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Evacuation Planning Around a Nuclear Power Plant

If you have a nuclear power station near you, you may be asked to join a team to develop plans for the total evacuation of your community. Here are some tips from a chief who has been through it.

There's a little yellow telephone that hangs on the wall in our dispatch center. On that telephone there is a small yellowish orange light. It lights up when a person on the other end of the line dials our dispatch center. Day in and day out, the dispatcher answers the normal 911 emergency telephone lines with little or no concern. But let that yellowish orange light on that yellow telephone flicker and come to life, especially around 2 o'clock in the morning, and the dispatcher's heart picks up pace.

The reason? That yellow telephone is a direct communications link between our city and the Emergency Operations Center at the San Onofre Nuclear Power Plant Generating Station. Sometimes it comes alive just for the purpose of testing. However, if it rings on an unscheduled basis, it may well herald the beginning of an incident at the nuclear power plant that could threaten the lives and property of everyone living within a 10-mile radius of the station.

In reality, we have had no emergency at San Onofre Nuclear Generating Station (SONGS) that has had any off-site consequences. By the same token, Three Mile Island probably never had an emergency with off-site consequences until the big one. Our city is located exactly three airline miles from the nuclear power plant. Because of this proximity, it is possible that sooner or later an emergency will occur at the power plant that will require our city to mobilize its forces and prepare to evacuate the community to protect it from radiation.

The Three Mile Island incident in Pennsylvania sparked considerable interest in the issue of emergency planning for an accident at a nuclear power plant. Prior to Three Mile Island, the Nuclear Regulatory Commission's requirements for evacuation planning were limited to an area within a five-mile radius of the facility. In fact, the primary evacuation zone was the area within two miles of the plant. As a result of a fluke in geographical boundaries, the two-mile emergency-planning zone around San Onofre consisted primarily of an unoccupied area that was used as a state park.

In the aftermath of the Three Mile Island incident, however, it was recognized that contingency planning for nuclear facilities must be more extensive. As a result, the Nuclear Regulatory Commission, in cooperation with the Federal Emergency Management Agency (FEMA), developed a set of guidelines for upgrading the evacuation planning around nuclear power plants. This document, entitled NUREG-0654, was sent to state and local governments. Among other things, NUREG-0654 established an emergency-planning zone that is approximately 10 airline miles from the epicenter of a nuclear power plant.



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Once again, due to a fluke in the topography and geography of our area, the city of San Clemente is entirely within the emergency-planning zone. Because of the new requirements, the entire population of our community could be asked to relocate in case of an accident at SONGS with off-site consequences. Obviously, we had to go back to the drawing board and upgrade our emergency operations plans in order to cope with such a possibility.

The fire service has been evacuating people for decades. Generally speaking, however, these evacuations have consisted primarily of relocating neighborhoods or small communities of people faced with imminent and life-threatening danger, such as, for example, a wide-front brush fire approaching a community, a hazardous material spill releasing a poisonous liquid or gas, or landslides and flood problems. Before the development of NUREG-0654, our fire department's emergency evacuation planning procedures consisted of evaluating our ability to evacuate one neighborhood to a relatively close relocation center. This was changed with NUREG-0654. The requirement now is to move the entire population out of the city to a host area 25 to 35 miles from the city limits.

Developing the Plan

Our city's experience in meeting this requirement may not be unique, but it was very enlightening to those in the department who had emergency planning responsibilities. Therefore, we would like to share with other fire departments some of the problems and solutions that were developed during this process.

The fire department was given responsibility for developing these plans because, in our city, fire department personnel had the most experience in emergency planning. Before NUREG-0654 was published, the fire department had the responsibility of keeping the city's basic emergency operations plan up to date.

Such an assignment is not uncommon. More and more communities across the nation are realizing that the fire department has probably one of the best organizational structures for developing a broad-based disaster response team. In addition, our profession has spent a lot of time developing methodologies (such as the Incident Command System) for major emergency response, and many fire service people have been exposed to the types of programs being taught at the various state training schools and at the National Fire Academy on emergency operations planning.

Despite this training and preparation, however, we found that upgrading our Radiological Emergency Response Plan was far from easy. Many of the issues and problems confronted during this process were unique and not addressed in the forms and procedures created to deal with other types of emergencies. Fortunately, there was enough overlap with the basic methodologies employed for other emergencies to make a transition to the development of an evacuation procedure for an entire area.



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It was apparent from the outset that the amount of staff time required to create this new evacuation plan was going to be considerable. Our department was already stretched to the maximum as far as staff personnel were concerned. Since a quality document was mandatory, it became apparent that this could not be a collateral duty of a staff officer; it had to be a primary responsibility. Through negotiations with Southern California Edison Co., owners of the power plant, a grant was obtained for the city to pay a full-time emergency operations planning officer for a period of approximately six months. Captain Richard Northrup, the department's emergency planning officer, was assigned to this task. He was to work a regular 40-hour workweek.

Southern California Edison Co. also contracted for the services of several consulting firms to prepare documents that complied with the requirements of NUREG-0654. Captain Northrup was assigned to coordinate this effort as it related to the city of San Clemente's policies and procedures. Additionally, because of the physical configuration of the emergency planning zone around SONGS, there were six other agencies that were important to the planning effort. These included the city of San Juan Capistrano, the county of Orange, the county of San Diego, the Camp Pendleton Marine Corps Base, and the state and federal agency with radiological responsibility.

Generally speaking, most of us prepare our plans in a vacuum. By that I mean that most plans are generated to meet particular local needs and do not necessarily take into consideration the problems that may be occurring in neighboring communities or in other agencies with similar responsibilities. I can almost guarantee that the basic emergency operations plan of most cities falls into one of two categories: either it is a boiler plate operation that has been adopted from a standard state plan and does not address local issues, or it is a completely localized plan that addresses specific needs of the community but does not look beyond the corporate limits.

Like oil and water, such plans don't mix well. If you put six or seven primary response agency representatives into a room together and ask them to coordinate their planning, you will find that autonomy, local policy and procedures, and past practices will inevitably come to the fore, resulting in conflicts and differences of opinion over basic issues.

Our situation was no different. Fortunately, over the past 10 or 15 years, Orange County has developed an extensive master mutual aid operation for the fire service. This was done because Orange County is periodically hit by major brush fires that require massive mutual aid operations. The Orange County fire service has spent a great deal of time developing some interjurisdictional agreements, and these proved useful in this planning process. Additionally, the Orange County government had developed a system called Control One, which serves as a clearinghouse for communications capabilities in the county. Control One not only monitors and controls radio frequencies for the fire service, but also serves as the



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coordinator for law enforcement agencies, emergency medical services, and other regional types of communications systems, including the teletype.

A mass evacuation is neither completely a fire problem nor completely a police problem. It requires the involvement of every level of government up to and including the local political entities. This is where our first problem occurred. The actual decision to evacuate a community because of an impending threat of radiological hazard is one that is both technical and political. A mechanism had to be worked out to coordinate the decisions of all these agencies so that if an evacuation did occur it would be carried out in a smooth and reasonable fashion.

Accurate evaluation of the danger is vital to the accomplishment of this goal. Therefore, one of the first steps in the planning process was to create the Off-site Dose Assessment Center (ODAC). The function of ODAC is to provide a location where the health physicist, representatives from the utility company and the various response agencies, and other state and federal officials can meet to assess the extent of the accident and its possible off-site radiological consequences. The radiological monitoring teams and the on-site radiological monitoring equipment then feed information into ODAC so that an objective evaluation can be made of the danger to nearby communities.

It also became apparent that in cases of nuclear accidents with off-site consequences, public information would become an essential element of any evacuation plan. Because of the complexity of responses required of the civilian population and the complexity of coordination required of the agencies involved, a comprehensive public education program was identified as a key element in the success of the evacuation plan. NUREG-0654 also identifies this as a necessary element but, unfortunately, does not establish standards for the delivery.

Another factor that cannot be ignored in dealing with evacuation planning around nuclear power plants, particularly as it relates to public education, is the response of groups that are against the use of atomic energy to generate power. The fire department is a response agency. We do not have the power to impose our values on the entire community; therefore, our planning effort has to remain relatively neutral regarding the energy issue. Our planning activities must be directed toward the resolution of specific response problems. Intervener types of groups, however, tend to view a neutral stance as being essentially pro nuclear energy. For example, if the city staff refused to give an estimate of how much time it would take to accomplish a specific function, even though other experts had offered estimates, this action was interpreted as being in the interests of the utility company.

This is not to say that the anti-nuclear groups did not contribute significantly to the planning process. Quite the contrary, many questions raised by these individuals found their way into the planning process because the issues were not only valid but had not been discussed in the professional journals. A classic example dealt with the evacuation of non-ambulatory individuals. The question was raised during the



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planning effort as to how we would evacuate elderly semi-invalids or non-ambulatory people who were not otherwise provided with a means of transportation. As a result of this inquiry, a special mail-out card system was developed that was sent to every householder by the utility company. This fill-out card identified some of the disabilities that could prevent a person from responding to an evacuation order. This information was sent back to the fire department where it was incorporated into a system for identifying and reacting to these special situations.

As an interesting sidelight of this process, the local Junior Women's Club assisted fire department personnel in developing a program called Operation SAFE (Special Assistance for Evacuation). Operation SAFE was conducted during Fire Prevention Week, October 1981, to help us continue to refine our information about the elderly population in the community. This information was also handy in helping us locate individuals who were in need of smoke detector devices and special assistance from other agencies, such as the senior citizen organizations.

Testing and Refining

All of our planning efforts culminated in a major exercise, which was conducted May 13, 1981. Literally hundreds of individuals and dozens of organizations engaged in a moderately scaled exercise to test the communications systems, decision-making process, standard operating procedures, and interagency cooperation.

The results of the exercise were mixed. While most participants felt relatively pleased with the operation, it was pointed out by FEMA and several other outside agencies that the degree of cooperation required for a massive nuclear accident evacuation is considerably more complex than we had been accustomed to dealing with in the past. While many elements of our plan received passing marks, other elements, including interjurisdictional planning and coordination, were pinpointed as being problem areas requiring more refinement. This finding came as somewhat of a shock and surprise to most of the responding agencies.

Almost as soon as the ink had dried on the evaluation report, all of the primary response agencies met in San Clemente to take a look at the areas where we needed to improve. It was obvious that FEMA's contention that additional work was needed in interjurisdictional planning and procedures should be given highest priority.

Each agency indicated a sincere interest in finding a mechanism that would reduce this problem to a minimum. The mechanism that was ultimately established was called the Interjurisdictional Planning and Coordinating Committee. It became the committee's responsibility to develop some standard operating procedures that would be common to all of the response groups.



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The committee began meeting on a regular basis to establish much more specific procedures to deal with the coordination problem. The titles of some of the procedures developed by the Interjurisdictional Planning and Coordinating Committee are indicative of the scope of its work:

- Emergency Operations Center Procedures
- EOF (Emergency Operations Facility - at the power plant) Operations
- Public Information and Media Center
- Radiological Monitoring Team Techniques
- Use of Off-site Dose Assessment Center
- Use of Sirens and Warning Devices for Evacuations
- Traffic Control and Arterial Highways

The development of these interjurisdictional procedures tested the flexibility and cooperation of everyone. It is simple to say that we are all going to do things the same way. However, there are so many variances created by political reality, logistical support, past experience and knowledge, and personalities that it is very difficult to achieve a common method of operation. In fact, the committee soon recognized that it would be impossible to have all of the procedures of every jurisdiction read word for word the same. The objective then became one of establishing interjurisdictional procedures that had the same format and were essentially the same in concept.

The Interjurisdictional Planning and Coordinating Committee soon broke into several ad hoc committees to evaluate specific areas of concern, such as communications, health problems, training, and legal issues. Each of these subcommittees would report back to the parent committee on a monthly basis with a series of recommendations that would then be adopted by the committee and taken back to each of the individual response agencies.

Many problems were encountered in the process. For example, for years the fire department had been training our fire suppression people, as well as some civilians and law enforcement personnel, in the use of radiological monitoring equipment that was essentially war oriented. There are hundreds of thousands of dosimeters and other monitoring equipment in service in this country. When this monitoring equipment was used in the context of a nuclear power plant accident, however, we ran into difficulty. As a matter of fact, the equipment is incapable of providing the kind of input that is necessary. This meant replacing that equipment and providing new training programs to bring up the skill level of those responsible for radiological monitoring. Contracts had to be negotiated with the major utility company to pay for many of these programs, practices, and hardware that were necessitated by the existence of the nuclear power plant.

In the past, whenever a hazardous materials problem was created in our community, it was considered a given. If an emergency with off-site consequences were to occur at a nuclear power plant, the argument



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could be made that this is also a given and no different from an emergency at a pesticide factory that has off-site consequences. To what extent should private enterprise be expected to pay for the planning required to cope with the off-site consequence of their emergency? A satisfactory answer to that question has still not been found. Southern California Edison Co. has spent literally millions of dollars and much preparation time to meet NUREG-0654 requirements, yet there is still considerable discussion in our area about the question of reimbursement.

Our evacuation plan is still undergoing revision. Because the area encompassed by the plan is experiencing rapid growth at this time, it can be reasonably anticipated that the radiological evacuation plan will never be a complete document. Every new road, every new highway, every new housing tract creates a new input to the evacuation scenario. Every time there is an incident at a nuclear power plant anywhere in the country the federal regulations and guidelines tend to be revised to establish new parameters for the adequacy of the emergency plan. It is doubtful whether any single industrial occupancy has as severe an impact on a community as does a nearby nuclear power plant.

Implications

Planning for the evacuation of an entire community goes far beyond anything we are normally used to developing in local government. It is also true that, given such a complex problem to deal with, it is impossible to develop a plan that will cover all contingencies.

The antinuclear groups have been contending this for some time. It is their position that if a plan does not provide specific answers to every question raised in the plan, then the plan is inadequate. However, this same charge could be made about all areas of emergency planning. As General Dwight D. Eisenhower once said, "Planning is essential - plans are useless."

The purpose of this kind of activity is not to develop a plan that is rigidly designed to solve every single solitary problem. The objective of all planning efforts is to raise the level of knowledge and expertise of the decision makers so that they can make intelligent use of their resources in a time of real crisis.

Only time will tell if the plans and procedures generated by the presence of San Onofre Nuclear Generating Station will ever have to be used in an actual emergency. I hope not. But if they are, each and every hour spent in the research and development of a planned document will return benefits by the hundredfold to the citizens whose lives and property must be protected by the decision makers and local governments.

No doubt problems of even greater magnitude will sooner or later create a need to expand this expertise to an even higher level. One interesting discovery we made during in our evacuation plan research was the fact that the occupancy just to the north of the city, which uses some very toxic rocket



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fuels, created a much greater sense of urgency among the decision makers than the nuclear power plant did.

Unfortunately, this type of installation does not have the controversy swirling about it that the nuclear power plant has. Nonetheless, the loss of life and property from a massive hazardous materials accident on a freeway or at some fixed installation could quite easily exceed the loss of life and property resulting from a nuclear power plant leak. It can only be a matter of time until such an emergency does occur, and then there will be an outcry for the development of standards like NUREG-0654 for evacuations from around these installations.

The fire service will probably continue to have responsibility for the development of such plans. It is incumbent upon us as professional fire officers to be prepared to respond to that challenge when it occurs.