

TERM

PERSPECTIVES, PROBLEMS AND PROGRESS  
IN  
STATE AND LOCAL GOVERNMENT  
RADIOLOGICAL EMERGENCY RESPONSE PLANNING  
IN SUPPORT OF  
FIXED NUCLEAR FACILITIES

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## INTRODUCTION

This paper reflects the views of the author and does not necessarily reflect the position of the Nuclear Regulatory Commission.

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### An Overall Perspective

Prior to the accident at Three Mile Island, radiological emergency response planning and attendant preparedness as it relates to nuclear facilities, was never in a position of high visibility within the nuclear industry or within the Federal, State and local governments in this country. There were a variety of reasons for this state of affairs.

First and foremost, were the two long cherished notions that nuclear facilities were designed and operated with such integrity that the chances of a serious accident occurring were extremely remote; and even if an accident were to happen, because of the integrity of design and construction, any accident would have little effect in terms of offsite radiological consequences. Although the record of nuclear power safety is excellent in general terms, it is not flawless and we have been given some serious warnings.

The first of these two notions, that is "chances" or "probabilities" of accidents happening, has, in my view and the views of others, been essentially knocked into a cocked hat. Two relatively serious events, in terms of "chance", have occurred in large power reactor facilities in this country within the last 4 years: the serious Browns Ferry fire and the accident at Three Mile Island.

The corrolary or second of these two notions, that is that little would happen in terms of offsite consequences, is to some measure still supported by the integrity of the facilities themselves. One cannot say too much with respect to the role and actions of operators and nuclear facility management during these events except to say that some correct moves

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were made but at the same time, many incorrect moves were also made. The point to be made here is that we were all very fortunate in both of these incidents in that offsite radiological consequences were either non-existent or minimal.

There may be those in industry and within the Federal government who do not share these observations, but nevertheless, it's my view, shared by many, that we came uncomfortably close in both of these accidents to potential consequences that could have caused grievous harm to our society, individuals, our environment, and our energy program.

The warning has clearly manifested itself. Dr. Stephen Hanauer, of the NRC, who was the Chairman of the NRC Special Review Group (of which I was a member), which prepared the report concerning the fire at the Browns Ferry nuclear power facility, remarked at one point during that investigation with words to the effect -- "Maybe it was like a mild heart attack -- it woke us up". We have had a second "mild heart attack" at Three Mile Island. So, it behooves all of us, industry, government and every one else involved, to learn from this experience because we may not get another chance to improve matters in the interim, should another accident occur.

Other reasons for a relatively weak radiological emergency response planning and preparedness program with respect to the operation of nuclear facilities, are rooted in deficiencies in general emergency planning and preparedness programs at the Federal, State and local government levels. Notwithstanding the massive Federal emergency operational response and industry response at Three Mile Island, advance

emergency planning and coordination leaves much to be desired. General emergency planning and preparedness at the governmental levels has suffered a period which can be characterized as relative "benign neglect", since the end of World War II. Civil Defense or Emergency Services programs at the Federal, State and local government level have fallen into disarray and mediocracy due to fragmentation of efforts, lack of motivation, inadequate attention, and inadequate funding. This is partially the reason why the new Federal Emergency Management Agency (FEMA) was established on April 1, 1979. FEMA brings together the major Federal agencies who have had responsibilities in civil preparedness and disaster control and mitigation.

Any radiological emergency response planning and preparedness program that is mounted, must depend ultimately on an adequate general emergency planning base. Efforts to build a proper radiological emergency response posture in support of these nuclear facilities, has suffered because one cannot build a "golden idol" on "feet of clay". If the base is defective, the idol will not stand for very long, if at all.

Adequate, well conceived general emergency planning and preparedness, to cover the wide range of hazards in our technological society is the key toward an improved radiological emergency response planning and preparedness program. The NRC and other technical agencies will work with the new FEMA to improve this program.

#### Problems & Progress

I have presented the overriding problem in my foregoing remarks. But, there are a number of specific problems related to radiological emergency response planning and preparedness. There are many but let me discuss

five of the more salient ones:

1. An Adequate Planning Basis:

What is an adequate planning basis for radiological emergencies at fixed nuclear facilities? This question, (phrased as "What kind of a nuclear facility accident should we plan and prepare for handling?") was essentially asked by many of the States and local governments, and their national organizations some years ago. This resulted in two Federal agencies launching an effort to examine this question.

In August of 1976, a joint Nuclear Regulatory Commission/Environmental Protection Agency Task Force on Emergency Planning was appointed to look into this matter. In December of 1978, after over 2 years of work, the joint NRC/EPA eleven member Task Force published its report, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans In Support of Light Water Nuclear Power Plants" NUREG-0396/EPA-520/1-78-016.

The bottom line on this Task Force report is, that there is no specific nuclear power plant accident that one can identify as being the accident for which plans should be in place. Rather, the Task Force came down on the side of planning for consequences, with only minimal concern for the uncertainties of probabilities. And, to define an adequate, improved planning basis, the Task Force recommended that essentially generic Emergency Planning Zones (EPZs) be established around all nuclear power facilities in this country. The Task Force further recognized that the Low Population Zone (LPZ) concept used for siting purposes had little real meaning in terms of offsite emergency planning. The Task Force, in essence,

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rejected the concept of the "LPZ" for definitive comprehensive emergency planning offsite. Further, the Task Force recognized the need to develop an emergency planning basis to address the so-called "Class 9" accidents.

This need for a capability to accommodate emergency situations beyond the design basis accidents used in plant and site evaluation, makes generic rather than site specific areas appropriate. The Task Force recommendation that the establishment of Emergency Planning Zones (EPZs) of about 10 miles for the plume radiological exposure pathway, and about 50 miles for the ingestion radiological exposure pathway would be sufficient to define the areas in which planning for the initiation of predetermined protective action is warranted for any given nuclear power plant. The Task Force report also provides guidance concerning time factors associated with releases and the radiological characteristics of releases.

Although not without some controversy, the Task Force report is a major milestone along the way toward defining an adequate radiological emergency response planning basis. The recommendations contained in this report are now formally before the Commissioners of the NRC and are being brought before the EPA Administrator as well. Problems in implementing the establishment of Emergency Planning Zones can and will be overcome if there is a will and commitment to do so.

2. Accident Assessment:

Accident assessment has been, and continues to be, a problem area. Although defined as an essential emergency planning element in 1970 in the emergency planning regulations 10 CFR 50 Appendix 'E' for

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nuclear facility licensees, and later in the former AEC's emergency planning guidance document for States and local governments "WASH-1293" (now NRC publication "NUREG-75/111"), much needs to be done to improve accident assessment, both onsite and offsite.

Steps are underway to improve this assessment capability.

On the licensee side, improved in-plant instrumentation specifically designed for assessing accident situations has been indicated. On the Federal, State and local side, standardized off-site accident assessment techniques and systems need to be developed and improved, especially in the areas of coordination between agencies at all levels of government and in the evaluative/decision making process. The coordination of accident assessment information must also be improved between the nuclear facility operator and the offsite agencies. Guidance concerning the types of emergency instrumentation which might be useful, and the acquisition of instruments and systems themselves, are needed in many localities.

Several programs are now moving to address these problems. Licensees will be required to upgrade their emergency plans to NRC Regulatory Guide 1.101, and to implement the related recommendations of the NRC Lessons Learned Task Force involving instrumentation to follow the course of an accident and relate the information provided by this instrumentation to emergency plan action levels. This will include instrumentation for post-accident sampling, high range radioactivity monitors, and improved



in-plant radioiodine instrumentation. The implementation of the Lessons Learned recommendation on instrumentation for detection of inadequate core cooling will also be factored into the emergency plan action level criteria.

Guidance in this area for States and local governments will be prepared by the Idaho National Engineering Laboratory under contract to NRC. Plans are also afoot to test an inexpensive airborne radioiodine sampling and collection device, which together with an existing Civil Defense radiological instrument, has the potential to help provide quick, rough "go" - "no go" information to authorities responding to an accident in offsite areas where a radioiodine release may be a dominant radioisotope in certain accidents. This portable device, invented and recently patented by researchers at the Brookhaven National Laboratory, is being independently evaluated by the Idaho National Engineering Laboratory. If it passes muster, NRC has plans to put it into the existing inventory of civil defense radiological monitoring instruments currently available to State and local government personnel.

### 3. Training

Since March 1, 1975, the NRC with the assistance of other Federal agencies, has conducted training programs for Federal, State and local government personnel in both radiological emergency response planning and operations. Over 1000 persons (80% State and local government personnel) have attended these training programs from all of the States. The training programs have been well received. Much remains to be done in terms of retraining because of the high turn-over among State and local government personnel

and also to keep pace with new developments in this area. NRC's plans are to continue to improve these training programs and to develop new ones where necessary. Nuclear facility personnel training must also be accelerated and improved as well.

Related to training, is the matter of standardized exercises to test emergency plans. Too often, in the past, exercises did not adequately test emergency plans. The NRC is developing exercises to realistically test onsite and offsite emergency plans.

#### 4. Funding

Adequate funding for general and radiological emergency response planning and preparedness has been a problem at all levels of government, Federal, State and local. The funding problem has been particularly acute at the local government level, where often many of the involved personnel are volunteers or part-time employees with meager resources available to them. Federal programs for general emergency planning and preparedness, that have been provided in the past, have not been entirely successful for a variety of reasons. Emergency planning and preparedness budgets are low, both at the Federal level, and at the State and local government levels, not only in terms of actual funding available but also in terms of priority assigned when related to other programs.

This situation needs to be improved. The amount of money required for a substantial improvement in the radiological emergency planning and preparedness effort, (as a sub-set of general emergency planning and preparedness), does not appear to be staggering. As a matter of fact,

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it is very small when compared to the investment made in a single nuclear power unit, of say, 1000 Megawatts-Electric, the gross cost of which today is well over the one billion dollar mark, in today's dollars,

Where can these funds come from?-- and more importantly--where should they come from?

Dr. Stephen Salomon, environmental economist of the NRC's Office of State Programs, has recently completed a year long study of this matter. His report which was released in draft form as "NUREG-0553" in the Spring of this year, two days before the Three Mile Island accident, examines this question of funding in significant detail. Dr. Salomon, over a 9 month period, visited some 12 States and 24 local governments charged with the responsibility to develop emergency response plans supportive of nuclear power facilities within their jurisdictions. His findings depict a wide range of funding situations, from relative "affluence" - to "abject poverty", - concerning resources to do a proper job in this area, particularly at local government levels. Even where funding was adequate, in some cases there was no motivation or encouragement to spend funds on radiological emergency response planning and preparedness. These problems have at their roots, the political, social, governmental and industrial perceptions of the relative safety of a high technology facility. Three Mile Island has changed a lot of complacent views.

But, in those communities with little available to them to improve matters, the recognition of a need to do more does not always translate to, or result in, improvement. Help is needed. And, although the Federal

government can and should provide some assistance, the nuclear industry has an obligation to provide financial assistance as well. Some nuclear utilities have voluntarily done yeoman's work in this area, but many have not done all they can and should do. It is in their best interests to do so. The need for these specialized emergency plans and the attendant preparedness that they imply, would be unnecessary if the nuclear facility were not there.

Dr. Salomon's report, "Beyond Defense-in-Depth", NUREG-0553, will be published as a final NRC staff report in about two weeks. His report is not touted as the "be all and end all" of the funding problem, but it is an excellent first glimpse of it and should serve as a basis for taking some action now and looking at the problem seriously, and developing a comprehensive solution in the very near future. The report should be useful to not only those of us involved in the regulation and management of the industry, but to the new Federal Emergency Management Agency (FEMA), recently established by the Presidential Reorganization Plan No. 3.

5. Emergency Planning Guidance

A great deal of good emergency planning guidance has been developed over the years, but much remains to be done. The accident at Three Mile Island has, in great measure, validated the existing guidance and the activities of the people in this business that take their work seriously. The existing guidance on Protective Action Guides (PAGs) for radiological exposure needs to be completed by the U.S. Environmental Protection Agency and the U.S. Department of Health,

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Education, and Welfare, agencies charged with this responsibility. A Federal policy on the administration of radioprotective drugs, such as Potassium Iodide as a thyroid blocking agent in some circumstances, needs to be developed by DHEW who is also charged with this responsibility.

Our emergency planning regulations and general guidance documents for nuclear facility licensees, Federal, State and local governments, need updating and improvement. As I have mentioned before, specific technical guidance, such as emergency instrumentation and accident assessment guidance, needs to be developed. Guidance on interdicting or controlling the accidental radiological exposure to humans via domestic animals and agricultural products in the food chain, needs to be developed as well. This can and should be done with the help of all concerned.

#### Summary

The last bastion of the "Defense-in-Depth" concept against consequences of accidents at nuclear facilities, which has governed the development of commercial nuclear power for two and one-half decades, is a proper and effective emergency planning and preparedness program with respect to these facilities. This bastion, has not received the support which it deserves. Proper and adequate emergency planning, rather than paying "lip-service" to it, can help alleviate many of the fears surrounding the safe operation of nuclear power facilities. In the past, the old view that emergency planning and preparedness should be "kept in the closet", away from public scrutiny, less it "stir-up the folks", just won't wash anymore. Three Mile Island has changed all of that, and I look at it as a healthy, up-beat change. This accident, has given us a golden opportunity to improve

things and we must not fail, collectively, to take advantage of it and to learn from it and to act on it. We are unlikely to have another chance to do so.

This means an augmented commitment of dedicated, competent people, money and resources, but it is a relatively small commitment in order to do the job properly. And, if this nation is to have its faith restored in this technology, an adequate, competent high visibility emergency planning and preparedness program can, among other needed improvements, help achieve this goal. The choice is ours, -- collectively.