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Writer's Direct Dial Number

February 4, 1980  
TLL 034

Emergency Preparedness Task Group  
Attn: Brian K. Grimes, Director  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Units I & II (TMI-1 & TMI-2)  
Operating License Nos. DPR-50 and DPR-73  
Docket Nos. 50-289 and 50-320  
Evacuation Time Estimates

The attached information is in reply to your letter dated November 29, 1979, requesting evacuation time estimates for certain areas around nuclear power reactors.

The time estimates provided were developed by the Pennsylvania Emergency Management Agency (PEMA). Metropolitan Edison believes that PEMA, and those state agencies with which PEMA coordinates radiological emergency response planning, are fully knowledgeable and qualified to provide the requested information. Nevertheless, it should be understood that the enclosed document is a "working" version that will be updated and refined as better information becomes available.

The evacuation time estimates were produced at a time when PEMA's Emergency Plan for TMI was being upgraded to meet recently published criteria, and county plans were being rewritten to correspond to the revised PEMA plan. Part of this work includes refinement of evacuation routes and procedures.

Thus, the time estimates provided are viewed by Metropolitan Edison as very conservative. Revisions to the state and county plans are likely to result in shorter evacuation time estimates. The use of Dauphin County as the basis for the study provides additional conservatism since Dauphin County is judged to be the county in the vicinity of TMI for which evacuation of the general population and of special facilities will take the longest. Moreover, many of the assumptions used in developing the data ensure that the estimates envelope the possible range of evacuation times.

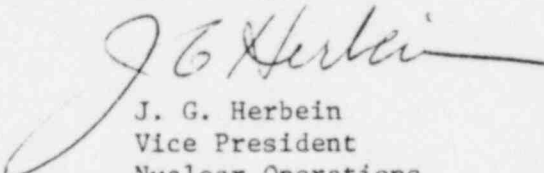
It is anticipated that evacuation time estimates will be refined as response implementation capabilities are enhanced.

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AND  
BGRIMES  
CE*

*F 31102110 455*

February 4, 1980  
TLL 034

Sincerely,



J. G. Herbein  
Vice President  
Nuclear Operations

JGH:DB:hah

Attachment

cc: J. T. Collins  
R. Vollmer  
D. DiIanni  
J. Roe

Problem: Develop time estimates for evacuation of various areas around fixed nuclear facilities.

Facts Bearing on Problem:

1. All power reactor licensees are required by NRC to submit by January 31, 1980 evacuation time estimates as prescribed in letter of November 29, 1979 from Brian K. Grimes (see enclosure 1).
2. Development of time planning factors for Pennsylvania's fixed nuclear facilities was based primarily on conclusions arrived at during a January 18 conference in PEMA offices (attendees are listed at inclosure 2).
3. Dauphin County was used as the sample for planning purposes (see inclosure 3 for special facilities).

Assumptions:

1. A best estimate of evacuation movement times will be degraded by a factor of two for both 2 and 5 mile evacuations during adverse weather conditions; the degradation factor will increase to three for a 10 mile evacuation under adverse weather conditions.
2. Hospital evacuation in Dauphin County will require 24 hours under best estimated conditions; and will increase to 48 hours for adverse weather.
3. Notification time for Amish and other Old Order communities (primarily in York and Lancaster Counties) will require 2 hours for the 10 mile radius at Peach Bottom (No impact on TMI).
4. Mobilization time prior to formal initiation of evacuation will require 6 hours for a 10 mile evacuation; 3 hours for a 5 mile evacuation; and 1 hour for a 2 mile evacuation (Of course, the reduction of these times would not preclude the major portion of the population from movement out of the risk area).

Discussion:

Development of movement times for 2, 5, and 10 mile evacuations was based on moving 100% of 1970 census tract population; assuming three people per auto; utilizing route capacity by specific highways; coordinating PennDOT recommendations with each County plan to assure no conflicting guidance; continuing two-way traffic on routes; assuming prior mobilization and stationing of emergency forces from State and county; excluding consideration of traffic using secondary roads;

assuming no adverse weather complications; and a speed of 30-35 mph.

In that the counties around TMI have elected to maintain a 20-mile evacuation capability, the use of routes which would accomodate such a movement have been used for the 10, 5, and 2 mile estimates. PennDOT has, nevertheless, prepared an updated evacuation route map for 10 miles. In view of various refinements in the original TMI plan, a requirement now exists to review and update the 20-mile evacuation map--in coordination with concerned counties. However, for the purposes of this exercise the available data is adequate for time estimation.

In view of the TMI experience, the State does not contemplate ordering or recommending evacuation by sector within 10 miles of a nuclear facility. A 360 degree evacuation would be anticipated. If the situation permits, resources and emergency forces would be directed to concentrate in that direction perceived to be at greatest risk.

The time estimates developed in this paper are for planning purposes. Each nuclear facility represents a differing set of considerations, and certain unique problems. Therefore, the figures that follow in conclusions apply to Dauphin County only.

Conclusions:

- - Evacuation of general population around TMI - Dauphin County:

	<u>BEST ESTIMATE</u>		<u>ADVERSE WEATHER</u>
10 Mile	7	Movement	21
	<u>6</u>	Mobilization	<u>6</u>
	13		27
5 Mile	4	Movement	8
	<u>3</u>	Mobilization	<u>3</u>
	7		11
2 Mile	1	Movement	2
	<u>1</u>	Mobilization	<u>1</u>
	2		3

(Notification times in excess of 15 minutes, and special movement problems of groups, such as island residents, are additional factors for consideration).

- - Evacuation of special facilities around TMI--Dauphin County:

	<u>BEST ESTIMATE</u>		<u>ADVERSE WEATHER</u>
10 miles	24	(hospitals)	48
5 miles	5	(nursing homes)	10
2 miles	0	(No special facilities)	0

(Obviously, ambulatory and some non-ambulatory hospital patients could be evacuated much more rapidly than 24 hours. However, the time factors involved suggest that a take-cover in place option may be the best solution for certain patients. Dept. of Aging estimates 5 hours for nursing home evacuation-- Mr. Rogers, phone 783-3746).

-- Time required for confirmation of evacuation:

The best indicator of evacuation "status" will be radio reports from State Police officers manning traffic control points. As traffic flow out of the risk area decreases one can assume the majority of residents who elect to evacuate have passed through. In more rural locations arrangements can be made to leave some designated indicator on a gate or door. However, it is not contemplated that emergency forces will be ordered into a known contaminated area to make a door-to-door check.

-- Notification times in excess of 15 minutes, considering present alert system capabilities:

Present alert/warning system capabilities for the general population are far from providing for the goal of 100% notification within 15 minutes. With present capability a time of 2 to 3 hours would be required to assure greater than 90% notification of the general population within 10 miles of the facility.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

Enclosure 1  
TLL 034

November 29, 1979

ALL POWER REACTOR LICENSEES

Gentlemen:

This letter, which is being sent to all licensees authorized to operate a nuclear power reactor and to all applicants for a license to operate a power reactor (FSAR docketed), is a request for information regarding estimates for evacuation of various areas around nuclear power reactors. The requested information is in addition to that requested by the October 10, 1979 letter to all power reactor licensees from Darrell G. Eisenhut, Acting Director, Division of Operating Reactors, Office of Nuclear Reactor Regulation.

Although evacuation time estimates are expected to be prepared in the course of the upgrading of the state of emergency preparedness as specified in the October 10, 1979 letter, submission of these estimates to the NRC is being requested on an accelerated time scale so that the NRC can identify those instances in which unusual evacuation constraints exist and special planning measures should be considered. In some cases of extreme difficulty where a large population is at risk, special facility modifications may also be appropriate. The requested information will also enable the NRC to be responsive to a recommendation from the Environment, Energy and Natural Resources Subcommittee of the House Committee on Government Operations. The information requested in the enclosure should be submitted no later than January 31, 1980.

The October 10, 1979 letter indicated that efforts to develop a model plan were continuing. It now appears that the model plan will not be completed on a schedule which will be of use in developing upgraded plans for the requested January 1, 1980 submittal. The upgraded plan development should therefore proceed on a site-specific basis.

Sincerely,

Brian K. Grimes, Director  
Emergency Preparedness Task Group  
Office of Nuclear Reactor Regulation

Enclosure:  
Request for Evacuation Time  
Estimates

cc w/enclosure:  
Service List

*dupl  
#8494116004  
(4 pp.)*



REQUEST FOR  
EVACUATION TIME ESTIMATES (AFTER NOTIFICATION)  
FOR AREAS NEAR NUCLEAR POWER PLANTS

Background

Prior to recent NRC requests that means for prompt notification to the public be installed around each nuclear power plant site, a significant component of evacuation time estimates was the time required to notify the public of a need for evacuation. Studies of actual evacuations that have taken place generally do not distinguish between the time required for notification, the time required to implement the evacuation, and the time required to confirm that an evacuation has taken place.<sup>1/</sup> The estimates for time required for evacuations now requested relate primarily to the time to implement an evacuation as opposed to the time required for notification. These estimates may be based on previous local experiences (e.g., chemical spills or floods) or may be based on studies related to population density, local geography and road capacities. No standard method for making such estimates is identified for use at this time. The basis for the method chosen should be described in the response. As an independent check on the evacuation time estimates, agreement with or comments on the time estimates made should be obtained from the principal local officials responsible for carrying out such evacuations. Such agreement should be documented or the areas of disagreement indicated in the submittal.

The format given below is appropriate for reporting to the NRC estimates of the time required to implement evacuation of areas near nuclear power plants. These estimates, are to be made for the primary purpose of making available, to those officials who would make evacuation decisions in an emergency situation, knowledge of the time required to complete one of the protective action options (evacuation) available for a particular potentially affected segment of the population. A second purpose of these estimates is to identify to all concerned those instances in which unusual evacuation constraints exist and that special planning measures should be considered. In some cases of extreme difficulty where a large population is at risk, special facility modifications may also be considered.

Given a decision to evacuate rather than shelter in an actual event, fewer or more sectors or different distances than given in the reporting format might be evacuated should this be the chosen protective action. For example, three 22-1/2° sectors might be initially evacuated in a downwind direction (the sector containing the plume and an adjacent sector on each side), followed by the evacuation of other sectors as a precautionary measure.

1/

Hans, J. M., Jr., and T. C. Sell, 1974 Evacuation Risks - An Evaluation, U. S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, EPA-520/6-74-002.

Format for Reporting Information

The areas for which evacuation estimates are required must encompass the entire area within a circle of about 10 miles radius, and have outer boundaries corresponding to the plume exposure EPZ. These areas are as follows:

<u>Distance</u>	<u>Area</u>
2 miles	two 180° sectors
5 miles	four 90° sectors
about 10 miles	four 90° sectors

Estimates for the outer sectors should assume that the inner adjacent sectors are being evacuated simultaneously. To the extent practical, the sector boundaries should not divide densely populated areas. Where a direction corresponding to the edges of areas for which estimates have been made is thought not to be adequately represented by the time estimates for adjacent areas, an additional area should be defined and a separate estimate made for this case. The format for submittal should include both a table and a figure (overlaid on a map) which each give the information requested in items 1 and 2 below. Additional material may be provided in associated text.

Required Information

1. Two estimates are requested in each of the areas defined in item 1 for a general evacuation of the population (not including special facilities). A best estimate is required and an adverse weather estimate is required for movement of the population.
2. The total time required to evacuate special facilities (e.g., hospitals) within each area must be specified (best estimate and adverse weather).
3. The time required for confirmation of evacuation should be indicated. Confirmation times may consider special instructions to the public (e.g., tying a handkerchief to a door or gate to indicate the occupant has left the premises).
4. Where plans and prompt notification systems have not been put in place for areas out to about 10 miles, estimates of the times required to evacuate until such measures are in place for the plume exposure emergency planning zone (EPZ) should also be given. Notification times greater than 15 minutes should be included in the evacuation times and footnoted to indicate the notification time.



5. Where special evacuation problems are identified (e.g., in high population density areas), specify alternative protective actions, such as sheltering, which would reduce exposures and the effectiveness of these measures.
6. A short background document should be submitted giving the methods used to make the estimates and the assumptions made including the routes and methods of transportation used. This document should also note the agreement or areas of disagreement with principal local officials regarding these estimates.



DAUPHIN COUNTY

Enclosure 3

TLL 034

2 Mile: 0 - Hospitals  
0 - Nursing Homes

5 MILE: 0 - Hospitals  
2 - Nursing Homes = Frey Village Retirement Center (Av. Census 240)  
1020 North Union Street  
Middletown, PA 17057  
(5 Miles - North)

Odd Fellows Home of PA (Av. Census 131)  
999 West Harrisburg Pike  
Middletown, PA 17057  
(3 Miles - Northwest)

10 MILES: 3 - Hospitals  
9 - Nursing Homes (Includes - 5 Miles)

Hospitals: Hershey Medical Center (Av. Census 350)  
500 University Drive  
Hershey, PA 17033  
(9.5 Miles - North/Northeast)

Community Osteopathic Hospital (Av. Census 175)  
4300 Londonderry Road  
Harrisburg, PA  
(10.0 Miles)

Harrisburg Hospital (Av. Census 479)  
South Front and Chestnut Streets  
Harrisburg, PA  
(10.5 Miles)

Nursing Homes: Dauphin County Home & Hospital (Av. Census 521)  
Paxton and South 25th Streets  
Harrisburg, PA 17511  
(9 Miles Northwest)

Alpine Retirement Center (Av. Census 183)  
Ruhenhaus Lane  
Hershey, PA 17033  
(10 Miles North/Northeast)

Colonial Pines Golden Age Home (Av. Census 57)  
120 Willow Road  
Harrisburg, PA  
(10 Miles North/Northwest)

Leader Nursing and Rehab. Ctr. (Av. Census 112)  
800 King Russ Road  
Harrisburg, PA  
(10 Miles North/Northwest)

Nursing Homes:  
(Continued)

Helen O. Snavely Memorial Home (Av. Census 22)  
R.D. #1  
Hummelstown, PA 17036  
(8 Miles North/Northeast)

Villa Teresa Nursing Home (Av. Census 178)  
1051 Avila Road  
Harrisburg, PA 17109  
(10 Miles North/Northwest)

Beistline House (Av. Census 60)  
South 28th Street  
Harrisburg, PA  
(9 Miles Northwest)