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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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before the

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)

PUBLIC SERVICE COMPANY)
OF NEW HAMPSHIRE, ET AL.)

(Seabrook Station, Units 1)
and 2))

Docket Nos. 50-443-OL
50-444-OL

(Offsite Emergency
Planning Issues)

APPLICANTS' PROPOSED FINDINGS
OF FACT AND RULINGS OF LAW

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APPLICANTS' PROPOSED FINDINGS
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1. BACKGROUND AND INTRODUCTION

1.1. These findings and rulings address all contentions in this proceeding with respect to radiological emergency response planning for that portion of the emergency planning zone (EPZ) for the Seabrook Station (Seabrook) which lies within the State of New Hampshire except those contentions made with respect to the protective action of sheltering. Seabrook is a nuclear power facility located in the Town of Seabrook, New Hampshire constructed, and to be operated, by the New Hampshire Yankee division (NHY) of Public Service Company of New Hampshire, the lead owner of Seabrook.

1.2. The emergency plan litigated in this phase of the hearings is known as the "State of New Hampshire Radiological

Emergency Response Plan." The most recent revision of the plan issued prior to the hearings is "Revision 2." Revision 2 (hereafter NHRERP) was admitted into evidence as Applicants' Exhibit 5 for the purpose of showing the contents of that revision. See Boston Edison Co. (Pilgrim Nuclear Power Station), ALAB-83, 5 AEC 354, 369 (1972), affirmed sub nom., Union of Concerned Scientists v. AEC, 499 F.2d 1069, 1094 (D.C. Cir. 1974).

1.3. Of some 122 contentions proffered by intervenors for litigation in the NHRERP phase of the hearings, various prior rulings of the Atomic Safety and Licensing Board (ASLB or Board) on objections made to admission and motions for summary disposition had, prior to the start of the evidentiary hearings, reduced the number of contentions remaining for litigation to a total of twenty-six.

1.4. The remaining contentions, denominated by party and original number, are the following: New England Coalition on Nuclear Pollution (NECNP) Nos. RERP-8, NHLP-2, NHLP-4, NHLP-6; Seacoast Anti-Pollution League (SAPL) Nos. 7, 8, 8A, 15, 16, 18, 25, 31, 33, 34, 37; Town of Hampton (TOH) Nos. III, IV, VI, VIII; Town of Hampton Falls (TOHF) Nos. 2, 4; Town of South Hampton (TOSH) Nos. 2, 3, 8; and Town of Kensington Nos. 1 and 6. ASLB MEMORANDUM FOLLOWING PREHEARING CONFERENCE (Sept. 22, 1987), Attachment, passim.

1.5. NECNP-NHLP-4 was withdrawn by stipulation. See No. 8.1.1, infra; NECNP-RERP-8, SAPL-16, and TOH-VIII are sheltering

contentions and are not dealt with herein.

1.6. In addition to the parties referenced above, the remaining active parties to the proceedings are the Applicants,¹ The Staff of The U.S. Nuclear Regulatory Commission (Staff), The Town of Rye (Rye), The Town of Amesbury (TOA), The Attorney General of The State of New Hampshire (NHAG), and the Attorney General of the Commonwealth of Massachusetts (Mass. AG). In addition, although not a party as such, the Federal Emergency Management Agency (FEMA) filed testimony and participated in the hearing as contemplated by the Memorandum of Understanding between the Nuclear Regulatory Commission (NRC) and FEMA. Memorandum of Understanding, 50 Fed. Reg. 15485, 15487 (Apr. 18, 1985). FEMA's testimony in all areas was based upon NHRERP Rev. 2 and did not reflect any consideration of the evidence addressed at the hearings. E.g., Tr. 3093, 5092.

1.7. At the direction of the Board, ASLB MEMORANDUM FOLLOWING PREHEARING CONFERENCE (Sept. 22, 1987) at 2, the parties met and agreed to a classification of the matters to be litigated into seven categories, as follows:

1. Letters of Agreement

¹The Applicants are a group of utilities located in the New England area. At the time of these hearings, that group consisted of: Public Service Company of New Hampshire, as of this writing a debtor in possession under Chapter 11 of the U.S. Bankruptcy Code, Canal Electric Co., Connecticut Light and Power Company, EUA Power Corporation, Hudson Light and Power Department, Massachusetts Municipal Wholesale Electric Company, Montaup Electric Company, New England Power Company, New Hampshire Electric Cooperative, Inc., Taunton Municipal Lighting Plant, The United Illuminating Company, and Vermont Electric Generation and Transmission Cooperative, Inc.

2. Response Personnel Adequacy
3. Transportation Availability and Emergency Support Services
4. Reception Centers
5. Evacuation Time Estimates
6. Shelter (not dealt with herein)
7. Notification and Communications.

1.8. These findings and rulings follow the categorization agreed to by the parties. Tr. 9682.

1.9. Hearings were held in Concord, New Hampshire on the following dates: Oct. 5-9, 1987; Oct. 19-23, 1987; Nov. 2-6, 1987; Nov. 16-20, 1987; Nov. 30-Dec. 4, 1987; Dec. 14-17, 1987; and Jan. 11-13, 1988 and, in Boston, Massachusetts, on Feb. 8-10, 1988. In addition, limited appearance statements were received from a number of elected and appointed governmental officials.

1.10. The following sets forth the Board's findings of fact and rulings of law with respect to the issues tried in this phase of the proceeding.

2. LETTERS OF AGREEMENT

2.1. Findings of Fact:

2.1.1. SAPL Contention 15 as redrafted and admitted for litigation raises a number of specific matters with respect to the Letters of Agreement (LOAs) aspect of the NHRERP. In particular, it is alleged that agreements were required, but were either unsigned or not included in the plan, for the Rockingham County Dispatch Center, the U.S. Coast Guard, New England Telephone Co., the New Hampshire Towing Association, towing

companies, reception centers, mass care facilities, the FAA, host health care facilities for Goodwin's of Exeter, Eventide Home, and Seacoast Health Care Center, the Air Force (for Pease Air Force Base), the Navy (for Portsmouth Naval Shipyard), and the New England Interstate Radiation Assistance Compact; it is further alleged that the State Police Compact is out of date, that there are letters missing for ambulance and bus companies, and that the letter included for the Omne Mall staging area is signed by an owner who has since gone bankrupt. See Seacoast Anti-Pollution League's Contentions on Revision 2 of the New Hampshire Radiological Emergency Response Plan (Nov. 26, 1986) at 22-24.

2.1.2. TOSH 3 also raised issues concerning LOAs. In a prior memorandum and order this Board granted partial summary judgment with respect to this contention and limited its litigation to the issue of whether there are sufficient LOAs from employers of Teamsters Union indicating a willingness to make such drivers available when called upon. ASLB MEMORANDUM AND ORDER (Ruling on and Disposing of All Outstanding Motions for Summary Disposition of Contentions) (Aug. 31, 1987) at 16-18. Similarly TOK-6, which also raised issues as to LOAs, was limited to the issue of whether drivers would be made available by their employers. Id. at 13.

2.1.3. Direct testimony was elicited on the matter of LOAs from the Applicants and FEMA. Testifying as witnesses for the Applicants were Anthony M. Callendrello, Manager, Emergency

Planning for NHY (Qualifications, Post Tr. 2790), Paul R. Frechette, Jr., Senior Emergency Planner, NHY (Qualifications, Post Tr. 2791), and Richard H. Strome, Director of the New Hampshire Office of Emergency Management (NHOEM or OEM) (Qualifications, Post Tr. 2792). FEMA witnesses were Edward A. Thomas, Chief Natural and Technological Hazards Division, FEMA Region I (Qualifications, Post Tr. 3088 at 8), and Edward A. Tanzman, Energy and Environmental Programs Attorney, Energy and Environmental Systems Division, Argonne National Laboratory (Qualifications Post Tr. 3088 at 13). The Board finds that all of these witnesses were of specialized knowledge and thus qualified to testify with respect to LOAs.

2.1.4. The Rockingham County Dispatch Center is a facility owned and operated by a governmental entity (Rockingham County), and, therefore, no LOA for the Dispatch Center is required. Nevertheless, Volume 5 of the NHRERP contains a LOA with the Rockingham County Sheriff's Department whereby the department agrees to provide the State with communications assistance in an emergency. App. Dir. No. 1, Post Tr. 2795 at 4; FEMA Dir., Post Tr. 3088 at 84.

2.1.5. The availability and willingness of the United States Coast Guard to aid in an emergency response is documented in the Memorandum of Understanding executed between the Coast Guard and the Director, NHCDA, which was signed on November 6, 1986. App. Dir. No. 1, Post Tr. 2795 at 3 and Attachment 2.

2.1.6. Since New England Telephone is not assigned any

specific responsibilities in the NHRERP, no LOA is required with it. App. Dir. No. 1, Post Tr. 2795 at 4; FEMA Dir., Post Tr. 3088 at 84.

2.1.7. The LOA with the New Hampshire Towing Association included in NHRERP Volume 5, has been signed by the appropriate parties. App. Dir. No. 1, Post Tr. 2795 at 2. In the December 1986 RAC review of Revision 2 it was determined that what had been considered as a deficiency in the NH Towing Association agreement had been adequately corrected. Id. There are currently 19 LOAs with towing companies consenting to provide approximately 50 towing vehicles with respective drivers and crews as needed (see Attachment 1 for all towing company LOAs obtained since Rev. 2). Id. These current LOAs with towing companies provide resources in excess of the recommendations for six tow trucks for the New Hampshire portion of the EPZ as set forth in Section 12 of Volume 6 of the NHRERP. Id.

2.1.8. All Reception Centers identified in the Host Community plans (Volumes 33, 35, 36, and 38 of the NHRERP) are public facilities operated by political subdivisions of the State of New Hampshire and no LOAs are required. App. Dir. No. 1, Post Tr. 2795 at 4.

2.1.9. The American Red Cross (ARC) is responsible for providing mass care to those evacuated from the plume exposure EPZ. A written agreement between the ARC and the State of New Hampshire is included in Volume 5 of the NHRERP; the December 1986 RAC review of the plan found that the ARC LOA adequately

demonstrates an ability to open and staff planned mass care facilities. App. Dir. No. 1, Post Tr. 2795 at 4-5; FEMA Dir., Post Tr. 3088 at 83.

2.1.10. No LOAs are required with any public facility designated in the plan as a mass care facility; a LOA will be obtained from every private facility designated for mass care; most recently, LOAs with the Salem Boy's and Girl's Club and Squamscott Home Health, Inc., Dover have been obtained. App. Dir. No. 1, Post Tr. 2795 at 5 and Attach. 3.

2.1.11. The ARC is currently working to obtain LOAs with Rochester Catholic High School in Rochester and St. Thomas Aquinas High School in Dover; all required LOAs with regard to host center facilities in Salem have been signed; all mass care facilities in Manchester are public facilities and require no LOA; the Rochester Host Plan (Volume 35) lists the Salvation Army building as a mass care facility; the use of this facility is ensured through a national "Statement of Understanding Between the Salvation Army and the American National Red Cross," (9/75). App. Dir. No. 1, Post Tr. 2795 at 5 and Attach. 4.

2.1.12. A LOA has been executed between the State and the Federal Aviation Administration. App. Dir. No. 1, Post Tr. 2795 at 4.

2.1.13. LOAs with host health care facilities have been obtained for all Special Facilities in the EPZ; LOAs with the following host health care facilities have been obtained since Rev. 2 of the NHRERP: Clipper Home of Wolfeboro (for Goodwins of

Exeter); Clipper Home of Rochester (for Clipper Home of Portsmouth); McKerley Health Care Center- Derry, Inc. (for Eventide Home); Maple Leaf Healthcare, Villa Crest and Maple Leaf, Inc. (for Seacoast Health Care, Inc.). A question was raised as to whether an LOA had been obtained for a host facility for the Mark H. Wentworth Home in Portsmouth. Tr. 2903-04. One has been. Tr. 2972-74, attachment, Post Tr. 2974. No other host health care facility letters are outstanding. App. Dir. No. 1, Post Tr. 2795 at 5-6 and Attach. 5.

2.1.14. New Hampshire can request federal assistance through FEMA. FEMA will then allocate resources as necessary under the Federal Radiological Emergency Response Plan (FRERP), 50 Fed. Reg. 46542 (November 6, 1985); since Pease Air Force Base and Portsmouth Naval Shipyard are federal (Department of Defense) establishments, FRERP obviates the need for any specific military and governmental facility agreements. App. Dir. No. 1, Post Tr. 2795 at 3-4; FEMA Dir., Post Tr. 3088 at 83.

2.1.15. The New England Interstate Radiation Assistance Plan (NEIRAP) is a legislative act which has been approved by the legislatures and governors of the respective party states. App. Dir. No. 1, Post Tr. 2795 at 2-3. The fact that NEIRAP contains no signature page in Volume 5 of the NHRERP in no way invalidates this compact. Similarly, the New England State Police Compact is a ratified compact enacted into law by the appropriate legislative bodies, and is in effect as defined in the Compact. Id. at 3.

2.1.16. There are LOAs contained in Volume 5, which list the number of vehicles and personnel available. These letters make available 67 vehicles, 49 of which are life support units (ambulances). (The LOA with O'Brien Ambulance, Inc., no longer extant, is to be deleted from Vol. 5.) App. Dir. No. 1, Post Tr. 2795 at 6; App. Dir. No. 2, Post Tr. 4228 at 14-15. This is in excess of the total of 36 ambulances required for New Hampshire as listed in the IFO Resource Coordinator's procedure, Volume 4, §18, Attachment 18B. App. Dir. No. 1, Post Tr. 2795 at 6.

2.1.17. Entities executing these vehicle and personnel LOAs also agree to make available at least 126 Emergency Medical Technicians for emergency response. App. Dir. No. 2, Post Tr. 4228 at 15.

2.1.18. LOAs, either present in the NHRERP, Volume 5, or obtained since Revision 2 to the NHRERP, Attachment 4 hereto, make available 709 standard school buses and 19 coach buses garaged in 17 locations by 10 transportation companies. App. Dir. No. 2, Post Tr. 4228 at 12-13. In addition, two of the providers will make available 67 vans with a capacity ranging from five to 20 passengers each. Id.

2.1.19. LOAs, as of August 26, 1987, reflect the availability of approximately 796 drivers from the bus provider companies. App. Dir. No. 2, Post Tr. 4228 at 13-14. Viewed from the perspective of vehicles and drivers from the same companies that could be matched at the time of a mobilization, the

agreements represent approximately 720 vehicle and driver "pairs." Id. at 14. This leaves 75 vehicles and 76 drivers "unmatched." The available vehicles are in excess of the number required for evacuation. See Nos. 4.1.46-4.1.47, infra.

2.1.20. However, it appears that with respect to at least one provider, the number of drivers which would be made available may be overstated. Guadagna Dir., Post Tr. 8117, passim. See also Tr. 8129; Tr. 8168.

2.1.21. Driver deficits, if any, can be met from the Emergency Driver Pool (EDP) which the New Hampshire Office of Emergency Management has established in case there is a need to supplement the bus provider drivers at the time of the emergency. App. Dir. No. 2, Post Tr. 4228 at 14. The Emergency Driver Pool consists of approximately 168 New Hampshire Department of Transportation personnel, 196 New Hampshire National Guard personnel, for which no LOAs are needed, and 48 Teamsters personnel. Id.; App. Dir. No. 1, Post Tr. 2795 at 7. The availability of the Teamster personnel is supported by LOAs with the drivers' employers. To date LOAs have been obtained from nine transportation companies representing about 48 drivers. App. Dir. No. 1, Post Tr. 2795 at 7, Attach 6. All personnel in the Emergency Driver Pool have a "Light Commercial License" which is required to drive a bus. App. Dir. No. 2, Post Tr. 4228 at 14.

2.1.22. A LOA between New Hampshire Yankee Division of Public Service Company of New Hampshire and the State of New

Hampshire has been executed and is also found in Volume 5. App. Dir. No. 1, Post Tr. 2795 at 3.

2.1.23. A question was raised as to whether those signing LOAs were aware that the commitment included a commitment to respond to a radiological incident at Seabrook. Tr. 2799. Evidence was offered which the Board credits that a number of the LOAs recited that Seabrook was one of the facilities involved as well as Vermont Yankee, a nuclear power plant located in Vermont. E.g., App. Dir. No. 1, Post Tr. 2795, Attach 1, 2, 5 & 6. In addition, there was no attempt by the State Officials involved to mislead anyone on this subject. Tr. 2800, 2841.

2.1.24. An issue was raised as to whether the persons seeking the LOAs were familiar with the requirements of NUREG-0654. Tr. 2827, 2829. All of these persons are professional planners. Tr. 2835. Many of the professional planners have had FEMA training, Tr. 2829.

2.1.25. A question was raised on cross-examination as to whether the Teamsters would, in fact perform if called upon. Tr. 2869 et seq. The Teamsters are part of the backup driver pool only, Tr. 2887, 2889, 2997, and based upon the record in this proceeding, the Board finds that they will in fact respond with a sufficient number of drivers if called upon, Tr. 3028; SAPL Ex. 1, passim.

2.1.26. A question was raised as to whether the communications with tow trucks were sufficient in light of the fact that the LOAs do not specify that in all cases the tow

trucks have radios. Tr. 2894. The tow trucks will be dispatched by the State Police from locations on the periphery of the EPZ by means of telephone calls to their places of business. Tr. 3029-30.

2.1.27. A new LOA has been obtained for use of the Omne Mall as a staging area from the new owner. Tr. 3032-33; App. Ex. 6, Post Tr. 3033.

2.1.28. One bus provider, Jan-Car, has gone out of business, Tr. 2930, but its successor which purchased the bulk of its buses has executed a successor LOA, Tr. 3034-37; App. Ex. 7, Post Tr. 3035.

2.1.29. New LOAs will be submitted to FEMA for review, Tr. 2995. Tr. 3024-25.

2.1.30. Concern was expressed that on a given day providers which had signed LOAs might not have the equipment or drivers actually available when needed, but, as Director Strome testified, this possibility is the reason that a surplus of equipment and driver providers is recruited and maintained. Tr. 3031.

2.1.31. FEMA took the position that as of the time it reviewed NHRERP Rev. 2, there were certain LOAs missing. FEMA Dir., Post Tr. 3088 at 82-90. However, FEMA acknowledges that it has not yet reviewed the new LOAs which were introduced by the Applicants presented to this Board in this hearing. Tr. 3093.

2.2. Rulings of Law

2.2.1. There is no regulatory requirement that separate

LOAs be obtained for those Federal departments or agencies which are covered by FRERP.

2.2.2. There is no requirement that the State of New Hampshire obtain LOAs with respect to facilities owned or operated by the state or its political subdivisions.

2.2.3. "Separate LOAs are not required for the recipients of services (as opposed to providers) nor for individuals who collectively provide a labor force or activity. Nor are separate LOAs required for response organizations where response functions are covered by laws, regulations or executive orders. Principal response organizations are in this latter category." ASLB MEMORANDUM AND ORDER (Providing Basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) at 37; Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), LBP-85-14, 21 NRC 1219, 1366 (1985).

2.2.4. LOAs do not, and are not required, to constitute contracts; rather, they serve, "as a statement of interest of the parties entering the agreement to provide assurance that a support organization has been notified and has agreed in principle to provide a support function." Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), LBP-85-14, 21 NRC 1219, 1367 (1985).

2.2.5. Any rebuttable presumption that sufficient LOAs are not in place arising from the FEMA testimony, Post Tr. 3088, has been overcome by the evidence adduced at the hearing. See Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit

No. 1), ALAB-698, 16 NRC 1290, 1298 (1982).

2.3. Conclusions

2.3.1. Based upon the foregoing, the Board finds that sufficient and necessary LOAs have been obtained.

3. RESPONSE PERSONNEL ADEQUACY

3.1. Findings of Fact

3.1.1. Four contentions were admitted for litigation in this proceeding which raised issues as to the adequacy, *i.e.*, staffing sufficiency, of response personnel in specific towns. These contentions are TOH-VI, TOSH-2, TOHF-2, and TOK-1. See ASLB MEMORANDUM AND ORDER (Providing basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 22-25 and appendix at 1 (with respect to TOH-VI); ASLB MEMORANDUM AND ORDER (Ruling on Contentions and Establishing Date for Hearing) (Apr. 29, 1986) at 32-33 (with respect to TOSH-2), at 10-11 (with respect to TOHF-2), and at 13-14 (with respect to TOK-1).

3.1.2. In addition three contentions were admitted for litigation which raised the issue of response personnel adequacy, *i.e.*, staffing capability, for all local municipalities and the State of New Hampshire and also with respect to the staffing capability of state response personnel to compensate for inadequacies or deficiencies in local response organizations. These contentions are NECNP-NHLP-2, SAPL-8, and SAPL 8-A. ASLB MEMORANDUM AND ORDER (Ruling on Contentions and Establishing Date for Hearing) (Apr. 29, 1986) at 63-65 (with respect to NECNP-

NHLP-2); ASLB MEMORANDUM AND ORDER (Providing basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 35-36 and appendix at 3 (with respect to SAPL-8 and SAPL-8A.

3.1.3. Six New Hampshire towns have expressed a present intention, or an announced policy, of refusal to participate in emergency planning and implementation of NHRERP for these localities. These are TOH, TOSH, TOHF, TOK, the Town of Rye (Rye), and the Town of North Hampton (TONH). Inter alia, each of these towns takes the position that there are an inadequate number of competent local personnel to carry out the tasks assigned to the town by NHRERP.

3.1.4. TOH offered the testimony of two police officers, Sergeant Victor DeMarco and Detective William Lally, DeMarco et al. Dir., Post Tr. 3659, and the Chairman of the Board of Selectmen, Dona Janetos, Janetos Dir., Post Tr. 3597, in support of its position that there were not local personnel to carry out the assigned duties of TOH under NHRERP and that the State would be unable to compensate for this lack of personnel.

3.1.5. The police officers testified that there were a total of 27 full-time police officers in TOH plus the chief, two deputies and four dispatchers and approximately 50 special officers. DeMarco et al. Dir., Post Tr. 3659 at 2. They further testified that this was an insufficient number of police to man necessary traffic control positions while at the same time staffing necessary security and emergency operations center (EOC)

functions. Id. at 11.

3.1.6. The officers further testified that there would be substantial delay before off-duty TOH Officers could be brought in to augment the typically on-duty staff of 15. DeMarco et al. Dir., Post Tr. 3659 at 11.

3.1.7. In addition, the officers stated their view that there would not be sufficient State Police Officers from Troop A available to carry out the traffic control duties assigned to them in TOH and, at the same time, compensate for lack of TOH personnel and that it would take three to four hours to deploy State Police from other Troops. DeMarco et al. Dir., Post Tr. 3659 at 12.

3.1.8. The officers further stated their belief that the special officers employed by TOH in the summer months were inadequately trained to carry out emergency duties without supervision of full-time officers and, in any event, in the main, lived so far away as to make them unavailable if off duty for a lengthy period of time. DeMarco et al. Dir., Post Tr. 3659 at 13.

3.1.9. Ms. Janetos testified that NHRERP was making too burdensome demands upon a number of town employees including the Town Manager who is to staff, coordinate, and direct all Town Departments and act as Civil Defense Director, the Public Works Director who is assigned responsibility to assess road condition and to maintain road accessibility and Public Works employees all of whom are assigned, according to Ms. Janetos to multiple duties

for which they are not trained and which are outside their normal job experience. Janetos Dir., Post Tr. 3597 at 3-6.

3.1.10. In addition, Ms. Janetos stated her belief that the State would be unable to compensate for the deficiencies in TOH capabilities because: (1) any such response would be delayed, (2) a prior drill had deficiencies, (3) too much reliance is placed upon Teamsters who may not be available, and (4) because the State does not have sufficient personnel to assist all of the EPZ towns simultaneously. Janetos Dir., Post Tr. 3597 at 7-9.

3.1.11. Ms. Janetos was required to withdraw certain of her testimony concerning the availability of State Police Officers and reliance on the teamsters. Tr. 3612-17, and see Janetos Dir., Post Tr. 3597 at 7.

3.1.12. It is apparent that a large part of Ms. Janetos testimony, subscribed by her counsel, was based, not upon her own knowledge, but upon representations made to her by counsel. Tr. 3614, 3618, 3627.

3.1.13. The Board does not credit the testimony of Ms. Janetos.

3.1.14. SAPL sponsored testimony on the issue of town emergency response personnel adequacy through six witnesses, each of which is a town official of one of the remaining five non-participating towns: Walter F. Shivik, Chairman of the Board of Selectmen of TOSH, Post Tr. 3780, Suzanne Breiseth, Chairman of the Board of Selectmen of TOHF, Post Tr. 3739, Andrew Christie, Jr., Police Chief of TOHF, Post Tr. 3741, Sandra Fowler Mitchell,

Director of Emergency Management of TOK, Post Tr. 3805, David P. MacDonald, Civil Defense Director of Rye, Post Tr. 3867, and Richard W. Ingram, a member of the Board of Selectmen in TONH, Post Tr. 4479

3.1.15. In the case of TOHF, the points were advanced that there were inadequate police officers to accomplish the tasks that the police chief believed would be necessary to be performed, Christie Dir., Post Tr. 3741 at 1-3; that the Selectmen, Civil Defense Director, Town Clerk (who has signed a statement that she will not be available in the event of a radiological emergency) and the Town Health Officer are part-time officials; that there is no full-time fire department, highway department, RADEF officer, dispatcher, transportation coordinator; no back up personnel for any of the positions described just above; and that mutual aid which is relied upon "in all other emergencies" would be unavailable in radiological emergencies, Breiset Dir., Post Tr. 3741, passim.

3.1.16. Similar assertions were made for TOK, i.e., that certain officials are part time, the police force is small and the fire department a volunteer department; in addition, the witness stated her concern that State workers brought in to do the job would not have the necessary familiarity with the town. Mitchell Dir., Post Tr. 3805, passim.

3.1.17. While Ms. Mitchell testified that her town was incapable of responding to a radiological emergency, it is to be noted that in 1986, in the annual Town Report of Kensington, in

her report as Director of Emergency Management, she took the position that the Town, given its fire and police departments could "meet the demands of any emergency." Tr. 3808-09; App. Ex. 8, Post Tr. 3812.

3.1.18. Confronted with her report she took the position that the report was written to "quiet" the town. Tr. 3810.

3.1.19. In the case of Rye, testimony was given that: (1) there would be no one on duty in the Road Agent's department after 4:00 P.M. and it might be impossible to reach anybody; similar questions as to availability were raised as to a number of other positions. MacDonald Dir., Post Tr. 3867 at 2. In addition it was suggested that Town Officials in Rye do not have experience with emergencies which require a great deal of coordination. MacDonald Dir., Post Tr. 3867 at 4. Testimony was also adduced to the effect that for any situation involving more than six emergency personnel, Rye relies on mutual aid, and "[i]n a general regional emergency mutual aid cannot be relied on because each community will be fully occupied with its own operations." Id. Further Rye makes the assertion that it cannot be assumed that the necessary people will be standing by and ready to go in an emergency whenever it might occur. Id. In addition an issue was raised as to whether there would be anyone available to give members of the public information on request. Id. at 6.

3.1.20. Mr. MacDonald acknowledged that Rye had an

emergency plan for nonradiological emergencies, Tr. 3871, which he said he would put into effect in an earthquake, a hurricane, a tornado, but not in a situation where the source of the threat was an accident at Seabrook. Tr. 3871; 3872; 3873-75, 3926-27.

3.1.21. However, on Board inquiry he admitted that he would, in reality, in the event of an accident, use the useful elements of the plan if he was confronted with an actual radiological emergency and admitted that his difficulty in owning up to that obvious fact was that he did not want to be viewed as having contributed to the licensing of the plant. Tr. 3929-30.

3.1.22. Mr. MacDonald also testified as to certain changes that he would like to see in the emergency plan, without which he felt the plan would be inadequate; the conditions, in the form of criteria, are beyond implementation in any practical sense. Tr. 3902-05; App. Ex. 10, Post Tr. 3908 at 11-12

3.1.23. Similarly, TONH has Selectmen who may not be available at the time of an emergency, and town employees with the same problem; further TONH questions the ability of the State Police to supply necessary troopers to man the traffic control points assigned to them in the event other towns are also making such demands. Ingram Dir., Post Tr. 4479, passim. Finally, the ability of the road agent to clear the roads is questioned. Id.

3.1.24. The TONH Road Agent in fact has no responsibility to clear roads under the NHRERP. Tr. 4485.

3.1.25. When Mr. Ingram was asked by FEMA Counsel whether TONH selectmen would reconsider their decision not to

take part in the planning process if the plant is licensed, he answered they would be derelict if they did not. Tr. 4500.

3.1.26. The question of whether personnel would be able to arrive at various places in a timely fashion, is a matter treated in the discussion of evacuation time estimates below.

3.1.27. TOH sponsored a panel of witnesses who gave testimony that most of the teachers in schools would not be available to assist children in their school classes in the event of a radiological emergency because they would first look to assisting their own families. Pennington et al. Dir., Post Tr. 3945. This testimony is discussed in detail infra in the portion of this decision dealing with human behavior in emergencies. See Nos. 7.1.3-7.1.20, infra.

3.1.28. In response to these assertions and observations as to personnel resources, the Applicants presented the testimony of a panel of six witnesses. App. Dir. No. 3, Post Tr. 3228. The panel consisted of Messrs. Strome, Callendrello and Frechette, described earlier, joined by John D. Bonds, Assistant Director for Planning of the Division of Public Health Services of the New Hampshire Department of Health and Human services, (Qualifications, Post Tr. 3184) William F. Renz, an Emergency Planning Specialist from Aidikoff Associates (Qualifications, Post Tr. 3185), and William T. Wallace, Jr., M.D., M.P.H., Director of the Division of Public Health Services of the New Hampshire Department of Health and Human Services (Qualifications, Post Tr. 3183).

3.1.29. The Board finds that these witnesses were qualified and competent to give the testimony they did on this subject.

3.1.30. In response to the various allegations of response personnel inadequacy, the Applicants' Panel presented a Personnel Resources Assessment Summary, App. Ex. 1, as corrected by App. Ex. 1A appearing Post Tr. 4685 (and hereafter cited and referred to as Applicants' Exhibit 1 or "the survey").

3.1.31. The survey (Applicants Exhibit 1) is a "snapshot" of the status of an ongoing personnel resource assessment program taken just prior to the date their testimony was prefiled which memorializes the program as of August of 1987. Tr. 3246, 3258.

3.1.32. In order to determine the types and numbers of personnel required and available to perform the functions required under the plan, the emergency planners began by doing a "walk-through" of the implementing procedures to identify, by position and functional responsibility, all tasks required to be performed in fulfilling the emergency response functions. App. Dir. No. 3, Post Tr. 3228 at 3. This process led to the determination of the specific staffing requirements to implement each plan, and the identification of those positions requiring staffing for 24-hour operations. Id.

3.1.33. The term "walk-through" in the emergency planning field means to read the procedure, analyze each step, and make a determination against objective criteria as to how

many people are needed to perform each step. Tr. 3277-78.

3.1.34. The survey does not attempt to deal with availability in the temporal sense; it is implementation of the plan that is designed to ensure that people are at hand to perform their functions when they need to be performed; the survey assumes people will be available; the survey deals with how many people it takes to perform each of the various plan functions and also who can be made available to do them; this is because the issue of whether people will be there is an issue of planning and implementation, not personnel resources, per se. Tr. 3283-87.

3.1.35. In doing the survey, staffing for 24 hour coverage was assumed to be covered by two 12-hour shifts which is a usual and acceptable practice in emergency planning. Tr. 3294-95.

3.1.36. Other than when the "snapshot" is actually taken, the numbers which appear in a survey such as Applicants Exhibit 1 may not be totally accurate at any given point in time because of on-going personnel turnovers. Tr. 3336.

3.1.37. The next step in this program following the "walk through" was the identification of available personnel resources to fill the emergency response positions for each municipality designated in the procedural walk-throughs. This was done through the analysis of background documentation and included specific data sources such as Town Plan Appendices; Town Annual Reports; the New Hampshire Police Standards and Training

Commission records, the New Hampshire Fire Standards and Training Commission records, the Bureau of Emergency Medical Service records, and the New Hampshire Firemen's Association records. In addition, interviews were conducted with persons knowledgeable about the specific communities to verify and adjust the numbers of required and available personnel. Various individuals such as Selectmen, Town Managers, Civil Defense Directors, Police Chiefs, Fire Chiefs, and Health officials within the local municipalities were contacted by representatives of the New Hampshire Emergency Management Agency and New Hampshire Yankee. App. Dir. No. 3, Post Tr. 3228 at 4.

3.1.38. The survey also reflects the assignment of personnel to the various necessary functions; in the case of those towns (11 of 17) which have been willing to engage in emergency planning, the assignments, App. Ex. 1 § 2.3, were made by, or with the concurrence of, municipal officials. App. Dir. No. 3, Post Tr. 3228 at 4-5.

3.1.39. In the case of the six nonparticipating towns, no assignment of personnel had been completed by municipal officials; as a result, those developing the survey included an assignment in an Organization Chart depicting personnel needs, a breakdown of personnel availabilities, and a matrix of how the available personnel might be assigned to the corresponding emergency response organizations for each of these towns. App. Dir. No. 3, Post Tr. 3228 at 5; App. Ex. 1, § 2.2.

3.1.40. For the most part, the towns participating in

emergency planning have made assignments of available personnel to emergency response positions. As of July, 1987, 370 of the 378 local emergency response positions have been filled by the 11 municipalities. Local officials have indicated that they will continue to make assignments using available personnel. App. Dir. No. 3, Post Tr. 3228 at 6.

3.1.41. In cases where there simply are not sufficient personnel to perform a required function, State Police or other personnel have been assigned the task. App. Dir. No. 3, Post Tr. 3228 at 6-7. A State Police Division Commander testified unequivocally that the State Police had the manpower to carry out their assigned functions, Post Tr. 4687-88, as well as to perform those necessary functions assigned to that organization in the event the nonparticipating towns continued to refuse to participate, Tr. 4721-23, and see Tr. 4696-99.

3.1.42. In addition to the New Hampshire State Police resources, the New England State Police Compact makes available a pool of additional trained officers; the maximum resource of troopers in the New England States is approximately 3300, Tr. 4731, or approximately 3000 in addition to the 247 troopers, Tr. 4696, in New Hampshire.

3.1.43. A review of the survey reveals that in the case of all of the towns personnel available to the local municipalities to staff the respective emergency response organizations exceeds the personnel required. App. Dir. No. 3, Post Tr. 3228 at 6; App. Ex. 1 § 2. In particular this is the

use for all of the nonparticipating towns. Id. § 2.2.

3.1.44. As noted earlier, certain of the witnesses testifying for the intervenors have indicated their belief that the personnel in many of these towns do not have, as a result of their present jobs, the background or experience to carry out assigned tasks. While that may be true in particular cases as of this time, there is no reason to believe that personnel cannot be properly trained. Training of local responders will be provided by the New Hampshire Emergency Management Agency. App. Ex. 5, Vols. 16-32 (§II. of each).

3.1.45. The survey also addressed the question of State resources to carry out the various tasks assigned to the State as such, and also to determine the State's ability to supply necessary assistance to the towns that request it. App. Ex. 1 at §3.

3.1.46. Those developing the survey first assured themselves through a review of the pertinent sections of the NHRERP that all assigned responsibilities were addressed. App. Dir. No. 3, Post Tr. 3228 at 9.

3.1.47. On the basis of this review, a subsequent step involving a walk-through of each implementing procedure was conducted to identify by agency, position and functional responsibility all the tasks required to be performed in fulfilling emergency response functions. This analysis included both primary and support (secondary) responsibilities. App. Dir. No. 3, Post Tr. 3228 at 9.

3.1.48. The next step in the process was the identification of personnel resources available to fill the emergency response positions noted during the procedural walk-throughs. To accomplish this, assessment worksheets were developed specifically for each State agency. The purpose of the worksheets was to elicit pertinent agency-specific data by a review of the agency's assigned responsibilities. App. Dir. No. 3, Post Tr. 3228 at 9.

3.1.49. Under the auspices of the New Hampshire Emergency Management Agency, interviews were arranged with the principal emergency response personnel in each New Hampshire State agency with assigned responsibilities under NHRERP. The assessment worksheets were completed during the interviews, and the number, location, and type of personnel available to perform emergency response functions were documented. App. Dir. No. 3, Post Tr. 3228 at 9-10; App. Ex. 1, Fig. 3.1-1.

3.1.50. The survey demonstrates that there are sufficient State personnel to carry out the functions assigned to the State. App. Ex. 1, Table 3.1-1 (as corrected App. Ex. 1A, appearing Post Tr. 4685).

3.1.51. The survey also analyzes the question of whether sufficient State personnel will be available to supply necessary assistance to local municipalities. The survey indicates that sufficient personnel will be available to assist both the nonparticipating towns and those towns which the plan assumes are unable to mount a full response from local resources.

App. Dir. No. 3, Post Tr. 3228 at 10-12; App. Ex. 1 Tables 3.1-2-3.1-4.

3.1.52. At the time the FEMA panel testified, it was unable to comment in depth upon the Personnel Resources Summary inasmuch as FEMA's testimony was directed only to NHRERP (App. Ex. 5) and did not reflect any review of that document. Tr. 4053

3.1.53. The FEMA witnesses did view the Personnel Resources Summary as being a significant document which represented significant progress in the resolution of FEMA's preliminary findings of inadequacy with respect to personnel resources. Tr. 4098, 4109, 4165-66.

3.1.54. A sufficient number of bus drivers are available for the maximum transportation need. In addition, a pool of backup drivers has been identified. See Nos. 4.1.49, 4.1.50, infra.

3.1.55. NECNP presented the testimony of Clifford J. Earl, Post Tr. 3776, the President of Resource Management Systems, Inc., who offered certain criticisms of the methodology employed in the survey and questioned its reliability.

3.1.56. Mr. Earl criticized the survey for failing to explain or define "key terms" focusing on the term "availability" as used in the survey. Earl Dir., Post Tr. 3776 at 2-4. However, it appears that any uncertainty which may have existed with the term was resolved by the testimony given by the Applicants' panel on cross-examination, and, in the case of the towns, that the survey viewed as "available" any person who was a

full or part time employee or volunteer serving the town in certain positions as defined for each town in the survey. See, e.g., App. Ex. 1 at 2-5, 2-9, 2-14; Tr. 3253-54, 3260-62, 3284-86, 3311-12, 3317-21. A similar approach was taken with respect to State personnel. App. Dir. No. 3, Post Tr. 3228 at 8-10. It is clear to the Board how the term "available" was used. Tr. 3321-25. There is no failure of definition.

3.1.57. Mr. Earl's second criticism is that the survey "fails to quantify the work load for each position to be filled." Earl Dir., Post Tr. 3776 at 4-5. However, during their cross-examination, the Applicants' witnesses demonstrated that "work loads" as that term is commonly understood were fully taken into account in the walk-throughs performed. Tr. 3271-75, 3283, 3287.

3.1.58. Mr. Earl's final criticism is that the survey "fails to show consideration of potentially critical variables." Earl Dir., Post Tr. 3776 at 5-6. However, we do not understand the survey to be an attempt to fix the methods and procedures to implement the emergency response functions called for under the overall plan. Rather the concept is to demonstrate that a sufficient personnel resource is at hand, that can, or will be trained to, provide the manpower necessary to carry out the specific functions of the plan at the time of an emergency. NHRERP adequacy is not premised upon the requisite that every town official remain in every town 24 hours a day and seven days a week awaiting an emergency.

3.1.59. On rebuttal, Mr. Earl reaffirmed and elaborated

on his earlier testimony to the same end that the survey results were not reliable. Earl Reb., Post Tr. 8915 at 2-5. He opined that the survey failed to employ consistent data sources, id. at 6, consistently to define "availability," id. at 7-11, and "walk-through," id. at 12-16, and failed to consider variables such as arrival times, id. at 16-17; in addition, he charged the use of less than highly sophisticated survey techniques and controls in conducting the survey, id. at 18-24. This rebuttal testimony reads more like a lawyer's brief than testimony; it deals more with methods and procedures than with substance, and the various points relating to the latter are amply rebutted by the record. See Nos. 3.1.56-3.1.58. The root of Mr. Earl's difficulty in accepting the adequacy of the survey seems to lie with the other side of the coin of his observation that:

"a significant portion of the staff responsible for conducting the survey may have been inexperienced in the field of personnel resource planning. While Applicants' witnesses are emergency planners, none of them have any special expertise in personnel resource planning." Earl Reb., Post Tr. 8915 at 23.

Mr. Earl, we note, has no special expertise in emergency planning and would appear to be inexperienced in that field. Earl Dir., Post Tr. 3776, Resume following p. 6.

3.1.60. Circumstances involving personnel who normally provide support to a given community on a volunteer, part-time or seasonal basis, or who have residences or regular employment locations out of the area, are not unique to radiological emergency response planning; the availability of emergency

workers to respond to an emergency does not necessarily depend upon their living or working in the affected community. App. Dir. No. 3, Post Tr. 3228 at 17.

3.1.61. With respect to the allegations that emergency workers will be forced from their posts by overexposure to radiation or will, in the alternative suffer radiological injury in order to carry out their duties, the following was adduced: Radiation exposure limits for emergency workers are specified in the NHRERP. The limit is 5R for local emergency workers. App. Dir. No. 3, Post Tr. 3228 at 14. Proper reporting and tracking procedures of emergency worker exposures are in place to ensure that exposure levels are maintained within prescribed limits. Id.

3.1.62. Management of emergency worker exposure would include rotation of assignments among members of the local emergency organization or removal from assignments and replacement of those emergency workers whose individual radiation exposures indicates a trend toward the established limit. App. Dir. No. 3, Post Tr. 3228 at 14.

3.1.63. The 5R exposure limit prescribed for local emergency workers corresponds to the highest value for whole body dose established by the USEPA PAGs for the general population. While the EPA PAGs establish an exposure limit of 25R for emergency workers, the State of New Hampshire has elected to set exposure limits for local emergency workers comparable to the highest levels prescribed for the general public. App. Dir. No.

3, Post Tr. 3228 at 14-15.

3.1.64. When the protective action of evacuation of the general public has been completed, there would be no need for local emergency workers to remain in affected areas. Therefore, local emergency workers would not be expected to exceed the 5R exposure limit. Additional emergency tasks such as control of access to exclusion areas, field monitoring, plume tracking, and collection of environmental samples would be performed by state emergency workers whose exposure limits correspond to those established by the US EPA PAGs for emergency workers. It is the goal of the Division of Public Health Services to limit exposure to emergency workers at the same level incurred by the general public. There is no intention of allowing local emergency responsibilities to go unmet. App. Dir. No. 3, Post Tr. 3228 at 15.

3.2. Rulings of Law

3.2.1. Any rebuttable presumption as to adequacy of personnel resources arising from the FEMA testimony, Post Tr. 4051, has been overcome by the evidence adduced at the hearing. See Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), ALAB-698, 16 NRC 1290, 1298 (1982).

3.3. Conclusions

3.3.1. Based upon all of the foregoing the Board finds that there is reasonable assurance that there will be sufficient response personnel to carry out protective action responses as required for each of the New Hampshire towns located in the

Seabrook EPZ and for the State, both as to its direct and compensatory responsibilities in the event of a radiological emergency arising at Seabrook.

4. TRANSPORTATION AVAILABILITY & SUPPORT SERVICES

4.1. Findings of Fact:

4.1.1. A total of eight contentions admitted for litigation raised issues as to the availability of transportation and emergency support services. These are TOSH-3, admitted ASLB MEMORANDUM AND ORDER (Ruling on Contentions and Establishing Date and Location for Hearing) (April 29, 1987) at 33 and limited, ASLB MEMORANDUM AND ORDER (Ruling on and Disposing of all Outstanding Motions for Summary Disposition of Contentions) (August 31, 1987) at 16-18; TOSH-8, admitted ASLB MEMORANDUM AND ORDER (Ruling on Contentions and Establishing Date and Location of Hearing) at 37-38; TOK-6, admitted ASLB MEMORANDUM AND ORDER (Providing Basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 30-31, appendix at 2, limited ASLB MEMORANDUM AND ORDER (Ruling on and Disposing of all Outstanding Motions for Summary Disposition of Contentions) (August 31, 1987) at 13; TOH-IV, admitted ASLB MEMORANDUM AND ORDER (Providing Basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 15-21, appendix at 1, limited ASLB MEMORANDUM AND ORDER (Ruling on and Disposing of all Outstanding Motions for Summary Disposition of Contentions) (August 31, 1987); SAPL-18, admitted ASLB MEMORANDUM AND ORDER (Providing Basis for and Revision to

Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 38-39, appendix at 4, limited ASLB MEMORANDUM AND ORDER (Ruling on and Disposing of all Outstanding Motions for Summary Disposition of Contentions) (August 31, 1987) 22-24; SAPL-25, admitted ASLB MEMORANDUM AND ORDER (Providing Basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 39-40, appendix at 5; SAPL-37, admitted id. at 49-50, appendix at 5; NECNP NHLP-6, admitted id. at 53-56, appendix at 6.

4.1.2. In support of these contentions, the intervenors TOH and SAPL offered the testimony of four witnesses, Daniel Trahan, Director of the Seacoast Health Center, Post Tr. 7806, Maureen Barrows, Commissioner of Rockingham County, Post Tr. 4405, Ann Hutchinson, Division Manager of the Berry Division of National School Bus Service, Inc., Post Tr. 4562, and Joan Pilot, President of Amoskeag Ambulance Service, Post Tr. 7670. A number of the points made by these witnesses dealt with issues of role conflict which are dealt with separately, infra.

4.1.3. Mr. Trahan testified that in his view his facility, Seacoast Health Center, could not be safely evacuated or sheltered, Trahan Dir., Post Tr. 7806 at 3-8, and that the transportation allocated to his facility was inadequate, Trahan Dir., Post Tr. 7806 at 8-9.

4.1.4. Mr. Trahan testified under cross-examination, however, that the transportation allocated for his facility was based on information he himself provided to the New Hampshire

Civil Defense Agency. Tr.7824-25.

4.1.5. Under cross-examination it also turned out that Mr. Trahan's facility has a complete disaster plan, Tr. 7810; App. Ex. 25, which he authored, Tr. 7822, and the facility complies with each and every provision in the disaster plan, Tr. 7821. The disaster plan includes detailed provisions for the orderly evacuation of patients, App. Ex. 25 at 3, 14, 23-36, outlines emergency duties for administrative, pharmacy, housekeeping, kitchen, and maintenance, as well as nursing staff App. Ex. 25 at 14, 39, includes shelter provisions for tornados, App. Ex. 25 at 48-50, repeatedly stresses the responsibility of staff to assume their positions in time of disaster, App. Ex. 25 at 38, 24-26, and provides for off-duty personnel "to be called to assist in any emergency or evacuation," App. Ex. 25 at 23.

4.1.6. Mr. Trahan testified that his facility is not adequately staffed to carry out an evacuation in a radiological emergency. Trahan Dir., Post Tr. 7806 at 5-6. Under cross-examination, however, he testified that the facility's staff are trained in all aspects of preparedness for any disaster and that they participate in ongoing training and drills so that they each promptly and correctly carry out a specific role in case of a disaster. Tr. 7816. Mr. Trahan also testified that his facility was not adequately staffed, Tr. 7822, but then opined that it was sufficiently staffed for the number of patients they took on, Tr. 7823. Later, under Board questioning, Mr. Trahan testified that "there are many types of crises that [his facility] may have

difficulty responding to . . . in a manner that includes proper handling of [his] patients." Tr. 7840. Nevertheless, he admitted that, during a hurricane emergency two years ago, his facility followed the evacuation plan checklist, including arranging for emergency food supply and bringing in the required staff to the facility. Tr. 7843-44.

4.1.7. Ms. Hutchinson testified to her experience that although her former employer Berry Bus Co. had agreed to make available 9 drivers in an emergency, in fact, in an exercise held in 1986, only six agreed unconditionally to drive busses in both the exercise and a real emergency; from this experience she stated her opinion, based upon no actual research or survey evidence, Tr. 4574, that other bus companies would be unable to produce the number of drivers recited in their various LOAs, Hutchinson Dir., Post Tr. 4562 at 4-6.

4.1.8. Commissioner Barrows challenged the alleged assertion in NHRERP that only 15 seconds need be allowed for evacuation of a wheelchair resident from the room to a place where busses would pick the patient up, Barrows Dir., Post Tr. 4405 at 2-3. The point addressed by Commissioner Barrows is apparently in of a criticism directed to the ETE which is discussed infra. But to the extent that it is an assertion that NHRERP claims that persons can be transported from sick room to loading place in 15 seconds, the Board finds that that is not the assertion made at the referenced page of NHRERP Volume 6 (p. 11-21). Rather the assertion there is that assuming that elderly or

disabled persons are at the loading point when the bus arrives, they may be loaded at the average rate of 15 seconds per person.

4.1.9. In fact Ms. Barrows testimony as to the timed trial for evacuation of a resident specifically did not include a sequence of loading a patient onto a bus. Tr. 4435-36.

4.1.10. Ms. Barrows original testimony stated flatly that she did not believe that the Rockingham County Nursing Home could be evacuated in a safe or timely manner. Barrows Dir, Post Tr. 4405 at 2, 4.

4.1.11. However, on cross examination it was revealed that the Nursing Home has a complete evacuation and disaster plan. App. Ex. 11, Tr. 4426-31, 4434. The plan includes a reference for procedures in dealing with food and water exposed to radioactive fall out. Tr. 4432.

4.1.12. In addition, it appears that the Home has in fact been evacuated in a safe and timely manner. App. Ex. 12.

4.1.13. The Board does not credit the testimony of Commissioner Barrows.

4.1.14. Ms. Pilot questioned whether two persons requiring advanced life support (ALS) could be transported in one ambulance, Pilot Reb., Post Tr. 7670 at 1-2; she opined that certain nursing home patients might need ambulances, id. at 2, and expressed concern that radio frequencies did not appear in the ambulance company LOAs, id. at 2-3. In addition, she speculated that the number of ambulances called for in the NHRERP was inadequate.

4.1.15. On cross-examination, she admitted that she was unaware that the planners had worked with the hospitals and nursing homes to come up with the numbers, Tr. 7678, admitted, albeit reluctantly, that hospitals and nursing homes are qualified to decide what sort of transport their patients required, Tr. 7679, admitted that she was unaware that at the time of an actual emergency a doctor or nurse would decide what type of transport should be used for each patient, the plan containing "default values" only, Tr. 7678-80, and admitted that she had not inquired into the possibility that the radio frequencies were in the LOAs on file, but redacted in the public copies, Tr. 7682-83.

4.1.16. It is FEMA's position that there is no hard and fast rule as to the number of persons which should be transported in an ambulance. Tr. 4634-35.

4.1.17. In addition to the above discussed TOH and SAPL witnesses, Dr. Stephen Cole, a sociologist and President of Social Data Analysts Inc., (SDA), a consulting firm engaged in conducting surveys and polls, as a member of a panel of witnesses sponsored by Mass. AG testified that a SDA Survey of the New Hampshire portion of the EPZ demonstrated that the number of persons estimated in NHRERP to require public transportation assistance to evacuate was about three times the estimate made by Applicants' consultants, KLD. Ziegler et al. Dir., Post Tr. 7849 at 25-26.

4.1.18. The Ziegler et al. panel and its testimony is

discussed at greater length in connection with intervenor ETE and human behavior contentions, infra. The panel testimony presented by Dr. Cole is in support of SAPL contention 31, Basis 13 that the Applicants ETE transportation experts (KLD) were wrong as to their estimate of the percentage of people who would need transportation assistance. Ziegler et al. Dir., Post Tr. 7849 at 25.

4.1.19. Applicants' cross examination seriously challenged the survey both as to its external and internal validity. Tr. 7913-8006. Applicants also presented rebuttal testimony, discussed infra, which also attacked the survey and its results. App. Reb. No. 3, Post Tr. 9154, passim. We are cautioned by Dr. Spencer, Applicants' expert on statistics (which Dr. Cole admittedly is not, Tr. 7992) that the SDA survey data and interpretations of that data should not be trusted. App. Reb. No. 3, Post Tr. 9154 at 4. Dr. Miletic, Applicants co-panelist with Dr. Spencer, shares this view. Id. at 1-3, 16-17.

4.1.20. We note, on the question of internal validity, for example, that the transportation question which was asked in the survey did not differentiate between the kinds of public transportation that would be used. The question could have been answered in the affirmative by anyone who was thinking of a child at school when the accident occurred, and such persons are already accounted for without reference to the NHRERP number, which figure includes only those who are at home and without transportation. See App. Ex. 5, Vol. 6 at p. 11-1.

4.1.21. In point of fact, however, while the numbers are in close agreement, neither NHRERP nor Applicants' Special Needs/Transportation Panel use KLD's estimates of individuals that need transportation as SAPL Contention 31 and Mass. AG witnesses contend. Rather, reliance is on the results of the Special Needs Surveys conducted by the New Hampshire Civil Defense Agency (NHODA). App. Dir. No. 2, Post Tr. 4228 at 8-10.

4.1.22. On the subject of Transportation Availability and Support Services the Applicants presented a panel of four witnesses: Anthony M. Callendrello, Paul R. Frechette, and Richard H. Strome, all of whom have been described above, joined by Michael C. Sinclair, an Emergency Planning Specialist from Aidikoff Associates (Qualifications, Post Tr. 4222). App. Dir. No. 2, Post Tr. 4228, passim.

4.1.23. The Board finds that these witnesses were qualified and competent to give the testimony they did on this subject.

4.1.24. The "transportation dependent population" consists of four separate categories of individuals: (1) school children (when school is in session); (2) persons confined to institutions; i.e., hospitals, nursing homes, day-care centers, and jails; (3) the homebound, physically impaired who require transportation assistance; and (4) those individuals who indicate they are likely to be without transportation during an emergency. App. Dir. No. 2, Post Tr. 4228 at 2.

4.1.25. Based on data from the 1986-1987 school year,

approximately 347 buses and 30 vans are required to evacuate all the public and private schools and day-care centers in the New Hampshire EPZ. App. Dir. No. 2, Post Tr. 4228 at 3.

4.1.26. A special problem is said to be presented by the so-called "latchkey" child, i.e., those school children who, on a daily basis, arrive home from school while no parent is home and to whom a house key has been entrusted to allow entry into their home. App. Dir. No. 2, Post Tr. 4228 at 3.

4.1.27. Latchkey children are accommodated in the establishment of access control provisions relating to the Plume Exposure EPZ. Entry into the affected areas of the EPZ during an evacuation is discouraged in the case of non-residents. Residents returning to their homes, however, to prepare to evacuate will be allowed entry. This provision will allow for parents to return home in order to pick up their children. App. Dir. No. 2, Post Tr. 4228 at 3.

4.1.28. Public information materials and EBS announcements will be amended to indicate that residents will be allowed into the EPZ to return home to pick up family members or necessary belongings. App. Dir. No. 2, Post Tr. 4228 at 3.

4.1.29. Within the EPZ there are two hospitals, ten nursing homes and one jail which contain approximately 1,275 individuals. App. Dir. No. 2, Post Tr. 4228 at 4.

4.1.30. The types of vehicles used to evacuate these facilities are ambulances, coach buses, and school buses. From individual facility estimates, it has been determined that 18

ambulances, 15 coach buses, and 45 school buses (some of which will be equipped with conversion bed kits) will be allocated to evacuate the nursing homes, hospitals and jail within the EPZ. App. Dir. No. 2, Post Tr. 4228 at 4.

4.1.31. Special procedures for the jail are set forth in the NHRERP. NHRERP, Vol. 4B at Tab "Rockingham County Jail;" App. Dir. No. 2, Post Tr. 4228 at 4.

4.1.32. Each of the volumes which contains local plans, NHRERP Vols. 16-32, sets forth the maximum capacity for each facility and the number and types of vehicles allocated for the evacuation of each such facility. App. Dir. No. 2, Post Tr. 4228 at 5.

4.1.33. With respect to the Seacoast Health Care Center: There are three host facilities in Manchester, New Hampshire, the Maple Leaf Healthcare on Pearl Street, Maple Leaf Health Inc. on Maple Street, and the Villa Crest Units which will provide host care facilities for the Seacoast Health Care Center. These three host facilities have the same owner who has submitted a LOA designating these facilities as host facilities for the Seacoast Health Center. App. Dir. No. 2, Post Tr. 4228 at 5 and Attach. 1.

4.1.34. This LOA will be included in the Seacoast Health Center RERP set forth in NHRERP Vol. 18A. App. Dir. No. 2, Post Tr. 4228 at 5.

4.1.35. Appropriate LOAs have been obtained for host facilities for the Eventide Home and Goodwin's of Exeter which

will be included in the appropriate sections of NHRERP. App. Dir. No. 2, Post Tr. 4228 at 5, attachments 2 & 3.

4.1.36. Appropriate arrangements have been made for host care facilities for the patients at Exeter Hospital. App. Dir. No. 2, Post Tr. 4228 at 5-8.

4.1.37. SAPL Witness Dr. Joseph Degulis testified in rebuttal that insofar as the Catholic Medical Center (CMC) in Manchester was designated a host facility for Exeter Hospital, it would be unable, because of a shortage in medical staff, particularly nurses, to take five Class III patients in addition to its present volume of patients, Degulis Reb., Post Tr. 8749 at 1, noting that as of the date he testified, staff limitations at CMC permitted only use of 80% of available bed space. Id. at 2.

4.1.38. It turns out that Dr. Degulis does not speak for the hospital and its administration, Tr. 8767; that the only request that the Exeter Hospital has made is for food and shelter for its patients (Exeter Hospital being prepared to send its own medical staff with the patients), App. Ex. 29, and there is no evidence that the hospital administration agrees with Dr. Degulis' position, Tr. 8773-74. Further, in 1985, Dr. Degulis opined that CMC could handle 20 extra patients in an emergency who would not be coming from Exeter Hospital, but who would require treatment for radiation exposure. App. Exs. 31 & 32.

4.1.39. The Exeter Hospital RERP will be revised in order to place greater emphasis on those patients who have medical conditions such that their evacuation would be difficult

or could present a significant health risk to the patient. Section III.C.7 provides for the prioritization of patients for evacuation. It allows for consideration by medical personnel of current medical status, as it applies to patients within the categories of (1) Medical/Surgical, (2) Recovery Room, and (3) Intensive/Cardiac Care (ICU/CCU) only. The Exeter RERP will be amended to provide that at a SITE AREA EMERGENCY classification the hospital authorities should determine which patients, by virtue of medical condition, will require extraordinary assistance in evacuation. Additionally, hospital staff will note which patients require extraordinary assistance due to medical condition and prioritize patients for evacuation. The reference to 55 year olds will be deleted. App. Dir. No. 2, Post Tr. 4228 at 7-8.

4.1.40. Individuals who have "special transportation needs" are those identified in the New Hampshire Civil Defense Agency's (NHODA) Special Needs Survey as (1) homebound, physically impaired and requiring transportation assistance during an evacuation, and (2) those who indicate they are likely to be without a private source of transportation during an emergency. App. Dir. No. 2, Post Tr. 4228 at 8.

4.1.41. Section IV of each town plan contains an attachment to the procedure of the town Transportation Coordinator (or equivalent responsible individual) which lists the special needs information identified for that community. The names and addresses of individuals with special needs are main-

tained under separate cover at the state and local EOCs and at the Incident Field Office (IFO). App. Dir. No. 2, Post Tr. 4228 at 8-9.

4.1.42. The initial Special Needs Survey was conducted by the New Hampshire Civil Defense Agency (NHCDA now NHOEM) in March, 1986. The results were tabulated on July 11, 1986 and provided the information on the special needs population in the 17 New Hampshire EPZ communities that was utilized in producing Revision 2 of the NHRERP in August, 1986. Subsequently, NHCDA worked to update the initial survey results for the homebound or physically impaired to define the appropriate type of transportation resources needed. App. Dir. No. 2, Post Tr. 4228 at 9.

4.1.43. The respondents to the 1986 NHCDA Special Needs Survey who indicated they were homebound or physically impaired and expressed a need for ambulance transportation were contacted personally by NHCDA and asked specific questions relating to their medical condition and their need for medical or life-support capability during transport. In addition, several State agencies, including the Special Education Division of the New Hampshire Department of Education (NHDOE), the Governor's Committee on Handicapped, the Granite State Independent Living Foundation, and Exeter Area Visiting Nurses Association, which deal with handicapped individuals and home health care providers, were solicited for further information about the previously identified number of homebound individuals who may require

special transportation assistance. The home health care providers contacted were MOS Hospital Equipment, Life Plus Medical Products, Home Care Specialists, and Major Medical Supply. This research resulted in a determination that approximately nine individuals needed to be moved by ambulance and approximately 256 individuals could be evacuated by 32 buses. For planning purposes, the number of ambulances was increased to 18 in order to provide a conservative margin of available ambulance resources during an emergency. App. Dir. No. 2, Post Tr. 4228 at 9-10.

4.1.44. In response to the NHCDA 1986 survey and subsequent follow-up verification, approximately 2,340 persons indicated that they would need transportation. To assist these individuals, each town plan has established a system of bus routes and/or pick-up points. The number of buses which have been allocated for this is based on providing one bus for every 36 residents who responded to the survey in each town. However, to ensure that there are sufficient buses in each town, no town is allocated less than three buses. As a result, a total of 100 buses has been allocated for people needing a ride. This number is approximately 50% greater than the number of buses required by the survey results. App. Dir. No. 2, Post Tr. 4228 at 10.

4.1.45. Special procedures have been adopted for the Tuxbury Pond Camping Area. At a site area emergency or general emergency the campground may be directed to undertake a protective response or to close on a precautionary basis. The

Tuxbury Campground Plan (NHRERP, Vol. 31, Appendix F) indicates that facility staff will make available public information brochures and directions to campers. It is assumed that campers will leave in the same vehicles in which they arrived. Therefore, no special arrangements have been made to provide transportation resources to evacuate campers. In the event some campers require assistance, facility staff are directed by this plan to request assistance from either the South Hampton EOC or State IFO. Campers may also leave through ride sharing. App. Dir. No. 2, Post Tr. 4228 at 10-11.

4.1.46. According to identifiable needs, a total of 539 buses are required to evacuate the identified transportation-dependent population of the entire New Hampshire EPZ. This figure includes the need for approximately 453 regular school buses, 15 coach buses, and 71 "special needs" (i.e., conversion bed) buses for hospitals, nursing homes, jail and homebound mobility-impaired individuals. The plan also identifies the potential need for 30 vans for small facilities which have less than 15 students or occupants. App. Dir. No. 2, Post Tr. 4228 at 13.

4.1.47. LOAs, either present in the NHRERP, Volume 5, or obtained since Revision 2 to the NHRERP, indicate the availability of 709 standard school buses and 19 coach buses garaged in 17 locations by 10 transportation companies. In addition, two of the providers will make available 67 vans with a capacity ranging from five to 20 passengers each. Where a van

may not be available, a regular school bus will be substituted to meet a facility's evacuation requirements. App. Dir. No. 2, Post Tr. 4228 at 13 and Attach. 4.

4.1.48. The special needs buses described in the plan will be drawn from the pool of 709 standard school buses and equipped with the conversion bed kits, as required. The coach buses (with reclining seats) are designated only for use in evacuating patients from hospitals and nursing homes who require that type of transport. App. Dir. No. 2, Post Tr. 4228 at 13.

4.1.49. The LOAs, as of August 26, 1987, reflect the availability of approximately 796 drivers from the bus provider companies. Viewed from the perspective of vehicles and drivers from the same companies that could be matched at the time of a mobilization, the agreements represent approximately 720 vehicle and driver "pairs." This leaves 75 vehicles and 76 drivers "unmatched." Drivers willing to be reassigned to another provider would be "matched" with the remaining vehicles. Any remaining driver deficit, including deficits created by the fact that driver availability may have been overstated by a provider, see Guadagna Dir., Post Tr. 8117, passim, would be met from the Emergency Driver Pool (EDP) which the New Hampshire Office of Emergency Management has established in case there is a need to supplement the bus provider drivers at the time of the emergency. The Emergency Driver Pool consists of approximately 168 New Hampshire Department of Transportation personnel, 196 New Hampshire National Guard personnel and 48 Teamsters personnel.

All personnel in the Emergency Driver Pool have a "Light Commercial License" which is required to drive a bus. App. Dir. No. 2, Post Tr. 4228 at 13-14. The availability of members of the Emergency Driver Pool is supported either by their affiliation or LOAs. See No. 2.1.21, supra.

4.1.50. Given the availability of bus-and-driver pairs from the vehicle provider companies, and the personnel available from the Emergency Driver Pool, there is a substantial reserve of bus-and-driver pairs over and above the number required for the buses needed (when school is in session) to effect a complete evacuation of the New Hampshire EPZ. App. Dir. No. 2, Post Tr. 4228 at 14.

4.1.51. Available EMS or ambulance service is sufficient to respond to all identified New Hampshire EPZ needs. Volume 5 of the NHRERP contains LOAs which make available approximately 48 ambulances. A list of ambulance providers and number of ambulances is also provided in Volume 4, Appendix I (Section 2). The LOAs also commit approximately 126 EMTs to be available for emergency response. (Note: This accounts for the deletion of 1 ambulance and 3 EMTs as a result of the withdrawal of the O'Brien Ambulance Company.) App. Dir. No. 2, Post Tr. 4228 at 14-15.

4.1.52. Ambulance resources supporting evacuation would be drawn from commercial companies located in communities outside the EPZ. Approximately 200 emergency medical support personnel, who, for planning purposes, are not relied upon to drive

evacuation vehicles, have been identified within the EPZ communities through the Bureau of Emergency Medical Services of the New Hampshire Division of Public Health Services. These EMS personnel would continue to be available to serve the local communities, which may include providing assistance to mobility-impaired persons in an evacuation. App. Dir. No. 2, Post Tr. 4228 at 15.

4.1.53. Additional municipal ambulances are available from neighboring communities under existing "Mutual Aid" agreements and would be controlled through the existing Emergency Medical Services organization. This concept of response, and details of overall coordination, are presented in the EMS Coordinator's Procedure (NHRERP, Volume 4). In addition, as an added resource, the New Hampshire National Guard can make available approximately 75 medically qualified personnel to provide assistance. App. Dir. No. 2, Post Tr. 4228 at 15.

4.1.54. The resources required to assist those in each of the transit-dependent categories (identified above) are calculated separately by vehicle type and listed in the appropriate sections of the State and town RERPs. Section IV of each Town Plan contains an attachment to the procedure of the Transportation Coordinator (or equivalent responsible individual) which lists the individual town transportation requirements by the following categories:

- * "Public Schools," indicating the maximum student population of each facility;

- * "Private, Day-care/Nursery Schools," indicating the maximum licensed capacity of each facility;
- * "Nursing Homes/Hospitals," indicating the maximum facility population, including staff;
- * "Residents Requiring Transportation," which identifies the number of people who have indicated they would be without adequate transportation to evacuate on their own during an emergency; and
- * "Special Needs," which identifies those individuals who would require a special type of assistance; i.e., the homebound, mobility-impaired who might require an ambulance or wheelchair van or physical assistance to leave their homes.

App. Dir. No. 2, Post Tr. 4228 at 16-17.

4.1.55. At the ALERT Emergency Classification Level (ECL), the Transportation Coordinator (or equivalent personnel) of the local emergency response organization, or State IFO Local Liaison at the Incident Field Office in Newington, New Hampshire in the case of communities that require assistance, confirms the community's institutional and special transportation requirements. For example, when in session, schools provide the day's current attendance figures and the number of buses required to evacuate the student population. This information, when confirmed by the responsible local official at the outset of an emergency situation, provides the basis on which to estimate transportation resources needed to evacuate the identified

populations (should that become necessary). App. Dir. No. 2, Post Tr. 4228 at 17.

4.1.56. Should an accident escalate quickly and require (or potentially require) evacuation prior to completing verification of actual need, the transportation requirement numbers contained in the plans will form the basis for the procurement and dispatch of vehicles. The purpose of verification at the ALERT ECL is to determine the actual need of individuals, schools and institutions in the New Hampshire EPZ. App. Dir. No. 2, Post Tr. 4228 at 17-18.

4.1.57. Once this information is compiled, the numbers and types of vehicles required are reported by the local Transportation Coordinator to the community's Local Liaison at the IFO in Newington, New Hampshire. There the information is combined with similar data gathered from other New Hampshire EPZ communities and forwarded to the State EOC Resources Coordinator in Concord. App. Dir. No. 2, Post Tr. 4228 at 18.

4.1.58. The State EOC Resources Coordinator, with assistance from the Pupil Transportation Safety Representative (PTSR) and the State Bureau of Emergency Medical Services (EMS) Representative, mobilizes available bus, van, and ambulance resources from providers listed in NHRERP, Volume 5. At a SITE AREA EMERGENCY the vehicles are directed to assemble at the State Transportation Staging Areas (TSA). The New Hampshire Office of Emergency Management has established two State Staging areas; one at the Rockingham County Complex in Brentwood and the other at

OMNE Mall in Portsmouth. At the State TSAs the bus drivers will be issued dosimetry and provided with strip maps directing them from the State Staging Area to the local Transportation Staging Areas in each municipality (NHRERP Volume 4B, RCSD State TSA Procedure, and OMNE Mall State TSA Procedure). When evacuation is recommended, the requisite number and type of vehicles will be dispatched to the municipalities affected by the recommendation. App. Dir. No. 2, Post Tr. 4228 at 18-19.

4.1.59. Revision 2 to the NHRERP provides for the notification and possible mobilization of Emergency Medical Services at the ALERT Emergency Classification Level (NHRERP, Volume 4, Section 7, p. 7-2; and also Volume 4B, EMS Coordinator Procedure). Notification and coordination of the Emergency Driver Pool (which includes the New Hampshire National Guard, NHDOT, and Teamsters) as backup drivers will be initiated at the State EOC in Concord. Representatives from the National Guard and NHDOT are located in the State EOC in Concord, New Hampshire. Both the National Guard and NHDOT have existing agency procedures for emergency call-up of their personnel. A procedure for call-up of Teamsters and for coordination of the Emergency Driver Pool with vehicles is under development. App. Dir. No. 2, Post Tr. 4228 at 19.

4.1.60. Should an evacuation be ordered, the public will be informed of the time that the buses will begin traveling the designated routes via the Emergency Broadcast System (EBS). NHRERP, Volume 4, Appendix G (Emergency Broadcast System

Activation) Attachment 2, contains EBS Sample Messages. Messages "F" (General Emergency-Sheltering and Evacuation) and "G" (General Emergency-Evacuation) both contain a provision for indicating what time buses will begin traveling the pre-established bus routes (pp. G-32 and G-37 - G38, respectively). Identification of the bus routes and/or pickup points is contained in pre-distributed public information material. App. Dir. No. 2, Post Tr. 4228 at 19-20.

4.1.61. EBS messages and pre-distributed public information materials provide instructions on how individuals may request special transportation assistance during an evacuation by calling their local EOC or the State IFO: NHRERP, Volume 1, Section 2.6 (p. 2.6-11b) states, "[a]ny additional unanticipated bus needs will be coordinated through the town IFO Local Liaison." For example, Volume 16 (Town of Seabrook RERP), Section IV.F, p. IV-23a, Transportation Coordinator Procedure, outlines the duties of the coordinator, who is to "[d]etermine what type of transportation assistance is needed by individuals who telephone the [local] EOC to make requests;" and refers to Attachment 2. Attachment 2 to Section IV.F discusses "Requests for Transportation Assistance," and consists of a questionnaire to obtain the details of the need for transportation assistance from a caller, and either directs the caller to a bus route or determines what type of special transportation assistance should be provided. The Transportation Coordinator then contacts the IFO Local Liaison and informs him of the current transportation

needs, as described in NHRERP, Volume 16, Section IV.F (p. IV-24). The IFO Local Liaison will then call the Transportation Coordinator and report the number of buses sent and the estimated time of arrival, if an evacuation is recommended. The dispatch of the required resources is coordinated with State EOC and the State Transportation Staging Areas NHRERP, Volume 4, Section 7-EOC Resources Coordinator Procedure). This method of record keeping will ensure that adequate transportation resources are allocated for the transportation dependent. App. Dir. No. 2, Post Tr. 4228 at 20-21.

4.1.62. If an evacuation is recommended, the number of vehicles previously determined to be required are dispatched from the State TSAs to the local Transportation Staging Area in the affected communities (NHRERP, Volume 4, Section 7). From the local Staging Area, vehicles are assigned by the local Transportation Coordinator (or equivalent personnel) to assist the transportation-dependent population; i.e., buses are provided with strip maps and dispatched to each school and/or day-care center, and buses, vans and/or ambulances are dispatched to medical care facilities and the homebound, mobility-impaired (e.g., NHRERP, Volume 16, Section IV.F, p. IV-25). The bus drivers are also provided with strip maps directing them from their assignment to a Reception Area. In addition, buses are assigned to traverse pre-designated routes and/or pick-up points within the community to provide transportation for those without

alternative means of leaving the area. App. Dir. No. 2, Post Tr. 4228 at 21.

4.1.63. The State of New Hampshire will provide the level of training required for the drivers in order to carry out all potential assignments. Teamsters assigned to the Emergency Driver Pool (EDP) and available to drive emergency vehicles, have, as a minimum, a Light Commercial (Drivers') License, which by New Hampshire State licensing definition qualifies them to operate any vehicle exceeding 26,000 pounds gross weight. App. Dir. No. 2, Post Tr. 4228 at 22 and Tr. 4401.

4.1.64. Individual school plans exist for all public school, private schools, day-care centers, and nurseries in the Town of Hampton. These facility RERPs are maintained in NHRERP, Volume 18A, entitled "Hampton Special Facilities Plans." App. Dir. No. 2, Post Tr. 4228 at 22.

4.1.65. Upon notification of an emergency, individual school principals determine their transportation needs on the current day's school census and provide the data to the local Transportation Coordinator. The data are passed on to the community's IFO Local Liaison and to the IFO Resources Coordinator. App. Dir. No. 2, Post Tr. 4228 at 22.

4.1.66. When an evacuation is recommended, the IFO Resources Coordinator directs the State Transportation Staging Area Supervisor to dispatch the required number of buses to the Town of Hampton Local Staging Area (LSA). At the Hampton LSA, the Local Transportation Coordinator provides bus drivers with

directions (i.e., strip maps) to each school facility and to that school's assigned Reception Center. After loading at each school, the buses proceed directly to the appropriate Reception Center. App. Dir. No. 2, Post Tr. 4228 at 22-23.

4.1.67. In the event that any New Hampshire EPZ municipality, including TOH, is unable to respond during an emergency, the NHRERP provides a compensatory mechanism for coordinating a town's evacuation transportation response through the State IFO in Newington, New Hampshire utilizing State personnel. At the IFO, the State maintains duplicate listings of each town's special facilities and transportation-dependent individuals. Duplicates of each town's evacuation transportation maps and directions are stored at the State Transportation Staging Area (TSA) in Brentwood. App. Dir. No. 2, Post Tr. 4228 at 23.

4.1.68. At the ALERT classification, the IFO Controller (NHRERP, Volume 4) contacts the Rockingham County Dispatch Center to determine if, during the initial notification of each town, the Center was unable to establish communications with a municipality or was advised that a municipality is unable to respond. App. Dir. No. 2, Post Tr. 4228 at 23.

4.1.69. If so, the IFO Controller directs the TSA Supervisor to assign Rockingham County Sheriff's Deputies to perform the functions of the local Transportation Coordinator(s) at the local Staging Area. (Volume 4B, Rockingham County Sheriff's Department, Appendix F). Appendix F will be revised to indicate that this is performed at the ALERT ECL. Deputies

dispatched to perform such duty would be provided with radio communications equipment and duplicates of the information provided in the town Transportation Coordinator's procedures as well as the necessary maps showing bus routes, special facilities, and Reception Centers. Upon arrival at the town's designated local Transportation Staging Area (TSA), the deputies establish radio and/or telephone communications with State Transportation Staging Area Command Post. App. Dir. No. 2, Post Tr. 4228 at 23-24.

4.1.70. Concurrently, the IFO Coordinator directs that IFO Local Liaisons (NHRERP, Volume 4) begin contacting each of the town's special facilities and persons identified by the NHCSA Special Needs Survey, as requiring special transportation assistance, to determine their current status and anticipated evacuation transportation requirements. The number and types of vehicles required for that municipality are identified and communicated to the EOC Resources Coordinator who, in turn, will mobilize the resources and direct them to the appropriate State TSA. App. Dir. No. 2, Post Tr. 4228 at 24.

4.1.71. Upon a recommendation to evacuate, the State TSA will dispatch the required vehicles to the local TSA, and the assigned deputy will carry out all the transportation resource deployment and coordination responsibilities of the local Transportation Coordinator, as described in NHRERP, Volume 4B, Appendix F. This deputy would provide strip maps and directions,

and also coordinate the buses running the bus routes. App. Dir. No. 2, Post Tr. 4228 at 24-25.

4.1.72. Pre-distributed public information material and the Emergency Broadcast System messages contain instructions for individuals requiring assistance to call the IFO if they are unable to reach their local EOC, as would be the case in a non-responding town (refer to NHRERP, Volume 4, Attachment 13-A). The NHOEM Local Liaison at the IFO would complete Tab 1 to Attachment 13-A (Volume 4, p. 13A-5) to determine the type of assistance needed, and maintain lists of these people to ensure vehicles would be provided for evacuating them (p. 13A-3). These requests would then be relayed by the IFO Local Liaison to the State Transportation Staging Area or local TSA (if activated) to ensure that additional evacuation transportation would be provided where necessary. App. Dir. No. 2, Post Tr. 4228 at 25.

4.1.73. The allocation of buses in Hampton included provisions for a number of transient persons identified by hotels in response to the special needs survey. In addition, the bus allocation for Hampton was increased by nine buses. Tr. 4244-48.

4.1.74. The number of transients without transportation is small based upon the work of KLD Associates, the preparer of the ETE for Seabrook. Tr. 4935-37.

4.1.75. LOAs with reception centers and mass care facilities are either not required, have been obtained, or in the case of two buildings, currently being pursued. See Nos. 2.1.8-2.1.11, supra.

4.2. Rulings of Law

4.2.1. Any rebuttable presumption that provisions for transportation and support services are in any way inadequate arising from the FEMA testimony, Post Tr. 4583, has been overcome by the evidence adduced at the hearing. See Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), ALAB-698, 16 NRC 1290, 1298 (1982).

4.3. Conclusions

4.3.1. The Board finds and rules that there exists reasonable assurance that in the event of a radiological emergency at Seabrook Station, adequate transportation resources together with necessary support services can and will be made available to assist those with "special needs."

5. RECEPTION CENTERS

5.1. Findings of Fact

5.1.1. SAPL has raised two contentions with respect to Decontamination and Reception Centers; these being SAPL-7 and SAPL-33.

5.1.2. Contention SAPL-7 reads as follows:

"The New Hampshire State and Local Plans fail to meet the requirements of 10 CFR 50.47(b)(11) and NUREG-0654 K.5.b. because there has been no showing that the means of radiological decontamination of emergency personnel, wounds, supplies and equipment have been established. Further there has not been a clear showing that adequate means for waste disposal exist." ASLB MEMORANDUM AND ORDER (Ruling on Contentions and Establishing Date and Location for Hearing) (April 29, 1987) at 84-85.

5.1.3. In a prior memorandum and order this Board granted partial summary disposition of this contention limiting further litigation of it to "the adequacy of personnel and equipment (including that for collection and storage of radioactively contaminated water) to accomplish the monitoring and decontamination of the numbers of emergency workers and general public expected at the decontamination centers located at the host community reception centers." ASLB MEMORANDUM AND ORDER (Ruling on Summary Disposition Motions of Applicants and State of New Hampshire and Establishing Date for Filing of Late-Filed Contentions Arising out of Revision 2 of the New Hampshire Radiological Emergency Response Plan) (Nov. 4, 1986) at 26.

5.1.4. Thereafter, SAPL submitted revised bases for this contention and this Board admitted two of the proffered additional bases. ASLB MEMORANDUM AND ORDER (Providing Basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 35.

5.1.5. The new bases admitted were:

"(3) the number of host community primary reception centers is now fewer than previously planned because of the deletion of Nashua and Durham centers, which will increase the burden of monitoring and decontamination at the remaining centers. SAPL further questions the capability to decontaminate the decontamination centers and alleges (4) that dilution of the waste water generated at these centers, rather than storage and disposal of radiological wastes, could lead to a public risk."

5.1.6. SAPL-33 reads as follows:

"Contrary to the requirements of 10 CFR 50.47(a)(1), 50.47(b)(8), 50.47(b)(10) and NUREG-0654 II.J.12, there is no showing that NHRERP Rev. 2 provides adequately for the registering and monitoring of evacuees at reception centers within the 12 hour period." ASLB MEMORANDUM AND ORDER (Providing Basis for and Revision to Board's Rulings on Contentions on Revision 2 of NHRERP) (May 18, 1987) at 44-45, appendix at 5.

5.1.7. In support of these contentions, SAPL presented two pieces of testimony by Donald L. Herzberg, M.D., Post Tr. 5011 and Post Tr. 5012. Dr. Herzberg is the Director of the Division of Nuclear Medicine at the Dartmouth-Hitchcock Medical Center in Hanover, New Hampshire. Herzberg Dir., Post Tr. 5011 at 1. He acknowledged some input into the SAPL contentions. Tr. 5015-17.

5.1.8. Dr. Herzberg testified in his "direct" testimony that in his judgment there were too few people available to undertake necessary monitoring and decontamination procedures at the decontamination centers. Herzberg Dir., Post Tr. 5011 at 2.

5.1.9. In particular, he focussed upon the Dover Center stating that on the supposition that the monitoring Staff was only six persons, it would require over 20 hours of work by each individual to carry out the monitoring function, and an additional 30 hours of work for each individual to perform necessary decontamination functions if only one-fourth of the expected maximum number of arrivals proved to be contaminated. Herzberg Dir., Post Tr. 5011 at 2.

5.1.10. Dr. Herzberg also testified that the DPHS Supervisor at each center and the EOC Radiological Health

Technical Advisor had been given too many and too burdensome duties under the plan. Herzberg Dir., Post Tr. 5011 at 3.

5.1.11. All of the foregoing concerns were dealt with, and met by, the Applicants' panel of witnesses in their direct testimony. See infra.

5.1.12. Dr. Herzberg also testified that NHRERP lacked guidelines "for dealing with non-ambulatory individuals or with people whose response to the reactor accident results in their behavior being disruptive." Herzberg Dir., Post Tr. 5011 at 3. His experience and qualifications in this area seemed to be centered on his observations on personnel going through mock radiation accident scenarios and his experience with patients anticipating radiation treatment for illness. Tr. 5020, 5058.

5.1.13. Dr. Herzberg also suggested the plan should contain provisions for practice drills on a routine basis and a program for quality control for the radiation detection instruments. Herzberg Dir., Post Tr. 5011 at 3-4. It does. App. Ex. 5, Vol. 1, §§ 2.4.5, 3.1.4.

5.1.14. Finally, Dr. Herzberg suggested the need for provision for checking of the thyroid glands of possibly affected individuals sometime between 12 and 24 hours after the exposure in order to assure that accumulation of iodine in the blood stream has maximally accumulated in the thyroid. Herzberg Dir., Post Tr. 5011 at 4; Tr. 5046-47. Not to imply that DPHS does not have provisions for thyroid monitoring, it is sufficient here to

note that the planning basis for staffing is only 12 hours under applicable FEMA guidance. NUREG-0654, § J.12; Tr. 4880.

5.1.15. In response to the SAPL contentions, the Applicants presented a panel of seven witnesses including: Messrs. Callendrello and Frechette, Director Strome, Mr. Bonds and Dr. Wallace joined by William N. Colburn, Coordinator of Emergency Services, Division of Human Services, New Hampshire Department of Health and Human Services (Qualifications, Post Tr. 4737) and James A. MacDonald, Radiological Assessment Manager, New Hampshire Yankee (Qualifications, Post Tr. 4736). App. Dir. No. 4, Post Tr. 4740, passim.

5.1.16. Because the direction of the plume that will result from any given incident is unknown at this time, the planning basis provides for simultaneous and independent operation of the host community centers. App. Dir. No. 4, Post Tr. 4740 at 2.

5.1.17. Therefore, for the purpose of estimating the staffing and equipment requirements for registration, monitoring, and decontamination operations, it has been assumed that all segments of the EPZ would be affected by a contaminating, particulate release. This is a very broad, theoretical and conservative assumption. First, not all severe accidents would involve the release of particulate materials. NUREG-0654/FEMA-REF-1 at p. 15 states:

"[T]he potential for releases to the environment decreases dramatically in this order: (a) gaseous materials; (b) volatile solids, and (c) non-volatile solids. For this reason, guidance for source terms

representing hypothetical fission product activity within a nuclear power plant containment structure emphasizes the development of plans relating to the release of noble gases and/or volatiles such as iodine. Consideration of particulate materials, however, should not be completely neglected. For example, capability to determine the presence or absence of key particulate radionuclides will be needed to identify requirements for additional resources."

App. Dir. No. 4, Post Tr. 4740 at 2-3.

5.1.18. Second, plume dispersion would limit the affected segment of the population to areas in a downwind direction from the plant. The less concentrated the plume dispersion, the less the concentration of potential contaminants. The accident assessment model utilized by State of New Hampshire emergency response personnel, described in NHRERP, Volume 1, Section 2.5.2, allows the State to determine the concentration and dispersion of an actual plume and, consequently, that segment of the EPZ population which potentially could be affected by a contaminating release. App. Dir. No. 4, Post Tr. 4740 at 3.

5.1.19. FEMA guidance suggests the use of a minimum of 20% of the total evacuees as a planning basis for estimating the number of persons arriving at reception centers. App. Dir. No. 4, Post Tr. 4740 at 4; Tr. 4767-68. This is the basis used by the Applicants; however, there is a good deal of conservatism built into their use of the figure of 20% because it was not applied to the transit dependent population, with respect to which it was assumed that 100% would arrive at a reception center, and the numbers at the largest center were used as a planning basis for all centers. Tr. 4768-69. As a result, in

fact, the planning basis works out to be about 25% of all evacuees. Tr. 4769.

5.1.20. The mathematical model for determining each host community load is:

$$(20\%) \times \left(\begin{array}{l} \text{Sum of Peak} \\ \text{Populations For} \\ \text{(Assigned Communities)} \end{array} - \begin{array}{l} \text{Special Facility} \\ \text{Populations of} \\ \text{Assigned Communities} \end{array} - \begin{array}{l} \text{Transit Dependent} \\ \text{Numbers for} \\ \text{Assigned Communities} \end{array} \right) = P$$

$$P + \begin{array}{l} 100\% \text{ Transit Dependent Assigned} \\ \text{To That Host Community} \end{array} = \begin{array}{l} \text{Evacuee Load Per} \\ \text{Host Community} \end{array}$$

App. Dir. No. 4, Post Tr. 4740 at 5.

5.1.21. Performing the calculations, as described in the model, equates to 9,667 evacuees arriving at the reception and decontamination centers at Manchester, 6,829 evacuees at Rochester, 9,621 at Dover, and 6,416 at Salem. The planned staffing level to fulfill the registration, monitoring, and decontamination function at each of the four host communities is based on the community (Manchester) which is anticipated to receive the largest number of evacuees (9,667). App. Dir. No. 4, Post Tr. 4740 at 5.

5.1.22. The current information from the New Hampshire personnel resource assessment program indicates there will be approximately 1,300 state and local emergency workers who may potentially require monitoring and decontamination services at host community facilities. App. Dir. No. 4, Post Tr. 4740 at 5.

5.1.23. Revision 2 of the NHRERP allows for emergency workers, during the first twelve hours, to be sent to any of the four host communities. Upon closure of the centers for the general public, monitoring and decontamination assistance will be provided for emergency workers at the secondary monitoring and decontamination center at the Hillside Junior High School in Manchester. App. Dir. No. 4, Post Tr. 4740 at 5-6.

5.1.24. In order to eliminate the need to assign emergency workers to one of four facilities at the time of the emergency and to facilitate the tracking of emergency workers and their exposure records, the NHRERP will be amended to establish the Manchester secondary monitoring and decontamination center at the Hillside Junior High School as the emergency worker monitoring and decontamination center for all stages of an emergency. Therefore, the secondary center in Manchester will have the capability to provide monitoring and decontamination services to approximately 1,300 emergency workers. App. Dir. No. 4, Post Tr. 4740 at 6.

5.1.25. In general, the philosophy of the New Hampshire RERP is to plan for sufficient resources to implement the emergency response efforts without reentry of emergency workers or re-use of their equipment once outside of the Plume Exposure Pathway EPZ. This approach obviates the need to plan for extensive capability for decontamination of emergency worker equipment, vehicles, and supplies during the initial response phase of an emergency. App. Dir. No. 4, Post Tr. 4740 at 6.

5.1.26. Contaminated emergency worker equipment, vehicles and supplies would be identified and isolated until such time as the Division of Public Health Services (DPHS) can evaluate the safest and most efficient method to accomplish its decontamination. However, DPHS supervisors may direct the decontamination of selected items as deemed appropriate, based on the need for the item, time, staff available, and other conditions which are unique to a particular emergency. Appendix F9, Volume 4A, of the NHRERP identifies the appropriate equipment to conduct decontamination of the selected items. App. Dir. No. 4, Post Tr. 4740 at 7.

5.1.27. Assuming the Manchester number of 9,667 evacuees for each host community and taking information provided in Volume 6 of NHRERP which indicates that a reasonable assumption for vehicle occupancy is 2.6, the planning basis for vehicle load at each host community was obtained by the following calculation:

$$9,667 / 2.6 = 3,719 \text{ vehicles}$$

Rounding the number, 3,800 vehicles was established as the individual vehicle load planning basis for all host community centers. App. Dir. No. 4, Post Tr. 4740 at 7.

5.1.28. The New Hampshire Department of Health and Human Services Emergency Services Units (DHHS/ESUs) are responsible for establishing and administering reception and registration of evacuees at host community reception centers. Each center will be served by these Emergency Service Units

(ESUs), which are made up of staff from DHHS Divisions of Human Services, Children and Youth Services and Elderly and Adult Services. These units will function as trained cadres of department personnel who will provide registration services as well as operational supervision to volunteers in the provision of evacuee registration, message exchange and locating service, information/recreation services, mass care referral and student pick-up coordination. NHRERP, Volume 4B, Division of Human Services procedures provide a detailed description of what constitutes these various services. App. Dir. No. 4, Post Tr. 4740 at 7-8.

5.1.29. An analysis of registration processing has been conducted by the Division of Human Services to determine the number of staff required to provide registration services under the most pressing circumstances. An assumption was made that one registrar can process a "registration unit" every ten minutes, which translates into six units per hour or 72 units per twelve hours. Based on the assumed vehicle occupancy rate a "registration unit" can be considered as 2.6 people. App. Dir. No. 4, Post Tr. 4740 at 8-9.

5.1.30. Using the number of evacuees anticipated to arrive at reception centers, the calculation that follows determines the number of units requiring registration and the maximum number of registrars needed at each location.

Reception Center Registration Resources and Needs Formula

Projected Arrivals	/	2.6	= Number of Registration Units
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Since 1 registrar can register 72 units in 12 hours:

Number of Registration Units / 72 Units Registered in 12 hours = Number of Registrars Needed

<u>Town</u>	<u>Actual Staffing Needed</u>	<u>Planned Staffing Required</u>
Rochester	6,829 / 2.6 = 2,627 Units 2,627 / 72 = 37 Registrars	52
Dover	9,621 / 2.6 = 3,701 Units 3,701 / 72 = 52 Registrars	52
Salem	6,416 / 2.6 = 2,468 Units 2,468 / 72 = 35 Registrars	52
Manchester	9,667 / 2.6 = 3,719 Units 3,719 / 72 = 52 Registrars	52
	Totals: 176 Registrars	208

App. Dir. No. 4, Post Tr. 4740 at 9.

5.1.31. During cross examination of the Applicants' panel, some question was raised as to the validity of the 2.6 occupants per car assumption. Tr. 4746. This number was taken from the work done by the Applicants' experts who performed the Evacuation Time Estimates for Seabrook and will be discussed in more detail, infra, in connection with the Board's discussion of that subject. It was used as a planning basis for the vehicle load at each host community. App. Dir. No. 4, Post Tr. 4740 at 7. It also was used as a "registration unit" to determine the maximum number of registrars needed at each location. Id. at 8-9. However, it should be noted that for purposes of determining the necessary resources to perform registration functions at a

reception center, it was the opinion of Mr. Colburn that, from his experience, the number considered to be typical or average size was 3.2, thus the 2.6 number chosen for uniformity was extremely conservative (i.e., low) in his judgment. Tr. 4746-48. It bears noting that, even if a lower number of 2.3 be assumed for planning as was suggested in the cross-examination, the fact is that the planning basis is so conservative, having assumed for all centers a need to staff for registration of the same number of persons expected at the largest center, the adverse effect of such an assumption would be felt, if at all, only in connection with the largest center, Tr. 4749, and there the shortage would only be seven registrars, Compare App. Dir. No. 4, Post Tr. 4740 with Tr. 4750.

5.1.32. The NHRERP, Volume 4B, A-2 Division of Human Services procedures, includes a staffing chart entitled "Staffing Availability for Reception Centers." The personnel on the chart in Volume 4B who are assigned to primary and support ESUs are given training in reception center operations annually by the Division of Human Services. Therefore, the total number of projected staff is in excess of that required to serve the anticipated number of evacuees arriving at reception centers. In addition, volunteers from the host and adjacent communities could be used to augment DHS staff. App. Dir. No. 4, Post Tr. 4740 at 10.

5.1.33. In addition to registration requirements there

are an additional 220 persons needed as follows:

Message Exchange and Locating Service	4 x 16 = 64
Coordination of Volunteers	4 x 3 = 12
Information and Recreation Workers	4 x 10 = 40
Sorters and Receivers	4 x 6 = 24
Student Processors (if schools in session)	4 x 20 = <u>80</u>
	220

App. Dir. No. 4, Post Tr. 4740 at 10.

5.1.34. Thus, the total personnel needed to carry out all functions would be 428. In addition to the 90 ESU personnel, there is estimated to be another 471 personnel from the three DHHS Divisions who could be called upon to staff the four reception centers. Therefore, the total number of projected staff is in excess of that required to serve the anticipated number of evacuees arriving at reception centers. In addition, volunteers from the host and adjacent communities could be used to augment DHHS staff. App. Dir. No. 4, Post Tr. 4740 at 10.

5.1.35. There were introduced three exhibits, SAPL Exs. 3, 4, 5, which were the results of a survey taken by Mr. Colburn to determine why more employees of DHHS were not signing up to serve on ESUs, Tr. 4780. The survey results indicated that some 28.1% of those responding would be unwilling to respond to an emergency at Seabrook. Tr. 4785. However, none of the 95 persons in the ESUs were in that group. Tr. 4788-89. More importantly, as Mr. Colburn testified, if one assumes the survey can accurately be projected to all workers in DHHS, this means a

reduction of the total number of employees by 28.1% (unwilling to respond to a Seabrook emergency) or even by 57.2% (unwilling to join an ESU for all reasons, including Seabrook); however, there are still sufficient personnel to supply the needed 471 workers, Tr. 4800, and for this reason Mr. Colburn testified that, if anything, the survey enhanced his confidence that DHHS would be able to respond and fulfill its obligations under NHRERP, Tr. 4798-99.

5.1.36. A minimum of 40,000 copies of Form 1050 will be acquired and stored at Division of Human Services district and State offices. Other equipment, such as office supplies and 300 directional signs, is maintained at district and State offices, and is ready for delivery to reception centers. Tables and chairs are readily available at the reception facilities. Crowd management material, such as rope and crowd tape, will be available as needed for Reception Centers from the decontamination center supplies which will be provided to each Host Community. App. Dir. No. 4, Post Tr. 4740 at 11.

5.1.37. Each host community has two monitoring and decontamination facility centers. The primary center of each host community has sufficient capacity to meet the planning basis of 20% of total evacuees. The secondary center in Manchester is used for emergency workers. The secondary centers in the remaining three communities are available to be activated if they are required. App. Dir. No. 4, Post Tr. 4740 at 11.

5.1.38. The primary monitoring and decontamination center is co-located with the reception center in Manchester and Dover. In Salem and Rochester, the primary monitoring and decontamination center is in a separate building near the reception center. The facility layouts and traffic flows for each monitoring and decontamination facility are presented in the NHRERP, Volume 4A, Appendix F1. App. Dir. No. 4, Post Tr. 4740 at 11-12.

5.1.39. Initial monitoring of evacuees arriving at reception centers will consist of monitoring vehicles as they arrive at the reception centers. App. Dir. No. 4, Post Tr. 4740 at 12.

5.1.40. If the initial vehicle monitoring reveals no contamination, the vehicles will be directed to a parking area designated for non-contaminated vehicles, and evacuees arriving in these vehicles will proceed to the registration area monitoring point. App. Dir. No. 4, Post Tr. 4740 at 12.

5.1.41. If initial vehicle monitoring reveals contamination, the vehicles will be directed to a parking area set aside for contaminated vehicles. Evacuees arriving in these vehicles will be directed to the control point monitoring area within the decontamination center where they will receive a more extensive, full-body, personal monitoring. This more extensive monitoring, called "control point monitoring" is described in Appendix F5, Volume 4A of the NHRERP. Additionally, if an evacuee is found to be contaminated at the registration area

monitoring point, the person is immediately referred to the control point monitoring area for more extensive monitoring. In this manner, evacuee monitoring provides for the immediate segregation of potentially contaminated persons from non-contaminated persons. App. Dir. No. 4, Post Tr. 4740 at 12-13.

5.1.42. Once contamination is pinpointed and recorded at the control point, the evacuee is referred for decontamination. Each evacuee is "labeled" clean, contaminated or potentially contaminated through the use of a special tag which is given to all evacuees at the vehicle monitoring area. The tag has body diagrams and identifying numbers used for tracking evacuees and belongings through the monitoring and decontamination process. Reception center staff will not allow an evacuee into registration until the tag shows the evacuee has been declared "clean." App. Dir. No. 4, Post Tr. 4740 at 13-14.

5.1.43. As described in NHRERP, Volume 4A, Appendix F6, the initial step in the personal decontamination process would be the identification and isolation of any contaminated clothing or personal items. The contaminated items would be inventoried, (see Volume 4A, Appendix F5-Form 7), and placed in a personally identified plastic bag. App. Dir. No. 4, Post Tr. 4740 at 14.

5.1.44. Decontamination of a person may be provided by three methods: local, general, and a combination of local and general decontamination. Local decontamination could be carried out in either a sink or shower when only isolated parts of the body are contaminated. Direct washing of the area with a soft

brush and soap is employed with care being exercised so as not to spread local areas of contamination to other parts of the body. General decontamination consists of a full-body shower and is used when an evacuee is contaminated over a large portion of the body. A combination of local and general decontamination is employed when an evacuee is contaminated over a large portion of the body with localized areas of higher contamination. In this case, those areas of the body with higher levels of contamination would be washed using local decontamination procedures prior to the full-body shower. App. Dir. No. 4, Post Tr. 4740 at 14.

5.1.45. Each of the two decontamination centers per host community makes use of the gymnasium for waiting areas for the control point monitoring and locker rooms and showers for decontamination. Only middle and secondary schools are used for decontamination centers as they provide sinks and showers. App. Dir. No. 4, Post Tr. 4740 at 14-15.

5.1.46. Emergency workers with wounds that require medical attention would be referred directly to a medical facility. NHRERP Volume 1, Section 2.7.5 and Volume 4A, Appendix F will be amended to clarify this policy. The medical facilities to which emergency workers may be referred, and their capabilities, are listed in Table 2.8-1, Volume 1 of the of the NHRERP. App. Dir. No. 4, Post Tr. 4740 at 15.

5.1.47. The number of personnel required to staff the monitoring and decontamination center in each host community is:

Functional Area Staffing

<u>Primary Center</u>	<u>Planned Staffing</u>
Decontamination Admin. (DPHS)	3
Buffer Zone Advisor	2
Interior-Monitoring	6
Interior-Decontamination	6
Exterior-Control Point and Reg. Area Monitoring	41
Exterior-Vehicle Monitoring	<u>11</u>
	69
<u>Secondary Center</u>	<u>Planned Staffing</u>
Decontamination Admin. (DPHS)	3
Buffer Zone Advisor	2
Interior-Monitoring	6
Interior Decontamination	6
Exterior-Control Point	<u>6</u>
	23
TOTAL FOR BOTH CENTERS	92

App. Dir. No. 4, Post Tr. 4740 at 15.

5.1.48. The staffing charts contained in Appendix F4, Volume 4A of the NHRERP will be amended to reflect these numbers.

App. Dir. No. 4, Post Tr. 4740 at 15-16.

5.1.49. The personnel staffing indicated for the primary center reflects the number of personnel that could provide monitoring services to 9840 evacuees within a 12-hour period, the staffing for the secondary center reflects the number of personnel which could provide monitoring services to an additional 1,440 persons within a 12-hour period. App. Dir. No. 4, Post Tr. 4740 at 16.

5.1.50. The staffing levels for the positions of Decontamination Administrator (3) Buffer Zone Advisors (2) and Interior Decontamination (6) were derived from a careful review

of procedures and experience gained through walk-through demonstrations, drills, and an exercise. App. Dir. No. 4, Post Tr. 4740 at 16; Tr. 4852, 4862.

5.1.51. The positions of Control Point and Registration Area Monitoring are responsible for providing monitoring of individuals to detect contamination. The personnel who staff these positions can be moved between the two positions, as necessary, to optimize the center's operation. Assuming the entire 9,667 expected individuals are potentially contaminated, all of the individuals would be referred directly to control point monitoring. Given an average monitoring time of three minutes per individual, 20 individuals could be monitored in one hour; and 240 individuals could be monitored in 12 hours. The staffing level for these positions can be determined by the equation:

$$9,667 \text{ (Assumed Facility Load)} / 240 = 40.28 \text{ Staff Required}$$

This number was rounded off to 41. App. Dir. No. 4, Post Tr. 4740 at 17.

5.1.52. The control point monitoring positions at the secondary decontamination center have an assigned planned staffing level of six. Using the same rationale as discussed for the control point monitoring for primary centers, it can be shown the secondary centers have the ability to monitor 1,440 individuals within a 12-hour period. Therefore, the Manchester secondary center, which serves as the monitoring and

decontamination center for the emergency workers, can provide monitoring services for the anticipated 1,300 emergency workers. App. Dir. No. 4, Post Tr. 4740 at 17.

5.1.53. The personnel assigned to the position of interior monitoring are responsible for monitoring individuals after they shower. The staffing level of six would provide the capability to re-monitor approximately 1,440 individuals in a 12-hour period. App. Dir. No. 4, Post Tr. 4740 at 17.

5.1.54. Considering one monitor is able to survey a vehicle every minute (which equates to 720 vehicles in a 12 hour period) the staffing level of 11 monitors provides a capability of surveying 7,920 vehicles in a 12-hour period. This far exceeds the anticipated number of expected vehicle arrivals at each center including Manchester where an additional 1,300 vehicles are anticipated due to emergency worker arrivals. App. Dir. No. 4, Post Tr. 4740 at 17-18. In fact the staffing allows the capability to monitor more than twice the number of anticipated vehicles, allowing relief for the individual monitors. Tr. 4896.

5.1.55. DPHS will provide personnel to staff the 24 decontamination administrative positions in the four host communities. The Revision 2 of the NHRERP does not reflect current DPHS decontamination administrative staffing. Currently 18 individuals are identified to fill these positions. However, there are only 15 Decontamination Administrative positions required within the four primary centers and the secondary center

in Manchester. As operation of these centers provides sufficient capability to provide monitoring and decontamination services in excess of the anticipated demand, there is sufficient DPHS staff to support the planned host community response. DPHS will continue its efforts to identify individuals to staff the remaining six positions. App. Dir. No. 4, Post Tr. 4740 at 17-18.

5.1.56. Based on arrangements with fire officials of the four host community departments, a total of 328 fire personnel will be available to respond to an emergency. The Office of Emergency Management has initiated a training program in monitoring and decontamination operations. Training has been provided to date to 162 personnel of host community fire departments. This training is ongoing and will continue to be provided regularly to ensure that sufficient personnel are trained to meet the requirements for maximum staffing of these operations. App. Dir. No. 4, Post Tr. 4740 at 18-19.

5.1.57. To provide additional support to host town resources, fire departments from nearby communities that could or do provide mutual aid fire services to host towns have indicated that they will provide personnel to support monitoring and decontamination operations. These departments provide a pool of approximately 271 fire personnel who will be available to support host community fire departments. App. Dir. No. 4, Post Tr. 4740 at 19.

5.1.58. The chart below lists the primary monitoring and decontamination center fire personnel needs and the fire personnel available for all four host communities.

	<u>Host Fire Department Available</u>	<u>Other Community Fire Departments Available</u>	<u>Total Available</u>	<u>Planned Primary Center Staffing</u>	<u>Planned Secondary Center Staffing</u>
Dover	37	88	125	66	20
Salem	47	68	115	66	20
Roch.	68	32	100	66	20
Manch.	176	83	259	66	20
Totals	328	271	599	264	80

App. Dir. No. 4, Post Tr. 4740 at 20.

5.1.59. While operation of the secondary decontamination center in conjunction with the primary center would require an additional 20 fire personnel plus three DPHS staff, it is not required to meet the planning basis and, except in the case of Manchester where it serves as an emergency worker decontamination facility, is for back-up use only. If the staffing for secondary operation is factored into the total need, the four host communities require an additional 80 personnel (exclusive of DPHS supervisors). The resulting total staffing need of 344 (86 per host community) continues to be less than total available staff. App. Dir. No. 4, Post Tr. 4740 at 20.

5.1.60. The chart shown below reflects the number of showers available at the primary and secondary decontamination center for each host community and the hourly shower capacity for each facility.

Host Community Showers

<u>Host Community</u>	<u>Primary Center Showers</u>	<u>Capacity Per Hour</u>	<u>Secondary Center Showers</u>	<u>Capacity Per Hour</u>	<u>Totals Showers</u>	<u>Capacity Per Hour</u>
Rochester	28	168	24	144	52	312
Salem	29	174	25	150	54	324
Dover	40	240	34	204	74	444
Manchester	25	150	31	186	56	336

App. Dir. No. 4, Post Tr. 4740 at 21.

5.1.61. The planning basis for equipment is that there be sufficient equipment to monitor 9,840 evacuees and 1,440 emergency workers and decontaminate those workers and selected equipment; the equipment will be stored at designated areas and maintained by the Fire Chief or his designee. App. Dir. No. 4, Post Tr. 4740 at 21-22.

5.1.62. The principal item of equipment required for monitoring operations is the CDV-700 survey meter. This instrument is to be used by monitoring personnel to screen vehicles and persons for potential contaminants. A total of 70 of these instruments is required to equip all of the described monitoring positions in both the primary and secondary monitoring and decontamination centers for each host community. A total of 80 of these instruments will be acquired and maintained in each host community, specifically for these monitoring positions. This provides greater than 10 percent surplus to allow for

possible equipment failure. App. Dir. No. 4, Post Tr. 4740 at 22.

5.1.63. These instruments will be subject to the same inventory and operational verification schedule prescribed for all radiological equipment by the NHRERP, Volume 1, Section 2.4.5. These will be added to the equipment list in Appendix C of Volume 2 of NHRERP, Rev. 2. App. Dir. No. 4, Post Tr. 4740 at 22 as corrected Tr. 5084-85.

5.1.64. Based upon the foregoing, the Board finds that there is reasonable assurance that the four primary centers in conjunction with the secondary center in Manchester will be able to provide registration and monitoring services to anticipated personnel and vehicle arrivals at each center. App. Dir. No. 4, Post Tr. 4740 at 22 and attach. 3.

5.1.65. SAPL's witness, Dr. Herzberg, also filed supplemental testimony in which he stated that he still had concerns about the decontamination portions of the plan even after the filing of the Applicants' direct testimony with reference to this matter. Post Tr. 5012.

5.1.66. Dr. Herzberg is hardly an independent expert. Tr. 5014-18.

5.1.67. Dr. Herzberg admitted that he had not really studied the Applicants' testimony as of the time he filed his supplemental testimony. Tr. 5027. And his supplemental testimony is really in the nature of comments as to possibilities.

5.1.68. The procedures and equipment list for the sampling of waste water from the washing of evacuees and their vehicles are contained in the NHRERP Volume 4A, Appendix F10. The purpose of Appendix F10, Environmental Monitoring in the Host Community, is to verify that the discharge water from the decontamination centers does not exceed values for permissible concentrations identified in the New Hampshire Rules for Control of Radiation. App. Dir. No. 4, Post Tr. 4740 at 23.

5.1.69. The current procedures of the NHRERP establish that State personnel will provide the resources to accomplish environmental sampling. App. Dir. No. 4, Post Tr. 4740 at 23.

5.1.70. The responsibility for environmental sampling will be under the control of the Division of Public Health Services. The Water Supply and Pollution Control Division of the Department of Environmental Services will assist in collecting samples. The Field Monitoring Procedures contained in the NHRERP, Volume 4A, Appendix C will refer to Volume 4A, Appendix F8, Section D to reflect monitoring and sampling of host community decontamination center discharge water as part of the Special Environmental Sampling Procedures. App. Dir. No. 4, Post Tr. 4740 at 23.

5.1.71. Water Supply and Pollution Control maintains a roster of a minimum of 11 persons available to support special environmental sampling. App. Dir. No. 4, Post Tr. 4740 at 24 Actual sampling is something those individuals do on a daily basis. Tr. 4906.

5.1.72. The equipment required for this purpose has been identified App. Dir. No. 4, Post Tr. 4740 at Attach. 4. This equipment is in the process of being acquired, and it will be maintained by DPHS. Id. at 24.

5.1.73. The Board finds that there are in place sufficient procedures, personnel and equipment so as to provide reasonable assurance that waste water from the decontamination facilities can and will be disposed of in a manner that does not endanger the public health and safety. App. Dir. No. 4, Post Tr. 4740 at 23-24.

5.1.74. Decontamination center close-down procedures are contained in Appendix F. Volume 4A and Appendix B of Host Community RERPs address shutdown and removal of contaminated material and contaminated waste. Contaminated waste will be disposed of by the State through established contractual procedures with qualified radioactive waste handlers, and in conformance with rules promulgated by the DPHS Radiological Health Program for control of radiation. Contaminated materials will be handled by New Hampshire Yankee according to the provisions of the letter from George S. Thomas, Vice-President for Nuclear Production, dated May 1, 1986, included in NHRERP, Volume 5. App. Dir. No. 4, Post Tr. 4740 at 25.

5.1.75. Based upon the foregoing, the Board finds that adequate provisions have been made for the disposal of solid waste from the decontamination centers. App. Dir. No. 4, Post Tr. 4740 at 25.

5.2. Rulings of Law

5.2.1. Any rebuttable presumption that provisions for reception centers were in any way inadequate arising from the FEMA testimony, Post Tr. 5091, has been overcome by the evidence adduced at the hearing. See Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), ALAB-698, 16 NRC 1290, 1298 (1982).

5.3. Conclusions

5.3.1. The Board finds and rules that there is reasonable assurance that adequate reception centers for the purpose of registration, monitoring and decontamination can and will be made available in the event of a radiological emergency at Seabrook Station.

6. EVACUATION TIME ESTIMATES

6.1. Findings of Fact

6.1.1. A number of contentions admitted for litigation in this proceeding raise issues as to the efficacy of the Evacuation Time Estimate (ETE) which has been done for Seabrook Station. See summary of contentions and bases set out in App. Dir. No. 7, Post Tr. 5622 at 1-11.

6.1.2. A number of the issues raised have to do with the subject of human behavior in an emergency situation and will be treated in a separate section of this Initial Decision. See Proposed Findings No. 7 et seq., infra.

6.1.3. The Applicants' panel of witnesses for their direct case on this subject consisted of Messrs. Callendrello and

Frechette, described earlier, joined by Gordon Derman, President of Avis Air Map Company (Qualifications, Post Tr. 5260), Edward B. Lieberman, of KLD Associates (Qualifications, Post Tr. 5617), who calculated the ETEs, and Dennis S. Miletì, Ph.D., Professor of Sociology and Director of the Hazards Assessment Laboratory at Colorado State University (Qualifications, Post Tr. 5619).

6.1.4. Mr. Lieberman is a recognized authority in the field of ETE development and was, until the change of position on Seabrook by the Governor of the Commonwealth of Massachusetts, the expert of choice of the Commonwealth which, inter alia, technically reviewed Mr. Lieberman's methodology and found it acceptable. Tr. 6781-87.

6.1.5. The Board finds that the panel members individually and as a whole were competent to testify on the subjects addressed.

6.1.6. In addition, rebuttal testimony was presented by the Applicants with respect to certain surveys presented by witnesses for Mass. AG, App. Reb. No. 3, Post Tr. 9154; App. Reb. No. 4, Post Tr. 9155, by a panel including Dr. Miletì and Bruce David Spencer, Ph.D., Director of Methodology Research Center NORC, University of Chicago and Associate Professor of Statistics and Education at Northwestern University (Qualifications, Post Tr. 9154 [Post App. Reb. No. 3]).

6.1.7. The Board finds that Dr. Spencer and Dr. Miletì were competent and qualified to testify as to the subjects they addressed.

6.1.8. In NHRERP a number of ETEs for various scenarios were presented. App. Ex. 5, Vol. 6, §10.

6.1.9. These estimates were made by using a computer model known as IDYNEV. App. Ex. 5, Vol. 6 at p. 10-1.

6.1.10. In direct testimony presented during the hearings, the Applicants presented updated ETEs, also made through the use of IDYNEV, but which took into account, inter alia, information obtained from more recent aerial surveys which affected population estimates and vehicle estimates, new ramp capacity assumptions set out in the 1985 Highway Capacity Manual, an assumption of a larger voluntary or "shadow" evacuation in areas within and beyond the EPZ, a more detailed representation of through traffic along the interstate highways and three additional analysis regions. App. Dir. No. 7, Post Tr. 5622, passim, and particularly at 42-43.

6.1.11. During the course of the hearing, additional ETEs were generated and a matrix showing ETEs for the various regions (i.e., areas of evacuation) and scenarios (i.e., weather conditions, day of week, time of day, and season) are set out in the record. Staff Ex. 1, Post Tr. 6742.

6.1.12. These ETEs are expressed in time from the Order to Evacuate (OTE) and do not include the times between notification or an order for "beach closure" and the OTE; this was done because beach closure may precede an OTE by hours and possibly days in a given situation. App. Dir. No. 7, Post Tr. 5622 at 77; Tr. 6751-53.

6.1.13. The effect on the various ETEs was a decrease of fifteen minutes to an increase of ninety-five minutes depending upon the scenario and region being considered. Compare App. Dir. No. 7, Post Tr. 5622 at 42-43, with App. Ex. 5, Vol. 6 at pp. 10-6-10-10.

6.1.14. While a panel of SAPL witnesses presented certain testimony as to traffic conditions to be found in the beach area on a summer weekend day, Fallon et al. Reb., Post Tr. 8608, passim, the major portion of the intervenors' case with respect to the ETE issue was presented by Mass. AG.

6.1.15. Among the witnesses presented by Mass. AG was Avishai Ceder, Ph.D., Visiting Associate Professor at the Massachusetts Institute of Technology on the Faculty of Civil Engineering. Ceder Dir., Post Tr. 5169, passim & attach. 1, Post Tr. 5185 at 1.

6.1.16. The thrust of Dr. Ceder's testimony was to examine, and offer criticisms of, the IDYNEV Model. Ceder Dir., Post Tr. 5169 at 6.

6.1.17. It should be noted that in doing his analysis, Dr. Ceder did not avail himself of access to the IDYNEV Model itself; indeed, it was his position that such access was apparently unnecessary. Ceder Dir., Post Tr. 5169 at 8.

6.1.18. Dr. Ceder's first criticism of the model is that it "assumes that all right turning vehicles will select the outside lane and all left turning vehicles the inside lane." It is Dr. Ceder's view that "under congested conditions some

vehicles will be switching lanes prior to making turns and will encounter some difficulty in doing so," and this should be accounted for in the model. Ceder Dir., Post Tr. 5169 at 12. However, Dr. Ceder admitted that there existed no good model at this time to deal with this problem. Tr. 5256-57.

6.1.19. In any event, there is nothing in the IDYNEV Model to prevent the drivers from switching lanes prior to actually getting to the intersection, Tr. 5255, and it would seem reasonable to assume they do so; indeed, it is doubtful that it would be reasonable to assume the contrary, i.e., that any driver would attempt any turn from any lane.

6.1.20. Dr. Ceder next levels a criticism at the model's supposed assumption that "every motorist will select the optimal routing which minimizes evacuee travel times." With respect to this, Dr. Ceder notes his view that "the actual routing and traffic flow in each route will never follow entirely the so-called 'optimal' strategy, and consequently, the actual travel times will be higher than those calculated in the model." Ceder Dir., Post Tr. 5169 at 12-13. However, on cross-examination, he stated that there was only the "potential" for an increase in the ETE, Tr. 5274-75, and there is at least one demonstration in the record that such a happening will decrease the ETE, App. Dir. No. 7, Post Tr. 5622 at 46-47.

6.1.21. IDYNEV does not seek to optimize the good of the system as a whole; rather, the assumption was that each driver would seek to optimize his or her own goal. App. Ex. 5,

Vol. 6, App. B at B-1; Tr. 5261-62. And the assumption is that the driver will perceive his or her interest as getting as far away from the scene of the accident as soon as possible. Tr. 5272, 5273.

6.1.22. In addition, the model is programmed to override route assignments so that when vehicles encounter a filled link it will divert to other not completely filled links. In IDYNEV, vehicles which cannot travel along their assigned evacuation route due to excessive congestion will divert to another, alternative evacuation route if the latter is not congested. App. Ex. 5, Vol. 6, App. C at C-5; Tr. 5263; 5674; 5678-79.

6.1.23. Dr. Ceder criticizes the model for assuming that "spillback" conditions are properly treated. Ceder Dir., Post Tr. 5169 at 13.

6.1.24. Dr. Ceder was simply in error in this criticism. He apparently assumed that IDYNEV had the same limitation as another model he referenced, but in fact IDYNEV and its submodels do explicitly treat the "spillback" phenomenon and have been validated in a setting involving recurring "spillback." Tr. 5276-86; App. Ex. 15, Post Tr. 5292; App. Ex. 16, Post Tr. 5292 at 9.

6.1.25. Dr. Ceder criticizes the use of an input into the model which assumes drivers in a left lane of traffic on Rte 110 at the I-95 intersection can make a turn of 130 degrees and cross a raised median divider. Ceder Dir., Post Tr. 5169 at 14-

15. TOA witness Lord joins in the criticism of this assumption. Lord Dir., Post Tr. 8180 at 5-6.

6.1.26. However, the Applicants point out that assuming the turn described becomes unmanageable, the left lane traffic can instead be routed to the next exit on the road of concern and there exit to Route I-495, a major interstate highway. Tr. 5740-41. and see Tr. 5290. In fact the Applicants have run a simulation that assumes that the suggested turn and route are closed and instead the traffic proceeds to the next exit, and the ETE is unaffected. Tr. 5741, 6696.

6.1.27. Dr. Ceder objects to the use of the exponential gap modeling for certain limited purposes. Ceder Dir., Post Tr. 5169 at 16. Yet one of his own references clearly states ". . . free-flowing vehicular headway distributions may be approximated by the negative exponential distribution. . . ," and this is precisely the purpose for which the negative exponential is used in IDYNEV. Tr. 5293-5310; App. Exs. 17-19, Post Tr. 5311.

6.1.28. Dr. Ceder criticizes the reduction factor of 0.85 x capacity for congested flow used in the model. Ceder Dir., Post Tr. 5169 at 16-19.

6.1.29. This criticism is based entirely upon work done by Dr. Ceder and is at odds with the 1985 Highway Capacity Manual. App. Dir. No. 7, Post Tr. 5622 at 61. In addition it is to be noted that one of Dr. Ceder's own studies shows a capacity under forced flow conditions of 1,800 vehicles per hour with a maximum flow, i.e., capacity, under free-flow conditions of 2,000

vehicles per hour yielding a reduction factor of 0.9 essentially identical to that used in IDYNEV. Ceder Dir., Post Tr. 5169, attach 4, Fig 2. See also Tr. 5315-27; App. Ex. 20, Post Tr. 5347.

6.1.30. Dr. Ceder criticized the use of a discharge headway in the model of 2.4 sec/veh and suggested the substitution of a figure of 2.7 sec/veh. Ceder Dir., Post Tr. 5169 at 19.

6.1.31. Dr. Ceder's sole citation of authority for his opinion was a book entitled Traffic Analysis and Design by R. J. Salter. Ceder Dir., Post Tr. 5169 at 19. He claimed that Salter had found saturation discharge headways "for an observed 80 vehicles . . . to be 2.63 sec/veh." Id. When first asked, on November 5, 1987, on cross-examination, where he got that figure from the Salter text, he could not find or calculate it even after having a certain chapter of the book pointed out to him and three times denying that it was the relevant portion, Tr. 5334-37, 5348. The next day he returned to the witness stand, admitted that the portion of the book he had been directed to, App. Ex. 24, Post Tr. 5467, was the correct one, Tr. 5444, 5447, admitted the 2.63 figure was wrong, Tr. 5444-45, and changed it to 2.56, Tr. 5445, 5447. On further cross-examination, he stated that the "80" vehicles should be "226," Tr. 5453, admitted he had again done the calculation wrongly, stated that the headway figure should be 2.53, Tr. 5456, and, finally, admitted that when one put the Salter figures into passenger car equivalents, the

correct number was 2.16, Tr. 5465. The Board specifically rejects Dr. Ceder's 2.7 discharge headway figure.

6.1.32. Dr. Ceder next criticized the model for utilizing flow rates for two-lane roads based upon Level of Service (LOS) E from the HCM and suggests the use of LOS-F (as he defines it) instead. Ceder Dir., Post Tr. 5169 at 20.

6.1.33. The use of the LOS-E values was to reflect capacity of the links in undersaturated conditions only. See App. Ex. 5, Vol. 6 at p. 3-11. Finally, the Board notes that Dr. Ceder's definition of LOS-F nowhere appears in the HCM. App. Exs. 13, 14, Post Tr. 5225; Post Tr. 5214-25.

6.1.34. Dr. Ceder objects to the use of the "BPR Formula" for estimating travel time as a function of volume. Ceder Dir., Post Tr. 5169 at 20-21. However, the BPR Formula is used extensively elsewhere. App. Reb. No. 1, Post Tr. 8852 at 1.

6.1.35. Dr. Ceder raises a concern as to whether certain experimental data upon which the calibration of certain parameters is based is representative of traffic flow characteristics around Seabrook Station. Ceder Dir., Post Tr. 5169 at 21.

6.1.36. Use of the referenced values is justified by extensive calibrations done elsewhere which have generated a history of values in a tight range which show that the values are not location sensitive; furthermore, a sensitivity run has demonstrated that the calculated ETEs are not sensitive to these parameters. App. Reb. No. 1, Post Tr. 8852 at 2.

6.1.37. Dr. Ceder observed that in one of the sources he studied there appeared to be an assumption that "all links have the same values of capacity, length, and free-flow travel times," an assumption he believes to be inappropriate. Ceder Dir., Post Tr. 5169 at 21. This is not correct because IDYNEV does not make any such assumption. App. Ex. 5, Vol. 6 App. C at C-6.

6.1.38. The classification of roads within the EPZ was accompanied by way of capacity estimations based on physical surveys. App. Dir. No. 7, Post Tr. 5622 at 65. The measurements that were taken in the field were taken at representative sections; it is neither practical nor feasible to take width measurements at closely-spaced intervals along the highway. Id. at 64.

6.1.39. Dr. Ceder takes issue with the judgment made not to make certain refinements to the model which may affect the ETE. Ceder Dir., Post Tr. 5169 at 21. The Board finds that such refinements are unnecessary to calculate realistic ETES.

6.1.40. Next Dr. Ceder criticizes the ETE study on the basis that the study as set forth in App. Ex. 5, Vol. 6, does not contain an analysis of the effect of a single accident, that the probability of a serious multivehicle accident in one particular 2.65 mile segment was close to 100% (i.e. almost assured) during an evacuation and that travel in the EPZ should be equated to travel in a construction zone where accidents are more likely. Ceder Dir., Post Tr. 5169 at 22-29. The work zone analogy is

strained to say the least. Tr. 5338-45; App. Ex. 21, Post Tr. 5347. Acceptance of the 100% probability of a multivehicle accident described above requires the Board to accept the concept that there is a 100% chance of a serious multivehicle accident (i.e. death or personal injury involved), on a particular 2.65 mile stretch of four lane road when a flow of traffic is 2000 vehicles per hour for five and one half hours at 10 M.P.H. Dr. Ceder's attempt to explain why such an intuitively unlikely concept represents reality was wholly unconvincing, involved use of data of questionable relevance to the road at issue, questionable use of the data, even assuming its relevancy to the situation at Seabrook, and finally seemed not to be borne out by certain of the data used even accepting it as accurate and properly used. Tr. 5350-87; Tr. 5514-21; App. Exs. 22, 23, Post Tr. 5391. The Board specifically rejects these aspects of the Ceder testimony as well as the Adler rebuttal testimony, Adler Reb., Post Tr. 9524 at 18, based upon it.

6.1.41. In the event that vehicles are incapacitated on the highways, the NHCDA has entered into LOAs with multiple tow truck operators located, for the most part, along the periphery of the 10-mile EPZ. A number of these tow truck operators are located within approximately 1-3 miles of the "pre-staged" locations suggested in Table 12-1 of NHRERP, Volume 6. App. Dir. No. 7, Post Tr. 5622, Attachment 2. In lieu of tow truck "pre-staging," the NHCDA has elected to utilize routine, existing procedures for activating these vehicles, i.e., through the NH

State Police Dispatcher, to facilitate mobilization of these services. Note also that once activated, tow vehicles equipped with radio dispatch will enable the drivers to move from one incident directly to the next. App. Dir. No. 7, Post Tr. 5622 at 62.

6.1.42. A series of sensitivity tests were undertaken to quantify the effect on ETE of highway impediments which extend over substantial periods of time. Four runs were executed for each series; each run simulated the effect of 10 accidents of varying durations occurring on different randomly-selected high volume evacuation roadway links within the EPZ. All cases assumed that these accidents impede evacuation traffic and considered the case study, Region 1, Scenario 1, as reported in the ETE (the evacuation of the entire EPZ). Results of these sensitivity tests, which were conducted prior to the incorporation of the August, 1987 beach data, are shown below:

<u>Series</u>	<u>Scenario</u>	<u>Duration of Impedances</u>	<u>Range of Increase in ETE over 4 runs</u>
1	1	1 to 2 hours	0-10 minutes
2	5	1 to 2 hours	15-20 minutes
3	1	2 to 3 hours	30-60 minutes
4	5	2 to 3 hours	15-40 minutes

App. Dir. No. 7, Post Tr. 5622 at 62-63.

6.1.43. Ten accidents were simulated in each run since this number represents the anticipated number of accidents from defined statistics, based on the vehicle miles of travel expended

during the evacuation. These data indicate that if impedances are removed by tow vehicles in a timely manner, one can expect a small effect on ETE. If the responses are less timely, then more pronounced extension of ETE will occur. Note that the ETE is not extended the same amount as the longest impediment since traffic is free to redistribute on alternative outbound routes, if one route in the area is experiencing some loss of capacity. App. Dir. No. 7, Post Tr. 5622 at 63.

6.1.44. Even in the event that tow vehicles are not immediately available, the public is not helpless in emergencies as would be suggested by the thesis underlying "myths" about emergency behavior. In fact, the public is an actual resource in emergencies. The public often gives rise to "emergent work groups" in emergencies which form temporarily and on the spot to do what needs to be done (such as pushing evacuation impediments, like disabled cars, out of the way). App. Dir. No. 7, Post Tr. 5622 at 63-64, 105.

6.1.45. The authoritative publication "Accident Facts" (1986 ed) published by the National Safety Council show statistics derived from the total national experience including travel at high speeds which give rise to a calculation that 10.9 accidents of all kinds per million vehicle miles will occur. Tr. 6787-88.

6.1.46. It must be kept in mind that a mere "fender-bender" will not slow up evacuation because the car will not be disabled. App. Ex. 5, Vol. 6 at p. 12-3; no large scale

evacuation as yet has been affected by accident problems. Tr. 7489-90.

6.1.47. An evacuation of the Seabrook EPZ would involve approximately one million vehicle miles of travel in the EPZ during the evacuation time. Tr. 6788.

6.1.48. In actual fact there have been no reported fatal accidents in over 100 million person miles (about 40 million vehicle miles) of experience in the United States with actual evacuations. Tr. 6788-90.

6.1.49. With respect to the comparison of travel in the EPZ to travel in a work zone, it should be noted that most accidents there are due to driver distraction from construction activities and lane closures which will not be involved in evacuation. Tr. 6792.

6.1.50. ETEs typically recognize that these rare events (relative to the number of vehicles) are handled through the assignment of planned resources as they are needed in an actual emergency. That is to say, by identifying the necessary resources in the emergency plan to handle contingencies such as breakdowns, the impact of these events is minimal, if not negligible. A vehicle blockage would only affect the evacuation time if it occurred at the controlling location of the evacuation route, and then only for the time it took to remove the vehicle. The impact on evacuation times is, at most, the time required for an emergency vehicle to respond and remove the disabled vehicle,

and, in most cases, there is no impact. Urbanik Dir., Post Tr. 7372 at 8.

6.1.51. Finally Dr. Ceder offers some comments as to why IDYNEV is not "state of the art." Ceder Dir., Post Tr. 5169 at 29-31.

6.1.52. However, Dr. Ceder could give no example of a model which would have been reasonably available in the proper time frame for a Seabrook ETE which is better than IDYNEV. Tr. 5388-90.

6.1.53. The Board finds that the IDYNEV model is conceptually sound and suitable for the purpose of generating an ETE for the EPZ of a nuclear power plant. See also Mass. AG Ex. 10 at 1; Tr. 7440-42.

6.1.54. Also among the witnesses who testified with respect to the ETE issue was Dr. Albert E. Luloff, Associate Professor of Rural Sociology and Community Development and Community Development Program Coordinator in the Department of Resource Economics and Community Development at the University of New Hampshire. Luloff Dir., Post Tr. 8203 at 1.

6.1.55. Dr. Luloff finds fault with the growth rates used in estimating 1986 permanent population estimates. Luloff Supp. Dir., Post Tr. 8211 at 4.

6.1.56. The New Hampshire Office of State Planning (NHOSP) 1986 population estimates for the New Hampshire EPZ Towns, dated August 1987, compare well overall with the estimated figures used in Volume 6 of NHRERP. In fact, the ETE differs by

a total of 1,982 persons in excess of NHOSP estimates. App. Dir. No. 7, Post Tr. 5622 at 39 and Attach. 1.

6.1.57. The number of employees who work at the beach area during the summer is estimated to be 25% of the total number of employees in Hampton. App. Dir. No. 7, Post Tr. 5622 at 21. This percentage is based upon the seasonal employment picture shown in Table 5-2 of NHRERP Vol. 6. Id. at 22. A sensitivity study which analyzes any uncertainty in this estimate demonstrates minuscule effect on the ETE. Id.

6.1.58. Dr. Luloff also addressed the issue of whether the inputs used in the ETE regarding campgrounds and overnight accommodations were reliable. Luloff Dir., Post Tr. 8203 at 8-9 & attach. 3.

6.1.59. NHRERP contains a discussion regarding the estimates of Seasonal Housing Residents and Overnight Accommodations. App. Ex. 5, Vol. 6 at pp. 2-14, 2-17. NRC figures as prepared by Kaltman in 1981, were used as baseline information sources in the preparation of these two population estimates, as they were the most up-to-date figures available at the time of ETE development. However, it is necessary to estimate the number of vehicles in the EPZ belonging to transients at overnight accommodations which are not at the beach when the beaches are most crowded. The figures provided by the NRC via the Kaltman Report are therefore used with the following exceptions:

1. In order to avoid double counting, those vehicles at the beach which originated at seasonal housing away from the beach were excluded from the count of inland tourists, as these vehicles are included in the count of beach vehicles.

2. Discussions with managers of tourist facilities indicated an estimated 74% of visitors at off-beach facilities travel to the beach and park their vehicles there during mid-day weekend conditions. A factor of 50% was adopted by the ETE, i.e., that half of the tourists lodging at inland facilities will drive to the beach on a sunny day with the other half remaining within the EPZ but not at the beach. App. Dir. No. 7, Post Tr. 5622 at 24-25,

6.1.60. The aerial photographs are the basis for the input into IDYNEV of the number of vehicles along the beaches, while the NRC data in the Kaltman Report, together with a survey which established the 74% figure above, provides the basis for estimating the number of tourists lodged at inland facilities that are not at the beach. App. Dir. No. 7, Post Tr. 5622 at 25.

6.1.61. Estimates of vehicles associated with overnight accommodations, i.e., hotels, motels and guest houses, considered the same exceptions as noted for seasonal housing residents, as well as the following:

1. Arrival times at many overnight accommodations will be after 2:00 p.m. after the beach population has dropped below peak;

2. Departure times are usually before peak population conditions at the beach;

3. Many, if not most, patrons remaining for several days will leave the facility to go to the beach, or shopping or go to some recreational attraction;

4. The number of vehicles per housing unit may be less than one as: (a) family/friends arriving in one car may occupy more than one unit, and (b) bus travelers will occupy many units. App. Dir. No. 7, Post Tr. 5622 at 25-26.

6.1.62. Several larger motels indicated they set aside blocks of rooms on weekends for tour buses, at a rate of 20 units per bus. Estimates ranged from 5 to 40% with regard to those guests utilizing more than one unit per car; thus, an estimate of 0.85 vehicles per unit was adopted. App. Dir. No. 7, Post Tr. 5622 at 26.

6.1.63. NHRERP Rev. 2 discusses the manner in which vehicles at campgrounds within the EPZ were estimated. App. Ex. 5, Vol. 6 at p. 2-20. Again, the NRC base data was considered, with the exception that double-counting was avoided as with overnight accommodations; also, campground operators estimated that 75% of campground sites are unoccupied during peak beach hours. App. Dir. No. 7, Post Tr. 5622 at 26.

6.1.64. It is noted that NRC's figures used in Volume 6 estimated a total of 1,903 vehicles at New Hampshire EPZ campgrounds. App. Ex. 5, Vol. 6 at p. 2-21, Fig. 2-8; App. Dir. No. 7, Post Tr. 5622 at 26. The estimated number of vehicles

remaining at New Hampshire campgrounds during peak beach population hours totals about 476 vehicles. This number compares with an estimate of 734 vehicles using the NHCDA maximum campground capacity estimates of 2,938 vehicles. App. Dir. No. 7, Post Tr. 5622 at 26.

6.1.65. Dr. Luloff estimates the maximum to be 2,728. Luloff Dir., Post Tr. 8203 , Attach. 3, Post Tr. 8208, Ex. 3.1 at p. 1.

6.1.66. The Board does not deem these differences to be significant for any purpose in analyzing the efficacy of the ETE.

6.1.67. With respect to overnight accommodations, Dr. Luloff's study revealed a total of 5,076 rooms in the New Hampshire portion of the EPZ, Luloff Dir., Post Tr. 8203 attach 3, Post Tr. 8208, Ex. 3.2 at p.1, as opposed to the estimate of 4,247 which appears in NHRERP Rev. 2. App. Ex. 5, Vol. 6, fig. 2-6 at p. 2-18; id. at p.E-10. Over and above this number, an additional 1000 tourist vehicles were attributed to Portsmouth. App. Ex. 5, Vol. 6 at p. 2-27.

6.1.68. KLD completed an on-foot survey which recorded 2.6 vehicles per dwelling at seasonal housing units and did not depend solely on the NRC estimate of 2.5 vehicles per dwelling. App. Dir. No. 7, Post Tr. 5622 at 25.

6.1.69. Again the Board does not find these differences significant in the context of evaluating the ETE as a whole.

6.1.70. The remainder of Dr. Luloff's testimony, Luloff Dir., Post Tr. 8203 at 9-15 and attach 4, Post Tr. 8208 deals

with a survey which is pertinent to the questions of human behavior which are dealt with infra.

6.1.71. Mass. AG also presented a panel of witnesses on the subject of beach population estimates. High et al. Dir., Post Tr. 6849, passim. This panel consisted of Colin High, Ph.D., a principal of Resource Systems Group, Inc. and also Associate Professor of Engineering and Environmental Studies at Dartmouth College, High et al. Dir., Post Tr. 6849 at 1, William Befort, Ph.D., an assistant professor at the University of New Hampshire, id. at 2 (both Drs. High and Befort have training and experience in the field of aerial photography and its interpretation, id. at 1-2), and Thomas Adler, Ph.D., another principal of Resource Systems Group, Inc., with a background in transportation systems analysis, engineering, planning and computer modeling, id. at 3.

6.1.72. The thrust of the testimony presented by High et al. was that NHRERP Rev. 2 seriously underestimated the beach population at Seabrook. High et al. Dir., Post Tr. 6849, passim.

6.1.73. It was the position of High et al. that as a result of studies they had made of certain aerial photographs, "a reasonable estimate of the number of available parking spaces is 38,825, a 52½ increase in the number of motor vehicles and therefore, population over [that used in NHRERP Rev. 2]." High et al. Dir., Post Tr. 6849 at 5.

6.1.74. Dr. Befort made counts of vehicles from three

different sets of aerial photographs. High et al. Dir., Post Tr. 6849 at 10-14.

6.1.75. The first of these was a count from a set of photographs taken on August 11, 1985. Dr. Befort's examination of these photographs revealed a total of 20,127 vehicles of which 19,010 were parked. High et al. Dir., Post Tr. 6849 at 11.

6.1.76. Applicants' experts had also counted cars from this same set of photographs and found a total of 18,220 parked vehicles. App. Ex. 5, Vol. 6 at p. E-5; High et al. Dir., Post Tr. 6849 at 11.

6.1.77. Dr. Befort accounts for the discrepancy between his figure of 19,010 parked cars and KLD's figure of 18,220 as follows: the KLD count did "not include the Newburyport¹ part of the flight where [Dr. Befort] counted 1,165 parked vehicles;" Dr. Befort goes on to point out that if those are subtracted from his count of parked cars, his total for parked cars would be 17,845 or 375 fewer than KLD's count used in NHRERP Rev. 2; Dr. Befort goes on to say that this discrepancy of about 2% "is to be expected in a count of this kind." High et al. Dir., Post Tr. 6849 at 11.

6.1.78. As Dr. Befort points out, High et al. Dir., Post Tr. 6849 at 11, and Applicants do not contest, the August 11, 1985 series of photographs had gaps in them, although "most were in areas where only small numbers of vehicles were likely to be found." High et al. Dir., Post Tr. 6849 at 11.

6.1.79. Dr. Befort also had two other sets of photographs each of which sets provided complete coverage of the beach area and were taken on flights made July 5, 1987 between 3:30 and 4:45 P.M. and on July 19, 1987 between 1:40 and 2:40 P.M.; on both days the temperature was 80 degrees F.; there were scattered clouds; and July 19 was slightly hazy and more humid than July 5, 1987. High et al. Dir., Post Tr. 6849 at 12.

6.1.80. In using the July 5, 1987 photographs, Dr. Befort counted a total of 24,309 parked cars; using the July 19 photos, the result was 25,451 parked cars. High et al. Dir., Post Tr. 6849 at 13. Dr. Befort also testified that for various reasons and based on certain other photographs, it was doubtful that either of these counts represented the peak because the July 5, 1987 photographs were shot after the peak hour and there is evidence that the July 5, 1987 peak was higher than the actual peak on July 19. High et al. Dir., Post Tr. 6849 at 13-15, 21.

6.1.81. Applicants also had an additional set of aerial photographs taken on July 18, 1987, a sunny warm day in the mid-80s, between 12:00 M. and 1:20 P.M. App. Dir. No. 7, Post Tr. 5622 at 27-31. It was a representative peak day. Tr. 6075, 6083-84.

6.1.82. This July 18, 1987 set of photographs revealed a parked car count of 26,850. App. Dir. No. 7, Post Tr. 5622 at 38. Those doing the count were under instructions to err, if at all, on the high side. Tr. 5909.

6.1.83. The Applicants did not include vehicles in transit on the roads in the count as a device to account for possible double counting of residents at the beach, to account for the fact that many cars already moving on the roads would "beat the evacuation wave" in any event, and to account for the fact that some parked cars would not be used in the evacuation in any event. Tr. 6117-20. Staff witness Urbanik stated that he would include those cars which were in transit on the roads in a count. Tr. 7374.

6.1.84. To account for the fact that the July 18, 1987 photographs all were shot at various times before the usual peak hour of 2:00 P.M., the Applicants' experts made adjustments to each of the photographs' data to account for this fact. App. Dir. No. 7, Post Tr. 5622 at 30-38. These projections were validated by counting cars on a set of photographs taken closer to 2:00 P.M. (the so-called "Flight 0" photographs) and comparing the results with the projections; excellent agreement resulted. Tr. 6117.

6.1.85. As a result, Applicants estimate the peak parked car number to be 29,293, and used that figure as one of the inputs for the latest IDYNEV runs referred to earlier. App. Dir. No. 7, Post Tr. 5622 at 38.

6.1.86. The three 1987 sets of photographs are in good agreement showing actual numbers of parked cars ranging from 24,309 on July 5, 1987 to 26,850 on July 18, 1987. Tr. 6994, 7385. In addition, the Board agrees that all of these numbers

must have some adjustment upward in order to account for the fact that photographs were not taken at the peak hour, and the indication that the July 19, 1987 run may not have produced a peak day.

6.1.87. The methodology utilized by the Applicants to project to the peak hour for July 18, 1987 is the only such projection in the record, and seems at least reasonable to the Board in the circumstances.

6.1.88. Utilizing hard car counts from a representative peak traffic day as the basis of population assumptions to be used in the model is much more preferable to the use of counts taken on a nonpeak day and projecting a peak by adding certain of the available spaces. Tr. 6101-02; Tr. 6766-68, 6771.

6.1.89. In addition, one cannot use a mechanistic approach and assume that each and every empty space that could accommodate the physical dimensions of a car does in fact do so, because this results in overstating the expectation of the peak population at the beach. Tr. 6102.

6.1.90. Based upon all of the foregoing, the Board finds the Applicants use of the 29,293 figure for parked cars to be reasonable.

6.1.91. Utilizing primarily the photographs taken on July 5, 1987 (with the July 19, 1987 photographs used to clarify detail and act as a cross reference, Dr. High has made an estimate of the number of parking spaces in the beach areas. High et al. Dir., Post Tr. 6849 at 14.

6.1.92. The figure divined by Dr. High, 38,825, is considerably higher (by 13,000 spaces) than the number arrived at by KLD in a count based upon the August 11, 1985 photographs. High et al. Dir., Post Tr. 6849 at 16-17.

6.1.93. This substantially higher figure was reached by adding to the parked cars counted by Dr. Befort the following: unoccupied spaces in "organized official public lots" and "commercial lots;" unoccupied spaces "in other parking lots whether paved or unpaved where there was evidence that the lot is used (at least one car or wear marks);" unoccupied spaces in yards around houses and cottages "if they were accessible without moving other vehicles unless a blocking pattern was actually present;" "unoccupied curb space where there was at least one car parked in the section, or wear marks to indicate use and where driveways, intersections or roadways were not obstructed" such spaces were counted on major highways only if they were "off the travelled lanes;" and "hidden spaces" reduced by a factor in densely built up areas to account for the fact that some of the assumed hidden space might be a swimming pool or lawn. High et al. Dir., Post Tr. 6849 at 15-16.

6.1.94. Dr. High testified that the various types of parking spaces (14,516 in total) added to cars actually counted were not capable of being separately classified except for some 3706 which were in organized official lots. Tr. 6857, 6860, 6884-85.

6.1.95. It is suggested that the High et al. effort is an attempt to replicate the methodology used by the Applicants' experts in NHRERP and should be adopted for that reason. However, Applicants' experts, KLD, used that methodology not because KLD believed it to be as good as simply counting cars on a representative peak day, but because the photographs available to KLD at the time NHRERP was compiled clearly did not represent a peak day and some adjustment had to be made. Tr. 6766-68.

6.1.96. Staff witness Urbanik stated flatly that the High et al. figure was not, in his judgment, reasonable because it deviated so far from the counts of cars seen in the three sets of photographs taken in July, 1987. Tr. 7385. See also Tr. 7379-83; Tr. 7502-03.

6.1.97. The Board notes that the counting of additional spaces which are not delineated involves a great deal of judgmental activity, is not easy to do, and gives data of questionable accuracy, Tr. 5909; Tr. 5919-20; Tr. 5927; Tr. 7751-52, see also, Tr. 6899; Tr. 7040-41, at least absent a good deal of "ground-truthing," Tr. 5923.

6.1.98. In response to a question as to whether the 38,825 figure was an "absolute upper limit on the parking capacity of the area,," Drs. High and Adler replied:

"No. It represents, in our judgment, a reasonable estimate of the available parking capacity in the area. Not all of that capacity may be in use at one time as vehicles move around the area. However, all of it could be used. The absolute upper limit is clearly greater because our parking capacity estimate restricts blocking and

double-parking in driveways and yards, and does not allow for double parking on side streets, parking on travelled lanes, or parking on grassy areas, front lawns, vacant lots and beaches. Clearly any or all of these could be used under very heavy use of beach areas. If all of these additional areas were used the number of vehicles that could be parked would be much higher than our estimate." High et al. Dir., Post Tr. 6849 at 18

6.1.99. Drs. High and Adler further claimed that applying the above quoted criteria to 10 randomly selected photographs indicated a 119% increase in unoccupied parking spaces over that estimated by the technique they used to get the 38,825 figure. High et al. Dir., Post Tr. 6849 at 18-19. However, the witnesses did not claim that any higher number could properly be used for ETEs in 1987 or 1988. Tr. 6922, 6928, 6935.

6.1.100. Adler et al. suggest that more data gathering is necessary in order to have an appropriate ETE or set of ETEs, but the request they make is not reasonable and, so far as the Board is aware, such further data gathering would be much more extensive than has been required at any other nuclear plant. See Tr. 7014, 7059-61, 7076, 7126-29; Tr. 7606-07; Tr. 7614-15; Tr. 7625-26.

6.1.101. Also among the witnesses presented by Mass. AG was a panel composed of Donald J. Ziegler, Ph.D., Associate Professor of Geography at Old Dominion University, James H. Johnson, Jr., Ph.D., Associate Professor of Geography at the University of California at Los Angeles, and Stephen Cole, Professor of Sociology at the State University of New York at

Stony Brook and President of Social Data Analysts, Inc. Ziegler et al. Dir., Post Tr. 7849, passim., and attach's 1-3.

6.1.102. The testimony of Ziegler et al. addresses two issues (one, the "shadow" phenomenon and, two, role conflict and role abandonment among emergency personnel. It consists in the main of a telephone survey done by Dr. Cole's company, SDA, Ziegler et al. Dir., Post Tr. 7849 at 12-32 & Attach. 5, testimony on the results of that survey and other data on the issue of voluntary or "shadow" evacuation and on the issue of emergency worker role conflict and abandonment. Id. at 4-5, 32-54 & Attach. 4. This later portion of their testimony on role conflict and role abandonment will be discussed infra in connection with Human Behavior.

6.1.103. It should be noted that Dr. Cole, who sponsored the survey has, himself, previously stated that telephone surveys of this type had a serious problem in that one never knew if those originally selected in the sample who could not be found or refused to be interviewed for some reason were different in some relevant respect from those with whom interviews were obtained. Tr. 7898; App. Ex. 26 at p.62.

6.1.104. The SDA survey was represented to be a random sample of households by virtue of the fact that the household residential telephone numbers called were selected at random;, but the respondent within the household (i.e., one of the heads of household) was not selected at random but according to a quota controlled for sex. Tr. 7963. We are told by Dr. Spencer,

Applicants' expert on statistics, that there is no warrant in statistical theory to generalize from a non-random sample to a population. App. Reb. No. 3, Post Tr. 9154 at 3-16; App. Reb. No. 4, Post Tr. 9155 at 2-10. On a similar note, Dr. Cole, who disclaims any expertise on statistics warns that it is dangerous to generalize from this type of sample (a quota sample) to a population. Ziegler et al. Dir., Post Tr. 7849 at 30. For that and other reasons the SDA survey data and interpolations of that data should not be trusted. App. Reb. No. 3, Post Tr. 9154 at 3-16.

6.1.105. The concept of "shadow evacuation" is defined by Ziegler et al. as follows: ". . . the propensity for people to evacuate from an area threatened by or perceived to be threatened by a hazard, although they are not ordered or advised to do so." Ziegler et al. Dir., Post Tr. 7849 at 6.

6.1.106. The thrust of the Ziegler et al. testimony is to the effect that the SDA survey and other data that "more than 50%" of the EPZ population outside of the beach area would engage in a voluntary evacuation if only the beach population was ordered to evacuate. Ziegler et al. Dir., Post Tr. 7849 at 27.

6.1.107. The Ziegler panel never gave a precise number above 50%, but they did qualify their opinion by saying:

"While it is certainly true that surveys are not perfect tools for predicting exactly how individual people will respond to a future event, they do provide very useful evidence, particularly with respect to the issue raised here. The point here is not that a particular number of individuals would voluntarily evacuate but rather that the

planning assumption of a maximum of 25% voluntary evacuation in competing evacuation time estimates for the population is false. No one suggests that the survey is a precise instrument which accurately predicts how many, or which, people would actually attempt to evacuate were a real accident to occur at Seabrook. But, the survey is the best tool we have; it gives us a rough idea of the size of the evacuation voluntary in a scenario similar to that utilized in the questionnaire. In a real accident, depending upon the seriousness of the accident and other variables, the evacuation voluntary might be somewhat larger or smaller than that found in the survey. But we are sure that in any accident similar to that depicted in the [SDA survey] questionnaire, there would be a large voluntary evacuation of the permanent residents of the EPZ.

Ziegler et al. Dir., Post Tr. 7849 at 28-29.

6.1.108. In particular, the Ziegler panel expressed its disagreement with statement allegedly made by the Applicants' expert Dr. Mileti to the effect that the maximum size of a voluntary evacuation at Seabrook would be 25%. Ziegler et al. Dir., Post Tr. 7849 at 26.

6.1.109. In point of fact, in his affidavits cited by Ziegler et al., and in testimony before this Board Dr. Mileti has not taken the position that voluntary evacuation within the EPZ assuming a partial evacuation is ordered would be limited to 25%. What he has stated is that in the event of a concentric, evacuation, the voluntary evacuation in the concentric ten-mile zone around the concentric area ordered evacuated would be somewhere between 0-25%. App. Dir. No. 7, Post Tr. 5622 at 182.

6.1.110. The Ziegler et al. testimony and the SDA survey, being confined to a study of what may happen with respect

to populations inside the EPZ in the case of an evacuation of that area, does not challenge the Mileti position on concentric evacuation in the ten-mile ring around the EPZ.

6.1.111. Moreover, it turns out that the SDA Survey was circumscribed by the mechanics of a telephone survey and because of this its designers conceded it was impossible to use the real Seabrook EBS messages in questions directed at ascertaining human response relating to evacuation. Tr. 7972-73; Tr. 7976-83. Dr. Cole, himself, stated, "we were not making any attempt to evaluate the adequacy of these messages in a real emergency." Tr. 7981. See also Tr. 7981-83. As a result, any conclusions drawn from these responses, insofar as they might be used to demonstrate that good public information cannot overcome the voluntary evacuation effect in considerable measure, would be highly suspect.

6.1.112. The Board finds that Dr. Mileti's reasoning and use of available data to reach his conclusion that voluntary evacuation in the ten-mile concentric ring around the Seabrook EPZ would be 0-25%, App. Dir. No. 7, Post Tr. 5622 at 159-182, is persuasive, and the Board finds that in performing an ETE analysis for Seabrook, the use of an assumption to that effect is appropriate.

6.1.113. In fact Applicants have caused runs to be made with IDYNEV assuming voluntary evacuations in the ten-mile ring beyond the EPZ of 10% and 20% and the runs indicate that the ETE

simply is not sensitive to voluntary evacuation in this ring.
App. Dir. No. 7, Post Tr. 5622 at 48-49.

6.1.114. With respect to the concept of voluntary evacuation within the EPZ assuming only a partial keyhole evacuation of that area is ordered, Dr. Mileti, like Ziegler et al. believes a higher percentage than 25% and something in the range of 25% to 50% should be assumed for planning purposes.
App. Dir. No. 7, Post Tr. 5622 at 188; Tr. 6641.

6.1.115. In fact, the new IDYNEV runs for scenarios which involve keyhole evacuations of less than the entire EPZ which appear in the Applicants testimony all utilized the assumption that voluntary evacuation within the EPZ to the radius equal to that of the region being evacuated would be 50%. App. Dir. No. 7, Post Tr. 5622 at 40, 44. See also Tr. 5677.

6.1.116. In light of all of the foregoing, the Board finds that the use of this 50% assumption in the ETE is reasonable.

6.1.117. The final witness presented on the ETE issue by Mass. AG was Dr. Thomas J. Adler, President of Resource Systems Group, this time testifying alone. Adler Dir., Post Tr. 7181, passim; Adler Reb., Post Tr. 9524, passim.

6.1.118. A fair summary of the Adler testimony is that relying on certain of his own work and the testimony of other Mass. AG witness panels, Dr. Adler delivers an overall critique of the Seabrook ETE.

6.1.119. It is Dr. Adler's basic position that the ETE's for Seabrook should be substantially greater than those which appear in NHRERP, Rev 2. Indeed he believes the times will be considerably in excess of those revised ETEs set forth in Applicants' testimony. It is Dr. Adler's position that the appropriate ETE for the entire EPZ on a hot summer weekend day is at least 11 hours and 15 minutes. Adler Dir., Post Tr. 7181.

6.1.120. This conclusion of at least 11 hours and 15 minutes is based upon a run of IDYNEV which changed four items of input: (1) cars parked at the beach; (2) lowering of certain ramp capacities; (3) alternate destinations for Hampton Beach Area visitors and (4) effects of returning commuters. Adler Dir., Post Tr. 7181 at 51 and Tr. 7206-08.

6.1.121. By far the biggest contributors to the difference between this figure and that offered by the Applicants are the change in the assumption as to the number of parked cars and the change in ramp capacities, particularly that of the ramps at a certain interchange between I-95 and Rte. 110. Tr. 7221-22. See also, Tr. 7211-20; Tr. 7242-45; Tr. 7266-67; Tr. 7316-18.

6.1.122. The first criticism which Dr. Adler levels at the Applicants ETE is that the assumption is made that all evacuating vehicles will take the routes assigned them in the model and proceed to the host destinations assigned to the occupants. Adler Dir., Post Tr. 7181 at 9, 46-49.

6.1.123. Dr. Adler suggests that 1/3 or 2/3 of the Hampton Beach area visitors would evacuate South along Rte 1A

instead of taking Route 51 west and this would increase the ETE by 15 to 47 percent. Adler Dir., Post Tr. 7181 at 47.

6.1.124. To this the Applicants reply that it is unreasonable to suppose that cars will remain in a queue in Hampton beach waiting to go south, when they can go north more quickly; and the routing proposed by Dr. Adler would take the people closer to Seabrook Station which violates the criterion based in part on perceived human preference to move away from the accident, Tr. 5679-81. See also Tr. 7491-92.

6.1.125. Dr. Adler next takes the position that even assuming people would use Rte 51, the many Massachusetts residents would turn South on Rte 95, rather than continuing on Rte 51 west; an IDYNEV run according to Dr. Adler, based upon the assumption that two thirds of the traffic accesses I-95 South adds 15% to the ETE. Adler Dir., Post Tr. 7181 at 47.

6.1.126. Applicants point out that most travellers will have as their overriding goal the removal of themselves from the scene of the accident as soon as possible, Tr. 5697-80, slowing down to get from the Rte 51 two-lanes to the one lane on ramp will not further that goal; the presence of State Police will assist in maintaining westbound traffic on Rte 51, Tr. 6261; and the southerly route on Rte 95 will bring persons closer to Seabrook Station. See Tr. 7491-92.

6.1.127. Dr. Adler's third criticism in this area is that some of the routes to host centers for certain populations are circuitous; he made a model run assigning more direct routes

and the result was an 11% increase in ETE. Adler Dir., Post Tr. 7181 at 48-49.

6.1.128. Applicants again point out that the routes Dr. Adler has selected would take persons closer to Seabrook Station. One also might wonder if the Applicants routes are circuitous why does Dr. Adler's rerouting result in an increase in the ETE.

6.1.129. It has also been suggested that the many transients may be unfamiliar with the area, and thus unable or unwilling to go to their assigned host center. Applicants believe a number of features of the NHRERP and the ETE portion thereof respond to this assertion:

- The precautionary early closing of the beaches does not consider the immediate opening of reception and mass care centers for this population segment. The EBS message for beach closing directs these persons to leave the area immediately (Vol. 4, p. G-13). There is no reason for this population segment to report to host communities until and unless the order to evacuate is given. At that time, EBS messages will provide direction for all evacuees to travel to the appropriate reception centers; and TCPs throughout the EPZ will be manned to provide route guidance.
- Public information flyers and supplemental materials are to be provided to restaurants, hotels, motels, rooming houses, schools, camps, health care facilities, parks and state forests (Vol. 1, p. 2.3-2). This

material will contain information regarding the location of reception centers and evacuation route descriptions.

- The public information program also includes posters prepared by NHCDA for display in public places and state lands (Vol. 1, p. 2.3-2).
- Emergency public information will be contained on dedicated pages in telephone books which will be distributed in the EPZ (Vol. 1, p. 2.3-2). These pages will provide general instructions on what to do following notification of an emergency at Seabrook Station, and specifically list the Reception Center assigned to each EPZ community.
- Tourists that enter an area with which they are particularly unfamiliar will, in all likelihood, have in their possession maps of the area to avoid getting lost during their vacation.
- The traffic control points are established to "[f]acilitate evacuating traffic movements which serve to expedite travel out of the EPZ along routes, which the analysis has found to be most effective." (Vol. 6, p. 7-1). Hence, direction is provided throughout the EPZ along designated routes.
- There is no requirement that an individual report to a host community. Reception centers are established for the evacuating public to provide "services for any

evacuated population in need of public assistance" (Vol. 1, p. 1.6-6). The EBS messages provide information as to what services are available at the reception centers (Vol. 4, p. G-31 and p. G-37). However, it is an option for evacuating persons to refer to reception centers for assistance.

- The NHRERP calls for strip maps to be available to all transportation drivers in reaching their designated destinations. App. Dir. No. 7, Post Tr. 5622 at 91-93. 6.1.130. It is reasonable, based on the foregoing ETE and other NHRERP elements, to assume that both permanent resident and transient populations will have adequate access to information regarding appropriate evacuation routes. App. Dir. No. 7, Post Tr. 5622 at 93; Tr. 6369-70.

6.1.131. A second major criticism made by Dr. Adler is that the ETE assumes that all traffic control points (TCPs) will be staffed with barriers and traffic cones in place when evacuation begins. Adler Dir., Post Tr. 7181 at 9, 43-46.

6.1.132. In particular, Dr. Adler made a run with IDYNEV which assumed that the TCPs at the Rte 110/I-95 and I-95/Rte. 1/Rte.101C were not "fully operational" until one hour and forty five minutes into the general evacuation or about two hours after beach closing; the result was a 7% increase in ETE. Adler Dir., Post Tr. 7181 at 45.

6.1.133. The Applicants made several sensitivity runs

assuming late or nonextant manning of traffic control points.
App. Dir. No. 7, Post Tr. 5622 at 44-48, 67-68.

6.1.134. The purpose of the first sensitivity run was to quantify the effect on ETE of the late arrival of some traffic guides at control points during the summer season. Based on information provided by the New Hampshire State Police, it is expected that four State Police will report to the assigned control points within 15 minutes of the Beach Closure. Three more will report to their respective control points within the following 45 minutes; and six additional police will arrive within 2 hours of Beach Closure. This assumed manning schedule, the viability of which was confirmed by the testimony of a New Hampshire State Police Division Commander, Captain Sullivan, Tr. 4714-15, will have the following impacts on highway capacity relative to that used for the Planning Basis:

- The Route 51 overpass of I95 will service only one lane of westbound flow for a period of one hour following the beach closure. Thereafter, two-lanes will be established to service westbound evacuating flow.
- The intersection of Routes 1 and 101C will not be manned until two hours after beach closing. It is assumed that evacuees will respond to existing signal control even in the presence of no competing traffic flow.
- During the first two hours, evacuees from Hampton Beach will not be discouraged from travelling south over the

Hampton Harbor Bridge into Seabrook. Subsequently, all Hampton Beach evacuees will travel north and west, only.

App. Dir. No. 7, Post Tr. 5622 at 44-45.

6.1.135. The purpose of the second sensitivity run was to examine the sensitivity of ETE with respect to any possible further delay in manning the Route 51 overpass of I-95. Specifically, it is assumed for this run that the State Police established the TCP there two hours after the beach closing.

App. Dir. No. 7, Post Tr. 5622 at 45-46.

6.1.136. The third sensitivity run examined the impact on ETE if none of the capacity-enhancing TCPs in Massachusetts were established.

- The intersections of Routes 1 and 286, and of Routes 1 and 1A, both in Salisbury, were assumed to service evacuating flow with the existing signal control policy. It is assumed that evacuees would not violate this policy even in the absence of competing traffic flow.
- Only one ramp will service westbound evacuating traffic along Route 110, onto Southbound I-95.

App. Dir. No. 7, Post Tr. 5622 at 46.

6.1.137. The results of these sensitivity runs is to indicate that in the case of Run #1, the ETE for the entire EPZ will be reduced by some 20 minutes; in Run #2 the ETE is increased by five minutes and the ETE will increase by two hours

under the circumstances modelled in Run #3 if the TCPs in Massachusetts remain unmanned throughout the evacuation. App. Dir. No. 7, Post Tr. 5622 at 46-48. In rebuttal testimony, Dr. Adler questioned certain assumptions which underlay the two sensitivity runs dealing with the I-95/Rte. 51 interchange. Adler Reb., Post Tr. 9524 at 3. However, the problems he raises appear to be ones involving details of implementation easily resolved. See Tr. 9526-33.

6.1.138. If the Massachusetts TCPs are established, even with a delay, the ETEs will be greatly reduced. These ETEs will approach those for the Planning Basis if this delay in establishing these TCPs is moderate. Adler Dir., Post Tr. 7181 at 48.

6.1.139. Based on the forgoing the Board finds that the Applicants have adequately analyzed delays in manning TCPs and the decision makers will have adequate information to respond appropriately in the event of such an occurrence. The Adler suggestion of more runs of IDYNEV to investigate various permutations and combinations of manning sequences, Adler Reb., Post Tr. 9524 at 1-4, is not required to be adopted in order for this Board to reach a finding on this matter.

6.1.140. The third major objection which Dr. Adler raises is the fact that the earlier referred to study by himself with Drs. Befort and High shows "the number of vehicles which can occupy the beach areas on peak summer weekends is at least 50 %

greater than reported in [NHRERP]." Adler Dir., Post Tr. 7181 at 9, and id. at 19-22. See also id. at 67.

6.1.141. Dr. Adler has taken the "parking capacity figure of 38,825 found by counting parking spaces as input which had a considerable effect upon the ETE when plugged into IDYNEV. Adler Dir., Post Tr. 7181 at 21.

6.1.142. The Board rejects the use of this theoretical parking capacity figure. Even assuming that it is not an upper limit as the High et al. panel testified (See No. 6.1.98, supra), it does not appear to the Board to be a "realistic" figure. This is so because of the previous referenced excellent agreement between the number of parked cars actually observed in the three photographic runs made during the summer of 1987 indicates that something other than parking capacity, likely the capacity of the inbound roads, is limiting the number of cars and people who actually go to the beaches surrounding Seabrook. Tr. 6775-77; Tr. 7399; Tr. 7504-05; Tr. 7509. There simply is no basis for assuming as a realistic matter that as many as 38,825 cars will be parked in the beach area at any time. For reasons expressed earlier we think that the projected figure of 29,293 is a realistic figure to be used for ETE purposes. As the Staff Witness Urbanik testified, the fact is that no parking system, such as the Seabrook Beach Area, ever fills up completely because people are always coming and going. Tr. 7385-88. Similarly, the Board rejects the idea of adding in another 1,000-2,500 cars either to account for those on the roads when the photographs

were taken or to account for those which may have been parked in garages or under carports or under trees, see Moughan Reb., Post Tr. 9497, passim, or to account for the fact that the day photographed might not have been "the peak day," see Adler Reb., Post Tr. 9524 at 9-14.

6.1.143. Dr. Adler also claims to have found an error of interpolation which has been committed by KLD which he says requires the adding of one half hour to all ETEs. Adler Dir., Post Tr. 7181 at 13, 38.

6.1.144. Dr. Adler claims that KLD has assumed in computing when an ETE actually ends that all roads empty at a uniform rate and thus errs. Adler Dir., Post Tr. 7181 at 38

6.1.145. Dr. Adler is in error. In fact KLD interpolates only the last link to actually empty. Tr. 6819. Compare Tr. 7276-79.

6.1.146. Dr. Adler also raises the concern of persons simply abandoning cars if they are forced to wait in line for a considerable period of time and notes that this phenomenon is unaccounted for in the ETE. Adler Dir., Post Tr. 7181 at 16-18. His testimony is based, in part, upon a survey done by Dr. Luloff, which has no recognizable validity generally, see Nos 7.1.22-7.1.26, infra, and on this point, in particular, App. Reb. No. 4, Post Tr. 9155, passim; Tr. 8309-12. See also Tr. 8280-81; Tr. 8321.

6.1.147. To the extent the abandonment takes place in parking lots, this will presumably shorten the ETE. Tr. 7234-35.

To the extent it takes place on the roads, which is highly unlikely given the fact that most drivers have an ultimate destination a considerable distance from the beach, and the car is not on the side of the road, the effect would be the same as an accident which disabled a car (assuming the keys were not left in it) and would be handled in the same manner. It would seem that it could be pushed out of the way. Tr. 7261-63.

6.1.148. Dr. Adler could point to no known case where mass abandonment of cars occurred in an evacuation. Tr. 7237. Staff witness Urbanik was aware of no such event either. Tr. 7485-90. Nor was Mass. AG witness Luloff. Tr. 8216.

6.1.149. Dr. Adler next raises the question of the Rte. 110/I-95 interchange where the prior planning expects vehicles to turn across a raised grassy median in the event conditions downstream are congested. Adler Dir., Post Tr. 7181 at 26; Adler Reb., Post Tr. 9524 at 19-20. As noted earlier one solution to this problem is to have these evacuating cars only proceed down Rte. 110 to the I-495 interchange a solution which leaves the ETE unaffected. See No. 6.1.26, supra.

6.1.150. Dr. Adler takes issue with the fact that the IDYNEV model used for Seabrook simulated a higher discharge rate through certain ramps than was supposed to be assumed. Adler Dir., Post Tr. 7181 at 28.

6.1.151. The difficulty of this assertion is that Dr. Adler is in error in assuming that the version of IDYNEV used assumed that such ramps were always congested. In fact, the

assumption was that there would be times when the ramp was congested and times when it would not be and the assumption of a flow of 85% of capacity only operated in the congested condition. This is the assumption which Mass. AG's own witness Dr. Ceder endorses. Ceder Dir. Post Tr. 5169 at 20. It is for this reason that the output on occasion showed higher discharge rates than 85% of capacity but never exceeded capacity.

6.1.152. Dr. Adler raises questions as to whether commuters from work who must return home before evacuating have been properly treated. Adler Dir., Post Tr. 7181 at 27-31.

6.1.153. It is suggested that the analysis errs in that it assumes that commuters experience no delays in returning home. Adler Dir., Post Tr. 7181 at 11. However, the Applicants point out that the model compensates for any travel delays by making a pessimistic assumption in connection with the mobilization process to the effect that all evacuation preparation activities are performed in sequence when, in fact, it is reasonable to assume that, to a large extent, some of them will be performed in parallel. Tr. 5676.

6.1.154. It is to be remembered that delay in commuters joining the evacuation stream finally to leave the EPZ has no effect on an ETE so long as the trip generation time is not lengthened to the point where it approaches what would otherwise be the ETE. See Tr. 6712.

6.1.155. To begin with, Dr. Adler suggests, on the basis of data from NHRERP which he cites, viz. App. Ex. 5, Vol. 6

at p. 4-9, that a "commuter surge" will occur because 95% of the commuters will leave work in the first thirty minutes. Adler Dir., Post Tr. 7181 at 29. See also Adler Reb., Post Tr. 9524 at 6.

6.1.156. Dr. Adler misinterpreted the data. In fact the percentage of commuters who will depart their work in the first thirty minutes after notification is 74% according to NHRERP; 95% will have left work over a period of one hour after notification. App. Ex. 5, Vol. 6 at pp. 4-3, 4-16. Compare Tr. 7248-55. Further, the more relevant distribution is that for arrival at home because the commuters work at varying distances from their homes and the distribution of cars revealed by that analysis in thirty minute intervals is 26%, 45%, 18%, and 6%. Id.

6.1.157. Commuter traffic entering the EPZ along interstate highways will be travelling counterflow to the evacuation traffic for the most part. Commuter traffic moving with evacuees will leave the traffic stream to go home, leaving gaps. These gaps will be filled by the following evacuating vehicles; the commuters after going home and preparing to evacuate will rejoin the traffic stream. The ETE will be unaffected because these trips from home are explicitly included in the IDYNEV input. Tr. 6794.

6.1.158. Commuter traffic originating within the EPZ and travelling to the same or different towns within the EPZ may

have a longer travel time home than during normal conditions but this will not extend the ETE. Tr. 6794.

6.1.159. The exercise of Dr. Adler in adding 200 commuters to the traffic stream (on the critical path and in one lane, Tr. 7256-57) and producing a ten minute increase in the ETE, Adler Dir., Post Tr. 7181 at 31, is spurious because the model already assumes all commuters who return will evacuate and accounts for them. Furthermore, all commuters from the beach areas who are on this critical path are already included in the count of vehicles in the beach area. App. Ex. 5, Vol. 6, at pp. 4-2, 4-3, 4-5, 5-6.

6.1.160. On rebuttal, Dr. Adler claimed that IDYNEV is deficient in that it does not model the effects of commuters who live and work within the EPZ. Adler Reb., Post Tr. 9524 at 4-8.

6.1.161. Dr. Adler can point to no other ETE study where this has been done. Tr. 9536.

6.1.162. Dr. Adler, on rebuttal also decried the concept that IDYNEV assumes that, except for the assumption of 3,000 cars on the Interstate Highways, the streets and roads of the EPZ are empty. Adler Reb., Post Tr. 9524 at 8-9. The estimate of 3,000 through vehicles on the interstate highways was calculated from the number of miles of roadway and the vehicle density from the associated level of service. App. Dir. No. 7, Post Tr. 5622 at 70-73.

6.1.163. There are real problems of ascertaining the identity of those in the system so as to avoid double counting.

Tr. 9539-40. As noted earlier the Applicants believe that not counting these cars is a way to account for the double counting of beach residents and also recognizes that these cars will, in fact, exit the area before congestion occurs. Tr. 6117-19.

6.1.164. Dr. Adler also suggested that certain data he had utilized, App. Ex. 32, indicates that "peak days" may occur in late July or in August and more studies should be done to check his hypothesis. Adler Reb., Post Tr. 9524 at 10-12. Dr. Adler's use of the data he relied upon is indeed highly questionable, Tr. 9585-98, and his suggestion that his hypothesis is worth testing is wholly unconfirmed by any source other than his own work with the data described. See Tr. 9598-9600.

6.1.165. Dr. Adler next raises the question discussed earlier about the need to model the effect of accidents. Adler Dir., Post Tr. 7181 at 31. This has been discussed above. Nos. 6.1.40-6.1.50, supra.

6.1.166. Dr. Adler next raises the question of the effect of adverse weather conditions on the ETEs. Adler Dir., Post Tr. 7181 at 34-37.

6.1.167. Weather is one of the many major factors which influence highway capacity. Each type of influencing weather condition is addressed separately within the ETE. Highway capacity reductions of 20 and 25 percent for rain and snow respectively were utilized in the ETE. These figures are responsive to the guidelines established by the 1985 Highway Capacity Manual. App. Ex. 5, Vol. 6 at p. 3-11. Corresponding

with a reduction in capacity, the calculations of the ETE reveal that rain and snow increase the ETE relative to clear weather (compare the ETE for Scenario 2 with those of Scenario 1, and the ETE of Scenarios 6 and 7 with those of Scenario 5). App. Dir. No. 7, Post Tr. 5622 at 53-54.

6.1.168. Necessary to the understanding of capacity reduction due to snow is the correct understanding of the term "water-equivalent snowfall." The ratio of "water-equivalent" to "depth of snow" is commonly termed "snow-density." App. Dir. No. 7, Post Tr. 5622 at 54.

6.1.169. Average snow densities generally range from 0.05 to 0.3 with the higher figure applicable for late-winter snow (with a high moisture content). The average figure for freshly fallen snow is 0.1. (See Appendix H of National Cooperative Highway Research Program (NCHRP) Report No. 127). App. Dir. No. 7, Post Tr. 5622 at 54.

6.1.170. Applying this figure, a fall of 6 inches over 8 hours is equivalent to 0.075 in./hr. water equivalent snowfall. On this basis, the associated percent capacity reduction using the 2.8 percent model is:

$$8 + 0.075 \times 2.8/0.01 = 29 \text{ percent.}$$

App. Dir. No. 7, Post Tr. 5622 at 54.

6.1.171. This estimate of capacity reduction for the indicated severe snowfall, which only applies to conditions at the end of the 8 hour snowfall, compares with the representative figure of 25 percent in the ETE study, which was applied

throughout the 8-hour evacuation period. App. Dir. No. 7, Post Tr. 5622 at 55.

6.1.172. Staff witness Urbanik stated that the 25% capacity reduction factor used by KLD for Seabrook was in line with the factors used at other similarly located sites and perhaps a little higher. Tr. 7771.

6.1.173. Other studies offer evidence that capacity reduction due to snow is less pronounced. Using data from Appendix E of NCHRP Report 127, capacity is reduced by 25 percent whenever "snowstorm speed factor" is about 0.55. This value corresponds to a condition of 1 inch per hour of snowfall over 5 or more hours. App. Dir. No. 7, Post Tr. 5622 at 55.

6.1.174. The EPZ is subject to an average of 12-16 inches of snowfall per winter month, as shown in App. Ex. 5, Vol. 6 at Table 1-1. Thus, the example of 6 inches of snow within only eight hours given above represents a little less than half of a month's average snowfall. Even so, the 25 percent capacity reduction figure is applicable. App. Dir. No. 7, Post Tr. 5622 at 55.

6.1.175. The ETE estimates snow clearance times of driveways based on direct observation and discussions with persons living in the EPZ. App. Dir. No. 7, Post Tr. 5622 at 90-91.

6.1.176. Although snow clearing of driveways to access the road system can take place in parallel with other activities, the ETE adopts the point of view that this action follows the

preparation activity which, in turn, lengthens the temporal extent of the trip generation process. App. Ex. 5, Vol. 6 at 4-23.

6.1.177. NHRERP Rev. 2, App. Ex. 5, Vol. 6 at p. 3-11, addresses the issues of both ocean and inland fog as they relate to highway capacity. Discussions held with public officials indicate that low-lying ocean fog which can affect travel conditions is an unusual occurrence during the summer months, and when it does appear, generally dissipates by 9:00 to 10:00 a.m. or may appear after sunset, both times of the day when beach population is significantly below peak levels. Thus, the conditions of Scenario 2 (sudden rain occurring with beach population at capacity) are more severe than a scenario with early morning or late evening fog. Furthermore, the ETE obtained for the inclement weather scenario for rain can be used for widespread foggy conditions. App. Dir. No. 7, Post Tr. 5622 at 55-56.

6.1.178. Dr. Adler suggests that there are data which indicate that ocean fog is common in summer months. Adler Dir., Post Tr. 7181 at 35. When cross-examined, Dr. Adler did not have the data he relied upon² and was unable to say that the data dealt with fog conditions that would inhibit drivers. See Tr. 7292-95.

²In NRC proceedings an expert is expected to have at hand sufficient information pertaining to the details of the analysis to permit the correctness of the conclusion to be evaluated. Virginia Electric and Power Company (North Anna Nuclear Power Station, Units 1 and 2), ALAB-555, 10 NRC 23, 27 (1979).

6.1.179. Dr. Adler claims that prudence would dictate that empirical observations be made on the effects of fog on traffic in the area and suggested that such observations could be made "quite easily." He was unable to explain how that could be done easily. See Tr. 7296.

6.1.180. Tidal flooding is generally associated with high winds which raise the level of the tide along the coastal areas. (Of course, the level of the tide still responds to the lunar cycle.) It was estimated by FEMA that for the 50-year storm (a storm of particular severity with a one in 50 chance of occurring in any one year), it was possible for parts of Salisbury beach to remain under water for as long as 2 hours at high tide, at a depth which would make vehicle passage impossible and with no alternative roads available. App. Dir. No. 7, Post Tr. 5622 at 56.

6.1.181. Such an event, if synchronous with the Order to Evacuate, could delay some permanent residents up to 2 hours. (Note that such severe storms have not, in general, occurred during the tourist season.) Since the ETE substantially exceeds 2 hours, such an extension in trip generation time does not necessarily imply an extension in ETE -- certainly not an extension of as much as two hours, in any case. (It must also be considered that foreknowledge of the approach of such a severe storm may well lead to the beach area being evacuated prior to the accident.). App. Dir. No. 7, Post Tr. 5622 at 56-57.

6.1.182. Riverine flooding is associated with rainwater and/or melting snow run-off, and generally occurs in the Spring. Riverine flooding could also occur during heavy rains produced by hurricanes in Autumn. (As tabulated on p. 1-9, Volume 6, the maximum rainfall in the months of July or August over a 30 year period was less than 7 inches.) The Town of Exeter is most vulnerable to such flooding in that one, and possibly two, evacuation routes for Exeter evacuees could be severed. Specifically, Route 108 south of the village is a potential flood area, as well as Route 150 in northern Kensington. There are five other evacuation routes from Exeter to the north and west. Calculations indicate that the ETE for residents of the Town of Exeter are less than those for residents in the towns in the coastal region; therefore, any incremental delays experienced in Exeter due to the loss of a flooded road should not extend the overall travel time for the residents in the EPZ beyond the ETE. App. Dir. No. 7, Post Tr. 5622 at 57.

6.1.183. The effect of ice storms on the ETE can vary widely depending on the extent and physical condition of ice on the pavement, and on the temperature. The friction factor offered by an icy surface varies with temperature, increasing as temperature decreases below freezing. In the temperature range between 28 and 32 degrees F, the heated tire surface can ride on a thin film of water and traction is at a minimum. Under these weather circumstances, travel would be most affected. App. Dir. No. 7, Post Tr. 5622 at 57-58.

6.1.184. An exhaustive literature search has revealed no estimate of the effect of ice on highway capacity. In the absence of such data, application of the ETE for snow conditions (which includes a 25 percent reduction in capacity) appears acceptable for the following reasons:

- Highway capacity during an ice storm may be less than that during a snowfall, thus tending to increase travel time relative to snow. Note, however, that sanding operations would restore capacity of icy pavements to a significant extent.
- In general, there is no need to shovel a driveway in an ice storm, as is assumed within the ETE to be required for a snowstorm, thus tending to reduce trip generation time, relative to snow. A reduction in trip generation time tends to reduce ETE.

App. Dir. No. 7, Post Tr. 5622 at 58.

6.1.185. While Applicants are aware of no data to quantify these opposing trade-offs, it is reasonable to expect that the net effect is limited and that applying the ETE for the snow scenario 7 or 10 (see page 10-2) is a proper response. Note, however, that under severe ice conditions, in the absence of sanding, some highway sections with extended upgrades may become virtually impassable. Thus, sanding may be necessary to assure adequate traction on such highway sections. Sanding or salting, or a combination of the two, is a prevalent procedure in the area. App. Dir. No. 7, Post Tr. 5622 at 58.

6.1.186. It is also true that the phenomena of "impassable" roads, if it exists presumably will be taken into account by decision makers at the time in determining which protective actions to invoke. App. Ex. 5, Vol. 4, App. F at F-2

and Attach. C. For example, if the roads were truly impassable because of a blizzard, then the decision might be made to maximize dose savings to the greatest extent possible by ordering sheltering in place.

6.1.187. Dr. Adler next argues that, rather than the 2.6 figure assumed in NHRERP, the proper number of persons to be assumed to be in each evacuating vehicle is 2.3, again based upon the SDA survey. Adler Dir., Post Tr. 7181 at 42-43. A run made with IDYNEV by Dr. Adler on this assumption increased the ETE by 7%. Id.

6.1.188. This assumption, according to Dr. Adler is based on his tabulation from SDA Survey data tapes of the Survey respondents answers to the specific question regarding the number of cars that would likely be used in a scenario amounting to, but not described as, a general evacuation of the entire EPZ on, but not identified as, a peak summer weekend day and using that data to construct a figure representing the number of cars that would be used to evacuate the population surveyed and then expanding that number to the total population. Adler Dir., Post Tr. 7181 at 42; Tr. 7195-7200. The balance of the calculation was not disclosed. It is to be noted that this number was calculated from the responses to one question in the SDA. Id. Use of the results from similar questions in that same survey could give significantly different results. See Tr. 7189-204.

6.1.189. The Board is given no cause to accept Dr. Adler's assumption that there will be 2.3 rather than 2.6

individuals in each EPZ resident's car used for evacuation. Dr. Adler's assumption stems from and is an interpolation of SDA data, the validity of which is in serious question. We know of no reason why Dr. Adler is in better stead than Dr. Cole to generalize from a nonrandom sample to a population. Moreover, were we to be advised as to all of the steps taken to calculate the assumption value, the number would apparently vary according to the scenario postulated.

6.1.190. On the other hand it appears that the Applicants' assumption of 2.6 persons per car is well founded. Its derivation is detailed with the step by step methodology and the data employed are fully disclosed. App. Ex. 5, Vol. 6 at 2-3-2-5. The assumptions made and conclusion reached are rationally sound and in our view, and result in an acceptable number. Cf. Tr. 7042-43.

6.1.191. SAPL argues that because the KLD survey input to the Applicants' assumption of 2.6 individuals per car is potentially biased by nonresponse and that there is "therefore no reasonable basis for assuming that the . . . estimates of average person occupancy of vehicles evacuating the EPZ or other data derived from the survey are accurate." Adler Dir., Post Tr. 7181 at 42.

6.1.192. Applicants agree that a potential for bias or systematic error is associated with nonrespondents to a survey. The extent of any such bias depends on the context of the survey, the sampling procedure and the sampling frame. App. Dir. No. 7,

Post Tr. 5622 at 86-87. We are satisfied from the Applicants testimony, id. at 84-88, that the potential for bias can be discounted and that the Applicants' assumption of 2.6 individuals per car is an acceptable number. See NUREG-0654, FEM-REP-1 Rev. 1, Appendix 4 at 4-3.

6.1.193. Dr. Adler next charges that in doing the ETE, KLD used optimal signal controls. Adler Dir., Post Tr. 7181 at 49-51.

6.1.194. Dr. Adler ran IDYNEV assuming signal timings would be approximately equal for all approaches and the ETES increased 45%. Adler Dir., Post Tr. 7181 at 50.

6.1.195. In fact KLD did not optimize the signals; it did assume signal splits in a manner that was responsive to demand; added a 15% reduction in capacity for inefficiency (in addition to start up which is in the model). Furthermore Applicants say that the run done By Dr. Adler which fixed the splits is unrealistic, as he admits, because it assumes no traffic control overriding signals and/or that cars in an evacuation stream would remain in a queue even when there was no competing demand. See Tr. 7297-98.

6.1.196. Dr. Adler states that there is an inconsistency in the traffic routing on Rte 101 in that IDYNEV assumes traffic passes through a barrier. Adler Dir., Post Tr. 7181 at 53.

6.1.197. There is; it is minor; and wholly rectifiable. Tr. 7298-307.

6.1.198. Dr. Adler questions the plan of stopping persons who attempt to enter the EPZ saying it will cause massive queues and possibly interfere with emergency vehicles and affect the ETE. Adler Dir., Post Tr. 7181 at 55-57.

6.1.199. Applicants agree and the plan will be changed to not have screening at access control points invoked in the initial hours of the emergency. Tr. 6294-95. Dr. Adler, Tr. 7308, and Dr. Urbanik, Tr. 7374, agree that this will mitigate the problem.

6.1.200. Dr. Adler next takes issue with the assumptions made by KLD with respect to the number of cars which would be out of service thus creating additional transit dependent populations. Adler Dir., Post Tr. 7181 at 60-61.

6.1.201. It is clear that Dr. Adler's initial criticism is based upon his understanding that the method used by the Applicants to account for this problem was simply to increase the number of transit dependent persons by multiplying the total by 1.06. Adler Dir., Post Tr. 7181 at 61.

6.1.202. However, Applicants testimony makes clear that the method used was considerably more sophisticated than that and has as its basis a survey done of fleet owners on Long Island, New York, and adopting the most pessimistic unavailability rate which was learned of in the course of that survey. App. Dir. No. 7, Post Tr. 5622 at 20-21. Having had this brought to his attention, Dr. Adler then continued his criticism on the basis that he thought reliance upon fleet operations for this data was

unwise. Tr. 7310-12. However, this seems to the Board to be reasonable for planning purposes.

6.1.203. In addition, Dr. Urbanik testified that no specific account is usually given to the small number of vehicles that may be out of service. Urbanik Dir., Tr. 7372 at 14.

6.1.204. Dr. Adler criticizes the Applicants' experts for assuming that 50% of those without access to a car will engage in ride sharing for the reason that the many transients will not be in a position to ride share to the same extent as a permanent resident would be. Adler Dir., Post Tr. 7181 at 62-63.

6.1.205. This criticism conflicts with FEMA's suggestion that 70% of transit dependent persons would ride share. App. Dir. No. 7, Post Tr. 5622 at 19.

6.1.206. The only transients who are without access to a vehicle are those who arrived in a vehicle that does not remain in the area such as hitchhikers or persons who were "dropped off" by others; this amounts to only some 2% of the transients. App. Ex. 5, Vol. 6 at p. 2-1.

6.1.207. Dr. Adler next asserts that the surveys used by the Applicants to determine the transit dependent population are unreliable because of "nonresponse bias," and he goes on to state that certain results from the SDA survey show that the transient dependent population is underestimated. Adler Dir., Post Tr. 7181 at 62-63.

6.1.208. To begin with, a careful comparison between the SDA survey and the Applicants' survey demonstrates that the nonresponse rates are within one percentage point of each other. Compare App. Dir. No. 7, Post Tr. 5622 at 85 (37%) with Ziegler et al. Dir., Post Tr. 7849, Attach 5 at 49 (36%). In addition, in order to check whether the potential for bias as a result of nonresponse was actually manifested as real, significant bias, certain data obtained from the Applicants' survey was compared with actual population data obtained from other sources. App. Dir. No. 7, Post Tr. 5622 at 88-89. The result of a comparison of the surveys estimate of mean household size with that from data of the New Hampshire State Planning Office, and the survey data on mean travel times to work with those obtained in the five year earlier census snowed good agreement. Id. at 88-90. Therefore, the prospect of systematic error or bias can be dismissed. Id. at 88.

6.1.209. As noted earlier, the SDA survey which Dr. Adler relies upon has responses in it which fully support a figure of transit dependent population lower than that utilized by the Applicants, and the specific question relied upon by Dr. Adler did not differentiate sufficiently between types of transportation needs to be reliable for the use Dr. Adler is making of it. See No. 4.1.20, supra.

6.1.210. The results of the NHCDA 1986 survey and subsequent follow-up verification was used to develop the

transportation needs for transit dependent individuals. See Nos. 4.1.40-4.1.44, supra.

6.1.211. Dr. Adler next takes the position that NHRERP states bus mobilization times which are in conflict with a survey done by New Hampshire Civil Defense; NHRERP states that, based upon a telephone survey 50% of the buses will be mobilized in one hour; App. Ex. 5, Vol. 6 at p. 11-19; whereas the New Hampshire Civil Defense survey says that only 30% of the buses will reach the staging area within one hour. Adler Dir., Post Tr. 7181 at 64.

6.1.212. There does not appear to be any conflict here; NHRERP Rev. 2 defines mobilization time as the elapsed time for buses to depart their point of origin; App. Ex. 5, Vol. 6 at p. 11-18; it necessarily follows that at the end of one hour there will be fewer buses at the staging area than have been mobilized.

6.1.213. The ETE estimates that all day-trippers in the beach area are within thirty minutes of their cars. Assuming a walking speed of 2.25 mph implies a walking distance in excess of one mile in thirty minutes. Since the width of the beach parking areas are almost one-half mile, this estimate of 30 minutes is reasonable. App. Dir. No. 7, Post Tr. 5622 at 76.

6.1.214. A delay of 15 minutes preparation time at the Transportation Staging Area (TSA) was assumed for the movement of transit vehicles in and out of the areas. App. Dir. No. 7, Post Tr. 5622 at 76.

6.1.215. Sensitivity runs conducted to explore the extreme case of an "immediate" general emergency have resulted in extension of the ETE up to 20-30 minutes relative to the ETE calculated for the planning basis. App. Ex. 5, Vol. 6 at pp. 10-16-10-17. See also App. Dir. No. 7, Post Tr. 5622 at 83-84.

6.1.216. Dr. Adler complains of the fact that the ETE does not meet the requirement of including a proper "vicinity map" as required by NUREG-0654. Adler Dir., Post Tr. 7181 at 68.

6.1.217. NUREG-0654 requires:

"A vicinity map showing the plant location shall be provided along with a detailed map of the plume exposure pathway emergency planning zone (EPZ). The map shall be legible and identify transportation networks, topographical features and political boundaries." NUREG-0654 at 4-1.

6.1.218. The ETE complies with this requirement. App. Ex. 5, Vol. 6 at pp. 1-6, 1-7, 1-13, 3-8, 9-2.

6.1.219. The ETE also accounts for topographical features. The estimates of capacity for all two-lane roads in the EPZ are roughly 10% lower than if level terrain was represented. App. Dir. No. 7, Post Tr. 5622 at 64.

6.1.220. TOA witness Lord complains that several of the sketches in NHRERP of traffic control points are erroneous and that there are other TCP's which Mr. Lord thinks should have been included in the plan. Lord Dir., Post Tr. 8180 at 4-6.

6.1.221. Mr. Lord has no qualifications to make the latter judgment. Tr. 8182. As to the errors in sketches, these resulted, in part from the refusal (because of direction of the

Town) of TOA's police to meet with Applicants' experts to go over the sketches; Tr. 6690, 6781; and, in any event the Board deems any mistakes on TCP sketches to be a matter of details of implementation easily corrected and irrelevant to the findings required to be made in this proceeding.

6.1.222. The Staff offered testimony with respect to the ETE issue from Thomas Urbanik II, Ph.D. Urbanik Dir., Post Tr. 7372, passim.

6.1.223. While Dr. Urbanik addressed a number of subjects having to do with the ETE, and had some minor criticisms with respect to it, and some suggestions for improvements, his overall conclusion was:

"The KLD Study was prepared in a manner consistent with the guidance of NUREG-0654, Rev. 1, Appendix 4. Furthermore, it provides the necessary basis for the development of emergency plans for the evacuation of the Seabrook EPZ under a variety of conditions. The KLD Study is likely to aid decision makers in the selection of appropriate protective actions in the event of an emergency at Seabrook Station." Urbanik Dir., Post Tr. 7372 at 18-19.

6.1.224. The Board agrees with Dr. Urbanik's overall conclusion and so finds.

6.1.225. The Board specifically rejects the concept that more data gathering and additional ETE model runs must precede a finding of acceptability of the Seabrook ETE.

6.2. Rulings of Law

6.2.1. An ETE should not reflect a worst case scenario, rather, it should reflect realistic conditions so that it is of

use to the decision makers; for an ETE to be too conservative in its assumptions is as detrimental as it would be for all assumptions to be made in a highly unconservative manner.

Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-845, 24 NRC 220, 246 (1986); Philadelphia Electric Co., ALAB-836, 23 NRC 479, 491 (1986); Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), LBP-85-25, 22 NRC 101, 106 (1985).

6.2.2. Licensing Boards are not required to deal with details of implementation in proceedings with respect to off-site emergency planning. See Cincinnati Gas & Electric Company (Wm. H. Zimmer Nuclear Power Station, Unit No. 1), ALAB-727, 17 NRC 760, 770, 773 (1983); Louisiana Power and Light Company (Waterford Steam Electric Station, Unit 3), LBP-82-100, 16 NRC 1550, 1563 (1982).

6.3. Conclusions

6.3.1. The Board finds and rules that the Applicants have provided an adequate analysis of the time required to evacuate and for taking other protective actions for various sectors and distances within the plume exposure pathway EPZ for transient and permanent populations as required by 10 CFR 50 App. E, §IV.

7. HUMAN BEHAVIOR IN EMERGENCIES

7.1. Findings of Fact

7.1.1. A number of witnesses for the intervenors have testified in one respect or another to their views that members

of the public will not comply with instructions during a real emergency or that certain persons depended upon to carry out duties under the NHRERP will refuse to do so either out of fears for their own personal safety, or because they will feel it necessary to see to the protection of their loved ones. See Janetos Dir., Post Tr. 3597 at 8; Pennington et al. Dir., Post Tr. 3945, passim; Luloff Dir., Post Tr. 8203 at 9-15; Ceder Dir., Post Tr. 5169 at 10-11; Ziegler et al. Dir., Post Tr. 7849 at 36-54.

7.1.2. Ms. Janetos speculated on the question of whether the Teamsters would respond if called upon. Janetos Dir., Post Tr. 3597 at 8. Her testimony is just that, speculation, and is refuted by the testimony of the Teamsters Union Secretary, SAPL Ex. 1 at 26-27.

7.1.3. The testimony of Pennington et al. raised the question of whether teachers would leave their students in the classroom at the time of an emergency. Pennington et al. Dir., Post Tr. 3945 at 3-8.

7.1.4. Teachers are not being called upon to do anything under the plan that they would not normally do in any emergency, or for that matter, on any regular day; they are viewed by the planners as recipients of services rather than as emergency workers or providers of services. Tr. 3356-57.

7.1.5. The teachers on the Pennington et al. panel stated flatly that in the event of a radiological emergency, they

would immediately leave the children committed to their care in order to care for family or loved ones. Tr. 3947-50.

7.1.6. In addition each member of the panel, with one possible exception, took the position that in the event of a nonradiological emergency which threatened both the children committed to their care as teachers and their family or loved ones, they would leave the children. Tr. 3950-63.

7.1.7. There is no evidence that any teacher abandoned his or her pupils at the time of the Three Mile Island Accident. App. Dir. No. 7, Post Tr. 5622 at 130.

7.1.8. There is no evidence of teachers abandoning their children in time of emergency anywhere in the United States at any time. Tr. 3967, 3969; Tr. 6625-26.

7.1.9. Regarding the idea of role abandonment by teachers, Dr. Miletì testified:

"Regarding their behavior in an emergency, school organizations and teachers are not unique. Their behavior in an emergency would not differ in any way from the behavior of others with known emergency roles. Indeed, the research record strongly supports the ascription to teachers and other school personnel of responsibility for supervision of students in an emergency. Emergency response is facilitated when plans are predicated on pre-existing roles, rather than on artificial social structures constructed solely for emergency response use. (This does not mean that non-school personnel could not care for students in an emergency; good planning and some training in the supervision of students would ensure the efficacy of the use of such personnel in such a role.) Because school personnel who would accompany students on buses, for example, would be exposed to no greater radiological risk than the evacuating general public, and because

school personnel are accustomed to supervising students and dealing with students in the routine of their day-to-day work, school personnel need not receive the detailed training to be provided to other emergency workers. It is necessary only that such personnel be informed of their emergency duties in advance of an actual emergency -- for example, in the orientation program for school personnel at the beginning of each academic year.

Like other workers, the key to the response of teachers and other school personnel in any emergency (nuclear or non-nuclear) is their awareness of their role with respect to the students in that emergency. We have no doubt that some school teachers (and other school personnel) might be found who would swear in advance that they will desert their students in a radiological emergency. (This would also be the case in the vicinity of any nuclear plant, including Seabrook, we are sure.) We also have no doubt that in a real radiological emergency, teachers and other school personnel would generally remain with their students as long as necessary -- at least long enough to see them safely onto evacuation buses, particularly if those charges were small children. Similarly, we are confident that sufficient numbers of school personnel will be available to supervise students on buses. It is not necessary that each class be accompanied by its teacher."

App. Dir. No. 7, Post Tr. 5622 at 126-27.

7.1.10. Behavioral intention data of school teachers put forward by Mass. AG's experts to the extent any such data can be relied upon at all, confirms Dr. Mileti's opinion as to teachers. Ziegler et al. Dir., Post Tr. 7849 at 49.

7.1.11. Assuming that the teachers assertion that they will in fact abandon the children committed to their care in the event of any emergency which poses a threat to both the children

in the classroom and their families is true, this still does not mean that there will be no one available to see to it that children are put on a bus to be evacuated. As Mr. Moyer, one of the Pennington panel teachers, pointed out, a number of teachers have been identified who have indicated that they would stay. Tr. 3949.

7.1.12. In the case of only one school does it appear from the record, assuming the testimony is to be believed, that there would be no teachers at all to place children on buses in the event of an evacuation, and that is the Seabrook Junior High School. See Pennington Dir., Post Tr. 3945 at 7, Tr. 3950, 3985.

7.1.13. The testimony on this particular school was given by Witness Dunfey, whose emotional anti-Seabrook commitment is clear in the record. Tr. 3951-52; Tr. 3965-66; Tr. 4038-39. Indeed, in pressing her point, Ms. Dunfey took the position that in the event she was teaching a class of 28 children and notification was received of an accident at Seabrook, it would be "impossible" for her to account for the twenty-eight children and see to it that they got on a bus. Tr. 3996.

7.1.14. Another of the teachers declared that in the event of any emergency, radiological or otherwise that threatened her classroom and the school where her 12 and 15 year old children would be, she would leave the seven year old children in her second grade class to find her teenage children who would presumably be in the care of their teachers. Tr. 3947-48, 3954.

7.1.15. In addition, in the case of certain of the "informal surveys" done by the teachers it appears that the question of whether or not teachers would in fact abandon their charges was not put to the respondents, so even assuming that one credits this testimony, it cannot be said to clearly demonstrate that teachers so surveyed would in fact leave. Tr. 3973-85.

7.1.16. In the case of the large petition which is TOH Exhibit 10, the wording was such that it did not require the signer to take the position that he or she would abandon the children committed to his or her care, and admittedly no attempt was made to ascertain what the understanding of the signers was in that respect. See Tr. 3986-88.

7.1.17. The great weight of authority in the field of the social sciences holds that declarations and statements of preemergency intentions have little, if anything, to do with actual behavior; human response in an actual emergency is largely directed by factors which prevail during the emergency as it is experienced. These other factors involve relationships which cannot be simulated by hypothecation or by polls and surveys. App. Reb. No. 3, Tr. 9154 at 2-3; App. Reb. No. 4, Tr. 9155 at 10-11; App. Dir. No. 7, Post Tr. 5622 a2 143-49.

7.1.18. In light of the uncontradicted evidence that there is no known case in the history of this nation of teachers abandoning schoolchildren in the classroom during the time of an emergency; in light of the fact that no such action occurred at Three Mile Island, the Board finds it difficult to assume that

these teachers or their colleagues will in fact abandon their students in a time of emergency so quickly as to prevent their assisting children on to a bus. We need not, and do not, decide whether the testimony given in the hearing room was in fact deliberately false; rather we agree with the views expressed by Dr. Mileti and quoted above.

7.1.19. In the Shoreham proceeding, the Commission indicated its unwillingness to accept the representations of public officials to the effect that they would not do their duty in a radiological emergency, Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), CLI-86-13, 24 NRC 22, 29 n.9 (1986); Id., CLI-86-14, 24 NRC 36, 40 n.1 (1986). See also Notice of Final Rule EVALUATION OF THE ADEQUACY OF OFF-SITE EMERGENCY PLANNING FOR NUCLEAR POWER PLANTS AT THE OPERATING LICENSE REVIEW STAGE WHERE STATE AND/OR LOCAL GOVERNMENTS DECLINE TO PARTICIPATE IN OFF-SITE EMERGENCY PLANNING, 52 Fed. Reg. 42078 (Nov. 3, 1987). In the case of the teachers, we do the same.

7.1.20. We find therefore that there is reasonable assurance that to the extent the NHRERP counts on teachers to care for the children under their supervision at school, such care will be forthcoming in a real radiological emergency.

7.1.21. Dr. Luloff indicated that the AEL Associates survey (hereinafter sometimes referred to as the "Beach Blanket Survey") which he had conducted for Mass. AG on the beaches at Seabrook Station indicated that if a message to shelter was broadcast on those beaches, in fact a large proportion of the

persons on the beach would immediately, or shortly thereafter evacuate. Luloff Dir., Post Tr. 8203 at 11-13, Attach. 4.

7.1.22. It is questionable whether the Beach Blanket Survey is of any value. To begin with, the final selection of the questions was by a consensus including attorneys from the Commonwealth of Massachusetts, Tr. 8220, who have an obvious interest in the direction the survey takes; one of the emergency messages used in the survey was incomplete; Tr. 8223; Dr. Luloff admits that the survey was not designed to test what the reaction of people would be to the actual emergency messages to be used; Tr. 8224; no data was kept as to refusals to be interviewed; Tr. 8225; the sheltering scenario was described to the interviewee, no actual or hypothetical message was used, Tr. 8226, and Dr. Luloff admits that a change in phraseology would affect the responses, Tr. 8226-29; the question as to following police instructions was phrased so neutrally as perhaps to invite a rebellious response; Tr. 8230-36; no written instructions were given to interviewers; Tr. 8236-37; controlling for age and sex in the interview process was apparently important, Tr. 8243-45, but age of interviewees was not asked, Tr. 8262, and admittedly age classification in many cases would thus be one of guessing, id.; and only drivers were interviewed on the assumption that the driver would make the decision to shelter or leave for the group, Tr. 8253, a questionable assumption, it would seem, Tr. 8254-61; App. Reb. No. 4, Post Tr. 9155 at 13-15.

7.1.23. The Beach Blanket Survey is without external or internal validity. App. Reb. No. 4, Post Tr. 9155, passim. It is not based on random sampling in any sense. Two conclusions follow from this: (1) there is no statistical theoretical basis for assuming that its conclusions are accurate and (2) the estimates of sampling error presented in the report are meaningless and have no statistical basis. The manner in which the sample was selected involves so many kinds of selectivity and unequal representation of persons on the beaches that the statistics calculated from the Beach Blanket Survey should not be trusted even to the extent of generalizing to the beach population on the days sampled. Obviously, generalization to other populations is not possible from such a blatantly nonrandom sample. App. Reb. No. 4 Post Tr. 9155 at 10.

7.1.24. Surveys of behavioral intentions such as the Beach Blanket Survey are of no validity to begin with. App. Reb. No. 4 Post Tr. 9155 at 10-11. The Beach Blanket Survey, however, sought to gather data on "facts" in addition to data on behavioral questions, but flaws of internal validity in the survey design and interview schedule were profound and numerous. There is little, if any, basis to conclude that the answers interviewees gave to the questions which they were asked can be taken as any measure of the factual data the Beach Blanket Survey sought to collect. App. Reb. No. 4 Post Tr. 9155 at 11-12.

7.1.25. Invalid, unreliable survey questions as are found in the Beach Blanket Survey are, in essence, a "rubber ruler," that is, the survey would not produce the same result were it replicated. App. Reb. No. 4 Post Tr. 9155 at 21.

7.1.26. As Dr. Luloff himself stated: "Given the small size of this survey, if you torture the data long enough, it will confess to virtually anything" Tr. 8265

7.1.27. Dr. Ceder testified that during an evacuation what he referred to as "unstable" driver behavior might affect the time in which evacuation could be accomplished. Ceder Dir., Post Tr. 5169 at 10-11. Mass. AG witness Olivera testified as to observations he has made as Salisbury, Massachusetts Police Chief where traffic jams have caused drivers to disobey passing restrictions; he also speculated that, without police or traffic guides, maintenance of a two-way traffic flow on Rtes. 1A and 286 would be difficult during an evacuation. Olivera Reb., Post Tr. 9483, passim.

7.1.28. There is no evidence that aberrant driver behavior has been a factor in any evacuation in United States history. Tr. 7485-86. See also Tr. 7774-75. This is consistent with the phenomenon of "collective identification" observed by sociologists during real emergencies wherein aberrant, anti-social and individual-focussed acts dramatically fall off. App. Reb. No. 2, Post Tr. 9407, passim.

7.1.29. In addition, IDYNEV, the model used to do the ETE, utilized a 15% reduction in capacity factor on all roads to

account for driver uncertainty and short term disruptions which can disrupt capacity. App. Dir. No. 7, Post Tr. 5622 at 61-62.

7.1.30. The most extensive testimony concerning human behavior during emergencies sponsored by the opponents of licensing was the testimony of et al. on role conflict and abandonment sponsored by Mass. AG. Ziegler et al. Dir., Post Tr. 7849 at 36-54.

7.1.31. It is the position of Ziegler et al., that "[A] substantial number of the workers necessary for implementation of the Plan will, in fact, not be available to perform their assigned duties, or will not be available promptly [because of role conflict and/or abandonment]." Ziegler et al. Dir., Post Tr. 7849 at 40.

7.1.32. Their reasons for this opinion are (1) research shows that at the time of a disaster families tend to want to be together, and evacuate together, and therefore it must be assumed that a number of emergency workers will return to their homes to join their families, Ziegler et al. Dir., Post Tr. 7849 at 40-41, (2) their claim that it is "well established in the disaster literature" that the majority of those who experience role conflict resolve it in favor of helping their family and abandoning their emergency worker role, id. at 41-43, (3) their view that apart from terrorism and war, radiation is the thing most feared by people, id. at 44, (4) their claim that there was emergency role abandonment during the TMI Accident in connection with hospital workers and others, id. at 44- 47, (5) surveys at

Shoreham and at Diablo Canyon of volunteer fire fighters, bus drivers and teachers showed that a significant percentage of each of these groups would first make sure their families were all right, id. 47-50, and (6) the results obtained in answer to survey questions asked in the SDA Survey, id. at 50-53.

7.1.33. Directing our attention to this last evidence first which Ziegler et al. referred to as the "strongest and most direct evidence" they apparently had, Ziegler et al. Dir., Post Tr. 7849 at 50, the Board notes that if one examines the actual data which appears in Attachment 5 to the Ziegler et al. testimony (Post Tr. 7851) at pages 26-28 (Questions 342, 344, 345) and the testimony at pages 50-53, the following is revealed: thirty or thirty-one people, compare Ziegler et al Dir. Post Tr. 7849 at 51 with Attach. 5, Post Tr. 7851 (Question 344 showing 30 people responding to the question), had emergency roles; 53% i.e., 15 or 16 said they would immediately report for duty in an emergency, see answers to Question 344, Attach. 5, Post Tr. 7851 at 27, 40% (or 13) said they would check on their families first, id. Of the 12 or 13 who said they would check on their families first, 73% or 10 said they would call home and tell the family to leave without them, Answers to Question 345, Attach. 5, Post Tr. 7851 at 28, 9% (or 1) said they would drive home to check on the family and 18% (or 2) said they would check some other way, id. And see Tr. 8017-19, 8022-24.

7.1.34. Computing the sampling errors used for the statistics on emergency workers, with the simplified formula used

by Dr. Cole for calculating the standard error, results for the most part in sampling variability almost as large as the calculated statistics. Tr. 8022-24. This itself renders the statistics unreliable. App. Reb. No. 3, Post Tr. 9154 at 15-16. In addition, the questions utilized appear to be of a nature that would lead to a large amount of bias being injected into the survey with a concomitant increase in error, id. at 16-28.

7.1.35. Ziegler et al. speculate that all of those who attempt to call home will fail to get through and then will go home. This is rank speculation and is unpersuasive of the point of view of Ziegler et al. as are the survey results themselves. Ziegler et al. Dir., Post Tr. 7849 at 52-53. This speculation was not based upon any information received from the telephone company serving the area. See Tr. 8024-30. Compare Tr. 7946-47. In fact, in the seacoast area of New Hampshire it is highly unlikely that emergency workers will experience lengthy delays in getting through to their families in light of the equipment which is utilized by the telephone company serving that area. App. Dir. No. 5, Post Tr. 8920 at 6-7.

7.1.36. Surveys of the nature of the SDA survey of course measure pre-emergency intentions and there is no evidence that pre-emergency intentions are a reliable predictor of actual behavior in an emergency. App. Reb. No. 3, Post Tr. 9154. Staff witness Urbanik also testified that surveys as to what persons will do in the future simply have not proved to be reliable predictors of what people will do in fact. Tr. 7493-95.

7.1.37. One example of alleged emergency role abandonment given by Ziegler et al. in hospitals was wholly unpersuasive and indeed admitted by the witnesses to be a misleading description of the event. Tr. 8012-17.

7.1.38. The Applicants have presented an analysis of the human behavior issue by Dr. Mileti. App. Dir. No. 7, Post Tr. 5622 at 93-189. According to Dr. Mileti, emergencies are, by definition, and in reference to human behavior, unique situations. Emergencies analogous to one at Seabrook which pose a collective threat to an entire community are, behaviorally, in a class by themselves. Mass emergencies such as these transform communities behaviorally at both the group and individual levels. Priorities of ongoing social life shift, goals and objectives are transformed, and identifications change. The first priority for virtually all people who find themselves in such a collective threat situation becomes the collective safety of people and the community at large. People abandon personal forms of identification and personal interests and they identify with the entire human collective or community that is threatened. This "shift" in the human character has come to be known by many names, for example, the "therapeutic community." App. Dir. No. 7, Post Tr. 5622 at 94-95.

7.1.39. Contrary to popular belief, natural and technological disasters are not usually accompanied by panic or total confusion. App. Reb. No. 5, Post Tr. 9408, passim.

7.1.40. The change or "shift" in the social psychological complexion of social life and human behavior results in a variety of principles that emerge to document the character of emergency behavior. This includes, for example, a dramatic decline in activities and behavior that run counter to the good of the collective and those that are based in individual or personal interests, and a dramatic increase in acts and behavior that bring people together to help one another. This "shift" would undoubtedly occur in an emergency at the Seabrook Plant; it has occurred in every mass emergency of this sort studied by social scientists where it has been a topic of investigation (and has been evidenced even in emergencies where it was not formally a topic of investigation). This general shift in human behavior in emergencies should be considered in planning for emergencies since it will characterize the basis for human behavior in future emergencies. App. Dir. No. 7, Post Tr. 5622 at 95.

7.1.41. The results of actual empirical research on human behavior in mass emergencies provide clear guidelines for planning for future emergencies. Public behavior is rational, and the emergency goals of helping themselves as well as others take precedence over almost all else; the character of human spirit is strong when faced with mass emergencies and most people rise to the occasion. In simple terms, the "thin veneer of civilization" is not stripped from humanity when mass emergencies are experienced (as one would conclude from observing disaster

movies); it is in fact strengthened. App. Dir. No. 7, Post Tr. 5622 at 96.

7.1.42. Applicants have presented persuasive evidence that transportation for those lacking transportation in other emergencies has been made readily available by family and friends. App. Dir. No. 7, Post Tr. 5622 at 96-98.

7.1.43. The general principles of human behavior in emergencies which have already been discussed are applicable to all types of analogous mass emergencies, and have been observed in climatological, geological and technological emergencies including the Three Mile Island accident. Interestingly, another frequent research finding is that many people are surprised, as they reflect back on their emergency experience, that they did not observe what they might have expected to observe, for example, panic, hysteria, selfish acts, conflicts over scarce resources, and so on. Expectations about human behavior in emergencies by most Americans are quite consistent and even the antithesis of actual human emergency behavior. The "myths" which permeate our society about emergency behavior are strong and likely explain why most people who experience an emergency are surprised to learn that "when the chips were down in our community people really pitched in to do their part and help one another." More often than not, locals attribute this inconsistency between what they would have expected and what they experienced to the "unique" character of their community's citizens. In fact, it is the general universal character of

social life which leads to what is observed. App. Dir. No. 7, Post Tr. 5622 at 98-99.

7.1.44. One consequence of the existence of strong myths in American culture about emergency behavior is that these myths can manifest themselves in a variety of specific concerns as planning occurs for future emergencies. The underlying and incorrect thesis on which these specific concerns rests is typically that emergencies bring out the "worst" in people who become more irrational, selfish, aberrant, helpless and so on. The empirical facts are that emergencies bring out the "best" in people who become more rational, altruistic, compassionate, helpful and so on. App. Dir. No. 7, Post Tr. 5622 at 99.

7.1.45. Dr. Mileti testified that he was aware of no empirical studies to document past behavior where sheltering was necessary, he was confident that people would make shelter available if that alternative were selected in a given situation; he attributed the lack of empirical data on this issue to the fact that obtaining shelter from persons with it has never been shown to be a problem in times of emergency. App. Dir. No. 7, Post Tr. 5622 at 101.

7.1.46. To the extent that NHRERP Rev. 2 and the ETE in particular assume that the public will be able to push cars off the road and accomplish other such tasks without specific direction, the plans "are based on a very accurate impression of public behavior in emergencies; for this is precisely what would

occur." App. Dir. No. 7, Post Tr. 5622 at 103. See also id. at 101-103.

7.1.47. In addition, data from TMI and evacuations not involving nuclear incidents show that accidents and traffic jams are not problems in vehicular evacuations. App. Dir. No. 7, Post Tr. 5622 at 103-105.

7.1.48. An elaborate body of empirical research accumulated over the last three decades exists regarding public emergency behavior in the United States in reference to geological, climatological and technological emergencies. This research base also includes many studies about public response to the 1979 emergency and evacuation at Three Mile Island. This record provides a clear basis for the conclusion that mass community-wide emergencies (the sort of emergency of concern in these hearings regarding the Seabrook Station) elicit altruistic public behavior. In such a circumstance the public would clearly share rides with other evacuees without transportation, share shelter with those in need of it, and help themselves and others to solve "problems" (such as pushing evacuation impediments like disabled cars out of the way) encountered during the emergency. App. Dir. No. 7, Post Tr. 5622 at 105.

7.1.49. The notion of "role conflict" is a concept in the social sciences based on the following ideas: Individuals in society play many different roles, and each role has certain rights and obligations in particular social relationships. Because each person plays many different roles, the rights and

obligations of one role may be consistent with those of another role, or irrelevant to or in "conflict" with another role. The concept of role "conflict" is generally used uncritically, as an either/or matter in which a person is forced to choose between two or more roles. Conflict implies equally weighted contradictory alternatives, requiring a person to choose one role to play while abandoning another. This condition is rarely, if ever, found in actual social life. A more accurate term is role "strain," which denotes the difficulty of role obligations at the same time. Role "strain" is preferable because it describes more accurately the actual conditions that people experience in all of social life, not just those of emergencies. Role "strain" is something with which people cope in most social situations and is a permanent feature of social life. App. Dir. No. 7, Post Tr. 5622 at 106-07.

7.1.50. It is important to distinguish between role strain, which is a mental state (a feeling of concern and unease), and role abandonment, which is a type of behavior. Thus, while it is to be expected that emergency workers would experience some role strain during an emergency at Seabrook, this does not mean that they would abandon their emergency roles because of it. App. Dir. No. 7, Post Tr. 5622 at 107.

7.1.51. There are a number of early studies which appear to have documented cases of emergency worker role abandonment. App. Dir. No. 7, Post Tr. 5622 at 107-11.

7.1.52. However, subsequent studies which inquired to a greater or lesser extent as to the question of whether the persons who were "abandoning" their roles were fully aware of their role and were trained for it, tended to demonstrate that a well-informed, well-trained emergency worker did not abandon his or her role in time of emergency to assist loved ones, but rather with some anguish for those persons carried on. App. Dir. No. 7, Post Tr. 5622 at 112-17; Tr. 6628; Tr. 6668.

7.1.53. The conclusions that can be reached regarding the role conflict and abandonment on the part of emergency workers are straightforward. First, when emergency work roles are "certain" -- perhaps through training and planning -- for emergency workers, role conflict in emergencies does not result in the abandonment of emergency work roles. Second, when emergency work roles are not clear or "certain" -- perhaps through a lack of training or planning -- for emergency workers, role conflict in emergencies can result in seeing would-be workers play more certain roles toward intimates before attending to emergency work. Third, role conflict for emergency workers on the job during an emergency can elicit psychological stress or at least concern about the safety of intimates; and workers can improvise, or emergency plans can formalize, ways that emergency workers can check on the safety of intimates. Conclusions such as these suggest that if emergency workers -- before disaster strikes -- have a clear and certain image of their emergency role which can be achieved through planning and training, that

emergency workers resolve role conflict in emergencies in favor of emergency work roles while improvising ways to check on the safety of intimates unless formalized ways to accomplish this same objective are drafted into emergency plans. This conclusion would certainly explain why researchers reported role conflict in emergencies resulting in role abandonment during times when emergency planning and training -- and consequent low levels of emergency worker role certainty -- were slight in American communities. It would also explain why other researchers found little role abandonment resulting from role conflict in more contemporary emergencies where emergency workers could have had more certain, pre-emergency notions about their emergency roles. It seems, therefore, that the abandonment of emergency work roles by emergency workers is not a problem in disasters if emergencies are prefaced by emergency worker training. It is, however, one very real reason among others why emergency planning and emergency worker training is essential. App. Dir. No. 7, Post Tr. 5622 at 117-19.

7.1.54. People who know in advance of an emergency that they have emergency roles to play (should one ever occur) are able to make informal family contingency plans in advance of the emergency. For example, families can make plans in advance of an emergency to ensure that -- in an emergency -- the non-emergency-worker spouse (or other appropriate person) will take the appropriate measures to protect the family unit in the

absence of the emergency worker. App. Dir. No. 7, Post Tr. 5622
at 120.

7.1.55. Emergency workers who are at home when an emergency begins will likely continue to play the roles they are performing at the time (for example, father, husband, wife, mother, and so on) for a brief period of time. These roles are played at the same time that decisions are made that enable them to feel free about separating from family members so that emergency roles can be performed. What might seem to be a potential for delay in reporting for duty is not, in operation, a real problem because (a) most emergencies do not begin with the need for immediate and dramatic actions like evacuation; emergency organizations can be mobilized in stages while families complete decision-making, with other family members or intimates assuming the potential family role obligations of the emergency worker who has reported for work; (b) most families include at least one other member who is competent (i.e., able to drive, listen to emergency information, and make decisions) and able to assume the potential family role responsibilities of the absent emergency worker; and (c) workers are typically anxious to resolve other responsibilities and report to their emergency work stations. Workers away from home when an emergency begins typically improvise ways to assure themselves of the safety of intimates while tending to their emergency job duties at the same time. App. Dir. No. 7, Post Tr. 5622 at 122-23.

7.1.56. In cases where persons are not assigned specific jobs, but rather know they are part of a pool to be drawn upon in an emergency, the data base that exists shows that the only problem that occurs is that of too many persons showing up, which, in turn, can create a management problem. App. Dir. No. 7, Post Tr. 5622 at 125; Tr. 6672, 6674.

7.1.57. Sergeant DeMarco of the Hampton Police Department made clear his view that any police officer on duty at the time of a radiological emergency would stay by his post and function to the best of his ability; and with respect to those off duty he thought that they might want to see to the safety of their families first but that thereafter they would report for duty. Tr. 3723. This anticipated phenomena compares well with empirical data cited in Dr. Mileti's analysis of past emergency responses. App. Dir. No. 7, Post Tr. 5622 at 118.

7.1.58. Certain cases of alleged role abandonment at TMI by medical personnel turn out on closer inspection to be examples of the consequences of lack of planning, but they do not constitute any role abandonment by a trained emergency worker. App. Dir. No. 7, Post Tr. 5622 at 131-37; Tr. 6598-92.

7.1.59. The argument that the "unique" nature of radiation will cause workers to behave differently in the situation of a nuclear power plant accident than might otherwise be the case, can be overcome by proper training and information. App. Dir. No. 7, Post Tr. 5622 at 137-40.

7.1.60. There is no basis for saying that the general public and/or the emergency workers involved at Seabrook are any different than the general public and/or emergency workers at any other nuclear power plant; see Tr. 6314; therefore, if one were to accept the thesis of Ziegler et al., one would have to subscribe to the theory that all emergency planning around all nuclear power plant sites was a useless exercise. Tr. 8091. See also Tr. 8092-95.

7.2. Rulings of Law

7.2.1. This Board must and does reject any claim that state and local officials will refuse to act to safeguard the health and safety of the public in the event of an emergency. In actual emergencies, state, local, and federal officials have invariably done their utmost to protect the citizenry, as two hundred years of American history amply demonstrate. Notice of Final Rule, 10 CFR Part 50, EVALUATION OF THE ADEQUACY OF OFF-SITE EMERGENCY PLANNING FOR NUCLEAR POWER PLANTS AT THE OPERATING LICENSE REVIEW STAGE WHERE STATE AND/OR LOCAL GOVERNMENTS DECLINE TO PARTICIPATE IN OFF-SITE EMERGENCY PLANNING, 52 Fed. Reg. 42078, 42065 (November 3, 1987).

7.3. Conclusions

7.3.1. The Board finds and rules that there is reasonable assurance that neither panic on the part of the general public nor role abandonment by emergency workers will prevent the carrying out of adequate emergency response in the event of a radiological emergency at Seabrook Station.

8. NOTIFICATION/COMMUNICATIONS

8.1. Findings of Fact

8.1.1. Three contentions raised issues with respect to Notification and Communications; these contentions are TOHF-4, NECNP-NHLP-4, and NECNP-NHLP-6. NECNP-NHLP-4 was withdrawn by stipulation, Post Tr. 8853, and need not be addressed herein.

8.1.2. The Applicants presented a panel of witnesses on this portion of the proceeding consisting of Messrs. Callendrello, Frechette, Sinclair and Strome joined by Gary J. Catapano, President of Allcom, Inc. (Qualifications, Post Tr. 8917) and Robert O. Nelson, District Manager of Network Operations for New Hampshire and Vermont for New England Telephone Company (Qualifications, Post Tr. 8918). App. Dir. No. 5, Post Tr. 8920, passim.

8.1.3. The Board finds that the panel was qualified and competent to testify in the area of concern.

8.1.4. In the event the Town of Hampton Falls (TOHF), upon initial notification, indicates it is unable to respond to a radiological emergency, the State of New Hampshire will provide compensatory assistance. The communications equipment to support assistance measures currently exists and is operational. This equipment is in place at the Incident Field Office (IFO) at Newington Station, at the Rockingham County Dispatch Center (RCDC) in Brentwood, and at other agencies assigned emergency responsibilities in the State assistance plan. App. Dir. No. 5, Post Tr. 8920 at 1-2.

8.1.5. For the purpose of implementing State assistance, the plan does not depend on direct communications between the State and local personnel in TOHF. The State can fully effectuate its assistance using extant communication equipment available to the emergency organizations with assigned responsibilities. App. Dir. No. 5, Post Tr. 8920 at 2.

8.1.6. Municipal security and traffic control within TOHF will be provided by the New Hampshire State Police. Each State Police cruiser is equipped with a multiple frequency radio which allows communication with Troop A, Epping. Troop A, in turn, can communicate with the IFO via the State police radio network to receive direction and provide regular reports. App. Dir. No. 5, Post Tr. 8920 at 2-3.

8.1.7. Transportation dispatch will be provided by a Rockingham County Sheriff's Deputy assigned to operate the local transportation staging area. Each deputy's vehicle will be equipped with a mobile radio on the Rockingham County Sheriff's Department frequency, allowing for communication with RCDC and the State Transportation Staging Area Command Post located at the Rockingham County Complex. The Rockingham County Sheriff's Department currently has 13 mobile radios with an additional eight scheduled for installation. Both RCDC and the State Transportation Staging Area Command Post can communicate with the IFO using commercial telephone lines, the NHOEM Command and Control Radio System, the Sheriff's Department (Sheriff's 4)

Radio System, and the Rockingham County local departments' (L4) Radio Systems. App. Dir. No. 5, Post Tr. 8920 at 3.

8.1.8. Verification of transportation requirements for special facilities and special needs individuals in TOHF will be accomplished by an assigned TOHF Local Liaison in the IFO. There are nine telephones in the IFO designated for use by local liaisons for all EPZ communities. App. Dir. No. 5, Post Tr. 8920 at 3.

8.1.9. The New Hampshire Office of Emergency Management has conducted a survey to determine the number of transit-dependent people in the EPZ. Results of the survey show that the total number of Exeter residents requiring transportation assistance is 279 (p. IV-29 of Exeter RERP), and the total number of Rye residents requiring transportation assistance is 104 (p. IV-26 of Rye RERP). App. Dir. No. 5, Post Tr. 8920 at 3-4.

8.1.10. Implementation of the relocation assistance aspect of the Exeter and Rye RERPs is not predicated upon the ability of the general public to contact their local EOCs. Individuals without private transportation in need of relocation assistance will receive instructions on how to obtain such assistance through Emergency Broadcast System (EBS) messages and pre-distributed Public Information Material (PIM), and not through telephone contact with emergency response personnel. Both public information sources are intended to obviate the need for individuals to use their telephone except under special circumstances. App. Dir. No. 5, Post Tr. 8920 at 4.

8.1.11. The pre-scripted EBS messages found in Appendix G, Volume 4 of the NHRERP state that persons requiring relocation assistance will receive transport to Reception Centers via buses traveling along emergency routes or pick-up points in their area. The bus routes and/or pick-up points are pre-designated and are depicted on the Emergency Plan Information Calendar mailed to every household in the EPZ. The calendar also instructs residents to tune to an Emergency Broadcast System station for the latest evacuation bus information. App. Dir. No. 5, Post Tr. 8920 at 4.

8.1.12. Further, the EBS messages also advise people to refrain from all use of telephones unless absolutely necessary. Indeed, the only persons who are specifically instructed to call local EOCs or the listed New Hampshire Office of Emergency Management number for transportation assistance, are those requiring special assistance. In Exeter this includes the homebound and disabled, who have not made previous arrangements with local emergency response officials, and persons who cannot walk to a bus or bus pick-up point. In Rye, this includes only the homebound and disabled, since buses will pick up persons at any point along the pre-designated bus routes. Since the state has pre-identified and registered individuals requiring special transportation through the Special Emergency Help Survey, calls from individuals who have failed to inform officials of their special needs are not expected to overload the telephone systems

designated to handle them. App. Dir. No. 5, Post Tr. 8920 at 4-5.

8.1.13. Currently, emergency communications can be provided by the 15 telephone lines in the Exeter EOC. Three telephone lines are set aside at the IFO to receive calls from individuals requiring transportation assistance. These telephone lines will provide adequate communications capabilities to implement the RERPs in each of the communities, including any communications necessary to provide relocation assistance in the event of an evacuation. App. Dir. No. 5, Post Tr. 8920 at 5-6.

8.1.14. People whose special transportation requirements have been pre-identified through the Special Emergency Help Survey have specific resources allocated for them and will be contacted to verify their transportation needs at the time of an emergency. As a result, these individuals are not expected to call their local EOC. App. Dir. No. 5, Post Tr. 8920 at 6.

8.1.15. In the event of a radiological emergency at Seabrook, the potential impact to New England Telephone Company's Central Offices in the Seabrook area would vary based on the number of calls generated by area customers. The Central Offices, which are nothing more than large computers, can process thousands of calls in any given hour. The worst case scenario would occur if everyone connected to a given Central Office (switching location) picked up the telephone simultaneously to originate a call. This scenario would result in some customers

having to wait. The length of time would be determined by the telephone network conditions and switching machine load. In any event, because the Central Office computer processes calls 1.1 milliseconds, some customers may wait a few minutes for dial tone. Again, this is if everyone tries to originate a call at the same time. App. Dir. No. 5, Post Tr. 8920 at 6-7.

8.1.16. In regard to Line Load Control, New England Telephone Company's policy is to serve customers and provide access to the network. When this network becomes overloaded, priority is given to essential services. This feature called "Dynamic Service Protection" is designed to protect certain lines with priority status during extended overloads. Dynamic Service Protection does not deny service to any line. It merely gives essential customers such as Fire, Police, and Medical providers priority service while other customers are served as rapidly as equipment becomes available. App. Dir. No. 5, Post Tr. 8920 at 7.

8.1.17. The Board finds that notification and communication matters have been properly addressed in the NHRERP Rev. 2.

8.2. Rulings of Law - None requested.

8.3. Conclusions

8.3.1. The Board rules that notification and communications aspects of the pertinent regulations have been satisfied.

9. CONCLUSION

9.1. The Board finds and rules that adequate measures can and will be taken to protect the public health and safety in the New Hampshire portion of the Seabrook Station EPZ in the event of an accident at Seabrook Station.

Respectfully submitted,



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CERTIFICATE OF SERVICE

I, Thomas G. Dignan, Jr., one of the attorneys for the Applicants herein, hereby certify that on March 1, 1988, I made service of the within document by depositing copies thereof with Federal Express, prepaid, for delivery to (or, where indicated, by depositing in the United States mail, first class postage paid, addressed to):

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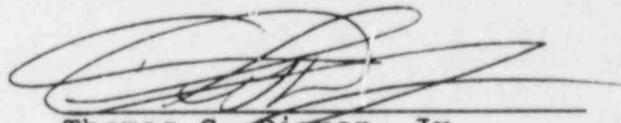
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