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Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Administrative Judges Helen F. Hoyt,
Dr. Richard E. Cole, and
Dr. Jerry Harbour

Re: Limerick Nuclear Generating Station
Docket Nos. 50-352; 50-353

Dear Administrative Judges:

SERVED FEB 7 1985

Thank you for your attention to the concerns which I expressed at the public hearings of your Board at Limerick Information Center, and for the opportunity to submit the notes from which I was working. I have tried to assemble and organize them as best I can; they are essentially the same as I was using that evening, but I have added a few pertinent up-dates.

In first looking into this question, I began with a concern whether the support plan suggested by ECI for my own county (Bucks) could fulfill the implicit promises to the evacuees. I soon had to question whether my own county would itself be protected under certain conceivable conditions. Finally, I began to question certain assumptions in the plans for evacuating the EPZ itself.

These notes reflect two inherent difficulties in the assessment of the evacuation plans: (1) that the ability to evacuate people from the EPZ and to care for them is intimately related to what happens in surrounding areas, and (2) that, depending upon weather, there is a potential no-man's land extending outward from the edge of the EPZ to a distance of at least another 15 miles. In that "no-man's-land", the predicated evacuation routes and support functions would not operate as envisioned; on the other hand, residents of that region would themselves be in need of the services which have been designed for the 10-mile EPZ, but without benefit of any realistic prior contingency planning that I have been able to discover.

Indeed, if Francis Bacon was right about the value of negative research, then my efforts of the past six months have been phenomenally successful. Most of the time, I have found myself in possession of more information on emergency planning (which, being the ECI drafts, was precious little) than the officials from whom I was seeking enlightenment. My quest began early last July, when I pointed out to my County Commissioners that they were about to consider a plan, of which they had not yet received copies, that listed as a mass care center a vacant school which had been put up for sale two years previously. The quest goes on: ECI's most recent update of the plan, dated October, 1984, changes a fire company assignment on that page, but has made no substitution for the defunct school.

Having begun with a basically null hypothesis, I have asked questions of many sources: Red Cross, police, fire, and ambulance workers, nurses, truck drivers, the County Agricultural Agent, the Directors of PEMA and BCEMA, New Jersey EMA, people from EPA and FEMA, school officials, and a variety of elected representatives.

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Included here are those responses which I thought most useful to you, with a table to indicate the content of the paragraphs. I am sorry it is so long. It was difficult to omit discussion of a question's significance when the answer, as so often happened, was not directly responsive to what had initially been asked, especially when the answer revealed either remarkable ignorance about radiation or about the plans, or else deep scepticism about evacuation possibilities. In general, the consensus among the people with whom I spoke, sometimes "off-the-record" for all practical purposes, was that the plans were unworkable, a farce, and no more than paper.

A case in point is what happened to several people who accompanied me to the Stowe meeting. They arrived too late to testify because, ironically, we had followed in the reverse direction along the evacuation route from a Doylestown mass care center past a reception center and thence to Limerick; we then took Route 422 to Stowe. A trip of approximately 32 air miles required nearly an hour and three-quarters, with the result that my passengers, one of whom had particularly new and relevant observations to make, found themselves at the bottom of the list. It was particularly frustrating for them to discover that so many people above them on that list seemed to regard their mission as a celebration of the nuclear industry, rather than addressing the real question of satisfactory evacuation plans. If the people concerned with the issue can't get into the EPZ in time to testify, how can we expect the people in the EPZ to get out in time to save their lives?

I was impressed by the statement yesterday of Deputy Director McGraw of the E.P.A., in which he told David Brinkley that no emergency plan, especially an evacuation plan, could effectively protect people's lives unless the people themselves were involved in total community knowledge and effort.

Although I personally believe Karl Abraham's statement, which he repeated to me a few days ago, that because of the density of population, Limerick should not have been built and certainly would not be built today, so that I also believe that a truly workable evacuation plan is probably impossible, I think nevertheless that it would be irresponsible not to examine whether such a plan could be devised. Clearly (to me, at least), it has not yet been devised, certainly not by ECI. That is why, in conclusion, I must go beyond my original null hypothesis, and agree with the Chairman of the Bucks County Commissioners in his judgment that the plans under consideration are "a dangerous trap".

If I can be of any help to your Board by way of explanation or supplementary information, I'm glad to offer it.

Very truly yours,

Margaret M. Dardis
Margaret M. Dardis

INTERFACE OF 10-MILE EPZ PLANS AND PROPOSED SUPPORT PLAN (BUCKS)

1. Will evacuees be able safely to reach the intended reception centers?

The list of service stations available for gasoline, towing, and other assistance brings to mind scenes in this area during the gasoline shortage ten years ago. It is not stated in the Montgomery plans that there are specific assignments to maintain order at such facilities, nor does there seem to be a consideration of the effect on traffic flow of queues of vehicles waiting to gas up.

In a conversation with Corporal Eliot of the State Police barracks at Trevoze, I learned that the procedure for clearing the Turnpike of west-bound traffic at the Philadelphia Interchange would require about an hour, presumably diverting that which was about to enter there as well as that which was traveling westward on the highway from New Jersey. Apparently the solution would be to send the impacted traffic back to New Jersey by way of I-95 and the Scudders Falls Bridge. [Depending upon weather conditions and the time of day and week, it is my estimation that this diversion could create an impenetrable traffic jam, or could be managed fairly smoothly; during daylight and early evening hours, during the week, and especially in ice, snow, or rain, it could impede, first, the movement of family members to their homes, volunteers to their assignments, and finally, of evacuees to the reception points.]

Information from the Director of Safety at AAA in Philadelphia yields a very substantial number of daily service calls in Montgomery County in the winter time, an overwhelming majority for dead batteries. Unfortunately, the figures could not be broken down to isolate the EPZ. Mr. Joseph Tomlinson, a long-time service station manager, estimates that at the supposed evacuation speed, most evacuees who started with an average level of gas in their cars would need to refuel in Bucks County. Under the conditions of disruption of traffic patterns, especially around U.S. 1, the Turnpike, and I-95 East, gasoline resupply deliveries would drop off to almost nothing. The Montgomery Plan provides a list of service stations, but in the absence of a security force at each one, there is danger of long queues of cars and disruption of traffic patterns, as occurred during the gasoline crisis.

A further problem appears to be unavailability of fuel on the Turnpike and, to a lesser extent, on the other evacuation routes. According to a Colonel Kuba, with whom I was finally put in touch at Indiantown Gap, evacuees would jam the Turnpike before the National Guard could respond to get its own vehicles and people up there. [Cpl. Eliot had already mentioned that there are almost no accessible entrance points to the raised section of the highway between Willow Grove and U.S. 1.] Col. Kuba was somewhat nettled that he had not seen the plans. "You seem to be privy to information that I have not been made privy to," he said. "Perhaps the General has seen it. I haven't." He went on to stress that their reaction time, to get a few drivers and vehicles on their way, would be a minimum of 2 hours, and more likely close to a 6 hour response. [Having read the testimony before you by a representative of the National Guard, I realize that it conflicts with the opinion that I have just cited. Not knowing the place of either man in the chain of command nor their direct involvement in implementing emergency procedures, I don't know which one to believe.]

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In efforts to obtain information directly from Willow Grove, I was referred to Sgt. Fitzpatrick, who works there in charge of the fire equipment, but did not reach him at 4:10 P.M. of the day I called; a clerk answered and told me, "They all go home at 4 o'clock." Granted that all personnel are on call, it is still clear that emergency response is on a call-up, not a minding-the-store basis, with a resulting delay in mobilization. On July 23rd, I spoke with Lt. Portnoy, and later with Col. Kuerschner, both of whom seemed genuinely puzzled when I asked them what their role in the forthcoming test would be. They had no idea where any orders would come from; presumably from the Gap. When I asked about support services on the Turnpike, Col. Kuerschner said, "You're hitting me completely cold."

In any event, evacuation of so many people over winding country roads and along the Turnpike, with questionable fuel and emergency services, is very likely to place them in competition with self-evacuating Montgomery County residents from outside the EPZ as well as those from Bucks and possibly parts of Philadelphia, for both gasoline and road-space.

Most important, there is the question of the possibility of radiological injury to the evacuees in the course of their movement.

The Pennsylvania Turnpike, between Norristown and the Philadelphia Interchange, curves back and forth between the 10% and the 16% wind frequency sectors (the highest and third highest of the compass divided into 16). The other two evacuation routes, 113 and 202, travel basically through the and wind frequency sectors, respectively. A tie-up on the Turnpike itself could thus subject to radiation people who had managed to complete the first phase of the evacuation process unscathed.

The assumption that half the evacuees would elect to keep going is a disturbing one. Supposing even that they eventually make their way to New Jersey, some might very possibly be in need of prompt decontamination. No machinery appears to be in place to accomplish the necessary monitoring. As far as the State of New Jersey is concerned, I understand from Mr. Joseph Hayden at the N.J. Emergency Management office in Trenton that people wishing to use their mass care centers would be permitted to do so if they requested shelter. At that point, they would presumably be monitored. Otherwise, anyone entering the state on the way to stay with Cousin Debbie and her kids would be permitted to do so, even though car, possession, and people might all have become contaminated without their knowledge. In the confusion it might be some days before they were properly cared for. [Reports from the accident in Bhopal cited cases of people who did not receive medical treatment because they ran off into the woods and were not even counted among the casualties at first.]

[It is my personal opinion that an evacuation plan which fails to provide, even require, exit monitoring for all evacuees after a major release of radionuclides is inherently immoral. This is especially true in view of the assumption that, in a day-time accident, commuters and parents returning to the EPZ before evacuation might not be aware of their own exposure as they moved about the area.]

Mr. Hayden also remarked that their Trenton center was a genuine shelter ("That's more than you people have," he added.) He estimated that it would take a half to a full day to get the evacuees onto the Turnpike, along it, and off either at U.S? 1 or to the Trenton area. One problem would be fuel on the Turnpike: "All the guys that pump gas will have jumped on their motorcycles and left."

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personnel in a major chemical disaster, if their families were within the danger zone.

[I do not impugn the devotion of emergency workers generally. My brother was an Army Ordnance safety officer in two wars, a successful safety director for a large coal-mining company, and later safety director in a petrochemical complex, with experience over a quarter-century. I am therefore well aware of what can be expected, as well as what can't be.]

In particular, what can be expected of volunteers is a question, both for the EPZ evacuation directly and for its facilitation in support areas. Both willingness and logistics must be taken into account.

On logistics, attached is a column from today's Courier-Times on the permanent traffic jam afflicting the central and lower Bucks area. A large number of the predominantly middle-class people who are volunteers live in this area, but work during the day, most of them at least 10 miles from their homes, many of them in Philadelphia, and some on the periphery or even within the EPZ. Their commutation routes, U.S. 1, the Pennsylvania Turnpike, and I-95, are the roads that would be most impacted during an emergency. When the Red Cross sent a "team" to the Neshaminy School in the recent November "exercise", they barely managed to get together the requisite number of volunteers to open one center, but according to Mr. Reardon at the Lower Bucks office, they would have been hard put to it to field more than that. He deplored the fact that the exercise was held during the day, because so few people were available. In a "real" emergency, however, he would be called upon to supply more than a dozen teams. Of course, many more volunteers would drop everything and attempt to report for duty than during the exercise, but the fact remains that they would probably be faced with nearly impenetrable traffic jams, not only on the roads cited, but also on such normally overloaded routes as 332 and 413.

On willingness, the thoughts of a friend of mine who is Director of Volunteers at Germantown Hospital (itself within the 25-mile region) are significant. She is an extraordinarily ethical person, an ecumenical Christian, who tried to give an honest answer to the two-part question: What would be the response of volunteers to such a situation as an emergency at Limerick, and what would be her own? She noted that volunteers who have family obligations generally do not come in when family needs supervene. Other volunteers are often older people, who tend not to come in during bad weather. "Thinking about myself, I know that I wouldn't volunteer to help move contaminated people. That may be selfish or irrational, but I keep remembering that I have children at home. If I didn't have them... I might... but I do. My first thought would be to get back to them (Bucks County) and take care of them."

There is also a question of the degree to which volunteers understand the nature of a nuclear accident and to which they are protected by insurance; this question bears directly on the willingness of some volunteers to serve. Lack of radiological training, noted elsewhere, suggests that people asked to enter a contaminated area might do so without the benefit of knowledge equivalent to medical informed consent. As far as insurance is concerned, Pennsylvania state law allows part-time employees and some categories of volunteers coverage under Workman's Compensation. The awards formula, however, is pegged to a person's earnings, so that a young person with a fire company, for example, who has not yet entered on his adult career, would receive compensation based only on his low earnings. Another law, 35 Pa CSA

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Section 7706, is a provision for pure volunteers. Under this, the state would pay a small sum (\$2,500 for accidental injury leading to death; up to \$1,500 for medical and hospital expenses; and weekly payments of \$50 during disabilities arising from accidental injury). This law applies to those cases where Workman's Compensation does not. Considering how small this coverage is, taken together with the way in which the high population of the Limerick environs waters down any Price-Anderson awards, volunteers are unlikely to be as willing to risk themselves in contaminated areas as they would be to face much more limited hazards in ordinary emergencies. It therefore becomes an important question: When is a person (nurse, bus driver, volunteer ambulance driver, etc.) removed from the protection of employee status? Attempts to explore this with several emergency units met with little success; they know as little about the coverage as I.

4. How is the evacuation of the EPZ affected by the 10- to 25-mile region under a plume?

The most serious failure in the plans for the 10-mile EPZ, at least from a technical standpoint, is the failure to provide appropriate contingency pre-planning for the 10- to 25-mile region.

As already pointed out, the plans as they stand set up the potential tragedy of moving evacuees to "safety" in an area where they can come under a dangerously concentrated plume.

As already pointed out, also, the possible necessity of evacuating and abandoning facilities designated for care and back-up, both in Montgomery and in Bucks County, would destroy considerable parts of the existing plan in practice, without an orderly substitution.

Furthermore, the commitment of Bucks County personnel to support of the 10-mile evacuation plan leaves no leeway for an effective, appropriate response if it should become necessary to start moving people from the 10- to 25-mile region of Montgomery, as well as Bucks. Since that region downwind is the most heavily populated in the two counties, only a little less dense than that of the more northerly parts of Philadelphia, which also fall in the same region, an influx from there could triple the evacuees.

The implications of all this for the people of the EPZ are that their escape routes might quickly become jammed with an enormous number of cars from various parts of Philadelphia, fleeing in whatever direction the drivers might guess was safe, along with much more rationally impelled people from southeastern Montgomery County, attempting to get across the Delaware bridges to northern New Jersey rather than risking Center City routes. In this scenario, parents returning to the EPZ for their children, emergency workers and volunteers, and emergency vehicles, as well as evacuees on their way out, could all be impeded by the lack of planning in the surrounding area.

Nothing in the long series of anecdotal reports which I have given would indicate that ad hoc planning is feasible. Indeed, like the weather of the 16 sectors, everyone talks about it, but no one does anything about it.

Reliance on ad hoc planning outside the EPZ would invalidate the plans for the EPZ, even if they were workable up to the (arbitrary) 10-mile border, which apparently they are not.

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5. What has been the effect of failure to involve the public in emergency planning?

Perhaps the fundamental fault in all aspects of the Limerick Evacuation planning is the failure to include the public from the beginning. In an interview on the David Brinkley show yesterday (Sunday, Dec. 16th), Deputy Director McGraw of the EPA discussed the problem of emergency planning for the people of the Kanawha Valley, especially those near the Union Carbide plant. He stressed that emergency planning must involve total community knowledge and effort in order to be effective.

It frightens me that a plan produced by ECI in October, 1983, was not available to the public; six months later, I was one of less than half a dozen people in my county who had a copy of it. The people charged with protecting the community, from County Commissioners through the Red Cross down to local police, ambulance, and fire chiefs, had not seen it six months later. To this date, the drafts are not generally available. None of the local input necessary for genuine planning as required by law has occurred.

Traffic jams are clogging Lower Bucks

If you've lived, worked or visited New York City, you know the problem of trying to drive an automobile crosstown during rush hour or at any other time of the day. It's almost an endless traffic jam.

If you've gone to New Orleans to be a part of Mardi Gras madness, you know what happens to all the streets funneling into Canal. It's an endless traffic jam.

If you're watching the Philadelphia Phillies in a vital baseball game at Veterans Stadium at the same time there is a sellout rock concert at the neighboring Spectrum, you know what awaits you. An endless traffic jam.

Welcome to Lower Bucks County, anywhere in the vicinity of Oxford Valley Mall, Langhorne Borough, Route 1 near I-95 and probably a few other assorted places. The endless traffic jam has found us.

Granted, it is the holiday season and the shoppers are out in full force. In 1984, though, the shoppers have only exacerbated the problem, not caused it.

For months prior to the Christmas rush that began with "Black Friday," the day after Thanksgiving, scenes like these have been commonplace.

A driver on Route 213 in Middletown Township trying to get to the traffic signal at Maple Avenue and Pine Street in Langhorne Borough may find himself as far back — bumper to bumper — as Reedman's around 5 p.m. That's nearly a mile.

On Route 413, also in Middletown Township, it is not unusual for bumper-to-bumper traffic to form all the way from the traffic signal at Bridgeton Pike to the Neshaminy Junior High School. That's nearly a mile.

At almost any point on Route 1, from Pennel to Oxford Valley Road, making a turn into and away from traffic is getting to be like Chinese checkers.

What has happened?

The answer can be found in one word: Development.

New businesses and the relocation of Delaware Valley Hospital have changed the landscape on Route 1 in the area of Oxford Val-



joe
halberstein

Courier Times Columnist

ley Mall. Traffic problems that used to be minor irritants to drivers now have reached the gritting teeth stage. Yet to come — nail biters and blowing the stack.

In the Route 413 corridor from Langhorne to Newtown, construction of new homes is doing what the planners feared might happen and the state experts said wouldn't. The two-lane highway is beginning to look a lot like overloaded.

There is no magical solution in sight as traffic conditions grow worse, which they will. It is a time-honored American tradition to permit a landowner pretty much to do what he or she wishes when the right amount of money turns up. That is: Sell.

Farmland in desirable Lower Bucks areas inexorably is giving way to homes and shopping centers.

The state Department of Transportation will do what it can. So will the Lower Bucks municipalities. They'll give motorists a turning lane or two, a left-turn signal or two.

Still, those of us who call Lower Bucks County home can say goodbye to the era of leisurely driving from Route 13 to Route 1 or from Morrisville to Bensalem.

The day of the horse and buggy on narrow farm roads, the day of the quick ride from Fairless Hills to Bristol Borough, the day of the scenic Sunday drive to the Delaware River and around — those are all in the memory book of tomorrow.

The traffic jam, that too modern, ever-growing unwanted phenomenon, has found us.

MONDAY, DECEMBER 17, 1984

BUCKS COUNTY COURIER TIMES

PENNSYLVANIA

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2. Can evacuees from the EPZ be properly processed upon arrival at the Reception Centers?

The EPZ (Montgomery) plan directs evacuees to three reception centers in Bucks. Of these, two, County Line Plaza and Montgomery Mall (actually in Montgomery County, but dispatching to Bucks mass care centers) lie well within a 20-mile radius from LGS. When frequencies of wind direction are plotted on a sector map, County Line Plaza is in a 5% region and Montgomery Mall in the 10% sector (16 sector total). The two malls are, however, close enough that an accident with a moderately wide angle of dispersion could simultaneously affect both, making them unacceptable for further use as staging areas.

Mr. Jack Clemens, of County Line Mall, had signed a letter of agreement for use of his mall in an emergency. He had been totally unaware that he would be receiving so many evacuees, or that there was any possibility of radiological contamination of vehicles or persons. He was especially concerned that, upon arrival after quite a number of hours of preparation and driving, people would need various facilities which his store just does not have, especially toilets. He seemed to be a man of compassion and scruples, who would not, however, promise on paper something that he doubted he could fulfill in practice.

Mr. David Filippone, of Neshaminy Mall, had signed a similar letter, and was similarly startled when he discovered the nature of the commitment. Since then, the owners of the mall have elected not to participate in the ECI plan even tentatively, pending further study of its implications.

Although Neshaminy Mall is 35 miles from LGS, it lies just inside the 10% sector, adjacent to the 16% wind frequency sector, and is therefore at much greater risk of receiving the tail of a plume than if it were located further north. Unfortunately, in that instance, the evacuees would be very likely to have come under the plume once or more during their travel on the Turnpike, so that their arrival at the reception center would constitute a major radiomedical emergency.

Ambulance corps members from Bristol, Yardley, Trevese, Newtown, and Pennel tell me that they do not carry monitoring equipment of their own, but generally rely on the fire companies for radiological back-up. The ECI plan calls for monitoring and decontamination to be done at the mass care centers to which people would be dispatched essentially at random (only in the order of their arrival at the reception center). The result is that, on the one hand, contaminated persons might be subjected to additional irradiation while finding and being processed at the mass care center, and, on the other hand, ambulance personnel called for the various medical emergencies likely to occur at the mass care centers, would have inadequate monitoring of patients. A consequence of this could be the contamination of an unnecessarily large number of ambulances, which would then have to be taken out of service. Another consequence could be the contamination of various facilities in virtually every high school in Bucks County, whereas monitoring at the reception centers could avoid that inconvenience.

Mr. Willard McKay, who is associated with both ambulance and fire companies in the Erwinna area, tells me that the ECI prescription for monitoring would be reason, if followed, to fail a student in radiological training, because it does not instruct the team to cease monitoring and recording as soon as an abnormal count is detected. At that point, the

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patient is to be stripped and scrubbed, in order that no further harm be done. In view of this medical policy, I find it unbelievable that, after hours on the road, evacuees would be sent on for what may be another hour or more, in the direction of a mass care center, without being screened.

I was glad to see that, in their review of the July 25th drill (despite some gross errors and misinterpretations on other points), FEMA noted the inadvisability of doing the decontamination monitoring at the mass care centers, thus agreeing with many of us who had questioned this aspect of the ECI proposals. No notice seems to have been taken of the criticism, however, for ECI's current "update" of the proffered (but not accepted) Bucks County support plan makes not change whatsoever in the procedure. (The date of transmittal of the "changes" is November 1, 1984.) This failure to read and respond to rational criticism so undermines the credibility of the Limerick plans to date, as written, that it is warranted to junk them and start over. The Emperor's new clothes can't be made adequate by retailoring them.

Depending upon the length of time individuals have had to prepare and on the length of time they have been on the road, there might be substantial non-radiological medical emergencies arising at the reception centers, but there are no plans or proposed agreements for handling such emergencies under roof. Heart conditions, epilepsy, psychiatric emergencies, diabetes, labor, etc., might all intervene before people could receive and follow strip maps. Inclement weather could compound discomfort and even loss of life.

The problem of safely reaching the mass care center is complicated by the problems of traffic on Bucks County roads and the probable behavior of the residents. This will be discussed in the section dealing with the 25-mile radius and ad hoc plans. It must be stressed, however, that in the best of conditions, the normal run from the reception centers to some of their corresponding mass care centers can take almost an hour. Under winter conditions, the perilous trip from Montgomery Mall to Bucks County Community College might simply be impossible; I have watched students take three hours to negotiate the exits from the college and successfully reach the top of the first hill on Swamp Road. Furthermore, despite the various traffic check points, strip maps issued to people unfamiliar with Levittown could be a source of confusion and delay. Even people born there get lost there. The trip from Neshaminy Mall to Council Rock HS, Pennsbury HS, or Pennwood HS, in the midst of possible self-evacuation, is problematical. The effect upon anyone who had already been contaminated is an unconscionable added insult to the body.

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3. Would housing, medical, and other services be adequate for the evacuees from the EPZ?

A considerable number of the mass care centers are located within or on the edge of the 25-mile radius. These include schools in Warrington, Perkasia, Doylestown, Chalfont, and Warminster; they are slated to receive more than 7,000 evacuees. The possibility therefore arises that, if they were to arrive in good time, followed by a wind shift and the plume, all these evacuees would have to be re-evacuated at the same time that the emergency management authorities would have to devise ad hoc measures to notify and move the Bucks County residents.

Roughly twice as many people would be assigned to mass care centers located beyond the 25-mile zone and as far away as 40 miles. Unfortunately, the majority of these lie in the 10% and a few in the 16% wind frequency sectors, so that some problems of food handling and personal care could possibly arise. At what point, if any, it would be necessary to move the centers, and what precautions should be taken up to that point, I have been unable to discover from any official agency, including Mr. Charles McGill of the Bucks County Emergency Management Agency and Mr. John Patten of the Pennsylvania Emergency Management Agency, with whom I discussed some of these issues at lunch a couple of months ago. Basically, the answer seemed to be that they would figure out what to do when and if the time came, a response which does meet the usual definition of planning.

On the theory that strong radiological training on the part of a considerable number of key Red Cross volunteers would help to safeguard the health of evacuees for whatever time they had to remain in the Ingestion Zone, I asked Mr. Bill Reardon of the Lower Bucks County Red Cross what background his workers had. Last summer he said that several of his workers had already had radiological training and that he had hoped that more would receive it, but that it was very difficult to get people to take the courses. They are able to get perhaps three or four people at a time to sign up for them. (At that time, Mr. Reardon had not yet received a copy of the ECI plan.)

More recently, Mr. Reardon has cleared up a question which had troubled me: how would the Red Cross supply cots, blankets, and other materials from its warehouse in Philadelphia, across the probable traffic block at City Line? He admitted that the maneuver would probably be impossible, and that materials would have to be airlifted in from other points, probably taking about 72 hours. This assessment, although realistic, raises the question of the health and comfort of evacuees, especially any that had had to undergo decontamination.

The ability of the schools themselves to make way for evacuees during the school year is questionable. In accordance with a requirement by the Intermediate Unit, every school has a general emergency plan covering various eventualities. Dr. John Byrne, Superintendent of Council Rock Schools, has told me that "the school plan is by no means the PECO plan." In the event of snow or an emergency which would prevent parents from being at home to receive their children, the school policy is to keep the children, including those in senior high school, at the school. Dr. Byrne's feeling was that an accident at Limerick would result in a situation in which it would take many hours for parents to return home, and many more hours before students could be discharged after verification by telephone. It is very likely that his schools, four of which are scheduled to accept 1,175

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evacuees, would give priority to housing and feeding an unknown, but possibly substantial, number of students. He did not have, and had never seen the ECI plan. He also offered the unsolicited opinion that no evacuation plan would work. Assistant Superintendent Hoffmann of Neshaminy told me that his schools would respond in an emergency, but also with the specific plans worked out for each district to deal with all emergencies; these might run counter to PECO's plans, but they would hold the students at school, regardless of whether the space was needed for mass care centers.

Mr. Dick Knippel, of the Intermediate Unit, verified that the plans in place at the school districts are their emergency plans for care of their students. He was somewhat skeptical about the efficacy of any evacuation plans ("I was at a school conference in Harrisburg at the TMI of TMI and drove home along the Turnpike, looking over my shoulder for the plume.") Although Mr. Knippel did not rule out the possibility of the schools' accepting evacuees, he was not in a position to discuss the specifics, because he had not received the plan.

The feeding of evacuees depends upon a number of factors. In the summer time, reliance would have to be on stored canned goods. In the winter, more fresh foods would be on hand in addition to the canned, but a considerable number of school children might have to be fed for several meals. I am told by Mr. Bernard Hoffmann of the Neshaminy School District and by Mr. Reardon that there are local depositories of food for the schools which would suffice for at least a week. At the Pennsbury School District, I ran into the fact that some of the food service people would probably be employed to prepare food for the evacuees, under some arrangement with the Red Cross, according to Mr. Gawrilak, who is in charge of the food service there. Mindful of the possible question of special precautions if the Pennsbury area should become part of the plume Ingestion Zone, I inquired whether anyone on their staff had had radiological training or would know how to safeguard food in those circumstances. Obviously the question had never occurred to him, and neither he nor his staff was prepared to deal with it.

At Bucks County Community College, Mr. Martin Beeman, an independent concessionaire, was utterly amazed when I inquired about feeding 1100 people on an emergency basis. Although there would not be a short-term problem, he had never heard of the plan and had never been contacted about his capacity or willingness to serve. A much more serious problem concerns the sleeping facilities there. The figure of 1100 seems to have been predicated on the seating capacity of the gymnasium. As President Rollins explained to me, "Some people came round about a year ago and asked how many people the gym could hold; I told them eleven hundred."

Although some schools have two gymnasiums as well as large cafeterias, some of the mass care capacity figures on the ECI list look suspiciously high. As noted elsewhere, one mass care center no longer exists: Delhaas High School, which was sold and converted into offices. I tried to check any possible new assignment by calling the fire company originally assigned there for decontamination. The man on duty, Gearhart, knew nothing about any emergency assignment. "The Chief might have a list in his desk drawer." When would the chief be back?" I asked. "Maybe tomorrow... hard to say..." It would be better if I called the Bristol Township Fire Marshal. It turns out that the Fire Marshal lives in New Jersey "the other side of the bridge!"

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Bristol Township Third Fire District's lack of knowledge regarding emergency plans is typical of organizations throughout the county. ECI had guarded the proposed support plan as if it were an industrial secret, with the result that no input-- and certainly no adverse criticism-- could take place.

Criticism would raise the fundamental question of whether the emergency services in Bucks County could possibly undertake the functions laid out by ECI. Both fire and ambulance units are already understaffed, so that some find it difficult to arrange for one fully operative day-time unit, and units are constantly called upon to cover for other companies.

The Levittown-Fairless Hills Rescue Squad, for example, has some 50 to 60 members on record, but has to maintain 2 paid crews, 9 hours a day, 5 days a week, with a part-time crew at another station. Most of the members work. They are, however, able to muster 20 people during the day, plus the 7 paid workers. Most of their men have had the few hours of radiological training which is included in the Basic EMT; otherwise, some 20 paramedics have had somewhat more. They have no dosimeters nor any other specific radiological equipment. Asked what would happen if one of their ambulances picked up an apparent medical case who was also contaminated, my respondent, Mr. Bernie Powers, said the vehicle would have to go out of service. He further commented that there is no county-wide utilization of squads, no one directing them in covering for one another; no division of territory, and no cohesion. How well would the plan work, he was asked. Answer: "It wouldn't!"

The Morrisville Ambulance Company, at the time of my call in August, said that their disaster plan was just a general response; they do not have a real blanket plan. As far as she knows, no one had ever seen or been approached about the ECI plan (which I identified as the "Bucks County plan, etc., reading from the title sheet). The only training she was aware of among the personnel was the regular 2 hours or so given with the Emergency Medical Technician training. When I inquired what procedure they would follow if a patient might be contaminated, she said they would call the EPA! The unit has no dosimeters; she knew of no procedure for getting them. She backed down a bit on calling the EPA, and said that in an emergency they would have to be guided by the patient's physical condition only. The only type of class given for disaster training, she said, was not geared to that high a level.

The Newtown Ambulance Squad numbers about 50 people, of whom 35 to 40 are active; of those one or two are also in the fire company. Between 20% and 40% of members work within a 10 mile radius of the station; about 90% work in the county. Mr. Robert Anderson, with whom I spoke, confirmed that, as with the other squads, there were no dosimeters or other equipment for monitoring radiation. His opinion was that he and other members were not too well prepared for a radiological emergency; he had seen no copy of the plan.

The Bucks County Rescue Squad, with fully paid day and midnight shifts during the week, has only 25 to 30 volunteers to cover on evenings and weekends, according to Chief Michael Plebani. They have 3 Basic and 2 Advanced Life Support units, and 1 Mobile Hospital Unit, which can be used as an operating room or can carry 4 to 5 stretchers. Neither the paid personnel nor the volunteers have had radiological training; for some reason, he said, it does not draw interest. No dosimeters or other radiological

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equipment. No knowledge of plan except a small item in the newspaper.

At the Penndel-Middletown Emergency Squad, Mr. J. R. Douthart and Deputy Chief Dennis Mitchell brought up an interesting point: that there are often several duplications of people serving in two emergency capacities at once: fire and police, or ambulance and fire, for example. Their squad has some 7 or 8 such cross-overs. [I have found this situation in several other instances; it may be more serious than appears from the numbers, because the people who double up that way seem to be better trained, more dedicated to service, and are leaders in the groups. An emergency that would require mobilization of both groups for a long period of time, during which the volunteer would have to remain constantly with one of them could result in decreased effectiveness of the other group.] Both men were unhappy about the current state of preparedness. "No one is really trained," said Mr. Douthart. "We need a genuine drill." That, despite (or perhaps because) of the fact that some 6 or 8 of their volunteers have had radiological training at the Bucks County Fire School; this statement may apply to cross-over members of the fire company who also serve with the ambulances.

Since each squad is expected to go out of its own area only on request to cover for another squad, Deputy Chief Mitchell was somewhat disturbed by the possibility that he would be called directly to Neshaminy Mall if there were emergencies among arriving evacuees. "Neshaminy Mall is not my job, man. I would have to rely on other companies, bring in Yardley, Morrisville, to cover for me." I asked what would happen if they were unavailable because of covering for other units already dispatched to the reception centers or to accidents. "I'd have to call in some of the New Jersey units," he answered. Further discussion elicited the fact that cooperation across the river is fairly common; the problem, of course, would be whether the ambulances could buck the tide of eastbound trucks and evacuees. I inquired about procedures if they had to pick up a radioactively contaminated patient. He replied that the personnel would use "sterile gloves, masks, and gowns; afterward a good vacuuming inside the vehicle, with the geiger counter to make a sweep of the inside afterward." As far as the plan was concerned, he had no knowledge of what would be expected. "I don't think we are adequately prepared. There are several people in both fire and ambulance who were or are qualified-- but there's no drill. If it came down, we'd do it, but haphazardly."

It was Mr. John R. Douthart who advised me when an accident should be scheduled: "It would be better after 6:00 P.M., best on Saturday between 5 and 6 o'clock. Monday afternoon would be the worst time-- and of course it's bad during working hours every day. Also late July and August are not so good." He went on to say that a majority of their volunteers work in the county, many fairly close by, so that the number stuck in traffic would not be particularly high.

Chief Fanini of the Bensalem Rescue Squad was well informed on chemical emergencies, and briefed me at length about his concerns with transport of both chemical and radioactive waste. He used to be fire chief; the fire company had a lot of equipment then, but the ambulance personnel would have to treat a patient on the basis of his apparent condition. He had followed the July 25th drill, and was not favorable toward Montgomery County's performance. He was well aware of the possibility of a plume extending downwind into Bucks, and commented: "There aren't too many in the lower end [of the county] that are equipped to deal with that situation."

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Unfortunately, I have lost my notes from an interview with a man who is from the Trevoze Heights Rescue Squad, located near the Turnpike-U.S. 1 Interchange. He has had long experience as a fire chief, and more advanced radiological training in the military. Discussing the main outlines of the ECI plan, which he had not seen, but had read about, he castigated the idea of evacuating people by the Turnpike. "Any fool knows you don't stand downwind from a burning building!" Even without notes, I recall his words.

* * *

The Newtown Fire Company informs me that their only method of notification, in the event of our being downwind after an accident, would be to blow the air raid siren signal at the firehouse: "Many people would think the fire whistle was stuck-- if they could hear the sirens at all." I asked about the procedure that had been suggested by Karl Abraham, of the Valley Forge NRC Office, for notification outside the EPZ: "Ask your police or fire department to notify you by telephone." That is clearly not possible, said the man at the desk at the fire department. He went on to say that he was not familiar with the emergency plan-- either the local Township plan or the ECI plan; he was not aware of training or any radiological equipment. Not being sure that he had all the information, I called back this morning, and was told that no one would be in until evening; fire calls are taken by the emergency number.

The Lower Makefield Township Civil Defense office responded to their phone in the township building. The Township clerk asked, "Would you hold while I look this up." She then advised me to call the Bucks County EMA number in Doylestown. I told her that Mr. McGill, if I inquired there, would refer me back to her. She does not know of any standard operating emergency procedure.

Because my own Newtown Township has a supposedly functioning emergency committee, I called Chief Adam Duffy, and received a taped message to call the county-wide police emergency number if necessary. Somewhat later, I called his number again and got our dispatcher, Shirley Milnor. When I explained my concern, her response was: "That's terrible. If there is a plan, I don't know about it." (Chief Duffy is with the police department.)

[It is true that I live somewhat outside the 25-mile radius, approximately 32 miles from LGS. I am not morbidly afraid of radiation, having X-rays when necessary, and a radioactive thallium test a while ago. IF THERE IS A 7-DAY 200-REM GROUND DOSE IN THE NEXT TOWNSHIP OVER, HOWEVER, I DON'T WANT TO STAY AROUND FOR A WEEK TO ABSORB (AND INGEST BY ACCIDENT) WHATEVER MAY DRIFT MY WAY. My efforts to find out what procedures would be taken for the protection of my friends and fellow citizens closer to the plant, as well as my friends, neighbors, and myself in this area, simply confirm my suspicion that there are no present workable plans, and that the plans developed by ECI for PECO are worse than unworkable: on the face of them, they were never even intended to be workable. Almost complete lack of knowledge about radiation, part-time employees, plans non-existent or locked away in a file cabinet, back roads, and the magic incantation, AD HOC by the state, county, and federal planning agencies do not forecast a rational, orderly response to an event that, if it ever occurs, will make everyone wish they had planned.]

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A necessary central resource in an evacuation is the hospital system. Present results of changes in medical logistics have resulted in a greater availability of beds in some hospitals than a few years past. On the other hand, a greater number of patients discharged immediately after elective surgery to the care of their families might respond adversely to an evacuation, so that they would constitute an additional load on the support facilities, including outpatient services. I have seen no provision in the plans for evacuation of a fairly considerable number of large hospitals in the 10- to 25-mile area. In fact, Abington Hospital, which is on the edge of that region, is one of the "support" hospitals for the EPZ. Plume travel along one of the most likely paths could require relatively rapid evacuation of that facility and abandonment of its support function in the EPZ plan.

As far as the ECI Bucks County hospital support interface is concerned, a page of hospitals with supposed bed capacity and radiological capability has been supplied by ECI.

A check of the listed facilities revealed that the capacity (number of beds) listed applied to the total number of beds in the hospitals; most of them are, of course, in use at any one time. The implication in the list is that the number of beds listed would be available for "Treatment of Contaminated Individuals"-- a manifestly ridiculous statement when one takes a second look. The relevant information, number of beds available for treatment of contaminated individuals, is omitted.

Furthermore, the figures given are incorrect with regard to the primary care facility, Lower Bucks County Hospital. Mr. Janssen, Assistant Administrator, was puzzled. "Even the number of beds (323) is alien to me. Currently we have 290 beds. We never had 323. In an emergency situation, we could probably make a total of 175 beds available by discharging elective patients, adding beds in extra spaces, etc. Under a real push, perhaps a bit more.

To some extent, the hospital staffs face the same dilemma as the bus drivers and the teachers: that they would wish to take their own families to safety first; such "self-evacuation" would be hampered by traffic conditions, and even though some of them express a willingness to return to their assigned duties, they question their ability to get there. In the course of teaching, I have used this question on occasion as an illustration of ethical problems, and since a number of my students are nurses or in nurses' training, the discussions have been illuminating. Those who have families and young women of child-bearing age, working at Abington, Warminster, Holy Redeemer, Lower Bucks, and other hospitals, were unanimous in giving first thought to their families. One or two said they would stay at their posts if they could verify that another family member had taken children to safety; several said they would finish a shift if there were a short time left on it; others said they would not report for duty if they were home.

This reaction is at first surprising. But when a young unmarried bus driver in our local school district told me that he would go home for his parents and leave, and when I learned that some National Guard members on active duty had discussed whether to evacuate their families before undertaking their other duties, it is clear that the same assumptions cannot be made about an accident at LGS as about a flood, hurricane, etc. After Bhopal, it would be difficult to predict the behavior of emergency