injured and the dead will increase the opportunity for talking and support.
- Assistance for first responders who may have their own post-incident 'stress' or anxiety should be referenced. Support via "buddy care" or peer support following the trauma of disaster response seems prudent.

CISM Activation Flowchart



Health Care Providers

Mental Health Care

By the nature of a nuclear event, health care providers assume the role of first responders and so their psychological and stress related needs will be addressed by CISM.

Notify the CISM Coalition to gear up for provision of services to health care first responders.

Health care providers may experience fear and terror. There may be: absenteeism, flight, refusal to see patients, and dereliction of responsibility. Many health care workers will feel they need to protect or evacuate their families. Ensuring that health care workers understand radiation, how to protect themselves, and the available medical countermeasures, can minimize role abandonment. Health care providers are more likely to provide patient care if they believe that their families will be taken care of in their absence. The availability of ongoing telephone contact with families and *dedicated personnel to assist first responders' families* will be reassuring to health care providers and help them focus on their mission.

Send information to health care providers about the effects of radiation, its long term side effects and the risks of cancer to themselves. Discuss concerns about carrying harmful radiation home to one's family members from the worksite. Discuss the guilt that providers may feel when they cannot treat everyone, are unable to do as much as possible for their patients under difficult circumstances and must make decisions about who they can and cannot save. Remind providers of the importance of sleep, and how fatigue and exhaustion aggravate fears and worries, and worsen performance.

Public Health will coordinate, as requested, appropriate internal or external behavioral health resources designed to provide tiered level debriefings to address mental health concerns. Debriefing sessions or other levels of intervention must be conducted by trained professionals in critical incident debriefing.

Public Health should ask hospitals to establish a communications liaison dedicated to staff members who are concerned about their own families.

THE GENERAL PUBLIC

Early Psychological Interventions

Early psychological interventions (psychological first aid) are provided in the first hours, days, and weeks after exposure to a traumatic event.

The term "worried well" should be avoided because it is seen as a disparaging designation.

Since psychological concerns will be so common following a nuclear detonation, even among those nowhere near the blast site nor the fallout, and since so many symptoms will be blamed on exposure, primary care providers (PCPs) must manage these patients. No mental health system will have the capacity to deal with so many people. PCPs should begin

their visits with the question, “Is this visit related to terrorism or radiation exposure?” They should try to assign a degree of exposure to their patients through testing (see chapter entitled; *Health Care Providers and Medical Management Following a Nuclear Disaster*) but more likely through a history of proximity to the blast site and exposure to fallout. It will be important to distinguish between those concerned about potential exposure and those who have a non incident-based psychological dysfunction.

A radiation event has the potential to yield a large number of psychological casualties. The initial reaction will be shock and fear. Many people will exhibit higher levels of anxiety rather than psychotic behavior. Expect cases of Post-Traumatic Stress Disorder (PTSD) and anxiety. These are natural reactions to radiation events. Assess patients for PTSD, depression, anxiety and increased use of tobacco, drugs and alcohol. Patients should be assigned to a risk category of low, medium or high (thus avoiding the term “worried well”) based on their degree of exposure, and the presence or absence of symptoms or underlying disease. Victims should then be treated, followed-up and educated as appropriate.

Symptoms should be recognized and discussed by the physician and not ignored. Frequent follow-up visits should be planned.

Patients should be given brochures, fact sheets and literature concerning radiation exposure and self-management of medically unexplained symptoms.

Individuals with greater degrees of psychological acuity could benefit from centralized access points to more qualified staff such as Ventura County Behavioral Health (VCBH) Disaster Response personnel. These staff would be mobilized by the VCBH Director/DOC liaison.

Principles of Psychological First Aid for the Public

- Reduce physiological arousal – encourage rest, sleep, and normalization of eat/sleep/work cycles.
- Provide food and shelter in a safe environment.
- Orient survivors to the availability of services/support.
- Assist in locating loved ones.
- Keep families together and facilitate reunions with loved ones.
- Provide information and foster communication and education.
- Observe and listen supportively to those most affected.
- Decrease exposure to reminders of the traumatic event.

- Advise decreased watching/listening to media coverage of overly traumatic images and sounds.
- Educate public to check rumors with available information resources.
- Use established community structures to encourage social conduct and education.
- Encourage talking to and involvement with the person's natural social supports such as family, friends, neighbors, and coworkers.
- Offer reevaluation if symptoms persist.
- Educate about the expected natural recovery that occurs for most people over time.
- Special focus may be given to better support specific subgroup populations such as elderly, youth, and non-English speakers.

Send out PSAs that will inform the public where to learn about, and how to report, the loss of loved ones and the loss of home and possessions. Handouts on radiation that summarize key points and which tell how to get both immediate care and long term follow-up may be helpful in minimizing radiological incident concerns.

Other announcements should address:

- The tragedy and disruption following a nuclear detonation will be prolonged, with sustained levels of distress. Anxieties about the safety or survival of loved ones, uncertainties about jobs and houses—these issues have to be resolved before people can move on.
- A good number of people will be suffering from post-traumatic stress disorder (PTSD). Hallmarks of PTSD are intrusive thoughts and memories, nightmares, flashbacks, dissociation (numbing), insomnia and hypervigilance. Victims benefit from talking about their anguish to someone they trust.
- The days and weeks after a nuclear disaster will be very difficult for most people. Psychological trauma may be severe even if the only nuclear bomb detonation has occurred thousands of miles away. Following a major psychological trauma, sleeplessness, anxiety, anger, hyperactivity, mild depression, or lethargy are normal, and may go away by themselves with time. If these symptoms are severe or lasting, counseling should be sought.

- Individual responses to a threatening or traumatic event may vary. Emotional reactions may include feelings of fear, grief or depression. Physical and behavioral responses might include nausea, dizziness, or changes in appetite or sleep pattern, as well as withdrawal from daily activities. Responses to trauma can last for weeks to months before people start to feel normal again.
- There are many things that can be done to cope with traumatic events, including:
 - Keep as many elements of people's normal routine incorporated into the disaster plans as possible, including activities to allay children's fears.
 - Be aware that individuals may have fewer emotional resources to attend to their day-to-day conflicts, so it is best to resolve the issues and struggles that they can. Following a disastrous event, old battles may not seem so important.
 - Turn to family, friends, and important social or religious contacts to set-up support networks to help deal with the potential stressors.
 - Let children know that it is okay to feel upset when something bad or scary happens. (The Red Cross has excellent brochures on children and trauma.)
 - Encourage children to express feelings and thoughts, without making judgments.
 - Eat as healthy a diet as possible.
 - Get regular exercise if at all possible.

Trauma Response Network

The National Institutes of Mental Health (NIMH) has developed trauma intervention strategies for the general public. Ventura County has elected to develop a Trauma Response Network to respond to large-scale emotional and psychological needs of the general public. The Network has adopted the basic strategies from NIMH, and has a Trauma Response Policy and Procedure Plan. The network has provided training for about 80 mental health providers.

For members of the **general population** who require the services of the Trauma Response Network (for psychological or emotional intervention), the American Red Cross will assume responsibility as lead agency. Members of the public will learn that these services are available, and where to obtain them, when they call 211 and from Public Service Announcements. When a response is needed, the Emergency Operations Center will contact the Red Cross District Mental Health Coordinator at XXX-XXXX:

- Ask the Red Cross to have the Trauma Response Network set up a phone bank to handle calls from people seeking information regarding unusual behavior of loved ones and to provide information to those cut off from ongoing psychological treatment and medications. Long-term effects, post 72 hours, may include anxiety disorders, depression, traumatic neurosis, insomnia and acute stress disorder.
- Notify Ventura County Behavioral Health to organize its resources and prepare to provide services for large numbers of Ventura County residents.
- Notify the Medical Reserve Corps that their skills in psychological first aid will be needed.

SECTION 14. DECONTAMINATION OF THE GENERAL PUBLIC

Decontamination Centers will be established at Red Cross Reception Centers, on the outskirts of hospital grounds in association with their Assessment Centers, and at other independent sites throughout the county (where it will be called a Decontamination Center) for convenient access by the general population. Decontamination will be supervised, and to the extent possible, run by trained local HazMat teams. Additional support for local HazMat teams should come as mutual aid from other counties and states. The DOE's Radiological Assistance Program (RAP) may also be asked to provide assistance in the decontamination of victims. RAP may be requested through the County EOC (which then requests through the Region and the State).

The routine outlined here is intended to describe how decontamination will be provided at those independent sites established within the county for the general population. However, the general structure and principles described apply to all decontamination efforts following exposure to nuclear fallout, whether that be at a Reception Center, on hospital grounds (as a part of an Assessment Center) or even the individual home.

While the main intervention provided at a Decontamination Center is washing, not everyone will be washed. Access control will need to be established as well as general security. This will best be accomplished by law enforcement officers. If local law enforcement is not available, private security and law enforcement from outside the county will be necessary. Due to privacy, access to the media should be controlled.

Each Assessment Center should have "greeters" deployed at its entrance. The greeter will welcome, ask simple questions, and perform some triage. A severely injured person arriving at a Reception Center or Decontamination Center with friends or family would best be managed at a hospital Assessment Center. After decontamination, a person with a minor injury should be referred to a clinic or Urgent Care Center. Each greeter should be expected to welcome 500 persons per hour. Each Center should have greeters with the capacity to speak and understand English and Spanish and expect to communicate in a rudimentary fashion with people who speak the great diversity of languages spoken in Los Angeles. Handouts with pictorial descriptions of the decontamination process should be made available.

It is important to create the perception of a moving line. This is best accomplished by providing adequate capacity and efficiency, and problem-solving at snags. Compromises may need to be made where equipment is lacking in order to promote line movement. For

instance, in the absence of adequate numbers of monitors, measurement of individuals *after* they have been washed may not be possible.

While waiting for washing, self-decontamination may be provided for with moist paper towels or wipes. Large containers should be placed after this self-decontamination site for paper waste. Such self-decontamination need only be offered to individuals with obvious contamination (dust, dirt, etc.) or to the apparently unsoiled but anxious or fearful.

A number of radiation monitoring lanes should be established just beyond the entrance. Each monitoring lane should process 100 persons per hour. Hand held meters are preferable to portal monitors as they are less prone to contamination.

Monitoring assistants should go through the waiting lines looking for:

- highly contaminated (smudged, soiled) individuals
- families
- individuals with medical problems
- pregnant women
- young children
- non-English speaking
- cultural or religious issues with the monitoring process
- elderly
- exhausted or ill-appearing

As a rule, **families should never be separated.**

The face, hands and feet should be monitored first. If they are negative for radiation, it's not likely there is any additional contamination. The ideal tool for this is the Geiger-Mueller detector with thin end-window or pancake probes. Geiger-Mueller detectors with side window counters are not sufficiently sensitive. Doorframe and portal monitors may also be used for whole surface scanning.

Allow people with no contamination or with levels of contamination below concern to go home or to shelters immediately. Send them home with instructions on showering and for them to continue monitoring television or the radio. (Sample instruction sheets are available in the Handbook for Response to Incidents Involving Radiological Dispersion Devices, prepared by Conference of Radiation Control Program Directors [CRCPD])

If contaminated beyond a set amount, send these individuals to the second station. At this station, steps will be taken to remove the radiation exposure. It is reasonable to **remain flexible** in the decontamination process. The outer layer of clothing should be removed in a concealed tent environment. Jewelry, credit cards and the driver's license should be returned in a plastic bag. A rinse-wipe-rinse-wipe technique may be useful on the hair for rough decontamination. The individual may be resurveyed with either the hand-held monitor or the portal monitor, which at this point in the process is less likely to become easily contaminated. Patients who pass this step may be allowed to finish their decontamination showering at home. Others may go through the decontamination washing in the HazMat tents on site. If the Center becomes congested at the washing step, a nearby hotel may be used for showering individuals with less pressing levels of contamination.

Specific instructions for showering are to: Use warm water and a mild soap; gently wash the exposed skin including the head, hair and hands; and not to use hair conditioner which may fix the contamination.

Re-monitor after showering. (This should be based on availability of resources. Realistically speaking, this is a low priority.)

Once an evacuee has been cleared of any contamination or successfully decontaminated, he or she should be marked as cleared (e.g., wristband).

Arrange for emergency pre-negotiated purchase agreements with cooperating retailers for such things as paper towels, wipes, baggies and folding chairs for the elderly.

Portal monitors should be set at some multiple of background (two or three).

It is unlikely that any person appearing at a community-based Decontamination Center will be so contaminated as to injure a worker. The exception to this rule is for the person who is seriously injured with radioactive fragments in his tissues who may be found in the pre-hospital or hospital setting. These fragments should always be removed with tongs.

For more details about Assessment Centers, monitoring and decontamination, see the chapter entitled, *Hospital Response to Mass Casualties*.

(The authors acknowledge the Centers for Disease Control videoconference, Preparing for Radiological Population Monitoring and Decontamination, bt.cdc.gov/radiation in the preparation of this chapter.)

SECTION 15. PUBLIC INFORMATION

The overarching goal of Public Information is to provide the truth, confront rumors and contribute to the restoration of order.

Pre-event coordination with Los Angeles should take place and result in a prepared Los Angeles County populace. Ventura County planners will meet with their Los Angeles County counterparts with the goal of assuring that Ventura County's concerns for the well-being of their citizens are included in Los Angeles County's plans. Los Angeles County residents will be introduced through various educational modalities to the possibility that their county could fall victim to a nuclear attack. In preparation for such an event, residents will be made aware of and prepared with the following information:

- Everyone should get inside, stay inside and stay tuned.
- Information as to who should and shouldn't evacuate will be made available on EAS stations and all other functioning media. This should be monitored from inside a structure.
- The importance of staying inside a shelter until told to evacuate. People will be more comfortable in their homes than in their cars. Roads may be congested or not moving at all. Everything about the response will be better if people who don't need to be on the road aren't on the road.
- How to safely welcome people into their homes.
- The importance of having a "survival kit" for the family in their vehicle and in their home. Bring food, water, medications, a change of clothing, etc when evacuating.
- The importance and method of external decontamination before evacuating and if, and under what circumstances, this should be done.
- What food and drink should and should not be ingested following a nuclear event.
- How to determine (learn) what route to take should evacuation be necessary.
- How to find a Reception Center or home to relocate to if evacuation is necessary.
- How to find EAS stations in neighboring counties.

- How to decontaminate again on arrival at the destination.
- How to register with the Red Cross and the CDC to document your survival and exposure following a nuclear blast.

The biggest threat to public confidence in government during an emergency is the absence of any information – this gives the impression that the Operational Area is not prepared to handle an emergency/disaster situation and is reluctant to take actions which could relieve anxiety the public might have about the situation. The purpose of risk/threat communications is to disseminate emergency information to the public accurately and rapidly to ensure public safety and welfare.

Following previous radiological emergencies, members of the public took incorrect and sometimes harmful actions due to fear and ignorance. These have included a refusal to purchase products from an affected area, having abortions due to a fear of fetal mutations, and denial to help (house, comfort, etc.) or provide medical care to victims even days and weeks after an event.

Since most domestic terrorist events will occur at the local level, integration and teamwork between Federal, State, and local planners is absolutely critical. State and local authorities retain the leadership role assuring the health and safety of our citizens. Therefore, preparedness and response instructions to Ventura and Los Angeles counties' citizens at the onset of an incident are necessary. The State and Operational Area incident communications authorities are required to contact the Department of Homeland Security (DHS) Public Affairs as soon as possible following a terrorist event. DHS Public Affairs and other Federal agencies will engage with the Operational Area Joint Information Center (JIC) as soon as possible to synchronize the overall incident communications effort, and to provide support and assistance where state and local capabilities have been destroyed or degraded.

On learning of a nearby nuclear detonation:

- The PIO will review the SEMS Multihazard Functional Plan, Management Section, M-53 through M-61, under Public Information Officer.
- The PIO will perform the following function immediately:

Transmit these messages through the OES personnel in the EOC to the EAS System (See The Multihazard Functional Plan, Management Support Document, pages MS30 to MS34 for details):

- Direct public to continue to listen to the EAS stations for accurate and up-to-the-minute updates.
- Tell public who should evacuate and who should shelter-in-place.

- Tell public who should take potassium iodide.
- Give location of Red Cross Shelters.
- Ask public to avoid using land lines and cell phone lines unless absolutely necessary. “If you are called by concerned family or friends, tell them your situation in one sentence and that you are being asked to stay off the line to keep the local communication system open. Imagine people who are trapped under rubble and calling for help with their cell phones but cannot get through because you are having a casual conversation on the phone.”
- If members of the public are wearing clothing contaminated by dust or fallout from the explosion, they should be instructed to take them off, wash themselves and put on uncontaminated clothing. If they are someplace where they cannot wash or rinse off, simply removing soiled outer garments will decrease their radiation exposure by 90%.
- Tell the public how to decontaminate in detail.
- Tell the public **not** to go to the hospital unless they have to be carried there. For all other problems they should go to their doctor, their clinic or an Urgent Care Center.
- Later, when there is less congestion in the phone line systems, encourage the public to call 211 for information. Give the cell phone equivalent of “211” (800 339-9597).

The tools available to the PIO to accomplish effective risk/threat communications are the news release, the public service announcement, the press conference and the news media interview.

A press release has a very specific design, appearance and distribution. A public service announcement is usually pre-recorded for broadcast over radio or television.

Pre-event information tends to take the form of a Public Service Announcement (PSA) unless a number of news media become interested and believe there may be a story of wide public interest.

Post-event, most event-related information is news and takes the form of a press release unless the news media chooses not to cover it in which case the issuing agency puts it out as a PSA.

The primary goal of the PIO will be delivery of continuous and accurate information on the status of the nuclear explosion and subsequent events. This message must be delivered by a small number of designated public officials or trained individuals.

The first release by the designated PIO should include the following message points:

- Expression of empathy, concern

- Commitment and support to on-scene leadership and responders
- Statement of known facts
- Protective measures and current threat condition
- Summarize law enforcement and public safety measures
- Public preparedness recommendations and instructions
- Future plans to brief the public
- Empathy and final message of reassurance

Sustaining messages by Federal, State and local officials must be coordinated and address:

- Protection of population from fallout and contaminated areas
- Evacuation guidance and support to State and local authorities
- Sheltering guidance as necessary
- Medical guidance (treatment, antidotes, prophylaxis, etc)
- Safety of food and water
- Dangers and hazards
- National communications to non-affected areas noting situation and instructions
- Distribution of key instructions for print, web, TV, and radio programming:

Public Service Announcements, as a part of a program of pre-nuclear explosion public education, will be used **before** the event to prepare and educate the population. Public Service Announcements will also be issued **after** the event to provide residents with useful information in regards to danger, food, water, radiation, fallout, etc.

- Public Service Announcements to be used after the event can be created during the pre-event phase, and then modified to fit the current situation. PSA's should be available in Spanish and Mixteco, using existing "Language Bank" resources if necessary. Some examples of PSA's include:
- How to shelter-in-place: Cover all doors, windows and vents with 2 to 4 mil thick plastic sheeting. Cut sheets wider and longer than the openings they are intended to cover. Turn off ventilation system and close exterior vents. Listen to local news.

- Creating a personal and family disaster plan.
- Risks of contamination and exposure to radiation.
- Outside the contaminated area, stay off the roads to reduce traffic.
- How to decontaminate evacuees and welcome them safely into your residence.
- How to decontaminate and care for pets and animals.
- Symptoms of radiation sickness.
- Where to listen for emergency information; the EAS.
- Safety of the food and water system. Outside the impacted area, food inside the home is safe and faucet water may be drunk and bathed in.
- Internal and external contamination issues.
- Radiation risk; protection through distance, time and shielding. Future cancer risk.
- Radiation exposure registry and its importance.
- Use the phone or the Red Cross to find family members. Use the phone sparingly so that lines for emergency response are not clogged up. Have a designated contact person out-of-state that you can notify as to your status as a part of your family disaster planning.
- What supplies should be stored in the home for a disaster. Prepare for fourteen days. DO IT NOW!
- Prepare a disaster kit for your car and your workplace.
- Describe the EOC, who is represented there, how decisions are made. Data is analyzed, synthesized and interpreted there.

In the pre-event phase, the County PIO group should strengthen contacts with and educate members of the media, keeping updated contact information available. Also, the PIO should regularly review procedures to use the EAS, testing it periodically. The public should be encouraged to maintain battery powered or crank radios for reliable information gathering during times of disaster.

Based on experience with nuclear power plants where education of the public has taken place, the following conclusions can be made (Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, Office of Radiation Programs, United States Environmental Protection Agency, May 1992.):

- Most evacuees use their own personal transportation.
- Most evacuees assume the responsibility of acquiring food and shelter for themselves.
- Neither panic nor hysteria has been observed when evacuation of large areas is managed by public officials.
- Large or small population groups can be evacuated effectively with minimal risk of injury or death.
- The risk of injury or death to individual evacuees from transportation does not change as a function of the number of persons evacuated, and can be conservatively estimated using National Highway Safety Council statistics for motor vehicle accidents (subjective information suggest that the risks will be lower).

The County Public Information Officers group should develop a brochure for family members of first responders. The brochure's purpose will be to prepare the family at home for a disaster and to give the first responder's spouse the confidence they need to call their working spouse and say, 'We're all here, we have everything we need, and we're safe. Don't worry about us. Go out there and do your job and be careful.'

Public Information Officers from all involved agencies will meet and work together in the JIC. The lead for the group of PIOs will be the Sheriff's PIO. All information from all public agencies will be reviewed and coordinated through the lead PIO and the PIO group. One useful source of disaster-related educational material for the PIOs is www.ready.gov.

During an event, local Public Information Officers will come together under a County JIC and will work with the Operational Area JIC. The County JIC will provide information such as press releases and press advisories to the Op Area JIC on a regular ongoing basis, as well as liaison to the Op Area JIC.

The County JIC will:

- Issue press releases on a daily basis or more frequently as needed
- Monitor news coverage to ensure accurate information is being disseminated and correcting incorrect information
- Schedule press conferences daily
- Manage press operations for disaster area tours
- Arrange for designated spokespersons and/or conduct interviews themselves; telephone interviews with the media

- As warranted, conduct spontaneous press conferences to answer media questions about changes in ongoing events
- Provide basic facilities to the news media and assist the media in disseminating information and in credentialing media representatives
- Cooperate with the Joint Information System (JIS) which is the body which assures coordination between JICs

The County JIC should have a:

- Research Team – oversees preparation of news releases, daily summaries, media advisories, feature articles, fact sheets and public service announcements
- Media Operations – responds to incoming media calls; provides information on latest developments; answers inquiries; monitors news coverage; manages news conferences; assesses public opinions, beliefs, and current knowledge; and provides background information on response activities
- Logistics Team – ensures all JIC functions operate efficiently and supervises all operational and administrative activities, including staffing and interoffice communications

If staffing is a problem, the County JIC should contact the Red Cross for staffing requests from among volunteers.

Each PIO will maintain and update their Agency's media contacts list with phone and fax numbers and e-mail addresses. If one PIO is sending out a press release for another agency, the other agency should not assume that it will go to all of its usual recipients. The other agency should specifically check the recipient list of the JIC with the sending agency.

Possible outlets for information dissemination during a disaster include:

- Local print media
- EAS stations
- Providing "Ventura" stories to LA based media
- Regularly scheduled press conferences
- Amber alert signs on freeways. Contact the CHP (through the EOC) with specific information to be posted, such as, "listen to the EAS on 1450 AM, 1070 AM and 100.7 FM radio"
- Television
- Town Hall meetings

- Computer web-casting
- NOAA Weather Radio (NWR) broadcast 24 hours a day from National Weather Service, accessed at frequency 162.40 through 162.55 – particularly important for warning people to avoid certain areas (any EAS message is automatically broadcast on this station)
- Social networks

The JIC will arrange for regular press conferences during the immediate disaster period. Examples of news items are:

- Immediate sheltering in place
- Immediate evacuation or avoidance of a specific area. (e.g. fallout)
- Basic facts (e.g. a nuclear blast has occurred...)
- Status of schools -- safety, openings and closures
- Cancellation of public gatherings and sporting events
- Rationing of food, water and utility supplies
- Reports on who is in charge and the decision process
- Broadcasts to public to remain calm. Difficult times are a test of our values
- Status of employment; who should go to work and who should stay at home:
 - Don't go to work in Ventura County unless you're in an essential field. Many people should qualify as essential. Examples include; trucking, food industry, water, police, fire and health. Examples of non-essential jobs; bowling alley, golf courses, movie theaters, sporting goods, beauty parlors, barbers, nail salons, tanning parlors, jewelry, etc.
 - Don't go to work in Los Angeles County unless required to do so to assist in disaster mitigation.
 - Go to work in Ventura County and other non-Los Angeles County neighboring communities after calling to see if your workplace is open, unless roads are clogged with traffic from people who are fleeing Los Angeles.
- Reports on road and transportation conditions
- Location of fallout plume

- Risk of radiation exposure from the blast itself and symptoms of radiation illness
- Risk of radiation exposure from fallout, symptoms and long term cancer risk
- Areas that have been evacuated, and those that may need to be evacuated
- Volunteer needs and assembly points
- Rioting and police response
- Anticipated food shortages and availability
- Forms of communication available post-disaster
- The importance of registering blast victims with the Red Cross
- Accessing medical services. The status of hospitals, emergency rooms, urgent care centers and doctors offices
- Animals; livestock and pets. What to do with them if you have to evacuate
- L.A. victims are arriving in Ventura County. What to do to help them and protect yourself
- How to receive L.A. victims into your home safely
- Explaining health risks based on distance from the blast, size of the blast, and prevailing winds
- Ask public not to flee Ventura County—if you leave there will be added road congestion. The EOC will inform residents if there are any parts of the County that should be evacuated
- Which food and water is safe? Can it be made safe?
- Tell Ventura County residents that the emergency broadcast system (EAS) is found at 1450 AM, 1070 AM and 100.7 FM radio

Means of communications: Within the Operational Area the following communication means are utilized (see the SEMS Communications Plan):

Phone and Fax – During an event when the County EOC is activated, the phone number is (XXX) XXX-XXXX. Alternate numbers include XXX-XXXX and XXX-XXXX. The fax number is (XXX) XXX-XXXX.

Radio – The County EOC uses the VHF radio system. There are 96 channels in all County radios.

Satellite Communications – The County EOC has access to the State’s Operational Area Satellite Information System (OASIS) and can communicate with the state via satellite if other communications are interrupted.

Ventura County Offices of Emergency Services (OES) Website – This website provides public access to information from the County EOC. www.vcsd.org/oes

Runners – If all communication methods are lost, the County EOC will use volunteers and assigned personnel to physically relay critical information between the EOC and various work centers. This method is slow and ineffective and will only be used temporarily until operations are relocated to designated COOP facilities.

SECTION 16. TRAFFIC CONTROL

Any hope of an orderly and smoothly flowing traffic pattern on Ventura County's highways will rely on a rapid and proactive response. As stated in the assumptions section, the following will likely occur:

- There will be no effort to turn back traffic coming from Los Angeles.
- There will be no effort to wash off or decontaminate vehicles entering Ventura County from Los Angeles.
- There will be no effort to screen vehicles for radiological contamination before or as a condition of entering Ventura County. (Law enforcement personnel who are concerned that this approach leaves them open for significant radiation exposure during contact with the public should review the chapter on Safety, Protection and Decontamination of First Responders and the chapter on Health Care Providers. This class of exposure carries very little risk. Law enforcement personnel who are likely to encounter areas that have a high degree of radiation should be provided with alarming dosimeters with preset levels for speedy field dose evaluation. Those that are expected to contact low dose contamination should wear either thermoluminescent devices (TLD) or film badges. In most radiation management environments it is best to wear either a TLD or a film badge **and** a direct reading dosimeter. Law enforcement personnel should not be placed in settings where they are likely to encounter significant radiation exposure.)
- Southbound lanes will not be immediately switched to northbound use. Contra-flow plans may be considered as the evacuation progresses. Emergency response and supply vehicles will have to be able to enter Los Angeles County.
- Generally, law enforcement will refrain from the use of force to prevent persons from traveling southbound to Los Angeles. Law enforcement will prevent individuals from entering dangerous areas (e.g., those with high levels of radiation) when requested to do so by the Unified Command.
- Roadside assistance for repair or gas will likely be unavailable or exhausted. Disabled vehicles will be pushed to the side of the road; traffic must be kept moving. Towing companies and AAA will be asked to do this. Businesses or Agencies with bulldozers may be recruited to help with this: Public Works, Fire Departments, Naval Base Ventura, etc. If traffic is standstill (congealed) or very close to it, some individuals in other cars may volunteer to help push a stalled vehicle off the road.
- Specific declarations by the Governor or the President of the United States will overrule or modify strategy decisions made here.

Ventura County is **not** blessed with a surface street pattern which provides many alternate traffic flow choices to its highway system. Major roads are not over-built and are currently at capacity in terms of handling traffic demands. Alternate routes are not efficient and quickly become gridlocked in commercial & residential zones.

Prevention of gridlock is a high priority and is a major goal of our response. When considering placing signage or utilizing the amber alert systems on the freeways, think about the impact that reading these messages will have on slowing or impeding the flow of traffic. Messages should address only the most important issues and be concise. Public Works can provide a limited number of temporary signs and Caltrans has a limited amount of directional signs available locally.

There are four highways entering Ventura County from Los Angeles – 101,118,126 and 1. Between them there are 8 northbound lanes. Under the best of circumstances, these 8 lanes can carry 250,000 vehicles per day in either direction. Assuming that there are 2 people per vehicle leaving Los Angeles and 2 million people evacuate north, that will mean 1 million cars coming into Ventura County or 4 days for the traffic to clear the County. If contraflow could be affected, this would create a total of 13 lanes heading north which could carry 400,000 people per day. It would take 2 ½ days for that number of vehicles to pass through the County with the additional lanes. It is not clear, though, with the devastation in Los Angeles and the aid that would be needed, that lanes would be able to be reversed for contraflow. Besides, it must be kept in mind that at the northern end of the County, all lanes merge into 2 at La Conchita. This will back up traffic all the way to the San Fernando Valley. (Other choke points where traffic will slow are at highway 1 north of the Los Angeles County line, the highway 23/101 northbound interchange, highway 118 west of Moorpark and highway 101 both north and south of Ventura.

Tactical vehicles might be able to use routes like Guiberson/South Mountain/Balcom Canyon, or Grimes Canyon to get around the middle of the county, but without traffic control in place, they will also quickly become congested. If first responders want to retain these roads, they should establish access control in order to exclude routine and evacuee traffic.

Sections of highway 101 and to a certain extent highway 118 in Los Angeles County just east of Santa Susana Pass Road would present obstacles, both north and south, to large trucks, large equipment and over-height containers due to the low height of some of their bridges. Other counties will want to plan to manage this traffic considering these limitations.)

It should be recognized that several things will have an impact on the traffic pattern. Some of the people coming north from Los Angeles have a destination **in** Ventura County, so they will no longer be on the road. Slowing traffic on 101 will drive others onto the 118 and 126 eastbound in an effort to get to highway 5 north and others still will leave the highway in an effort to wait it out in the cities in Ventura County that are situated along the highway. This will create significant traffic problems in these cities.

It should be kept in mind that the goal for everyone in this disaster is not necessarily to keep traffic moving but to absorb enough of Los Angeles' evacuees to get them away from the

fallout. These two things are related but they are not the same thing. To that end, people leaving congested highways to enter our cities is a good thing. Another major goal is to allow the injured to get to medical care and this is more dependent on the movement of traffic itself. It is hoped that the most seriously injured will have been addressed by the pre-hospital and health care system within Los Angeles County. Triage mentality during a major disaster would place more importance on the avoidance of contaminated fallout by 10,000 people than it would on the lives of 5 seriously injured evacuees.

In anticipation of this unprecedented traffic congestion, it becomes even more critical that evacuees are educated to bring food, water, medication, flashlights, blankets, pillows, etc., before they leave Los Angeles County.

Los Angeles County has 6,000 buses which might be used as a part of their plan to evacuate its citizens. These vehicles operate on compressed natural gas (CNG). Even school buses in Los Angeles are being converted to CNG. These vehicles have a shorter range than diesel. They require special filling facilities. They either slow fill at a rate of one hour per vehicle or fast fill at 10 to 15 minutes per vehicle. The SCAT facility in Oxnard can refuel these vehicles but there are no other filling facilities north of that until San Jose. On highway 5, Bakersfield has no CNG facilities and there are none in Las Vegas either. As traffic may be bogged down heading north along highway 101, it may be impractical to use these vehicles because they may run out of fuel before they reach Oxnard.

Other forms of transportation that might be utilized during a disaster are the railroad (one major track from Santa Barbara most of the way to Los Angeles); at least 8 public transit entities in Ventura County; several school districts that have busses; and other local public and private smaller and specialized transit providers with vans or smaller vehicles.

Planning to exclude single family cars heading northward in an effort to avoid gridlock is untenable. If these vehicles were directed off the highway, there would be no place with the capacity to park them. Furthermore, there is not enough public transportation available to move their occupants further north without a huge bottleneck of people developing. The passengers in these vehicles would be leaving behind their disaster supplies and a fall-back place to sleep as well, thus increasing the burden on whatever community they reached.

Evacuee "Aid" Stations may be set up at key locations. The locations of these Aid Stations should be established ahead of time. As long as traffic is moving at all, these should be out of sight at on/off ramps. These stations would dispense water, snacks, directions and maps, clothing and maintain portapotties. Volunteers may be utilized at these sites. A first responder could supervise volunteers and relay information to the public that has been produced by the PIO, and advise evacuees to listen to EAS stations. In turn, valuable information, both intelligence and health-related, could be gathered from the evacuees by the first responders and reported to the EOC.

If the duration and severity of the event justifies it, and traffic has come to a complete standstill, meals and beverages could be brought down to the highways in carts and distributed to the occupants of the vehicles. The moment traffic began to move again, food

and water carts would be removed from view. Portapotties and clothing would remain along the exits but out of sight from the highway. Evacuees would have to exit to utilize these services. Meals for travelers may be provided by the Red Cross and the Salvation Army but may be provided as well by pre-arrangement with local restaurants or by church and community groups. The Red Cross would be lead agency for these roadside efforts. Again, the better traffic can be kept moving, the more evacuees Ventura County can absorb. The vehicle on the road provides shelter to the occupants and a means of contacting them through the EAS radio stations.

Fuel will likely be a major problem. The County should plan for gasoline shortages. Under normal circumstances, due to the size of Ventura County, a vehicle with even half of a tank of gas can cross the County. This cannot be counted on with major traffic congestion. Most freeway on/off ramps have several gas stations. It may be prudent to restrict sales to 5-10 gallons per vehicle. Some gas stations can limit sales from their pumps with pre-set in-store control devices. Before implementing gasoline rationing, its overall impact on traffic flow must be carefully considered.

Assessment of vehicle occupants can be performed by Red Cross Volunteers along with Public Health staff to determine the services that will be required when evacuees arrive at the Reception Centers. Casual observations of mental and physical conditions need not be time consuming.

Traffic control will require a large number of first responders rapidly. Mutual aid should be tapped early to provide manpower for this. Consider barricades, directional signage and volunteers to free up first responders for other duties. Leave small groups or single officers to supervise volunteers at a location or intersection. Radio contact needs to be maintained at all times. Spontaneous volunteers will come forward – some will be utilized for traffic control. Historically, drivers have heeded directions by volunteers during power outages.

Do not let traffic slow down by answering the same questions repeatedly at the aid stations. Aid Station workers should contact the EOC's PIO about these frequently asked questions so that they may be turned into public service announcements. Keep vehicles moving. Advise drivers to tune radios to the EAS stations.

The CHP will be told by the EOC that they should relay information which would help traffic flow. This could be placed on highway signs, be recorded for content for EAS radio broadcasts and for amber alert signs.

Law enforcement in the field will need up to date information on food availability, gasoline, shelter and other resources.

Reception Centers will be set up by the Red Cross and their locations broadcasted through the media and placed on highway signage. For a proportion of the cars on the road, the reception centers will be their destination. In order to maximize their usefulness and

capacity, the reception centers will require “traffic control” that will consist of efficient use of available space to park cars.

The California Highway Patrol can anticipate the need for a number of messages:

- The 800 number for cell phones to reach “211” (800 339-9597).
- Call “211” for locations of shelters.
- If you have been contaminated, don’t stop to decontaminate. Simply removing your clothes eliminates 90% of the source of radioactivity.
- Please stay off cell phones unless absolutely necessary.
- The radio call numbers of EAS stations.

Remember that evacuees are driving their “shelter” – short term, their car is their home.

SECTION 17. RECEPTION CENTERS AND PRIVATE HOMES

People fleeing or directed to evacuate Los Angeles County during a nuclear bomb-related disaster will need to have a place to stay. This may be a Reception Center set up and run by the Red Cross or it may be the home of a friend, relative or good Samaritan volunteer. Those arriving from Los Angeles to any of these sites may or may not be expected by the Center or the homeowner.

Additional people who are not from Los Angeles County may choose to flee and evacuate north or may be directed to evacuate by local first responders. People in parts of Ventura County, especially south Ventura County, may be subject to flee, with or without official recommendations.

Reception Centers are intended to house and feed large numbers of evacuees on a temporary basis.

Members of the public who are evacuating will need to know where they can find shelter. The location of Red Cross Reception Centers will be available to the public on the EAS System radio stations and posted on signs along the highway. Immediately following the disaster, people will be discouraged from calling 211. People will be asked to not make telephone calls to keep lines open for First Responders and for people in serious trouble (the injured, those trapped in rubble, etc.). Later on in the disaster people will be encouraged to call 211 to get miscellaneous information including housing locations. At that point, the 800 number that cell phones must call to reach the 211 system (800 339-9597) will be repeated regularly on the EAS System radio broadcasts and will be placed on Amber Alert signs along the highways. The Telecommunications Device for the Deaf (TDD) may be used to call 211 by calling 1 805 983-2803.

Members of the public who prefer to find housing with an individual homeowner but have no friends or relatives available in a safe area, may choose to look for housing with a good Samaritan who volunteers space in his or her home. Such good Samaritan offerings spring up spontaneously with all major disasters, usually associated with the establishment of a website. Following Hurricane Katrina, several websites appeared in short order on the internet which listed space available in volunteer homes. These included:

- HurricaneHousingSearch.org/.com and KatrinaHousing.org

- Following a nuclear event in Southern California, some evacuating citizens may find housing at SoCalHousingSearch.xxxxxx.yyyy(This is a fictitious name of a site that might spring up). The Red Cross will vet these housing programs and will refer but not endorse evacuees to those that appear, to the best of its ability, to be legitimate. The public should be aware that due to the spontaneous nature of this support that there will be inadequate vetting of volunteer sites. The public should be aware that they may be taken advantage of by predators.

The 211 physical location will have various liaisons placed there representing the Red Cross, HazMat and Public Health to provide expertise and current information from their parent organizations.

Friends, family and good Samaritans will need information about how to decontaminate arriving evacuees from Los Angeles County. The Planning Branch Chief will ask the PIO to get information about external decontamination to the EAS stations for broadcast to the public. Additionally, individuals fleeing the blast or radiation exposure from its fallout will have two agencies to contact after the refugees are settled. Each evacuee should contact the Red Cross at XXX-XXXX or on their website at disastersafe.redcross.org to report his status as a survivor of the nuclear blast in Los Angeles, his condition and where he can be reached. Others can use this same website to learn the status of a loved one. Also, evacuees who feel they might have been exposed to radiation should contact the CDC at 1 800 CDC-INFO (232-4636) or on their website at www.bt.cdc.gov for long-term tracking, as well as for health-related information and available services and resources.

The Unified Command will establish a Joint Information Center (JIC) so that the Ventura County PIO can share information about Reception Centers, EAS radio stations, etc., with the Los Angeles County PIO for broadcast to Los Angeles County residents.

The Ventura County Planning Branch Chief will contact the Los Angeles County Planning Branch Chief with information for Los Angeles County residents about Ventura County Reception Centers, Ventura County radio station dial numbers for our EAS stations, and the importance of self-decontamination, if needed, **before** beginning their journey out of Los Angeles County. The Los Angeles County Planning Branch Chief will be asked to put this information out to Los Angeles County residents who have been advised to evacuate into Ventura County and points north. Los Angeles County will be urged to broadcast this information over their EAS stations at a minimum, and any other functioning mechanisms of communication available at the time (television, whether by airwave, cable or satellite; 211; call-in phone banks; etc.)

Red Cross Reception Centers should be prepared with radiation detection systems to screen evacuees by either portal or handheld devices and to decontaminate evacuees as needed. These should be set up in conjunction with HazMat. Once an evacuee has been cleared of any contamination or successfully decontaminated, he or she should be marked as cleared (e.g., wristband) by HazMat. Evacuees who pass through the screening and/or decontamination process present no risk to the Reception Center staff.

Red Cross will constantly evaluate its sheltering capacity against the volume of evacuees and create more capacity as needed both within Ventura County and adjacent counties, and counties further north. Currently, Ventura County Red Cross has 143 identified shelter sites in the county with capacities running from 30 to 350 people. University sites can shelter in the thousands. It is believed that the current maximum sheltering capacity in our county is somewhere between 14,000 and 15,000 people. The greatest limitation for provision of this amount of sheltering, for the first 5 days until mutual aid has arrived, is staffing. Additionally, road congealment has the potential to prevent the arrival of food, clothing and other supplies.

Hazmat in Ventura County is planning to provide detection and decontamination for 5 of the Red Cross Reception Centers. For more than 5 Reception Centers, mutual aid Hazmat should be called in. The Red Cross should try to anticipate early on if large numbers of evacuees will be requiring housing as the event unfolds. If so, it should call for additional (beyond the 5 local teams) mutual aid Hazmat teams with as much notice as possible.

Red Cross will be prepared with appropriate medical support for treating or triaging out injured and ill evacuees. Public Health nurses or skilled volunteer nurses should be on site or available to each Reception Center. Certain conditions will be managed at the Reception Center like 2nd degree burns. Patients will be referred for management of more serious concerns such as vomiting within 12 hours of exposure to radiation. The Red Cross should develop an MOU with Public Health for these nurses.

All individuals and organizations involved in housing evacuees will remember that a crime has been committed and to keep their eyes and ears open for either material evidence to that crime or for actual perpetrators or collaborators.

SECTION 18. COMMUNICATIONS DISRUPTION

Because of the potential to damage various communication modalities by direct explosive forces, subsequent fires and electromagnetic pulse (EMP) following a nuclear detonation, redundant communications systems must be a part of any robust communications plan.

Direct damage to communications systems in Ventura may not be necessary for us to experience major disruptions, since the destruction of a section of an integrated system located in Los Angeles can have the same effect as damage here. Major systems, relays and transmission facilities are located in the metropolitan areas of Los Angeles and are at risk of varying amounts of damage if an attack occurs in Los Angeles.

Little is known about damage from an EMP. Effects can only be postulated. It is thought that EMP can damage electronic devices in 2 ways. When in close proximity to the actual detonation, the device can directly pick up the pulse and destroy electronic components of radios, phones, computers, etc. Also, wire lines, acting much like an antenna, can pick up the EMP. It then travels in electric and communications lines, for example, for miles and can destroy equipment attached to them for power or data exchange. This EMP pulse cannot be protected against, like a power surge. Damage to electrical power distribution and communications infrastructure could be considerable. On the other hand, there are those who say that after an electronic device is shut down by EMP, it may recover simply by switching it back on again.

Immediately assess all forms of communications available to the response efforts. A single form of communication that is available countywide should be sought. The communications modality should be chosen according to intactness and in the following order of priority:

- Telephone – landlines and/or cellular. Emergency services have priority lines. All critical disaster responders should have Government Emergency Telecommunications Service (GETS) cards
- Radio – VHF or other governmental systems
- Satellite phones
- ACS (Auxiliary Communications Services) previously RACES – volunteer amateur radio operators
- Internet & email

- Messengers

The Logistics Section Manager will perform timely assessments of the available communications assets within our operational area. He will then designate the primary and secondary communications systems used in that operational period. This information will be shared with all responding agencies.

At the same time, the Public Information Officer (PIO) will determine the availability of the various channels of communication with the general public. The Emergency Alert System (EAS) should be available for immediate use. See Multihazard Functional Plan, page MS 30, for its use.

Table 13. Emergency Radio Stations

Ventura County	KVEN 1450 AM, KHAY 100.7 FM, KMLA 103.7 (Spanish)
Santa Paula Emergency	1610 AM
Los Angeles County	KFI 640 AM, KNX 1070 AM
Santa Barbara County	KMGQ 97.5 FM
San Luis Obispo County	KKJG 98.1 FM
Kern County	KUZZ-AM, 550 AM, KUZZ-FM 107.9 FM

Logistics should monitor the repair efforts to communications systems, providing periodic estimates of restoration and when systems become operational. Status of repair should be made available to the Unified Command and be placed in the briefing information in the operational period plan.

Logistics will immediately focus on sustaining any existing communications systems. Adequate supplies of batteries and battery chargers will be procured and forward deployed as needed. As transitions are made between various forms of communications, coordinate with ACS (formerly RACES) to provide “bridging” service if required.

A high priority is to be placed on a stable, reliable form of communications.

SECTION 19. RAGE, LOOTING AND HOARDING

ROAD RAGE

The congestion on the roads will be associated with the added emotions of fear, grief and even anger. These additional feelings may give rise to angry words, gestures or even violent acts. Some evacuees will believe that it is wise to pack a firearm as part of their disaster kit. Thrown into the mix may well be the supposition or knowledge that certain religious groups are responsible for the nuclear detonation. The stereotypical appearance of drivers in other cars may incite violent behavior in some evacuees.

Experience with a number of major disasters where large populations were expected to evacuate reassures law enforcement that this process will often proceed without violence, even in the presence of massive traffic congestion. However, experiences both in Los Angeles and Ventura Counties indicate that “road rage” is not unknown in this area. These episodes have been reported on the highways throughout Los Angeles during routine rush hours, as well as along highway 33 towards Ojai in the aftermath of storm emergencies. The frustration encountered in those situations will not be anything near the level of emotion experienced if a nuclear detonation occurs in Los Angeles.

LOOTING AND HOARDING

As seen in recent natural disasters, the timely supply of necessities of life is crucial in maintaining human health and optimism, and in demonstrating the resolve of local government and first responders. Supplying food, water, and other basic needs is the highest priority of government. Looting and hoarding of supplies destroys the crucial element of adequate amounts at the appropriate locations for the highest number of people. Current inventories of foodstuffs in local markets amount to several days of supplies for the population. The distribution system relies on continuous replenishment from regional warehouses. This “just enough, just in time” system does not allow for maintenance of large local storehouses or the hoarding of supplies.

Looting following a disaster is not inevitable. Many reputable scholars believe that it is, in fact, uncommon. It appears to be less likely following natural disasters and more likely in association with civil disturbances. In large natural disasters, as in Hurricane Katrina, it may occur as a result of a collective consciousness that the governmental response is inept. But whether the event is a natural disaster or a riot, certain risk factors may increase the likelihood of looting. There is more likelihood of looting associated with a natural disaster – and a nuclear detonation by terrorists would most likely be seen by the affected population

as something akin to a natural disaster – in those affected areas where there is a concentration of disadvantaged people who are exposed on a daily basis to the major differences that exist in lifestyles. Looting will be more likely in a sub-population that accepts that minor theft is a part of everyday life. There will be more chances that it will occur if youth gangs that are involved in frequent serious crime are a part of the daily experience. Instances of corrupt or unprofessional local police forces that have been involved in looting or hoarding have been covered by the media and would likely increase the chances that looting will occur by others.

LOOTING AND HOARDING PREVENTION

It is likely that people in Ventura County will, if not hoard, “stock up” on food supplies following a nuclear detonation in Los Angeles. Grocery store shelves should empty faster than usual in association with such an event. Gas stations and pharmacies also bear an increased responsibility and expectation to continue to provide goods during a disaster.

While shortages early on following a disaster in Los Angeles County appear to be inevitable, there are a number of steps that can be taken to try to lessen its length and severity. People should be told repeatedly to maintain enough supplies in their home to last them at least two weeks. This includes not only food and water but medications as well. Grocery stores, pharmacies and gas stations should be urged to make it a part of their disaster plan to call for re-supply **immediately** upon hearing of such an event rather than waiting until their stock grows low. Unified Command should call for these supplies to be shipped into the County independent of these stores and stations, though these products would be made available to them upon arrival.

Having abundant supplies of food, water, baby diapers, formula and gasoline will eliminate the need to loot or the desire to hoard items that are readily available. Encourage the setting up of streamlined checkouts to lessen the crowds at stores. Government response should supply the necessities in great quantities and in multiple locations, though this may take several days before it begins. Volunteers can be used in these endeavors.

The Federal government has a massive food storage program of canned goods located in salt caves near Kansas City. These may be accessed through the USDA and FEMA. These goods include canned meat, fruits vegetables and juices.

Lessen the temptation to loot by broadcasting PSAs that state all necessities are or will soon be available, the locations for distribution and that any looting will be punished severely.

LAW ENFORCEMENT RESPONSE

The Sheriff's Department should place an individual on the Logistics Section whose sole responsibility is to know, based on contact with first responders in the field; the adequacy of supplies at grocery stores; citizen cooperation and response to the level of available supplies and rationing (if applicable); hoarding; and the potential for rioting and looting.

This individual must anticipate needs of the population and order additional supplies into the County in great quantity, and (two to three) days early. The need for certain supplies like food, medication and gas should be anticipated. These should be ordered ahead of reports of shortages. Ideally, this individual will communicate with the heads of local grocery store chains, and pharmacy and gas station owners and ask them to re-order supplies immediately and without delay. They should be told to report back to Logistics as to the results of their efforts or if they encounter any impediments to their requests.

It is also important that officers in the field, especially those in high risk areas, be regularly updated with information on healthcare, housing, food, lavatories and gas stations.

Law enforcement will have to maintain a high visual presence. The population will likely cooperate with any supply plan as long as they feel it is fair and everyone is granted equal access. Officers can observe the process as well as assure citizens that their cooperation is supporting the response. They will be armed but should avoid pointing weapons unnecessarily or speaking brusquely to citizens. Remember that most of the citizens encountered are not actively looting, and should be treated accordingly. Law enforcement may be the primary dispenser of information and the only contact with government that most citizens have.

While looting is not inevitable in our County, measures should be in place and must be taken to curtail it. Areas with characteristics that place them at higher risk for looting do exist in our County. We have areas of economically disadvantaged people and areas with increased gang activity. Further, it is these areas that have the lowest intensity of supermarkets and large superstores. It is in such settings that more police attention should be concentrated and more care taken to avoid the problem. In addition to this, there may be groups of people of a similar description (poor, gang members) traveling together from Los Angeles County that don't have the same investment in our county as our own citizens do. It will difficult to predict where their presence might turn into looting.

Looters will be immediately arrested; early intervention and establishment of order have proven to be successful in curtailing criminal activity by usually non-criminal persons. The visual deterrent of police arresting looters is a force multiplier, even though it takes police out of the field to book their suspects. Deploy officers to areas of high risk for looting: shopping centers and concentrations of stores, auto dealerships, etc. Keep a mobile force of law enforcement available for rapid response to assist in anti-looting efforts. Consider using mutual aid assets, teamed with local officers & deputies, for these mobile patrols.

If local military forces are available to Ventura County at this time, the presence of armed but friendly soldiers along our highways and in front of stores, gas stations and other high risk targets will go a long way to prevent the outbreak of any violence.

Early in an event, prior to the arrival of outside supplies, it may be appropriate for law enforcement to organize and oversee "supervised looting". If a store has supplies desperately needed by members of the general community (milk, formula, diapers, food,

aspirin, etc.), it may be the most humane thing for law enforcement to open the store and give away needed supplies in an organized, controlled and fair manner. Such “losses” to the store owners should be reimbursable by either insurance or Federal and State monies. Certainly, losses will be minimized if vital items are distributed in this manner as compared to what they would be if indiscriminate looting took place with its associated property damage, theft of luxuries and attendant violence.

If supervised looting is required by order or circumstance, personnel in uniform will not participate in the commandeering of goods and supplies. The image of first responders removing valuable items (food, diapers, etc.) from stores will likely set off similar behavior in the population, and undermine the population’s faith in the response. Any commandeering of foods and supplies should be performed by plain clothes individuals or individuals that are not wearing first responder uniforms. This may be supervised by individuals who are dressed as first responders. Commandeering of food or supplies by first responders will be for the purpose of redistribution to the general population in need at designated sites.

While disaster declarations and our current plan allow for seizing food and fuel supplies, it is better to augment and assist private industry in keeping their outlets open, as well as providing for direct distribution through channels we control.

SECTION 20. PET EVACUATION AND SHELTERING

Many pet owners have a powerful emotional attachment to their animal(s). Some people will provide care of and protection for their pet or livestock equal to that which they would provide for a family member. People have even more complex relationships with service animals (seeing-eye dogs) and with animals used for therapy purposes.

Disaster workers should be prepared to encounter many kinds of animals, both traditional and exotic, during and after an event. Potentially dangerous or feared animals such as tigers, cheetahs, panthers, rattlesnakes, tarantulas and scorpions are all known or rumored to be kept in Ventura County, as well as animals that require a special environment such as monkeys (warmth).

HOUSEHOLD PETS

The burden of pets that are evacuated by their caregivers from Los Angeles County could be enormous. The number of pets that might come to Ventura County could be estimated as follows: 90-95% will take their pets with them; there are three people per household; 70% of households have pets; there are 1.5 pets per household. With an estimated 2,000,000 people fleeing in the direction of Ventura County, some **665,000 pets** might arrive with them. Granted, many of these evacuees will either pass through the County or stay with friends and family in Ventura County along with their pets, so the actual burden on disaster managers in the county will not be as great as calculated. (Ninety-five percent of pets will be dogs and cats with 60% of these dogs and 40% cats. 50% are small pets. There will be “dangerous” breeds of dog including Pit Bulls, Rottweilers and Chows with these breeds expected to constitute up to 30% of the total.)

People traveling with pets must put durable tags on their animals with current and complete information (owner’s name, cell phone number, phone number of host household, etc.).

Based on other disasters, people will frequently try to reenter a restricted zone to attempt to retrieve a pet, or refuse to evacuate rather than leave their animal(s) behind. This type of behavior puts both animal owners and emergency responders at risk.

Red Cross shelters will not house pets for reasons of sanitation and safety. Some evacuees will not use the established Red Cross shelters for that reason. Some individuals will choose to stay in the parking area outside the shelter with their pet and utilize the shelter only occasionally for their own needs.

The Head of Animal Regulation will be asked (via the EOC) to activate its disaster plan. As a part of this plan, Animal Regulation will **co-locate animal shelters next to Red Cross shelters as needed to handle the evacuees' pets**. All animals will be triaged at their intake sites and then sent to appropriate housing.

Our county is part of the State Veterinarian Association which has a disaster plan. This plan can be activated to provide assistance to Ventura County from other, unaffected areas of our state. There may be a delay of up to 72 hours for a full response.

Ventura County Animal Regulation services are requested through the Ventura County EOC. Animal Regulation personnel have radio capabilities to establish and maintain contact with other first responders (government channel 3). They are also equipped with cellular and satellite phones. Animal Regulation assigns personnel to the EOC, Operations section, if animal sheltering or rescue plays a part in a disaster.

People should be advised to wash their pets with the type of dishwashing soap used for hand washing dishes in the kitchen sink (dishwasher soaps used for dishwashing machines can be too harsh) and then to rinse them thoroughly. If the animal is covered in dust, it should be vacuumed off rather than taking the risk of rubbing contaminants into the animal's skin. During vacuuming, all people nearby should wear an N95 mask. Once clean, keep the animals from recontamination by limiting their exposure to other pets and persons that may have been exposed to the contaminants. Vacuum bags should be disposed of in double plastic bags which should be left at the property's fence line. Following vacuum cleaning, an animal should be bathed. Water from bathing an animal should be allowed to run down the drain.

Do not insist on separating people from their animals. Advise them of the restrictions at Red Cross shelters. Develop a list of locations that will provide temporary boarding for their animals, and transmit informational PSA's over the EAS system.

Start the Logistics Section on locating pet food, portable kennels, pet medication and vet services that can be utilized by the evacuating public. Deliver supplies for self-service pick up to locations that are publicized with PSAs and over the EAS system.

Information on how to handle pets during a disaster can be found at the Red Cross: www.redcross.org/disaster/safety/animal.html

or the American Veterinary Medical Association at: www.avma.org/disaster

WILD, STRAY AND DEAD ANIMALS

Stray animals will be picked up and housed at the animal shelter and temporary facilities opened as needed. Dead animals will be handled as advised by Environmental Health, depending upon their contamination level.

All animals are provided medical care regardless of cost.

The DHS/NDMS in coordination with HHS/ASPHEP will assist in delivering healthcare to injured or abandoned animals and perform preventive medicine activities.

Decaying carcasses create biologic waste and attract flies and rodents. They may also cause bad odors and very rarely contaminate groundwater. Animal carcasses should be disposed of to avoid creating a health hazard to other animals or a nuisance to humans. Individuals should dispose of the dead animals by burial or Animal Regulation should be contacted for specific disposal guidance.

The Ventura County Health Officer retains the flexibility to dispose of animal carcasses through burial by the homeowner on their private property. The Health Officer will consult with HazMat in making this decision.

It is extremely unlikely that medications will be made available to treat animals that are showing signs of Acute Radiation Syndrome.

Announcements should address the following:

- Be cautious of wild or stray animals. They may be disoriented and dangerous following a disaster. When safe to do so, try to confine such animals without running the risk of being bitten. Call Animal Regulation.
- People residing in Ventura County during a nuclear disaster are requested to keep their animals either indoors or, when outdoors, on a leash.

SECTION 21. AGRICULTURE CONSIDERATIONS

If fallout from the detonation of a nuclear bomb in Los Angeles County arrives in Ventura County, it has the potential to affect livestock and the quality and marketability of farm products. Milk, soil and crops from farms in the affected area will be monitored and sampled for possible contamination, and farmers will be notified of any special precautions necessary. The agricultural community in the affected areas will receive specific instructions through their organizations and the media. These instructions will be based on recommendations by local and State officials from the California Department of Health Services (CDHS)-Food and Drug Branch and its sister branch related to radiological health, and the California Department of Food and Agriculture. Local authority of the Agricultural Commissioner to prohibit the harvest of any lot of produce or seize and hold any lot of produce derives from Section 5551.(b) – 5555 of the Food and Agricultural Code (FAC). The Agricultural Commissioner will work with the FDA under ESF #8 in taking these actions.

For countermeasures to be effective in avoiding human exposure, they must be imposed immediately, even before levels of contamination are measured.

Countermeasures that should be taken immediately include:

- Provide dairy animals and poultry with shelter, stored feed and protected water supplies. In Ventura County there is virtually no stored feed or protected water for animals (e.g., watering troughs, ponds). If there is word of a nuclear detonation anywhere nearby, feed should be moved inside barns or other structures or covered with tarps. Water that can be covered; wells, rain barrels and tanks; should be covered. Piped water and well water will not be contaminated
- Place other livestock on feed and water as above, and shelter, if possible, after provisions have been made for dairy animals
- Thoroughly wash crops brought in from a contaminated area; green vegetables exposed to contamination should have outer layers removed
- Cease field work. After radiation levels are measured in the fields, workers in some fields may be advised to wear protective clothing (like that worn for pesticide applications)

Broadcast PSA's publicizing the above four points.

The main consequences of heavy concentration of fallout on crop and pasture lands include:

- Farm workers may not be able to manage and cultivate land safely for some time because of radiation hazard.
- It may not be advisable to permit animals to graze, because of the danger of radiation.
- Fresh fallout would provide surface contamination on all plants, resulting in potential hazard to human beings and animals consuming them.
- Radiation from fallout deposited on the leaves or the ground may damage the crop.

The protective actions farmers may be asked to take result from the concern that livestock could eat contaminated feed and water, absorbing radioactive isotopes into their bodies and ultimately passing this contamination into the food chain. This process eventually could contribute to exposure in humans from the ingestion of contaminated products.

Notify the Agriculture Commissioner about possible impending radiation risks to Ventura County agriculture and ask him/her to disseminate the above information to county farmers.

Notify the head of the Farm Bureau in Ventura County about possible impending radiation risks to local agriculture and ask him/her to disseminate the above information to local farmers. The Farm Bureau can communicate with its members using bulk mailing. It also has an Integrated Voice Recognition System with a FAX-back feature. The farmer can call an 800 number and get a FAX back.

Notify the Ventura County Agricultural Association (VCAA) about possible impending radiation risks to Ventura County agriculture and ask him/her to disseminate the above information to county farmers.

Notify the University of California Extension Service about possible impending radiation risks to Ventura County agriculture and ask him/her to disseminate the above information to county farmers.

Notify the Brand Inspector to stop shipping local production for processing.

Farmers will be permitted to return to care for their animals as long as radiation levels are considered safe. They should be considered emergency workers.

State and Federal officials will work with farmers and farm organizations to determine whether products are safe and whether or not to market them.

The ESF #8 ensures the safety of regulated foods, drugs, biologic products and medical devices following a nuclear disaster. It will arrange for the seizure, removal and/or destruction of contaminated products. This service is provided by the HHS through the Food and Drug Administration (FDA).

Suspected contamination on fruits and vegetables would mean that the produce must be checked before it is marketed. If fruit and vegetable crops are contaminated, they may be able to be washed. Rinsing with water is the most effective method of cleaning garden foods. Roots and tubers are not effected by surface contamination. The normal cleaning or peeling of vegetables such as potatoes and carrots should be adequate for removing contamination.

Farmers should be encouraged to have back-up generators for their crop refrigerators.

A nuclear detonation will produce fallout that contains different isotopes depending on what radioactive material was used to create the bomb. Some isotopes have short half lives and others have very long half lives. Depending on the half lives of the isotopes that contaminate a given field and how much fallout was deposited on the field will influence how long or if ever the farmer may work his land again. The land could in fact be so radioactive that it would be unsafe for humans to spend time working it on a regular basis.

Fallout could affect pasture grass and forage crops and make them unusable. Fields with very light fallout would be usable immediately. Heavy fallout would spread radioactive particles on the crop and might cause visible injury or even death to the plants. The radiation taken up by the plant would, at certain levels, present a health risk to the animals. Officials will be available to measure individual farms so that farmers have specific information with which to make decisions. If a survey indicates high levels of radiation, that crop might be removed as close to the ground as possible and not used. Growths after that should be measured for radioactivity. Seriously contaminated land may need to lie fallow for an unknown period. The USDA will advise as to when the land can be farmed again and suggest crops that have less of a tendency to pick up radioactivity.

Washing plants with water is the best way to clean them of fallout before consuming them. Roots and tubers absorb little contamination if harvested before the fallout is mixed with the soil. Routine cleaning or peeling of underground vegetables like potatoes and carrots is adequate to remove contamination. Ripe fruits may be lost because of the personal dangers involved in harvesting them.

Workers should not be allowed to enter the field until authorities have stated that it is okay to do so.

There are soil treatments that may be used on the land but they may vary depending on the isotope(s) deposited there. Authorities will inform farmers if and what soil treatments are available after they have completed their studies.

Aside from agricultural concerns, other consumables which tend to concentrate radioisotopes to toxic levels include wild game, mushrooms, berries and fish from lakes.

MANAGEMENT OF LIVESTOCK

Animals, like people, will need to be decontaminated. Fallout is dangerous to cattle, sheep, horses, pigs and other livestock. Accumulated fallout can give off gamma rays which penetrate the body. This can cause radiation-related disease in animals. If the fallout lands on the animal itself, it can suffer skin burns. This would be uncomfortable but would not necessarily kill the animal. Fallout is also dangerous to animals because if it is eaten on feed, the internal radiation can cause organ damage. Aside from acute illness, it can cause cancers and possibly genetic damage. The absorbed radiation in meat and dairy animals will eventually wind up in man's food supply. If farm animals must graze on contaminated land, their internal exposure can be significantly limited by feeding them adequate quantities of uncontaminated hay.

Livestock contaminated by fallout may be washed off with water. This should be done in an area where the runoff can go into a stream or creek that drains into the ocean. Animals that die from their exposure may be buried in the usual manner but if not previously decontaminated, should be washed off with water. After washing, they may be buried according to the usual protocol (Simi Landfill).

Livestock sheltered in barns during a deposition of fallout will experience reduced amounts of external radiation, will not have fallout settle on their coats, and will not eat contaminated feed. Therefore, the best way to protect livestock is to move the animals indoors before the arrival of the fallout. Milk cows should be prioritized for shelter, clean feed and water. During this time, the calves should be placed back with their mothers. Once fallout begins to come down, farmers, for their own safety, should not attempt to protect their livestock any further until told by authorities that it is safe to do so.

Acceptable water sources include automatic livestock waterers, covered wells, tanks, cisterns, or freely running springs. River water and pond water are less safe but if necessary may be used after the fallout has stopped. If it rains, livestock should not be allowed to drink the pond water for a few days. Fallout particles would settle to the bottom of the pond relatively quickly.

Cover exposed grain before the fallout arrives. A haystack could be covered with a tarp. Grain stored in permanent covered structures like bins, barns and silos is safe for the livestock to consume. Contaminated feed may eventually be able to be used but this should be postponed until told by authorities that it is safe to do so.

Milk cows that have no other alternative but to eat contaminated feed should **not** have their milk consumed by children. The amount of radioactivity in their milk will gradually diminish once they are back on clean feed.

Poultry should be placed under shelter and given uncontaminated feed and water. Hens that eat contaminated food will produce eggs that have detectable radioactivity. Once

removed from the contaminated food source, the radioactivity will rapidly disappear from the eggs.

In the past, Animal Regulation has activated a plan for livestock utilizing the fairgrounds facilities as well as coordinating offers of help from fellow livestock owners. Equine and other livestock owners, stables, farms, and property owners, utilize an informal network of assistance when necessary to care for each other's animals during disasters. Animal regulation has 4 trailers which can accommodate 500 animals total. Other facilities in the county that could be used include the old Honor Farm and unutilized dairies and stables. The above mentioned network of agricultural people own and volunteer the use of their specialized equipment and trailers to move livestock in a safe manner. Animal Regulation has several trailers for this use.

Animal Regulation has about 100 volunteers competent mostly to work with large animals. If more volunteers were necessary to address all needs, the Director of Animal Regulations would request these through the EOC.

DOMESTIC ANIMALS THAT ARE RUNNING LOOSE OR INJURED

As Operation Centers (EOC and DOC's) become aware of animals that are blocking traffic, or endangering lives, property or necessary resources (eg, water supplies, etc.), notify Animal Regulation.

Announcements should address the following:

- Domestic animals may escape or be killed in disasters. Escaped animals may wander onto land where they could:
 - contaminate water supplies
 - cause a build-up of manure
 - overgraze sensitive ecosystems
 - cause damage to crops

Additional information pertaining to "Fallout and Protecting Yourself, Livestock, Land and Crops" may be found at <http://www.radshelter4u.com/index3.htm> .

For more information please see: Radiological Emergency Information for the Agricultural Community:

<http://www.nysemo.state.ny.us/PIO/publicsafety/radiologicalforagriculture.asp>

The main document is:

<http://www.nysemo.state.ny.us/PIO/publicsafety/radiological.asp>

Additional information may be found in, Department of Homeland Security Working Group on Radiological Dispersal Device (RDD) Preparedness, Medical Preparedness and Response Sub-Group, 5/1/03 Version, Table #5, page 12.

Numerous techniques for minimizing uptake of marketable plants involving soil amendments are known and can be found in such documents as: Nuclear Energy Agency, Organisation for Economic Co-operation and Development, Chernobyl Assessment of Radiological and Health Impacts, 2002 Update of Chernobyl: Ten Years On, 2002, 99-108.

SECTION 22. NUCLEAR RESPONSE TRAINING NEEDS

A number of training needs should be addressed both before and after any nuclear explosion which has an impact on Ventura County. Training will be required for the following categories of individuals: first responders, volunteers and the public.

FIRST RESPONDERS

- Ventura County will have an ambitious drill plan with regular exercises, addressing the various responses mentioned in this document. A particular focus will be placed on communications.
- Ventura County must send various first responders to other disasters as they occur in the nation².
- This Nuclear Explosion Response Plan should be reviewed and revised after each exercise.
- Mandated training should focus on topics related to disaster preparedness.
- Educate the family members of first responders during the Training Academy Family Orientation Program to know what will be expected of them during a disaster. Between this training, the training of the first responders themselves and pamphlets created for the families of first responders, at least one major goal should be achieved: Create a person at home who will be able to tell his or her first responder spouse; "We're all here, safe, comfortable. We have enough to eat and drink for at least fourteen days. Just do your job, don't worry about us, and come back home safe and healthy." The American Red Cross has a booklet available for families that addresses when the first responder returns home.
- Roll call training should include educational elements about the issues related to a nuclear event in Los Angeles (e.g. risks associated with contact with a radiation exposed individual, etc.).

² Efforts to find these real life training opportunities should be the responsibility of both the OES and the individual agencies.

VOLUNTEERS

Prior to and after a nuclear detonation there will be a number of concerned individuals who volunteer to help.

- Those individuals who volunteer to help during disasters before an event should be directed to join a local DART Team (Disaster Area Response Training) or CERT Team (Citizen's Emergency Response Team) or be referred to the Red Cross. DART and CERT Teams perform light search and rescue in their own communities, secure their neighborhoods, report damaged utilities and provide first aid to injured neighbors. DART Teams also have a response role with the Sheriff.
- Health professionals and paraprofessionals who express interest in volunteering for disaster work prior to a disaster should seek to have their credentials approved and available. Both a Statewide and a local program of credentialing are being established. The interested health worker should have applicable documents available including picture identification.
- The Red Cross accepts volunteers for disaster training prior to disasters (as well as afterwards).
- Faith-based groups also organize for disaster response both as local churches, temples, etc. and through their national organizations. The local Mormon Church has one such program for its own members.
- There will be a need for individual meals during this disaster. Church groups, community-based organizations, restaurants and groceries should be recruited and organized to provide these as directed. The American Red Cross is the lead agency for this. Eligibility for reimbursement for the provision of meals by local restaurants by FEMA and the State as part of the county's overall disaster response should be researched by the County's Office of Emergency Services.
- During and after a disaster, a number of spontaneous volunteers will appear. These individuals should be referred to the Red Cross for intake, training and assignment. The Red Cross will open its Spontaneous Volunteer Intake Center to process these volunteers and either match them with requested needs or place them in team openings.
- Health professionals and paraprofessionals should be referred to the Operations Section of the Public Health Department's DOC for credential verification and assignment.

- The Operations Section of the EOC will have a liaison from the Red Cross (which will also represent VOAD – Voluntary Organizations Active in Disaster) present during a nuclear detonation response. Operations will also either have liaisons or maintain close contact with CERT (through the Fire Department), DART (through the Sheriff), the MRC (Medical Reserve Corps through Public Health), Public Health, and faith-based groups. In this way, the Operations Section will remain apprised of manpower resources available throughout the County and be able to communicate manpower needs as they arise.
- Public employees throughout the county should be expected to undergo disaster response training as part of their disaster service worker designation.

THE PUBLIC

- Training of the public is synonymous with public education. This will be accomplished through press releases, media interviews with knowledgeable first responders, and press conferences. See “RESPONSE COORDINATION”, for a complete discussion of methods and strategies.
- Business leaders (e.g., VCEDA) should serve as a liaison to the business community to promote education related to disasters and encourage volunteerism among employees (e.g., CERT, etc.).
- Advantage should be taken of the days, weeks and months designated for various disasters such as Earthquake Preparedness Month. Public service announcements which increase public knowledge should be released at these times.
- A robust pre-nuclear explosion public education program is planned for release in Ventura County in January of 2012.

SECTION 23. RECOVERY AND RESTORATION OF SERVICES AND UTILITIES

Four stages to the recovery and restoration of services and utilities follow a disaster as described in this Playbook:

- Mitigation Stage
- Preparedness Stage
- Response Stage
 - Emergency Phase (the early phase)
 - Transition Phase (the intermediate phase)
 - Recovery and Maintenance Phases (the late intermediate phase)
- Reconstruction and Long-term Recovery Stage (the late phase)

MITIGATION

Mitigation requires that major factors that could cause problems in a disaster be assessed before a disaster occurs and that conditions and factors that increase risk during potential events be addressed. Building disaster resistant communities is a key part of mitigation. Mitigation is also education. Education should be based on an assessment of community perceptions; their understanding of existing risk factors; their attitudes toward government officials and agencies; their beliefs about the likelihood that governmental representatives would act in their best interests; and their likelihood to respond appropriately to instructions regarding public safety.

PREPAREDNESS

Preparedness includes the regular activities which assure that resources are in place to respond to a disaster. This includes ongoing reassessment of mitigation needs. Department Operations Center plans are an important part of preparedness. Establishing a staff call-tree, linkages with the County Emergency Operations Center, and Public Health's broadcast fax system are all examples of preparedness.

RESPONSE

Disaster response can be broken into several component phases: emergency, transition, and recovery and maintenance. The response phase includes all efforts to respond to and return to normal functions. Alternative and/or temporary facilities and resources will have been established and will need to be maintained until permanent structures and institutions are in place.

Emergency Phase (The early phase)

This beginning period is characterized by an active contaminated plume, fires, etc. Field measurement data are limited or unavailable, yet immediate protective action decisions are necessary. Besides a moving plume, risk of exposure to deposited materials and inhalation of radioactive dust should be included in this phase.

The Emergency Phase is oriented toward saving lives. It focuses on search and rescue, provision of first aid, and hazard assessment. A nuclear detonation is a disaster that is very short-term, though the emergency phase may last for some time (e.g. rescue of individuals from building rubble, fires, etc.). The search and rescue aspect will likely be minimized within Ventura County proper, but the need for first aid and hazard assessment (e.g. radiation detection) may well be significant. Anticipate that the emergency phase will last about four days.

- After all of the public initially shelters in place, the next priority of this phase is to notify the public in Ventura County and parts of Los Angeles County who it is that needs to continue to shelter-in-place and who may now evacuate, and by what routes. It is unlikely that the first orders to evacuate will occur before four or five hours. These recommendations will be based on available information (little), assumptions (many) and verifiable reports like wind direction and speed and highway conditions. The safety officer and the health officer will determine areas requiring sheltering and evacuation and broadcast and publish this immediately.
- Open the Emergency Operation Center (EOC).
- Notify State and Federal authorities about the nuclear detonation. (Don't assume that this has been done. It probably has been, but don't assume it.)
- Launch all appropriate Department Operations Centers.
- Secure radionuclide analysis of detonated nuclear material to assist doctors in their patient management.
- Determine whether certain segments of the population need potassium iodide (KI) prophylaxis. Set up PODs to distribute KI as needed.
- Determine need for and establish health kiosks (eg., along highway exits) at critical sites.

- Establish need for and deploy field medical services and hospitals.
- Establish need for and implement shelters for people with special needs.
- Notify local PIO to release information directing our citizens to locations for assistance and available programs, as well as other relevant educational information.
- Establish triage, radiation detection and decontamination outside of all hospitals (Assessment Centers).
- Direct clinics and Urgent Cares to extend their business hours.
- Direct staff to conduct overall assessments and resource allocation.
- Coordinate plans with Red Cross and other emergency services providers.
- Track radioactive (fallout) plumes and post real-time plume location and direction on the web.
- Coordinate with state OES and FEMA to implement their assistance programs.
- Be prepared to provide emergency services (medical, food supplies, law enforcement, etc.) in the absence of information technology if computers are not functional or technology becomes a rate-limiting step.

Transition Phase (The intermediate phase)

The transition phase is the bridge between the initial response to the disaster and the beginning of recovery. Parts of transition will follow the early phase within as little as a few hours up to a week and begins after the initial events that have been set in motion (the plume, fires, injured in the field) have been brought under control. Since fires will not necessarily be extinguished at exactly the same time as the fallout plume has settled out, intermediate activities will begin at different times.

In this phase, protective actions may be taken based on some field measurements of exposure and radioactive materials. The primary response to the initial event will get underway and activities for transitioning to recovery will begin. Immediate needs will be met, and assets established that temporarily replace damaged infrastructure, resources, staff, etc. In this phase temporary hospital facilities may be set up that might be in place for weeks or months until permanent facilities can be repaired or replaced. Temporary communications links are in place, and work-around travel routes may detour damaged roadways.

- Plan for distribution of federal Strategic National Stockpile resources
- Establish field hospitals (e.g., at Oxnard Airport)

- Assess environmental status, e.g., water, air, sanitation and garbage
- Look for evidence of looting and respond appropriately
- Establish person registration to identify survivors and their whereabouts (Red Cross)
- Identify food needs by quantity and location
- Establish supplemental and emergency food delivery operations
- Identifying available health and mental health staff and deploy them as needed
- Assess and plan for re-establishment of supporting information technology for communications systems, healthcare and business
- Respond to the need for interventions to help people deal with PTSD and ongoing stressors that could impair daily functioning
- Provide essential public services such as housing, power, gas, water, postal, prescriptions etc.
- Identify residual hazards
- Establish and enforce access restrictions for Ventura County and in cooperation with law enforcement from Los Angeles County
- Educate the public how to deal with potentially contaminated evacuees from the Los Angeles area
- Develop plan to continue the process of reinstating family autonomy
- The Public Health Department will issue interim guidance on risk and protective actions by monitoring air, water, food, and soil quality, vector control, and environmental decontamination, in conjunction with response partners
- Consider restoration of financial institutions one of the transition phase priorities and dedicate resources to help them to be back online in hours
- Set priorities for recovery and business phase activities

Recovery and Maintenance Phases (The late intermediate phase)

The goal of the recovery and maintenance phase is to provide a bridge to re-establishment of normal operations, and to do so within a pre-established period of time.

The essence of this part of the response is to actively support and encourage the roadways, housing, food distribution, educational, healthcare and business activities to return to

normal or near normal as soon as possible. Some aspects of recovery may be expected to proceed more efficiently and rapidly than others. Business in Ventura County will return to near normal more rapidly than housing, since there will be no rapid solution to destroyed and contaminated housing in Los Angeles County. Healthcare services may return to pre-event flow and capability in a relatively short period following the emergency phase depending on ongoing pressures from the sick and wounded, contamination issues in healthcare facilities, especially in Los Angeles, and outside capacity to absorb local healthcare demand (out of state hospitals that accept burn patients, etc.). If the available housing in Ventura County absorbs greater occupancy by evacuees from Los Angeles who permanently or semi-permanently relocate here due to contamination at their homes, healthcare as well as other businesses in the county may see a permanent increase in volume. As with the emergency phase, a continuity plan needs to be documented, maintained and exercised. The following activities will occur in this phase:

- Assess roadway congestion and moderate roadway flow patterns to minimize traffic
- Assess the environmental status of facilities so that people can return to work as soon as possible
- Adjust healthcare expectations away from trauma response and trauma recovery toward ongoing therapeutic referrals for those who need assistance
- Provide assessment and direction to Ventura County farmers in regards to land and water use, crop harvesting and sales, and planting
- Repair damaged infrastructure
- Transition from emergency operations to restoring a good level of daily operations particularly in critical areas
- Conduct economic and social assessment of the status of communities and plan to return them to normal activities
- Modify and update a 24-hour help line through agreement with the County's 211 service provider
- Mitigate radiation-related hazards such as bagged, contaminated clothing and contaminated vehicles
- Implement and coordinate recovery and relief plans with the nonprofit sector and nongovernmental relief organizations and with all levels of government
- Estimate economic impacts
- Further minimize business disruptions

- Re-open schools
- Provide individuals and families with appropriate levels and types of relief with minimal delay
- Public Health, with Emergency Medical Services (EMS), will conduct post-event planning and operations to restore medical and public health services
- Continued emphasis will be placed on returning the local economy to normal functioning

RECONSTRUCTION AND LONG-TERM RECOVERY (THE LATE PHASE)

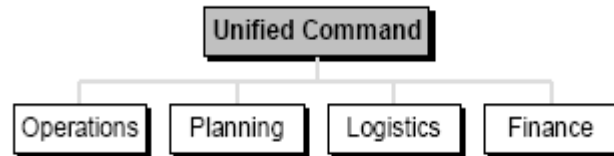
The late phase begins when Los Angeles and Ventura Counties have red-lined those areas which will be uninhabitable for a prolonged period and have designated the areas where clean-up efforts may prove to be profitable. This process involves convening stakeholders and technical subject matter experts who will identify and evaluate the restoration of affected sites.

This stage is oriented toward the reordering and reopening of activities, communications, utilities, roads, and general physical environment. It includes recovery and cleanup actions to reduce radiation levels in the environment to acceptable levels. Public Health goals will include addressing long-term chronic health issues and concerns, and the protection of children and other sensitive populations. Economic and social objectives will be to minimize disruption to businesses and communities, maintain property values, and the protection of culturally and historically important landmarks and resources. The return and normalization of critical airports and seaports to pre-event function is of importance for convenience, commerce and national security. For public well-being, there must be a restoration of hospital capacity, water treatment and sewerage system capabilities, the protection and recovery of personal property, and the assurance of adequate food, fuel and power. This stage blends with the recovery and maintenance phase (the late intermediate phase). The goal of this phase is to return, as quickly as possible, to pre-disaster levels and quality of operation. Time and information will be available to make considered and collaborative decisions. It ends when all recovery actions have been completed. This phase includes such activities as:

- Assessing long-term needs for supportive services
- Establishing plans for deployment of necessary staff and resources
- Conducting assessments of the vulnerability of, including assessment of opportunities for future risk reduction via improved construction, placement of facilities, etc.
- Assessing the long-term impact of lost work on the economic and social well-being of County residents and the County as a whole

- Debriefing on the event, and engaging in quality improvement planning
- Continually update needs and capacity assessments
- Keep in mind the goal of our efforts is to enable the resumption of normal community, educational, economic, health and business activities to the end of restoring a physically and mentally healthful environment for our citizens and those who have been displaced from our neighboring county.

SECTION 24. UNIFIED COMMAND



CONCEPT OF OPERATIONS

The objectives of this response are:

- Take all reasonable actions to protect the public and minimize the radiological and non-radiological (eg, physical, mental) health effects
- Protect emergency responders
- Gather and protect information that will be useful in managing health effects and for law enforcement purposes
- Establish and maintain public trust in the response
- Lay the groundwork for an extended response

Unlike natural disasters, a disaster resulting from a terrorist incident is also a crime scene.

IMMEDIATE PRIORITIES FOLLOWING A NUCLEAR DETONATION:

Normally the Unified Command/OES would not have its own “to do” list following a disaster. In this case, some issues will be both so important and so time sensitive that they will require direction and coordination from the Unified Command:

- ☐ As a first act, OES notifies the Sheriff, plume mappers and the National Weather Service/Oxnard of the likelihood that there has been a nuclear detonation.
- ☐ OES notifies Fire and the Health Officer when plume mappers and National Weather Service/Oxnard have been successfully notified.
- ☐ The Unified Command asks the JIC to immediately put out information throughout the county through every available modality for county residents to get inside, stay inside and stay tuned.
- ☐ On receipt of first plume maps from plume mappers, the Health Officer and Safety

Officer determine areas of the county where first responders should not go at that time and order plume maps to be posted on the internet to be shared with the general public and the news media for public consumption.

- ☐ Order initial protective actions within 20 minutes (everyone shelter-in-place and KI recommendations).
- ☐ County should request a major or disaster emergency declaration through the Sheriff.
- ☐ Ask governor to proclaim a State of War Emergency (Chapter 7 of Division 1 of Title 2, Article 12, Section 8620 – 8624 of the California Emergency Services Act).
- ☐ Review everything listed in the chapter entitled, *Immediate Situation Status* and make sure the various Teams are following up on those tasks that appear urgent.
- ☐ The EOC will notify the California State Warning Center once it has confirmed that there has been a nuclear attack in neighboring Los Angeles County.

JFO ORGANIZATION FOR TERRORIST INCIDENTS

For terrorist threats or incidents, the establishment of the FBI Joint Operations Center (JOC) may precede the establishment of the other components of the Joint Field Office (JFO) in time and may constitute the initial Federal coordinating presence locally. With the establishment of a JFO, the JOC is incorporated as a branch within the Operations Section with appropriate consideration given to the protection of sensitive law enforcement and investigative information within this structure. Utilizing the flexibility of NIMS, this JFO structure aids in the protection of sensitive information while fully integrating law enforcement operations with other incident management activities, as appropriate.

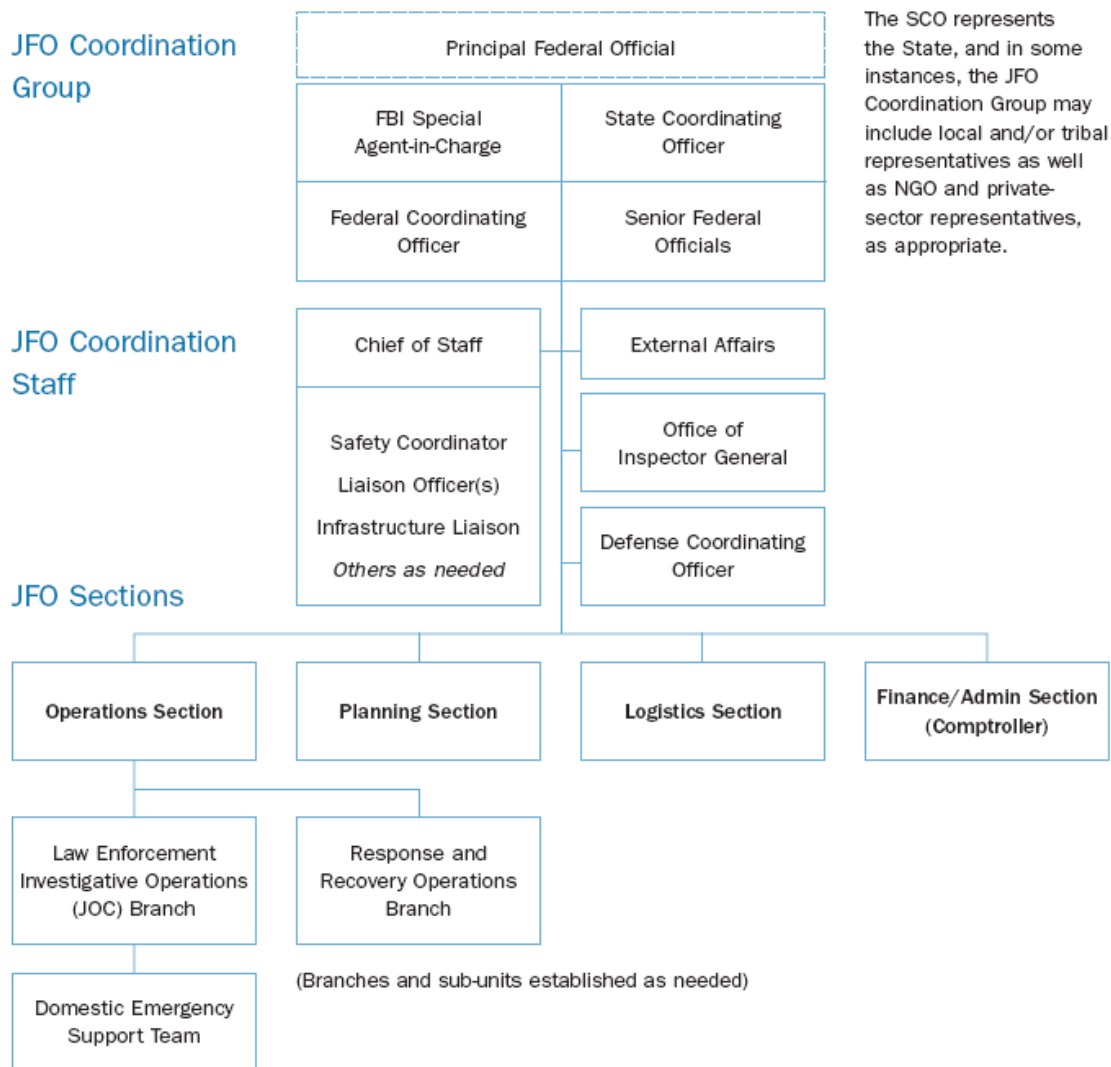


Figure 8. Sample JFO organization for terrorist incidents

INFORMATION SHARING AND DISSEMINATION

An actual terrorist event raises significant issues regarding information sharing and dissemination. Security and confidentiality concerns must be weighed against operational needs and public interest.

Certain response activities following a terrorist event may require security and confidentiality and will utilize the most secure form of landline available. Written confirmations of notification and updates will be used. Emergency response personnel will observe communication security procedures. Sensitive information will not be communicated by cell phone or radio.

The following systems will be used by Ventura County to disseminate information:

- CLETS (California Law Enforcement Telecommunications System): for law enforcement information
- RIMS (Response Information Management System): for information among the SEMS levels of government
- OASIS (Operational Area Satellite Information System): for information between other counties, the State and some federal agencies
- Ventura County Dispatch Centers: for field operations

The Ventura County EOC will have scheduled briefings for EOC staff and other emergency response personnel. If the federal JOC, federal ICP, Incident Unified Command, or JIC are operational, the Ventura County EOC will coordinate briefing times, reporting procedures, and news releases as much as possible with its federal counterparts, as well as with other SEMS levels.

SAFETY AND SECURITY

During an actual event, employee safety and operational security will be key concerns for Ventura County staff. During emergency operations, heightened safety and security procedures will be in force and will be followed by county staff. Security and safety procedures will also be implemented for all command posts and other operational sites. The Sheriff's Department will serve as lead for identifying security needs, and will work with the General Services Agency on building security issues.

If the Sheriff's Department needs additional security assets, they will be requested through mutual aid or obtained through other sources, i.e. private security agencies.

SECTION 25. OPERATIONS



This section focuses on reduction of the immediate hazard, saving lives and property, establishing situational control, and restoration of normal operations.

The Operations Section will manage the tactical operation of various response elements involved in the disaster/emergency. These elements may include:

- Fire/Rescue/Hazardous Materials
- Law
- Coroner
- Emergency Medical Services/Public Health
- Care and Shelter
- Public Works
- Building and Safety

The Operations Coordinator will either be a Sheriff's Department or Fire Department staff person, depending upon the situation and availability of staff.

IMMEDIATE PRIORITIES FOLLOWING A NUCLEAR DETONATION:

The Operations Team Chief will normally look to the County's Multihazard Functional Plan on assuming command. Actions that should be addressed early on that are particularly important in responding to a nuclear blast disaster are:

- ☐ Establish the condition of the water supply
 - ☐ Current status
 - ☐ Has any consequence or action in LA County affected our H₂O supply? (Some of our

water comes from LA's Municipal Water District. Lake Piru is fed by Lake Castaic. Contact water and sanitation groups for more information.)

- ☐ Liaison with utility people ASAP. Secure good communications with the personnel involved with pumping, testing and repair of their systems.
- ☐ Call the three major water districts and ask them to poll their individual vendors as to the integrity of their water systems. (If all is going according to plan, their call tree should already be activated and accumulating this information.)
- ☐ Request that they increase monitoring of their wells and distribution systems. Ask what steps are being taken to shelter and protect their resources from radioactive contamination.
- ☐ Contact Logistics Team Chief for ordering and delivery of drinkable water to sites where water supplies have been interrupted.

FIRE DEPARTMENT

The County Fire Department will be the lead agency for fire response, search and rescue, hazardous materials events, and medical/rescue operations.

They will also assist with:

- Perimeter and access control decisions
- Evaluate public safety concerns and, in concert with the Health Officer, make recommendations to the Sheriff's Department regarding:
 - Evacuations
 - Shelter in place
 - Combination of both
- Notifications
- Safeguarding evidence
- Damage assessment
- Fatalities management
- Assuring personnel protection and scene safety

LAW ENFORCEMENT

The Sheriff's Department will be the lead for:

- Perimeter security
- Access control
- Traffic/crowd control
- Looting
- Evacuations
- Notifications
- Safeguarding evidence
- Investigation, tracking, and maintaining scene integrity
- Assisting with damage assessment and fatalities management
- Intelligence gathering and sharing
- Hostage situations, hijackings, kidnappings
- Use of bomb squad
- Facility and personnel protection
- Use of Special Weapons and Tactics (SWAT) units
- Coordinating flow of traffic in affected areas with California Highway Patrol and other local law enforcement agencies

The Sheriff's Department will also coordinate Medical Examiner issues.

PUBLIC WORKS

Public Works will serve as the lead for structural/infrastructural needs assessment for County property, roadways and bridges and will refer calls to the appropriate agency for other problems they encounter (eg., Southern California Edison for downed power lines). They will do building inspections for structural/infrastructural damage. They will also assist with access based on the direction of law enforcement. For instance, they will put up barricades but not man them. Public Works has several hundred barricades. These would be quite useful at sites in the County that are set up for decontamination of the public and tent clinics. They may also be useful with patient flow at Assessment Centers set up on the fringe of hospitals for patient triage and decontamination. Activities include:

- Provide barricades for checkpoint access control

- Needs assessments
- Assure limited scene safety
- 2 small (10 wheeler) water tankers
- Assessment of public infrastructure (roads, bridges)
- Alternate route identification
- Request public works mutual aid from cities within the County.

GENERAL SERVICES AGENCY BUILDING AND SAFETY

General Services will assist Public Works with damage assessment activities. GSA will specifically be involved in:

- Utility access rerouting in buildings
- Building access

Facilities management

Building barriers

- Repair and maintenance of buildings
- Provision of emergency EOC facility

RESOURCE MANAGEMENT

Building and Safety's main role and responsibility during any disaster is to:

- Evaluate all private structures that may have been damaged in an incident
- Request county and building and safety mutual aid if needed

The County's Building Official is the ultimate authority in determining whether or not a building is inhabitable or safely accessible. These orders will be enforced by local law enforcement.

RESOURCE MANAGEMENT ENVIRONMENTAL HEALTH DIVISION

The Environmental Health Division will be responsible for the following:

- Oversight of hazardous material (radiation) decontamination

- Arrange for funding for cleanup of hazardous material
- Assist in field identification of hazardous materials. Assist Public Health Officer in investigating and monitoring public health threat
- Assist Public Health Officer with public health alerts and emergencies
- Provide technical support to the unified command for environmental monitoring, public health, and environmental impacts of hazardous substances
- Provide public information

HUMAN SERVICES AGENCY

The Human Services Agency will assist with care and shelter issues. Potential care and shelter activities are:

- Crisis intervention activities. HSA has 200 social workers. The Agency can provide a variety of administrative supports for care and shelter, individual safety and well-being, service referral, initiation of food stamps and CalWorks
- A multi-disciplinary team can address a variety of assistance needs
- Coordinate with other Care and Shelter agencies: American Red Cross and School Districts
- Provide Care and Shelter representation within the EOC and other locations, as needed
- Coordinate Care and Shelter mutual aid requests
- Support Red Cross in logistical requirements for Care and Shelter facilities

MEDICAL/HEALTH AND MENTAL HEALTH

The Ventura County Public Health, Emergency Medical Services Agency (EMS) is responsible for medical response operations, communications with hospitals, ambulance companies and health care providers, and coordination of medical/health resources during emergency response and recovery. Ventura County EMS will:

- Notify hospitals of threat assessment
- Assist with identifying the potential cause and the population at risk
- Coordinate polling of emergency rooms, physicians in private practice and veterinary clinics

- Outline medical prophylaxis and treatment measures
- Develop educational materials to teach and send to physicians
- Ensure hospital/ambulance staff have appropriate measures to prevent contamination of hospitals, ambulances and staff
- Make sure decontamination areas, treatment areas and a plan for crowd control has been instituted.
- Initiate public health alerts and emergencies in coordination with Public Health Officer
- Coordinate any requests for Critical Incident Stress debriefings for first responders and coordinate with Red Cross for counseling services for the community.

MEDICAL EXAMINER/CORONER

The Medical Examiner/Coroner will be responsible for the following activities:

- Recover and store human remains
- Identify the deceased
- Notify next of kin
- Protect personal property
- Help in final safe disposition of remains
- Issue final death certificate
- Assist in medical surveillance
- Coordinate proper disposal of personal effects
- Liaison with religious denominations so families' religious needs are met
- Collect criminal evidence as indicated

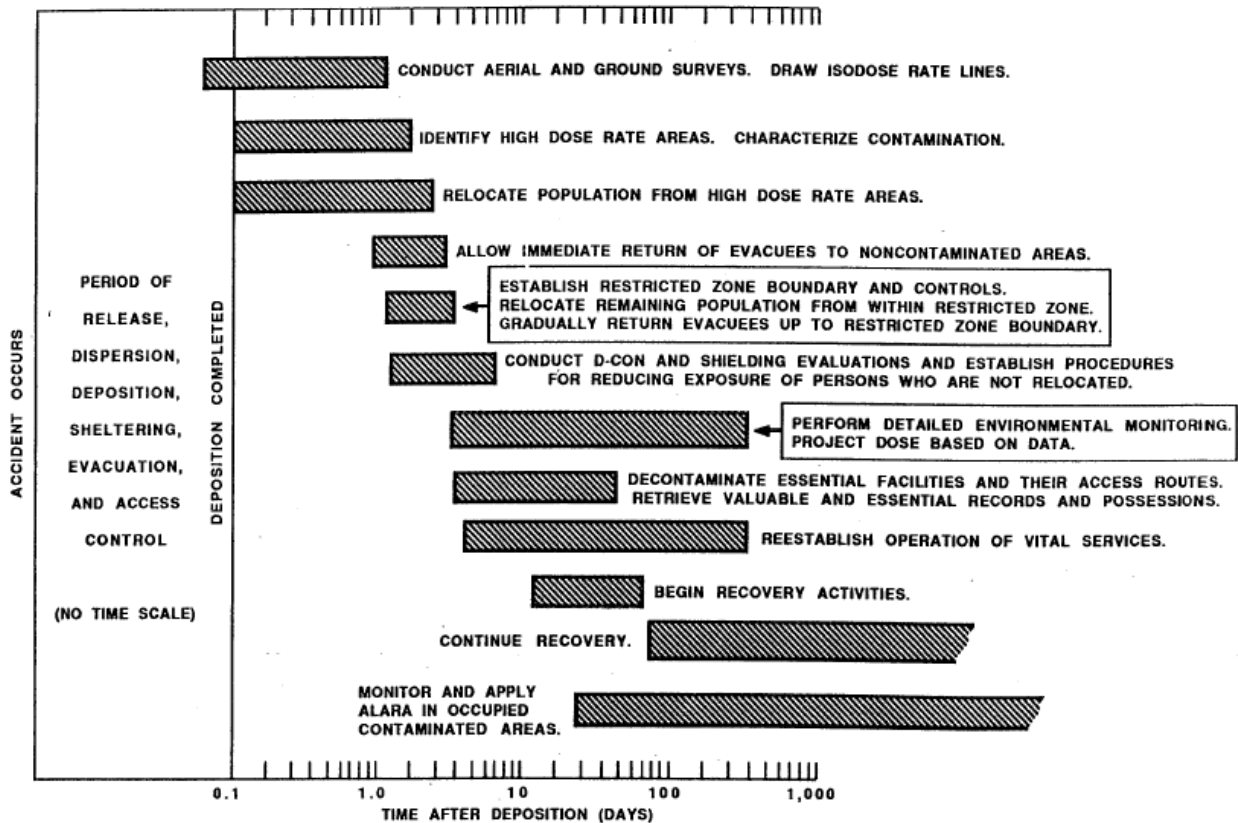
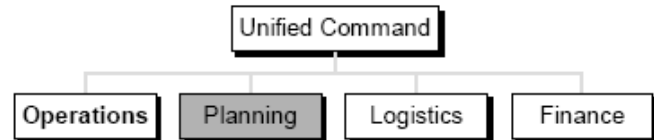


Figure 9. Nuclear Response Time Frame

Source: Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, Office of Radiation Programs, United States Environmental Protection Agency, May 1992

SECTION 26. PLANNING/INTELLIGENCE



The Planning Section collects, evaluates and disseminates incident situation information and intelligence to the Unified Command and incident management personnel, prepares status reports, displays situation information, maintains status of resources assigned to the incident, and develops and documents the Incident Action Plan based upon guidance from the Unified Command.

IMMEDIATE PRIORITIES FOLLOWING A NUCLEAR DETONATION

The Planning/Intelligence Team Chief will normally look to the County's Multihazard Functional Plan on assuming command. Actions that should be addressed early, some of which are particularly important in responding to a nuclear explosion disaster are:

- ☐ Log on to RIMS—monitor
- ☐ Test OASIS
- ☐ Contact CHP, FBI, EMS: verify phone numbers and radio links
- ☐ Contact NOAA Phone # XXX-XXX-XXXX or www.weather.gov/losangeles Get current weather conditions: wind speed and direction. Get forecasts for operational period.
- ☐ Collect data and assemble a real time plume map to post on the Internet or assure that NOAA will do this.
- ☐ Determine if there are any power outages in our County.
If out, extent and duration of outage
- ☐ Do any consequences or actions in LA County further threaten our power supply?
Information System Infrastructure
- ☐ System status report on telephone (landline and cell), computer links and radio systems within the county
- ☐ Will any action taken in LA County affect our capabilities?
- ☐ Ask grocery stores to request re-stocking immediately. Hoarding should be anticipated.
- ☐ Ask grocery stores to implement their disaster rationing plans.

- ☐ Inform gasoline stations to implement gasoline rationing plan.
- ☐ Maintain close contact with law enforcement personnel who are involved in monitoring grocery stores to learn citizen response to adequacy of supplies, hoarding and the potential for rioting and looting.
- ☐ The establishment of Reception Centers (evacuee centers) is the responsibility of the Red Cross. Contact Red Cross to discuss demand and response.
- ☐ Send materials for distribution to first responders related to stress, anxiety and other psychological needs to supervisors and managers listed in Table 14:

Table 14. Ventura County and City First Responder FAX #s

<u>First Responders</u>	<u>Fax #, usual</u>	<u>Fax # during event</u> (if changed)
County Fire	XXX-XXXX	
Sheriffs Department	XXX-XXXX	
Simi Valley Police	XXX-XXXX	
Oxnard Police	XXX-XXXX	
Ventura Police	XXX-XXXX	
Port Hueneme Police	XXX-XXXX	
Santa Paula Police	XXX-XXXX	
Oxnard Fire Department	XXX-XXXX	
Fillmore Fire Department	XXX-XXXX	
Thousand Oaks Police	XXX-XXXX	
Camarillo Police	XXX-XXXX	
Moorpark Police	XXX-XXXX	
Ojai Police	XXX-XXXX	

- ☐ Contact the Los Angeles County Planning Team Chief with information for Los Angeles County residents about Ventura County Reception Centers, Ventura County radio station dial numbers for our EAS stations, and the importance of self-decontamination, if needed, **before** beginning their journey out of Los Angeles County.
- ☐ The Red Cross accepts donations, directs and registers volunteers and provides many forms of support on an individual basis. Determine where and how these services will be provided and place the PIO in charge of disseminating this information and making the public aware of how to access these services.
- ☐ Contact Public Works Departments at the County and the cities to determine the integrity of their sewage systems.
- ☐ Perform frequent assessments of the available communications assets within our operational area. Designate the primary and secondary communications systems used in that operational period.
- ☐ Pharmacies should be called and asked to reorder before their supplies grow low.

- ☐ Notify the Agriculture Commissioner about possible impending radiation risks to Ventura County agriculture and ask him/her to disseminate protective information to county farmers.
- ☐ Notify the head of the Farm Bureau in Ventura County about possible impending radiation risks to local agriculture and ask him/her to disseminate protective information to local farmers. The Farm Bureau can communicate with its members using bulk mailing. It also has an Integrated Voice Recognition System with a FAX-back feature. The farmer can call an 800 number and get a FAX back.
- ☐ Notify the Ventura County Agricultural Association (VCAA) about possible impending radiation risks to Ventura County agriculture and ask him/her to disseminate protective information to county farmers.
- ☐ Notify the University of California Extension Service about possible impending radiation risks to Ventura County agriculture and ask him/her to disseminate protective information to county farmers.
- ☐ Ask the PIO to get information about external decontamination to the EAS stations for broadcast to the public.
- ☐ Determine, based on present and projected requirements, the need for establishing specific and/or specialized branches/groups/units. The following may be established as the need arises:
 - Resources Unit
 - Situation Status Unit
 - Documentation Unit
 - Damage Assessment Unit
 - Advance Planning Unit
 - Recovery Planning Unit
 - Demobilization Unit
 - Technical Specialist

Either a County Sheriff or Fire representative will fill the Planning/Intelligence Coordinator position. In addition to the standard situation, documentation, demobilization, and resources units, the Planning/Intelligence Section may also include units that address crisis management and consequence management concerns, as well as threat analysis. Threat analysis planning and intelligence activities will address two key areas:

- Law enforcement and crisis management activities

- General threat analysis

Information developed during the threat analysis process will be shared with the appropriate agencies. Release of threat analysis information to the public will be based upon coordination with the PIO.

The Planning and Intelligence section will include representation from the Terrorism Early Warning Group.

Law Enforcement

The Sheriff's Department will assign staff to all Units within this Section. The FBI will be welcome to place a liaison here. (FBI will already be a member of the Unified Command.)

Fire Department

The County Fire Department will assign technical specialists to assist with fire, search and rescue, hazardous materials, and medical information.

Public Works

The Public Works Department will assign staff to the Damage Assessment, Advance Planning, and Recovery Planning Units, as appropriate.

Resource Management Agency- Building and Safety Environmental Health

RMA will provide Technical Specialists as appropriate.

Public Health

Public Health will provide Technical Specialists as appropriate.

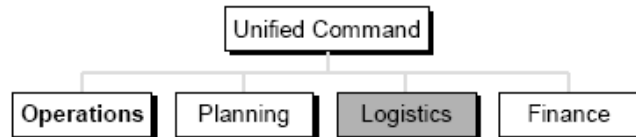
General Services

General Services Agency will provide Technical Specialists as Agency appropriate.

Business Community

A representative of the business community (e.g., VCEDA) would be welcome to sit on the Planning/Intelligence Section to consider crisis and consequence management issues and what resources the business community could offer to respond. During a crisis, this representative's portfolio would be to keep or get business open and provide resources for the response (warehouse space, donations of food, water, housing, etc.).

SECTION 27. LOGISTICS



The Logistics Section is responsible for all support requirements needed to facilitate effective and efficient incident management, including the ordering of resources from off-incident locations. The Logistics Section Coordinator will determine, based on present and projected requirements, the need for establishing specific and/or specialized units. The following units may be established as the need arises:

- Supplies
- Information Systems Branch (includes communications)
- Transportation Unit
- Personnel Unit (includes emergency responder medical services)
- Procurement Unit (includes fuel and food services)
- Facilities Unit

IMMEDIATE PRIORITIES FOLLOWING A NUCLEAR DETONATION:

The Logistics Team Chief will normally look to the County's Multihazard Functional Plan on assuming command. Actions that should be addressed early on that are particularly important in responding to a nuclear blast disaster are:

- ☐ Make plans to collocate Federal assets that arrive on the scene as the Joint Field Office (JFO) with a State/local Emergency Operations Center (EOC), if possible, to support the local incident management activities.
- ☐ Place a liaison at the LOA EOC from our EOC.
- ☐ Contact the Department of Homeland Security (DHS) Public Affairs as soon as possible. DHS Public Affairs and other Federal agencies will engage with the Operational Area Joint Information Center (JIC) to synchronize the overall incident communications effort, and to provide support and assistance where state and local

capabilities have been destroyed or degraded.

- ☐ Pursue support for all law enforcement activities from the local military and National Guard.
- ☐ Send liaison to ESF #8 and have them send liaison to us.
- ☐ Establish communication, liaison if possible, with regional and national coordinators with authority for management of the dead.
- ☐ Designate the Medical Examiner from the County Medical Examiner's Office as the local coordinator with full authority and responsibility for the management of dead bodies.
- ☐ In coordination with the Medical Examiner, appoint individuals to be in charge of one or more function(s) and give them the corresponding section in the chapter entitled, *Management of Dead Bodies*:
 - Storage
 - Identification
 - Information and communication
 - Disposal
 - Support for families
 - Logistics and communication
 - Security
- ☐ Sustain existing communications systems.
 - ☐ Procure adequate supplies of batteries and battery chargers and forward deploy as needed.
 - ☐ Coordinate with ACS (formerly RACES) to provide "bridging" service if required.
- ☐ Monitor the repair efforts to communications systems. Provide periodic estimates of restoration status and report when systems become operational. Status of repair should be made available and placed in the briefing information in the operational period plan.
- ☐ Designate Head of Volunteers and Donations. (This person will probably be from the Red Cross.) Direct the PIO to work with this person to publicize intake sites.
- ☐ Locate pet food, portable kennels, pet medication and vet services that can be utilized by the evacuating public. Deliver supplies for self-service pick up to locations that are publicized with PSAs and over the EAS system.

- ☐ If grocery stores run out of food, arrange for basic food items to be distributed by the County at designated locations and to shelters or special care facilities. Order food for distribution through the State **early**, anticipating needs well ahead of time, allowing two or three days for arrival of requested food.
- ☐ Notify Ventura County Behavioral Health to organize its resources and prepare to provide services for large numbers of Ventura County residents.
- ☐ Notify the Medical Reserve Corps that their skills in psychological first aid will be needed.

The Sheriff's Department and General Services Agency will fill the Logistics Section Coordinator position. This Section is responsible for identifying supplies, services, equipment, and facilities that will be required for both crisis management and consequence management activities.

During emergency operations, particular emphasis will be placed on maintaining the operational capabilities of county computer systems and telecommunications, including land line, cell phone and radio.

Resources Database - As part of its planning effort, County OES has developed a resources database for terrorism events. This database identifies potential shortfalls and indicates potential sources to remedy the shortfalls. The database is a restricted use database.

SHERIFF'S DEPARTMENT

The Sheriff's Department will serve as the lead for the Logistics Section.

GENERAL SERVICES

General Services Agency will be responsible for maintaining and updating the county building status and building utility information. GSA will also provide staff and be responsible for the Resources Unit.

FIRE DEPARTMENT

County Fire Department will provide input on fire, search and rescue, hazardous materials, and coordinate medical logistical support requirements with the EMS Agency as necessary.

PUBLIC WORKS

Public Works will also assist with logistics requirements for evacuations. They do not normally sit in the Logistics seats.

EMERGENCY MEDICAL SERVICES

Management activities for response personnel.

SECTION 28. FINANCE/ADMINISTRATION



The Finance/Administration Section Coordinator will determine, based on present and projected requirements, the need for establishing specific and/or specialized branches/groups/units. In certain of the functional areas such as procurement, a functional unit need not be established if only one person would work in the unit. In that case, the normal procurement officer would be assigned rather than designating a unit. The following may be established as the need arises:

- Cost Recovery Documentation Unit
- Time Unit
- Purchasing Unit
- Compensation/Claims Unit
- Cost Analysis Unit

The Sheriff's Business Office will oversee finance operations within the EOC and County Executive Officer will oversee the administrative function. Issues that may need to be addressed include:

Continuity of Operations -It will be necessary to ensure continuity of day-to-day operations during an actual event. This includes payroll processing, contracts management, and personnel actions. Finance/Administration should make its personnel needs known to the Spontaneous Volunteer Intake Center of the Red Cross. There are likely to be skilled volunteers available to fill some/many of these positions.

Cost Recovery -It will be necessary to track all costs associated with an event or potential event. Within Finance/Administration there may be a separate Cost Recovery Unit.

SHERIFF'S DEPARTMENT

The Sheriff's Business Office in coordination with the CEO, Auditor/Controller, Treasurer, and GSA Purchasing will oversee the finance operations within the EOC and will insure that costs for a potential or actual event are tracked in a timely manner.

ADMINISTRATION

The County Manager will oversee the administrative function in the EOC.

AUDITOR-CONTROLLER

The Auditor-Controller's Office will be responsible for the Cost Recovery Unit.

SECTION 29. IMMEDIATE PRIORITIES OF OTHER AGENCIES, DEPARTMENTS AND NON-GOVERNMENTAL ORGANIZATIONS

THE RED CROSS

Immediate responsibilities for the Red Cross following a nuclear detonation include:

- ☐ Set up Reception Centers (mass care shelters) in pre-arranged locations. This should be coordinated with HazMat (for screening and decontamination) and Animal Regulation (for maintaining evacuee's pets).
- ☐ Ask the PIO to disseminate the location of these sites to the public.
- ☐ Anticipate early on if large numbers of evacuees will be requiring housing as the event unfolds. If so, it should call for additional (beyond the 5 local teams) mutual aid HazMat teams with as much notice as possible.
- ☐ Send a representative to the EOC for liaison.
- ☐ Contact the Behavioral Health Department to activate the Trauma Response Network phone bank to handle calls from people seeking information regarding unusual behavior of loved ones and to provide information to those cut off from ongoing psychological treatment and medications.
- ☐ Place liaison at 211 center.
- ☐ Investigate web sites which pop up after the event that purport to offer good Samaritan housing. Publicize those sites which appear to be legitimate, being careful to "refer without endorsing".

PUBLIC INFORMATION OFFICERS

Immediate responsibilities for PIOs following a nuclear detonation include:

- ☐ During the first twenty minutes tell the people of Ventura County to Get inside, Stay Inside and Stay tuned, AND; who should take potassium iodide pills.
- ☐ Work with the Head of Volunteers and Donations (from the Red Cross) to publicize volunteer and donation intake sites.
- ☐ Inform the public that the Red Cross accepts donations, directs and registers volunteers and provides many forms of support on an individual basis.
 - ☐ Determine where and how these services will be provided and place Logistics and the PIO in charge of disseminating this information and making the public aware of how to access these services.
- ☐ Monitor television, radio and internet for:
 - ☐ Status of LA-based media
 - ☐ Content of early reports
 - ☐ Are EAS stations working?

The Health Officer will play the lead role in communicating with the media.

- ☐ Write EAS bulletins in conjunction with the Health Officer for broadcast to the public:
 - ☐ How to perform external decontamination.
 - ☐ Immediate sheltering in place
 - ☐ Delayed evacuation and avoidance of a specific area. (e.g. fallout)
 - ☐ Basic facts (e.g. a nuclear blast has occurred...)
 - ☐ Reports on road and transportation conditions
 - ☐ Location of fallout plume
 - ☐ Areas that have been evacuated, and those that may need to be evacuated
 - ☐ Accessing medical services. The status of hospitals, emergency rooms, urgent care centers and doctors offices
 - ☐ Animals; livestock and pets. What to do with them if you have to evacuate
 - ☐ How to receive L.A. victims into your home safely
 - ☐ Ask public not to flee Ventura County—if you leave there will be added road congestion. The EOC will inform residents if there are any parts of the County that should be evacuated

- ☐ Pet food, portable kennels, pet medication and vet services are available to the evacuating public. Supplies for self-service pick up will be delivered to locations as follows.....
- ☐ Provide dairy animals and poultry with shelter, stored feed and protected water supplies. In Ventura County there is virtually no stored feed or protected water. If there is word of a nuclear detonation anywhere nearby, feed should be moved inside barns or other structures or covered with tarps. Water that can be covered; wells, rain barrels and tanks; should be covered. Piped water and well water will not be contaminated
- ☐ Cease field work if fallout is occurring or anticipated.
- ☐ Write individual PSAs as needed, to address:
 - ☐ How to protect oneself from fallout (shelters, general considerations)
 - ☐ Status of schools -- safety, openings and closures
 - ☐ Cancellation of public gatherings and sporting events
 - ☐ Rationing of food, water and utility supplies
 - ☐ Reports on who is in charge and decision process
 - ☐ Broadcasts to public to remain calm. Difficult times are a test of our values
 - ☐ Status of employment; go to work or stay home:
 - ☐ Don't go to work unless you're in an essential field. Many people should qualify as essential. Examples include; trucking, food industry, water, police, fire and health.
 - ☐ Don't go to work in Los Angeles County unless required to do so to assist in disaster mitigation. Examples of non-essential jobs; bowling alley, golfing, movie theaters, sporting goods, etc.
 - ☐ Go to work in Ventura County and other non-Los Angeles County neighboring communities after calling to see if your workplace is open, unless roads are clogged with traffic from people who are fleeing Los Angeles.
- ☐ Risk of radiation exposure from blast itself and symptoms of radiation illness
- ☐ Risk of radiation exposure from fallout, symptoms and long term cancer risk
- ☐ Volunteer needs and assembly points
- ☐ Rioting and police response
- ☐ Anticipated food shortages and availability
- ☐ Forms of communication available post-disaster
- ☐ The importance of registering blast victims with the Red Cross

- ☐ L.A. victims are arriving in Ventura County. What to do to help them and protect yourself
- ☐ Which food and water is safe? Can it be made safe?
- ☐ Tell Ventura County residents that the emergency broadcast system (EAS) is found at 1450 AM, 1070 AM, 100.7 FM radio and 103.7 FM (Spanish).
- ☐ The best way to protect livestock is to move animals indoors before fallout arrives. Milk cows should be prioritized for shelter, clean feed and water. During this time, the calves should be placed back with their mothers. Once fallout begins to come down, farmers, for their own safety, should not attempt to protect their livestock any further until told by authorities that it is safe to do so.
- ☐ Place other livestock on feed and water as above and shelter, if possible, after provisions have been made for dairy animals
- ☐ Thoroughly wash crops brought in from a contaminated area; green vegetables exposed to contamination should have outer layers removed
- ☐ After radiation levels are measured in the fields, workers in some fields may be advised to wear protective clothing (like that worn for pesticide applications) and be allowed to work

Public Health/Emergency Medical Services

Immediate responsibilities following a nuclear detonation include:

- ☐ Health Officer will work with Safety Officer to review plume maps sent in by plume mappers and National Weather Service to determine if and when fallout will require evacuation of parts of the County. Send out notification to shelter-in-place or evacuate to the population areas affected if indicated. Send similar notifications to Los Angeles County residents if Los Angeles County EOC would like us to do so.
- ☐ Notify the public about which geographic areas of the County should take potassium iodide and inform them.
- ☐ Notify hospitals of threat assessment.
- ☐ Provide Red Cross Reception Centers with public health and/or other qualified nurses to help triage/evaluate arriving evacuees and manage minor illness including dressing changes of people with 2nd degree burns.
- ☐ EMS will determine the demand, both in volume and severity of problems, being placed on the health care system (hospitals, emergency rooms, urgent care centers, clinics) in Ventura County. Coordinate serial polling of emergency rooms, hospital beds available, etc.
- ☐ Share status of the health care system in Ventura County with RDMHC. The RDMHC is responsible for performing this assessment with Ventura County Health Care Agency's cooperation.
- ☐ Ensure hospital/ambulance staff has appropriate plans and resources to prevent contamination of hospitals, ambulance rigs and staff.
- ☐ Make sure an Assessment Center with a triage, monitoring and decontamination area, and a plan for crowd control has been instituted.
- ☐ Initiate public health alerts and declare public health emergencies in coordination with the Public Health Officer.
- ☐ Coordinate any requests for Critical Incident Stress debriefings for first responders.
- ☐ Coordinate with Mental Health for counseling resources.
- ☐ Take the lead role in communicating with media.
- ☐ Determine (after arrival of Federal assets) the types of isotopes resulting from the blast and their significance.
- ☐ Ask the Regional Disaster Medical/Health Coordinator (RDMHC) for the State Office of Emergency Services (OES) Region I (LAOA and adjacent counties) to determine inpatient bed availability in nearby counties.
- ☐ Ask RDMHC to request health professionals from other counties to augment local hospital staff.

- ☐ If demand and acuity is high, activate SEMS to utilize emergency contract agreements and the mutual aid system. Contact the Regional Disaster Medical Health Coordinator (RDMHC), Region 1, to determine if RDMHC is operational. If not, call the State Department of Public Health and/or the State Emergency Medical Services Authority (EMSA) to learn the State's hierarchy of back-up.
- ☐ Send Ventura County's **medical and health resource requests through the RDMHC** and follow the medical and health resource ordering/request flowchart.
- ☐ Request additional staffing from the Disaster Medical Assistance Teams (DMATs); the Commissioned Corps Readiness Force (CCRF) for the US Public Health Service; the Visiting Nurses Association; students from schools of medicine, pharmacy, nursing and public health; retired and other volunteer healthcare workers; the Medical Reserve Corps; and the American Red Cross. Also, request health staff from the Naval Base Ventura.
- ☐ If Ventura County physicians who are knowledgeable about treatment of radiation-exposed patients cannot meet the local need, request Medical Emergency Radiological Response Teams (MERRTs) from ESF #8.
- ☐ If the resources required to deal with medical needs of evacuees from Los Angeles are greater than can be provided locally or regionally, ask the Regional Disaster Medical/Health Coordinator (**RDMHC**) for the State Office of Emergency Services (OES) Region I (LAOA and adjacent counties) to call in the **Emergency Support Function (ESF) #8 Health and Medical Services**.

ESF #8 provides coordinated Federal assistance to supplement State and local resources in response to public health and medical care needs following a major disaster. Included in the ESF #8 response is triage, treatment and transportation of victims of the disaster and evacuation of victims out of the disaster area. The ESF #8 can deploy the National Disaster Medical System (NDMS), a nationwide medical mutual aid network between Federal and non-Federal sectors that includes medical response, patient evacuation, and definitive medical care consisting of pre-committed, non-Federal, acute care hospital beds. NDMS can provide Disaster Medical Assistance Teams (DMATs) which can assist in the care of victims at the location of a disaster.

- ☐ If needed, ask for the ESF #8 resources which include:
 - ☐ sending into our County an assessment team that assists in determining specific health/medical needs and priorities and an assessment of the health system/facility infrastructure;
 - ☐ specialty DMATs which address mass burn injuries and contamination;
 - ☐ casualty clearing/staging (by DOD and National Guard units);
 - ☐ individual clinical care specialists to work alongside of local doctors (the VA is the usual source for these); and

- ☐ restocking of health and medical facilities with pharmaceuticals, supplies and equipment.

The ESF #8 is called in by the State government when the regional medical authority (the RDMHC) asks it to do so.

- ☐ If needed, other services available through the ESF #8 include monitoring of injury and disease patterns; monitoring the health and well-being of emergency workers; and extensive assistance related to radiological exposures, including assessment of medical effects, collection of relevant samples, advice on protective actions, and provision of technical assistance and consultation on medical treatment and decontamination of victims.
- ☐ If needed, the ESF #8 ensures the safety of regulated foods, drugs, biologic products and medical devices following a nuclear disaster. It will arrange for the seizure, removal and/or destruction of contaminated products. This service is provided by the HHS through the Food and Drug Administration (FDA).
- ☐ Consider whether to establish non-hospital facilities (school gymnasias, mobile medical units, warehouses, arenas, etc.) to shelter and treat mass casualties.
- ☐ Establish medical facilities at Oxnard Airport to stabilize and decontaminate the sickest patients for airlift transport to other cities for treatment. It is possible that it may take up to two days to establish this field hospital. This site should be established as (what ESF #8 refers to as) a State-operated Regional Evacuation Point (REP). ESF #8 will coordinate the hand-off of patients from this REP to the NDMS patient evacuation system. Arranging for airlift transport is a part of this system.
- ☐ Task the Plans section in the HCA DOC with sending medical information to all the clinics, hospitals and offices, and outposts where doctors are providing medical treatment. A special emphasis will be placed on medical information about radiation-related illness, injuries related to a nuclear detonation, internal decontamination, decorporation as well as steps that health professionals can take to avoid radiation contamination.
- ☐ Send a liaison (a knowledgeable public health nurse) to the 211 system to provide expertise to the operators in answering questions from the public. The 211 system should answer calls on health concerns from Ventura County residents.
- ☐ Assemble a small team of medical professionals (nurses and one physician or pharmacist) to answer telephone calls from front line health care providers regarding specific questions on medications, prescription replacement and technical issues about radiation-related patient management. This group should be located at the Public Health Department. Medical questions from nurses at Reception Centers will also be answered.
- ☐ Place PSAs for the public on the EAS system that answer questions and concerns about where to find medical care; the triage of patients at hospitals; referrals of the

walking injured to clinics rather than to hospitals; information on radiation exposure, poisoning and decontamination, etc.

- ☐ Ask County and private clinics to expand their hours of operation.
- ☐ Send relevant triage and treatment protocols to the clinics.
- ☐ Set up 4 mobile clinics where additional medical assets are needed and can provide basic primary and preventative care services to displaced persons.
- ☐ If there appears to be bottle-necking of screening and decontamination or many evacuees are arriving for services in Ventura County, call the DOE's Radiological Assistance Program (RAP) to provide assistance in the decontamination of victims. RAP may be requested through the County EOC (which then requests through the Region and the State).
- ☐ Set up PODs for the first 12 to 24 hours after the detonation to distribute KI for those who were exposed to radiation.
- ☐ Determine need for and establish health kiosks (e.g., along highway exits) at critical sites.

Fire Department/HazMat

Immediate responsibilities following a nuclear detonation include:

- ☐ Fire Chief to appoint Safety Officer (someone from Hazmat knowledgeable about radiation) to the EOC as first act.
- ☐ Have Safety Officer work with Health Officer to review plume maps sent in by plume mappers and National Weather Service to determine if fallout may require evacuation of parts of the County. Send out notification to shelter-in-place to the County population within 20 minutes of the blast.
- ☐ Place portal monitors at 5 Reception Centers (care shelters) in association with monitoring and decontamination activities and follow established MOU's for their use.
- ☐ Set up monitoring and decontamination of people and vehicles where appropriate. This will be done in three major types of settings: at 5 Red Cross Reception Centers; at Assessment Centers located at the 8 county-wide hospitals; and at 3 independent sites in the County.
- ☐ What is the status of fires within LA County?
- ☐ Place liaison at 211 center.

Sheriff/City Police

Immediate responsibilities following a nuclear detonation include:

- Civil Disorder
 - ☐ Brief responders to make a robust response to any disorder, including looting
 - ☐ Assign units to make high visibility patrols to saturate areas of concern
 - ☐ Remember, any actions taken could be a part of a criminal investigation. Interview people and look at gathering potential evidence to support this effort
- HAZ/MAT Support
 - ☐ Send law enforcement officers to all Hazmat-run decontamination sites. There will be 16 of these: 8 at our hospitals, 5 at Red Cross Reception Centers and 3 independent Decontamination Centers for members of the general public.

California Highway Patrol

Immediate responsibilities following a nuclear detonation include:

- ☐ Determine the early evacuation situation?
- ☐ Determine the impact of the evacuation on the roads?
- ☐ Assess road usage. Count of vehicles per hour entering the County and count of vehicles leaving the county. Set up counting sites at county lines (4 entry points – 101,118,126 and 1 -- and 5 exit points – 101,150, 118, 126 and 33
- ☐ Contact Caltrans to see if their data collection system can provide information on road usage
- ☐ Establish an incident command post at each entry point to Ventura County to monitor the flow of traffic and estimate the number of people coming into our county
- ☐ Contact Santa Barbara and San Luis Obispo Counties to learn about the traffic situation up there and to coordinate traffic system
- ☐ Prepare for disabled vehicles to be pushed to the side of our highways. Caltrans, towing companies and AAA should be alerted that they may be needed for this work as well as Public Works, Fire Departments, Naval Base Ventura, etc.

The California Highway Patrol should place the following messages on highway signage:

- ☐ The locations of Red Cross Reception Centers (shelters).
- ☐ If you have been contaminated, don't stop to decontaminate. Simply removing your clothes eliminates 90% of the source of radioactivity. Put clothing in your trunk for later double bagging.
- ☐ Please stay off cell phones.
- ☐ The radio call numbers of EAS stations.

National Weather Service/Oxnard

Immediate responsibilities following a nuclear detonation include:

- ☐ Using radar, determine hypocenter of the nuclear detonation. Determine wind direction and speed at that site. Immediately send this information to the “plume mappers” by email and phone using GETS/WPS card.
- ☐ Send information as to location of hypocenter of blast and wind direction to the Unified Command.
- ☐ Establish the location of the fallout plume—gauge its size and direction. Request HYSPLIT model run from National Centers for Environmental Prediction (NCEP) for dispersion and transport (20 minute turnaround). Ask for a map with isodose rate lines of 10 rem, 5 rem and 0.5 rem over 4 days. The 0.5 rem line is the most important one. Have this map projected over a street detail map. Immediately report/transmit this information to the members of the Unified Command.
- ☐ Determine forecast and atmospheric conditions and predict its effect on the radiation plume. Compare to plume forecasts from “HotSpot” software (<http://www.llnl.gov/nai/technologies/hotspot/>) and to information obtained from helicopter crew.
- ☐ Post the fallout plume as close to real-time as possible on the internet for the average citizen to monitor.

Hospitals

Immediate responsibilities following a nuclear detonation include:

- ☐ Hospitals will activate their emergency plan – HEICS.
- ☐ Monitor and staff CAHAN and REDDINET terminals.
- ☐ Handout documents to educate/prepare hospital staff. Topics will include:
 - ☐ How to avoid contamination
 - ☐ What to do if you think you are exposed
 - ☐ Effects of contamination include...
 - ☐ Reassurance that in a hospital setting it is very unlikely to encounter significant contamination while caring for contaminated patients

(These documents should already have been used to educate staff. Ask Public Health for these documents if you cannot find them.)

- ☐ The hospital should immediately “lock down”, providing only two entrances:
 - ☐ An entrance for triage and patients
 - ☐ An entrance for personnel, staff, press, officials, etc.
- ☐ The hospital should establish its Assessment Center. (See: Section 10 Hospital Response to Mass Casualty)
- ☐ Discharge hospitalized patients deemed sufficiently stable to be managed at home.
- ☐ Cancel elective admissions/surgeries/procedures.
- ☐ Activate call-back procedures, call in off-duty staff and extend existing staff hours.
- ☐ Ask the County Public Health DOC to request health professionals from other counties to augment local hospital staff if needed.
- ☐ Arrange to transfer stable patients to other area hospitals if conditions of the event permit. (The ability to transfer patients to other medical sites may be limited due to road congestion.) Very limited helicopter transport may be available.
- ☐ Modify and convert large internal spaces as well as existing patient rooms to accept more beds as surge capacity is exceeded. To the extent required, licensure flexibility should be sought. Surge will need to be dealt with internally until the roads clear up for transport to other facilities.
- ☐ If overwhelmed, ask the County Public Health DOC to request from the RDMHC for the National Disaster Medical System (NDMS), DMATs and Commissioned Corps Readiness Force (CCRF) of the US Public Health Service and the U.S. Military medical services to bolster personnel and equipment resources and set up freestanding field care sites.

- ☐ For early discharge victims of the disaster, manage patients at home with home visits or contact by the Visiting Nurse Associations, the Commissioned Corps Readiness Force (CCRF), the Citizen Emergency Response Team (CERT) workers, the Disaster Assistance Response Team (DART) and the Medical Reserve Corps (MRC). These services may be accessed through the County Public Health DOC.
- ☐ Conduct briefings with staff to record information for post incident sharing with other hospitals. There is a real need to maximize the lessons we learn from disasters. Render anonymous any information shared to protect patients' privacy.

Ventura County Medical Association/Private Practice Physicians

Immediate responsibilities following a nuclear detonation include:

- ☐ FAX out documents to educate/prepare office staff. Topics will include:
 - ☐ How to avoid contamination
 - ☐ What to do if you think you are exposed
 - ☐ Effects of contamination include...
- ☐ Reassure the public that in a medical setting it is very unlikely to encounter significant contamination while caring for contaminated patients
 - ☐ (These documents should already have been used to educate staff. Ask Public Health for these documents if you cannot find them.)
- ☐ Dispense accurate psychological information and be proactive to allow people access to information (e.g., the internet) without coming to the hospital.

Medical Examiner

Immediate responsibilities following a nuclear detonation include:

- ☐ Request a Disaster Mortuary Operational Response Team (DMORT) through the Public Health DOC if a significant increase in dead bodies comes to Ventura County. Request the Weapons of Mass Destruction (WMD) DMORT Team which has the capacity to decontaminate between 5 and 50 deceased persons per hour if most of the bodies coming in are contaminated.
- ☐ Provide Just in Time (JIT) training to all personnel.
- ☐ Distribute Job Aids that outline individual safety precautions, as well as follow up testing for exposure.
- ☐ Appoint individuals to be in charge of one or more function(s) below and give them the corresponding section in the chapter entitled, *Management of Dead Bodies*:
 - ☐ Storage
 - ☐ Identification
 - ☐ Information and communication
 - ☐ Disposal
 - ☐ Support for families
 - ☐ Logistics and communication
 - ☐ Security

Animal Services

Immediate responsibilities following a nuclear detonation include:

- ☐ Activate disaster plan.
- ☐ As a part of this plan, Animal Regulation co-locate animal shelters next to Red Cross shelters as needed to handle the evacuees' pets.
- ☐ Triage all animals at Red Cross Reception Center intake sites and then send to appropriate housing.

Water Purveyors

Immediate responsibilities following a nuclear detonation for the three major water purveyors include:

- ☐ Contact the County EOC Operations Section.
- ☐ Request the EOC to contact Federal radiation authorities to coordinate with and evaluate whether any of the exposed water sources are at risk from, or have already been, contaminated with fallout.
- ☐ Monitor water for radioactivity at the various water purveyors.
 - ☐ If there is any question of significant radioactive contamination, shut down water flow and inform Operations.

See Table 8 for Water District phone numbers.

Grocery Store and Chain Managers

Immediate responsibilities following a nuclear detonation include:

- ☐ Implement stock rationing as planned or as directed by County EOC.
- ☐ Call food distributors for resupply early and frequently. Do not wait for stock to diminish or become depleted.
- ☐ Review with staff how to continue to sell in the event of electrical or electronic failure.

Gasoline Stations

Immediate responsibilities following a nuclear detonation include:

- ☐ Set pumps to ration gas supplies as planned or as directed by County EOC.
- ☐ Call gasoline distributors for resupply early and frequently. Do not wait for fuel to diminish or become depleted before calling.
- ☐ Review with staff how to continue to sell gasoline in the event of electrical or electronic failure.
- ☐ Review with staff how to switch over to generator power if electricity fails.

Pharmacies

Immediate responsibilities following a nuclear detonation include:

- ☐ Begin to ration pharmaceuticals and other non-pharmaceutical stock as planned or as directed by the County EOC.
- ☐ Call pharmaceutical distributors for resupply early and frequently. Do not wait for pharmacy stock and non-pharmaceutical stock to diminish or become depleted before calling for resupply.
- ☐ Review with staff how to continue to sell pharmaceuticals and non-pharmaceuticals in the event of electrical or electronic failure.

A blast fax system is available in the Public Health DOC that has a list of most local pharmacies. It may be utilized to reach Ventura County pharmacies.