Appendix A: Approach to the Statement of Work

To review the critical preparedness components at Indian Point, Millstone and the affected jurisdictions in New York we conducted an outreach effort into the surrounding community, and reviewed public information efforts, previous exercise results for the site, current response plans and exercise data, and the data underlying the response plans, such as population data, evacuation time estimates, alert and notification system specifications, offsite accident impact analysis methodologies, and communication capabilities. Our approach to conducting this outreach effort and these reviews is described in the sections below.

Approach to Outreach

A significant part of our effort was outreach into the community at large. The purpose of this activity was three-fold: to assess the degree to which individuals and community groups and their members are aware and informed; to gain an understanding of the varied community concerns; and to solicit a range of ideas regarding the best way to resolve major issues. By interacting directly with the public, we also sought to establish the credibility, integrity, and validity of the review process and ourselves as its agents. Public education was not an objective of this effort, but may have occurred as a natural consequence.

To begin the process, JLWA met with each County Executive and their key staff to ensure high level understanding and support, and to establish trust and gather ideas for the overall approach. Based on these meetings and on input from the State, target groups for our outreach effort were identified.

Before beginning the concentrated outreach effort (September 9 through October 10) care was taken to obtain and review materials thought relevant by those wanting to close the plants. That was done for two purposes. Although those involved in the review are well aware of the issues involved in offsite safety around nuclear power plants, it was important to learn what plant opponents were specifically concerned about regarding Indian Point and Millstone, rather than assuming what their concerns might be based on our experience elsewhere. Studying that body of information prior to initiating the outreach also helped us to focus the questions we asked during subsequent outreach efforts.

Target groups included both public officials and private citizens, such as: elected and appointed officials of both the executive and legislative sides of local government; individuals with a role in implementation of the response plans; individuals with an interest in the issue from a public policy perspective; the general public; and the media. Those contacted usually fell into one or more of the following categories: fire, police, public works, schools, transportation, health care, business, private individuals and federal or state facilities. Although in the course of our review we had many occasions to interact with our colleagues in the emergency planning profession, they were not a specific target of our outreach into the community because of the purposes of that effort as described above.

Our approach to contacting the targeted individuals and groups was to obtain lists from the counties including current contact numbers and to make a quasi-random selection, keeping in mind the need for balance and the time limitations of the contract. These lists were supplemented by use of the internet or phone books as appropriate. Most of the contacts were in Westchester and Rockland Counties, where there was the greatest infrastructure, population at risk, planning difficulty and degree of County cooperation.

Those who have an interest in the issue from a public policy perspective and who were in favor of closing the plant often self-identified themselves by contacting us and asking for a meeting. Such groups we have labeled, for convenience and with no disparagement implied or intended, "advocacy groups." Their requests were honored. Subsequent recommendations that we meet with their associates for verification or elaboration were acted upon when the meeting was otherwise desirable and consistent with our overall approach.

Meetings with the general public were held where elected officials both expressed interest and were willing to activate the machinery of local government to make it happen. With few exceptions, the most vocal participants in these meetings were associated with advocacy groups or repeated the positions of advocacy groups. We know we cannot determine the beliefs and attitudes of the general public from such meetings. Nevertheless these meetings, when combined with individual and group interviews, were useful for revealing a higher than expected level of distrust of government and the plant within the community.

In each individual or group interview ideas for improvement were solicited and cards were left should participants want to submit information later. Upon learning that some might not share concerns for fear of retribution, we began to assure participants that the report would not contain names. With few exceptions the meetings were face-to-face and on-site. While phone interviews would have resulted in more interviews for a given expenditure of time and effort, they would be less likely to involve others on the staff who could contribute to the discussion, and the context, including the facility itself, would be less clear. Body language and facial expressions would have been missed. Being on-site and in person also allowed the interviewers to become well acquainted with the area, its population distribution, roads and traffic patterns.

While some of the purposes and approach outlined above applied to both Indian Point and Millstone, there were some major differences. Those differences trace back to the lack of a developed infrastructure and population concentration near to the plant, which is separated by water from New York. Discussions with those few primarily responsible for Fishers Island's response to an event at Millstone were quickly accomplished. Outreach did not end there however, because local officials on Long Island properly observed that while their residents were outside of the 10 mile EPZ, shadow evacuation would occur and create significant public safety issues. Consequently, consideration of these effects was appropriate even when shadow evacuation did not interfere with evacuation directed by responsible authorities. The purpose of our outreach beyond Fishers Island then was to learn of these effects so as to be able to recommend measures to address the public safety issues they raise.

Approach to Public Education and the Media

JLWA reviewed public information documents and communication materials to find out whether they informed and educated citizens. We examined the public education section of each county's emergency response plan and the emergency planning brochure that is sent to every household in the ten-mile EPZ. Additionally, we evaluated county websites, press releases, public announcements, and other communication materials.

Our approach to the media was to be responsive, accessible and thorough, whether initiating contact or answering a media request.

We began the media outreach by contacting as many local media representatives as possible to introduce ourselves, explain our role and provide any necessary background material. JLWA targeted the most appropriate media by obtaining media lists from the affected counties. To supplement these lists, we also made additional calls and researched the internet to locate other key media representatives. Finally, we researched past news stories to find other journalists who wrote about the issues.

When we contacted the media representatives, many were unaware of the review and its purpose. In these cases, we would inform them about the review and then direct them to the Governor's press releases for further explanation. We also told them that they could call us back with any additional questions. When the media contacted JLWA, we gave them information about the review and provided them pertinent websites that housed additional information. In some instances, we arranged interviews with James Lee Witt and/or the Program Manager.

After the initial contact to local media, some media requested periodic updates on the review. JLWA then contacted them before both the Indian Point drill and the exercise, offering them interviews with James Lee Witt and/or the Program Manager to explain how the review was being conducted and its emergency preparedness goals. Of those contacted, few knew about the drill or exercise and why either was being performed.

Approach to Historical Review

IEM completed a historical emergency planning review for Indian Point and the jurisdictions within its 10-mile emergency planning zone. The review is based on FEMA-certified exercise and Nuclear Regulatory Commission reports for 2002, 2001, 2000, 1999, 1998, and 1996. For Millstone, IEM reviewed Inspection and exercise reports from 2002, 2001, 2000, and 1997: IEM reviewed the Areas Requiring Corrective Action and Significant Findings identified in the reports and created tables so that FEMA and Nuclear Regulatory Commission report information will be accessible for future Indian Point exercises. The purpose of the review was to:

- Establish a historical baseline of findings that occurred during exercises at the state and local jurisdictions, and
- Identify findings within the departments responsible for radiological emergency preparedness at Indian Point and Millstone.

Also as part of the historical review, IEM gathered previous performance information and critical response milestone data for Indian Point and Millstone to establish baselines of previous performance information for the facilities.

Approach to Planning Review

In order to ensure that required the elements of emergency planning are addressed by the responsible jurisdictions, we reviewed the radiological emergency preparedness plans for the licensees and jurisdictions involved in coordinating emergency response for the nuclear plants in question. For Indian Point, this effort included a review of the plans for Indian Point, the State of New York, and Putnam, Rockland, Orange, and Westchester Counties. For Millstone, we reviewed emergency plans for the Millstone Power Station, the State of Connecticut, Fishers Island, and Suffolk County. In both cases, the primary focus was on determining the plans' regulatory compliance with Nuclear Regulatory Commission, FEMA, Code of Federal Regulations, and Environmental Protection Agency planning criteria.

Two exercises involving the safety of the communities surrounding Indian Point were held in September 2002. The first was a September 5 drill that was preparatory to the second, a full scale exercise held on September 24. For both exercises we stationed observers at each County EOC, the State EOC, the plant and the Joint News Center. Because there were also "out of sequence events" such as FEMA interviews at congregate care centers, we took the few opportunities available to us to observe these as well. We observed these events to evaluate communications, coordination, resources management, command and control, and personnel management. The exercise evaluations are part of the integrated plan review. The focus of this review is to evaluate how well licensee, county, and state plans and other identified organizations work together in a coordinated emergency response.

In addition to the exercise evaluation approach used by FEMA, we prepared a list of things to look for that was based on the objections of those who find the plans faulty. For example, one question was, "What explicit attention did they (decision makers) pay to shadow evacuation?" Another was, "What was assumed about the ability to move school populations before the general public became aware of the decision to evacuate?"

We were also interested in the effectiveness of the exercise program as it is presently constituted, and in particular whether a successful exercise is an indicator of a successful plan. Accordingly, our observers were asked to look at such things as the extent to which the scenario was realistic and was a test of participants' capabilities.

Our post-exercise evaluations followed the same approach, using the FEMA criteria supplemented by specific and widespread issues of concern regarding Indian Point.

Because Millstone had had a full scale exercise in 2002, the State initially requested we observe a special tabletop exercise focusing on communications. During the development of this exercise, however, Connecticut authorities were unable to devote the time and resources to the effort that would be required for a meaningful test. Consequently, no exercise related to Millstone was observed or evaluated.

Approach to Operations Review

JLWA/IEM reviewed critical portions of the planning basis for radiological emergency preparedness for Indian Point, Millstone, and the associated jurisdictions. Specifically, population basis information, evacuation time estimates, alert and notification system specifications, offsite accident impact analysis methodologies, and communications technology capabilities were reviewed. This involved the following:

- An independent verification of population estimates for permanent residents, transient populations, and special facilities within the 10-mile emergency planning zone of Indian Point, as well as within 2, 5, and 10-mile rings, 22.5 degree sectors, and emergency response and planning areas. For Millstone, IEM analyzed only those portions of the emergency planning zone located in New York.
- Review of the evacuation time estimate methodology being used by the contractor currently providing updated evacuation time estimate to the Indian Point facility. For Millstone, IEM evaluated the most recent ETE report provided.
- Evaluation of the adequacy of the alert and notification system and backup systems at Indian Point and Millstone, as well as the facilities' process of notification.
- Determination of the adequacy of the respective Indian Point and Millstone current dose assessment methodologies.
- Review of the adequacy of technology currently in place at Indian Point, Millstone, and their associated jurisdictions (based on observations and information provided), as well as the backup technologies and technologies in development; reviewers also provided recommendations for future use of emergency communications technology at these sites.

Appendix B: Detail on Offsite Accident Impact Analysis Review

Indian Point

JLWA/IEM completed a thorough review of relevant documentation and conducted detailed interviews and follow-up with Indian Point personnel responsible for offsite accident impact analysis in an emergency. Plans and associated administrative procedures were evaluated for technical soundness and completeness. Methods detailed were compared with Nuclear Regulatory Commission Standards and dispersion modeling and meteorological best practices. An evaluation was also done on how well the Indian Point methods handled effects local to the plant and surrounding area such as channeling of the airflow (or radiological plume if a release occurred) by the Hudson River Valley.

The information on the dose assessment methodology used at Indian Point was obtained from the following documents provided by the Indian Point:

- IP-EP-115, Emergency Plan Forms;
- IP-EP-510, Meteorological, Radiological, and Plant Data Acquisition System;
- IP-EP-620, Estimating Total Population Exposure;
- IP-EP-520, Modular Emergency Assessment and Notification System ;
- Selection of Air Monitoring Locations, Calculations of Dispersion Patterns for Diffusion Overlays, and Recommendation for a Meteorological Program to Satisfy A.E.C. Safety Guide 23 at Indian Point Power Generating Complex, prepared by Joseph Laznow, Mitchell M. Wurmbrand, and Edward J. Kaplan, for Consolidated Edison Co. of New York, Inc., New York, NY, July 31, 1972;
- Radioactive Release Overlays Based on Nuclear Regulatory Commission Pasquill Categories for Indian Point Station, prepared by Lester A. Cohen, Nuclear and Emissions Control, Engineering Department, Revised May 1977;
- Appendix 2, Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants
- Regulatory Guide 1.112, Calculation of Release of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors, U.S. Nuclear Regulatory Commission, Office of Standards Development, May 1977;
- Regulatory Guide 1.111, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, U.S. Nuclear Regulatory Commission, Office of Standards Development, May 1977;
- Regulatory Guide 1.111, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, U.S. Nuclear Regulatory Commission, Office of Standards Development, July 1977;

Additional Detail on Offsite Accident Impact Analysis at Indian Point

To estimate the noble gas release rate at the source of the accident using field monitoring readings, the following data are required:

- field data reading;
- location of the field data reading;
- sector where the field reading was taken (see discussion on population analysis for a description of "sectors");
- wind speed;
- normalized concentration at that location ($\chi U/Q$) (taken from the plant's dose assessment overlays and base map);
- dose factor based on time after shutdown .

The Hudson River Valley surrounding the Indian Point facility produces local effects that dominate the airflow in the region during conditions of weak-to-moderate synoptic pressure gradients (i.e., wind speeds less than 4 meters/sec). Under these conditions, the daytime air flow is predominately up-valley toward the N or NNE and the nighttime flow is predominately down-valley toward the S or SSW. The predominant direction of strong winds is from the WNW to NW, which pushes the winds across the valley toward the SE to ESE.[1, 2] The paper by Laznov, et. al., describes these conditions as determined by an experiment using balloons to track the airflow. Laznov combined airflow patterns with a calculation of the dispersion of the plume to produce a set of 18 map overlays that can be used along with 7.5-minute U.S. Geological Survey maps and some calculations to determine the expected pattern of doses. These were later revised by Cohen to produce the currently used set of 21 overlays.

The dose rate in millirem per hour (mrem/hr) at a point on the map downwind from the accident source is determined by multiplying by a conversion factor that depends on the time after shutdown for noble gas releases and on the iodine isotopes present for iodine releases. An additional factor is applied if the release contains significant particulates. The dose (mrem) is finally determined by multiplying by the release duration (hrs). These calculations are done at the site boundary and at distances of 2 miles, 5 miles, and 10 miles downwind. When field data of dose rate (mrem/hr) are obtained, an estimate of the release rate can be obtained by reversing the calculations just described.

New York State Dose Assessment Plan

IEM reviewed the State's plan and associated documentation on offsite impact analysis for accuracy and completeness, as well as for any specific content that was in conflict with Indian Point or Millstone's methodology.

[1] Laznow, *et. al*, 1972, *op. cit.*
[2] Coehn, 1977, *op. cit*.

The State of New York uses an explicit methodology for offsite impact analysis that is different from both Indian Point and Millstone. Specifically, the State uses the Radiological Assessment System for Consequence Analysis (RASCAL) model. RASCAL is a software modeling system that runs on a computer. It takes input from a meteorological source and information about the potential or actual radiological release and calculates effects of the radiological plume on population that is threatened. IEM evaluated the accuracy and suitability of RASCAL and made a determination on whether or not RASCAL was used in accordance with Nuclear Regulatory Commission methodology. IEM further reviewed the expected accuracy of results, along with uncertainties associated with model predictions. Specifically, IEM also reviewed how well RASCAL handled local effects such as river valley channeling of airflow at lower wind speeds.

If RASCAL cannot be run for some reason, the New York REP plan describes other dose estimating procedures based on the diffusion overlays and base maps provided by the Indian Point. The procedures are detailed as follows:

- If a release is anticipated, but no material has yet been released, or no data from monitors within the plant are available, the dose can be estimated using the type of accident, the final safety analysis report (final safety analysis report) accident analysis and estimated dose projections, the meteorological data (atmospheric stability, wind speed, and wind direction), and the diffusion overlays and base map. This methodology is fairly crude, but seems reasonable when there is no real data available. As stated in the plans, the results from this dose assessment would be updated when more data becomes available.
- If release rate information is obtained from monitors or direct measurements taken within the plant, the dose can be estimated using the release rate, meteorological data, diffusion overlays, duration of exposure, time after shutdown, and data from the Response Technical Manual and Environmental Protection Agency Protective Action Guidelines Manual.
- If gamma exposure rate information is obtained from offsite monitoring data, the dose can be estimated using the gamma exposure rate, meteorological data, diffusion overlays and base map, and exposure time. To include decay of radionuclides, the time after reactor shutdown and data from the RTM and Environmental Protection Agency protective action guidelines manual would be used.
- If the nuclide concentration is known and the release is at ground-level and under average or unknown meteorological conditions, the dose can be estimated using pre-calculated doses at 0.25 and 1 mile from a 1 μCi release, assumed average meteorological conditions (D stability, 4 mph wind speed, no rain), dose conversion factors from the RTM, and activity of each isotope. The dose can be adjusted for distance, elevation, and rain. If the nuclide concentration is known and the meteorological conditions are also known, the dose can be estimated using the release rate of each isotope, data from the RTM, exposure duration, and average wind speed. Again, the dose can be adjusted for distance, elevation and rain.

Meteorological Data Handling

IEM reviewed the procedures for obtaining current meteorological data associated with dose assessment at Indian Point, Millstone and the State of New York. IEM evaluated how the meteorological data were collected, where towers and instruments were located or sited, the type

of instrumentation used on the towers, and calibration/maintenance schedules or other procedures for ensuring proper operation. IEM also looked specifically at how atmospheric stability (a measure of turbulence in the air) was calculated during an accident, how meteorological data was transmitted to the dose assessor, redundant sources of meteorological information and how power was supplied to instruments.

The primary source of meteorological data at Indian Point is a 400-foot tower located in the southern corner of Indian Point Energy Center immediately southwest of the IPEC Training Center.[3] This tower has instrument packages at 10 meters, 60 meters, and 122 meters above ground. Each package measures temperature, dew point, wind speed, and wind direction. Wind speed and direction are measured by a Climatronics Model F460 cup anemometer and wind vanes. Precipitation is also measured at a height of 1 meter. Pasquill stability class is calculated based on the 10-meter and 122-meter instrument levels, but can also be computed from the 10-meter and 60-meter levels. Data are logged at the tower and transmitted by an auto feed to the Emergency Operations Facility by way of land lines and optical fibers for storage on a mainframe computer. The data logger computes stability and finds 15-minute averages for use in the impact analysis.

A secondary, backup source of meteorological data is a tower located about 1,200 feet northeast of the primary tower, about halfway between the two power reactors. This tower measures wind speed and direction and sigma theta at 10 meters above ground. The instruments are similar to those on the main tower.

A third set of meteorological instruments is located on the top of the Emergency Operations Facility building. These instruments measure wind speed and direction and sigma theta. The wind flow to these instruments is obstructed by the Emergency Operations Facility, but data from these instruments are logged and monitored and can be used in the event that data from the other two towers are not available.

[3] Information on the meteorological data at Indian Point was obtained during a phone conversation between IEM and Entergy on November 1, 2002.

Appendix C: Individual Plan Review Compliance Matrices

The tables in this section contain the findings noted during the individual reviews of the radiological emergency plans for the following organizations:

- Indian Point Energy Center
- State of New York
- Putnam County
- Rockland County
- Orange County
- Westchester County
- Millstone Power Station
- State of Connecticut
- Fishers Island
- Suffolk County

The plan document for each organization was evaluated for its compliance with planning criteria from the following organizations: the Nuclear Regulator Commission, the FEMA, the Code of Federal Regulations, and the Environmental Protection Agency. For each requirement listed in the tables, the individual plan was assigned a rating of "Met" or "Not Met."

Please Note:
To facilitate review of the matrices, in the following tables any requirement which the particular organization was judged as having satisfactorily "Met" with no other comment from the reviewer has been removed. The following tables contain only those items which each organization was judged to have "Not Met" or only "Partially Met", as well as any requirements ("Met", "Partially Met", or "Not Met") for which the reviewer included a comment.

Compliance Review Matrix for Indian Point Facility

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.1.a—Identifies State, Local, Federal, and private sector organizations that are part of the overall response organization	NUREG 0654	2.A.1.a	Met	It would be helpful to have a consolidated table of all organizations involved in the response, since that information does not appear in one place in the plan. Specific tasks for State agencies are discussed in the State Plan. No federal agencies are listed. Presumably, the US Department of Agriculture (USDA) or the Department of Health and Human Services (DHHS) might have a role in some scenarios. Also, West Point is in the 10-mile emergency planning zone; there may be other federal facilities as well.
II.A.1.b—Concept of Operations and relationship to the total effort specified for all parties with an operational role	NUREG 0654	2.A.1.b	Met	The plan would benefit from significant expansion on this issue. Most of the relevant concept of operations (CONOPS) information appears elsewhere in the plan. This would be a good section for consolidating that information and defining what is expected.
II.A.1.c—Interrelationships in response organization illustrated in a block diagram in the plan	NUREG 0654	Figure A-1	Met	The plant relies on the State or FEMA to contact other ingestion pathway states according to the diagram provided.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.B.1—Onsite emergency organization of plant staff personnel for all shifts and its relation to the responsibilities and duties of the normal staff complement is specified	NUREG 0654	2.B.1	Met	The plan provides sufficient separate detail about both organizations; however, it would be helpful to provide discussion about how the emergency response organization (ERO) compares to the normal staffing organization.
II.B.2—Emergency Coordinator designated for all shifts who has authority and responsibility to initiate emergency actions, including providing protective action recommendations.	NUREG 0654	2.B.2	Met	The plan would benefit from more emphasis on the responsibility of the Emergency Coordinator to make protective action recommendations.
II.B.3—Line of succession established for Emergency Coordinator position. Specific conditions established for higher-level utility officials to assume this function.	NUREG 0654	2.B.3	Met	The plan provides details concerning the succession of the Emergency Director (ED) after activation of the ERO; however, there is no detail or contingency in the plan if the initial on-call ED is not able to be reached. (Note: This may appear in the Implementing Procedures, which were not available to this reviewer.)
II.B.8—Contractor and private organizations who may be requested to provide technical assistance and augmentation of the emergency organization are specified.	NUREG 0654	2.B.8	Met	The plan references a number of supporting organizations. Additionally, it states that letters of agreement (not required) appear in Appendix 2, which was not provided to the reviewer.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.C.1.b—Specific Federal resource needs expected and anticipated arrival time for them are specified	NUREG 0654	2.C.1.b 2.A.1.a	Partially Met	While the types of assistance that can be provided by NRC, DOE, FEMA, EPA, U.S. Coast Guard, and National Weather Service are outlined in section 2.A.1.a of the final IPEC Emergency Plan dated 8/29/02, the expected resource needs from these agencies are not specified. The anticipated arrival times is noted for DOE/Brookhaven (3 hours), but not for other agencies.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.C.1.c—Licensee, Local, and State resources available to support the Federal response, e.g. air fields, command posts, telephone lines, radio frequencies, etc., are specified.	NUREG 0654	2.C.1.c 2.A.1.a	Not Met	Section 2.A.1.a (Federal Agencies) in the final IPEC Emergency Plan dated 8/29/02 notes that Westchester Co. Airport can supply facilities for air transportation. Section 2.C.1.c notes that space is available to accomodate NRC (TSC, EOF/AEOF) and FEMA representatives (EOF/AEOF) and that equipment and communications capability are available. Section 2.C.1.c then notes only: “In addition to Indian Point facilities and equipment, State and local facilities and equipment are available to support the Federal response.” The information alluded to in the requirement (e.g. air fields [other than Westchester Co.], command posts [other than for NRC and FEMA], telephone lines, radio frequencies, etc.) is not specified. It may be argued that the IPEC Plan does not need to contain specific State and Local resources, but since the Emergency Director may be the one requesting Federal assistance, this information should be readily available to him to facilitate timely Federal response.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.C.3—Radiological labs, their capabilities, and expected availability to provide radiological monitoring and analysis services in an emergency are specified.	NUREG 0654	2.C.3 Appendix 2	Not Met	This section does not provide specifics concerning the labs and their capabilities/availability. Section 2.C.3 of the the final IPEC Emergency Plan dated 8/29/02 states: "In addition to Indian Point's radiological assessment facilities, other Entergy power plants in the area may be utilized to analyze inplant and offsite environmental samples. Offsite analytical assistance may be requested from State and Federal agencies and other utilities if the offsite radiological monitoring and environmental sampling operation exceeds the capacity of the Indian Point capabilities." A letter from DOE/Brookhaven stating that individual LOAs are no longer necessary is included in Appendix 2 of the final IPEC Emergency Plan. Nevertheless, the plan does not provide specifics concerning the capabilities/availability of the other labs mentioned in Section 2.C, so the requirement is not met. If the capacity of Indian Point capabilities were exceeded in this area, this information could be assembled when needed, but the purpose of emergency response planning is to prepare this information in advance so that, in the case of an emergency, response operations would not be impeded while this information was gathered.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.D.1—An emergency classification and emergency action level scheme has been established. The plan identifies parameter values and equipment status for each emergency class.	NUREG 0654	2.D.1	Met	Sufficient detail is provided in the plan. Additional information appears in the Implementing Procedures.
II.D.2—The initiating conditions for emergency classification and EALs include the example conditions in Appendix 1 and all postulated accidents in the FSAR for the nuclear facility	NUREG 0654	2.D.2	Met	Sufficient detail is provided in the plan. Additional information appears in the Implementing Procedures.
II.E.3—Contents of initial emergency messages to be sent from the plant have been established with State and Local organizations. It shall include information about: Class of emergency Whether a release is taking place Potentially affected population/areas Whether protective measures may be necessary	NUREG 0654	2.E.3 IP-EP-115	Met	Part I of the NY State Radiological Emergency Data Form is used.
II.E.6—Each organization has established a system for public warning within the 10-mile emergency planning zone. Licensee is responsible for demonstrating that means exist for doing so. State and Local governments are responsible for activating such a system	NUREG 0654	2.E.6	Met	No backup means is specified in the plan for activating the sirens in a given County if the encoder equipment or radio transmitter/repeater prevents the EOC from activating sirens. While such a contingency is not required by regulation to be in the plan, consideration should be given to establishing one if one does not already exist.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.F.3—Each organization shall conduct periodic testing of the entire emergency communications system (see evaluation criteria H.10, N.2.a, and Appendix 3)	NUREG 0654	2.F.1 2.N.2	Met	While this regulation was technically met, during the 9/5/02 exercise it was openly noted that an operational problem with the Executive Hotline was known for at least 4+ months and not corrected--indicating a need to review the efficacy of the test and follow-up process.
II.G.2—The public information program shall provide the permanent and transient adult population within the plume exposure emergency planning zone an adequate opportunity to become aware of the information annually. The programs should include provision for written material that is likely to be available in a residence during an emergency. Updated information shall be disseminated at least annually. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway emergency planning zone, appropriate information that would be helpful if an emergency or accident occurs. Such notices should refer the transient to the telephone directory or other source of local emergency information and guide the visitor to appropriate radio and television frequencies.	NUREG 0654	2.G.2	Partially Met	There are indications that the 2001 booklet missed a significant portion of the permanent population. County booklets are not available on an Indian Point website, though they are available on the Westchester County website. According to IP emergency preparedness personnel, school programs are not used to reaching parents through their children. There is no evidence of a coordinated program to inform the large population that commutes into the 10-mile emergency planning zone to work. Section 2.G.2 (Public Education Materials) of the IPEC Emergency Plan dated 8/29/02 states that “an advertisement containing the specified information has been prepared for insertion in telephone books, and for use as a posting in such places as motels, hotels, and workplaces. Siren information stickers are also distributed to provide information for the transient population.” However, during a visit to

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
				Indian Point on February 13, 2002, an IEM employee did not notice signage posted for the purpose of providing appropriate information that would be helpful to transient populations if an emergency or accident occurs. IEM is aware of an effort by Westchester County to post evacuation route information at bus stops. On this same visit, the IEM employee did not notice any evident public information material posted in his hotel room or lobby, which was located within several miles of the Indian Point Energy Center. Entergy noted that siren information stickers have been prepared and provided to the counties, but the counties are responsible for distribution to the transient population. It is worth noting that as of 2/24/03, the Entergy website used to provide information to the public about emergency planning and nuclear safety (www.safesecurevital.com) still does not provide links to electronic versions of the emergency information booklets. It appears that Entergy is making appropriate efforts in this area with regard to aspects within their control, but as noted by Entergy, improvements are needed.
II.G.3.a—Each principal organization shall designate the points of contact and physical locations for use by news media during an emergency.	NUREG 0654	2.G.3.a	Met	The Indian Point Corporate Spokesperson is the only POC noted in the plan.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.G.3.b—Each licensee shall provide space which may be used for a limited number of the news media at the nearsite EOF.	NUREG 0654		Not Met	While details may be discussed in the Implementing Procedures (not provided to this reviewer), there is no discussion of this issue in the plan, and no evidence presented during the exercise.
II.G.4—A spokesperson is designated who should have access to all necessary information. Arrangements are established for timely exchange of information among designated spokespersons. Coordinated rumor control processes have been established.	NUREG 0654	2.G.4	Met	The plan assumes all rumors will be identified by the Joint News Center staff. The plan should also address rumor identification by plant staff or other Entergy officials (as actually occurred during the 9/24/02 exercise). Everyone in the ERO should be aware of the rumor control process.
II.G.5—Each organization shall conduct coordinated programs at least annually to acquaint news media with the emergency plans, information concerning radiation, and points of contact for release of public information in an emergency.	NUREG 0654	2.G.5	Met	This outreach was planned prior to the 9/24/02 exercise.
II.H.4—Each organization shall provide for timely activation and staffing of the facilities and centers described in the plan.	NUREG 0654	2.H.1 2.H.2 2.E.1	Met	The plan calls for the Technical Support Center (TSC), Operational Support Center (OSC), and Emergency Cperations Facility (EOF) to be activated with minimum staff within 60 minutes following declaration of an Alert, Site Area Emergency (SAE), or General Emergency (GE). The estimated time of 60 minutes may be overly optimistic, given the potential for delays in reaching the site by necessary personnel during an event.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.H.6—Each licensee shall make provision to acquire data from or for emergency access to offsite monitoring and analysis equipment including: Geophysical phenomena monitors Radiological monitors Laboratory facilities, fixed or mobile	NUREG 0654	2.H.7	Met	Additionally, the plan should list consultants available for seismic monitoring backup support.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.H.11—Each plan shall, in an appendix, include identification of emergency kits by general category (protective equipment, communications equipment, radiological monitoring equipment and emergency supplies.	NUREG 0654	Table H-1	Met	The level of information provided in the plan concerning this issue fulfills the regulation, but would be of questionable use during an event. The plan does note that more detailed information is provided in the Implementing Procedures. Clarification should be sought concerning the Nuclear Regulatory Commission/FEMA intent underlying this requirement to determine the appropriate amount of detail that should be included in the plan.
II.I.6—Each licensee shall establish the methodology for determining the release rate/projected doses if the instrumentation used for assessment are offscale or inoperable.	NUREG 0654	2.I.6	Met	A methodology is stated in the plan. No details are provided in this section, although the topic is covered in the dose assessment Implementing Procedures.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.I.7—Each organization shall describe the capability and resources for field monitoring within the plume exposure emergency planning zone which are an intrinsic part of the concept of operations for the facility.	NUREG 0654	2.I.7	Met	The description provided in this section is minimal. The following information would also be useful in this section:: • The number of field teams that can be dispatched from Indian Point if needed • A map of Reuter Stokes Monitor locations • A map of Thermoluminescent Dosimeter (TLD) locations • A map of Air Sampler locations
II.I.9—Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure emergency planning zone as low as 10^{-7} uCi/cc under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detectable capability.	NUREG 0654	2.I.9	Met	The required capability is stated in the plan, but no detailed information is provided regarding how this detection/ measurement is to be accomplished. The plan states that further details appear in the Implementing Procedures.
II.I.10—Each organization shall establish means for relating the various measured parameters (contamination and activity levels, etc.) to dose rates for key isotopes (Table 3, pg. 18) and gross radioactivity measurements. Provisions shall be made for estimating integrated dose from the projected and actual dose rates and for comparing these estimates with the protective action guides. The detailed provisions shall be described in separate procedures.	NUREG 0654	2.I.10	Met	Dose assessment procedures are being assessed in a different part of this review.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.2—Each licensee shall make provisions for evacuation routes and transportation for onsite individuals to some suitable offsite location, including alternatives for inclement weather, high traffic density and specific radiological conditions.	NUREG 0654	2.J.2	Met	This issue is discussed briefly in the plan sufficient to meet the requirement; the plan states that further details are provided in the Implementing Procedures.
II.J.7—Each licensee shall establish a mechanism for recommending protective actions to the appropriate State and Local authorities. These shall include Emergency Action Levels corresponding to projected dose to the population at risk….. Prompt notification shall be made directly to the offsite authorities responsible for implementing protective measures within the plume exposure pathway emergency planning zone.	NUREG 0654	2.J.7	Met	Protective action recommendations for the plume exposure pathway are based on EPA Protective Action Guides discussed in EPA-400-R-92-001. The plant procedure for making protective action recommendations only factors in meteorological conditions, not road conditions or other similar factors. The process defaults to evacuation protective action recommendations downwind. Counties are expected to be aware of that fact in making protective action decisions (protective action decisions).
II.J.8—Each licensee's plan shall contain time estimates for evacuation within the plume exposure emergency planning zone. These shall be in accordance with Appendix 4.	NUREG 0654	2.J.8	Met	Note: The evacuation time estimate update is expected to be completed by KLD in late December 2002.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.10—The organization's plans to implement protective measures for the plume exposure pathway shall include: Maps showing evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas Maps showing population distribution around the nuclear facility. This shall also be by evacuation areas (licensees shall also present the information in a sector format) Means for notifying all segments of the transient and resident population	NUREG 0654	2.J.10	Partially Met	The current Evacuation Travel Time Estimates (ETTE) report for Indian Point dated May 1994 contains maps showing evacuation routes, evacuation areas (ERPAs), and population by ERPA. The monitoring points for Indian Point are listed in IP-1015, Rev. 10 dated 9/19/02, "Radiological Monitoring Outside the Protected Area." Entergy claims that the relocation centers in host areas and the shelter areas are offsite issues and are listed in each county's plans, though NUREG-0654 does not make this distinction. As the entire ETTE document is not included in Appendix 5 of the IPEC emergency plan, this reference seems too far from a plan or procedure to call this requirement met. We recommend Entergy consider centering all the required map informaton in the IPEC Emergency Plan, or at least adding specific pointers in the plan to where the maps are located for reference by the reader.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.10.m—Bases for the choice of recommended protective actions from the plume exposure pathway during emergency conditions. **This shall include expected local protection afforded** in residential units or other shelter for direct and inhalation exposure, as well as evacuation time estimates.	NUREG 0654	2.J.10.m	Met	This requirement was met, but without the proper emphasis. It appears that the plant never issues a sheltering protective action recommendation. If the State would make a sheltering protective action recommendation under certain conditions, it might be advisable to document those conditions and ensure that the plant's protective action recommendations are in line with them.
II.K.1—Each licensee shall establish onsite exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides (EPA 400-R-92-001) for: removal of injured persons, undertaking corrective actions, performing assessment actions, providing first aid, performing personnel decontamination, providing ambulance service, and providing medical treatment services.	NUREG 0654	2.K.1	Met	It would be helpful to specify where the bulleted activities fall into the table of more general activities provided in the plan.
II.K.2—Each licensee shall provide an onsite radiation protection program to be implemented during emergencies, including methods to implement exposure guidelines. The plan shall identify individual(s), by position or title, who can authorize emergency workers to receive doses in excess of 10CFR20 limits. Procedures should be worked out in advance for permitting onsite volunteers to receive radiation exposures in the course of carrying out lifesaving and other emergency activities. These procedures shall include expeditious decision making and a reasonable consideration of the relative risks.	NUREG 0654	2.K.1 2.K.2	Met	The plan discusses this issue in sufficient detail to satisfy the regulation, and refers to the Implementing Procedures for more information. However, the content of the procedures was not available to the reviewer and could not be evaluated.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.K.7—Each licensee shall provide the capability for decontaminating relocated onsite personnel, including provisions for extra clothing and decontaminants suitable for the type of decontamination expected, with particular attention given to radioiodine contamination of the skin.	NUREG 0654	2.K.7	Met	The plan discusses this issue in sufficient detail to satisfy the regulation; it is assumed that more specific information appears in the Implementing Procedures, but this could not be verified. Also, because decontamination is routinely performed in nuclear plants for radiation workers, it is assumed that the plant has established protocols for decontamination.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.N.1.b—An exercise shall include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident scenario requiring response. The organization shall provide for a Federal and State observers/evaluators. The scenario should be varied from year to year such that all major elements of the plans and preparedness organizations are tested within a five-year period. Each organization should make provisions to start an exercise between 6:00PM and midnight, and another between midnight and 6:00AM once every six years. Exercises should be conducted under various weather conditions. Some exercises should be unannounced.	NUREG 0654	2.N.1.b	Partially Met	The final IPEC EP dated 8/29/02 does not specifically mention varying the exercise weather conditions, but IPEC provided evidence on the follow up EOF visit conducted in February 2003 that exercises and drills do in fact use a variety of weather inputs. There appears to be an inconsistency in plan content versus the standard as concerns the 5-year period for varying elements of the plan. The IPEC EP dated 8/29/02 states that the exercising follows a 6-year cycle. Further, the IPEC EP states that at least one exercise is conducted every six years between 6:00 p.m. and 4:00 a.m, while the standard calls for two exercises during different time periods as specified at left. If the regulator has provided dispensation on the frequency and timing of the night exercises, it is not evident in the plan. It is recommended that a statement be included in plan section 2.N.1.b that exercises are conducted under varying weather conditions. It is also recommended that the plan clarifiy whether provisions are made for one or two night exercises, and if only one, what dispensation was provided to deviate from the NUREG standard. In our view, that would be the easiest way to satisfy this requirement.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.N.2.a—Communication Drills. Communications with State/Local governments within the plume exposure pathway emergency planning zone shall be tested monthly. Communications with Federal ER organizations and States within the ingestion pathway shall be tested quarterly. Communications between the nuclear facility, state and local EOC's and field assessment teams shall be tested annually. Communication drills shall also include the aspect of understanding the content of messages.	NUREG 0654	2.N.2.a	Not Met	There is no mention in the plan of testing communication with any other States in the 50-mile ingestion pathway. The NY State Radiological Emergency Response Plan (dated February 2001), Procedure F, Section 2.3 addressed quarterly testing of communications links with other States within the ingestion pathway, but this requirement in NUREG-0654 is noted as applicable to plant plans. As this requirement is not discussed at all in the IPEC Emergency Plan, it is still not met for the plant plan. However, it does not represent a significant public health and safety issue. It is recommended that Entergy modify the IPEC Emergency Plan, in coordination with NY SEMO, to note that the State performs the communications drill to meet this requirement.
II.N.2.b.—Fire Drills. Fire Drills shall be conducted in accordance with the plant technical specifications	NUREG 0654	2.N.2.b	Met	It would be good to note the governing technical specifications and any applicable procedures if no information about the frequency of fire drills is provided in the plan.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.N.2.d—Radiological Monitoring Drills. Plant environs and radiological monitoring drills (onsite and offsite) shall be conducted annually. These drills shall include collection and analysis of all sample media and provisions for communications and record keeping. The state drills need not be at each site. Where appropriate, local organizations shall participate.	NUREG 0654	2.N.2.d	Not Met	There is no mention in the plan of local participation in annual drills.
II.N.2.e(1)—Health Physics Drills. Health Physics drills shall be conducted semi-annually which involve response to and analysis of simulated elevated airborne and liquid samples and direct radiation measurements in the environment. The state drills need not be at each site.	NUREG 0654	2.N.2.e	Not Met	The plan only states that water samples "may" be included.
II.N.2.e(2)—Health Physics Drills. Analysis of in plant liquid samples with actual elevated radiation levels including use of the post-accident sampling system shall be included in Health Physics drills by licensees annually.	NUREG 0654	2.N.2.e	Not Met	The plan only says water samples "may" be included.
II.N.3—Each organization shall describe how exercises are to be carried out to allow free play for decision making and to meet the following objectives. Pending the development of exercise scenarios and exercise evaluation guidance by Nuclear Regulatory Commission and FEMA the scenarios for use in exercises and drills shall include but not be limited to the following: The basic objective of each drill and exercise and appropriate evaluations criteria; The date(s), time period, place(s) and participating organizations; The simulated events;	NUREG 0654	2.N.3	Partially Met	A description of how "free play" is implemented into exercises is not provided in the plan. Section 2.N.1.a of the final IPEC Emergency Plan dated 8/29/02 states that, "For exercises involving only partial participation by these agencies (offsite), emphasis is placed on development and conduct of an exercise that is more mechanistically and operationally realistic. Players will be able, by implementing appropriate procedures and corrective actions, to deterimine the outcome of the scenario to a greater

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
A time schedule of real and simulated initiating events; A narrative summary describing the conduct of the exercises or drills to include such things as simulated casualties, offsite fire department assistance, rescue of personnel, use of protective clothing, deployment of radiological monitoring teams and public information activities; A description of the arrangements for and advance materials to be provided to official observers.				extent than when core damage and the release of radioactivity are prerequisites for demonstration of all objectives." This is the only discussion at all relating to "free play" in the Section 2.N. Section 2.N.3 does not discuss how "free play" is implemented into exercises. Though the IPEC Emergency Plan states that free play will be incorporated, the the plan does not "describe how exercises are to be carried out to allow free play for decision making and to meet the following objectives," as specified in the requirement. The FINAL Offsite Extent-Of-Play for the September 24, 2002 Indian Point 2 Full-Participation Exercise, dated 8/12/02, contains a set of Extent-Of-Play Ground Rules noting that free play messages will be developed and injected during the exercise. However, extent-of-play agreements are not part of the plan. These documents are typically developed with a limited set of "trusted agents," see limited distribution, and are not normally maintained "on the shelf" with emergency plans and procedures. If Entergy would include the information about free plan in the Extent-Of-Play Ground Rules in the IPEC Emergency Plan, this requirement would be fully met. As it is, the requirement is only partially met.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.O.3—Training for individuals assigned to licensee first aid teams shall include courses equivalent to Red Cross Multi-Media.	NUREG 0654	2.O.3	Not Met	No discussion of the first aid training provided or its equivalency to Red Cross training appears in the plan. Entergy claims this requirement is addressed in the IPEC training program. However, multiple attempts to verify that claim had not connected as of 2/26/03.
II.O.4.f—First aid and rescue personnel	NUREG 0654	2.O.4.f	Not Met	Training for first aid and rescue personnel is not discussed in Section 2.O.3, which is referenced here. Entergy claims this requirement is addressed in the Indian Point training program. However, multiple attempts to verify that claim had not connected as of 2/26/03.
II.O.4.h—Medical Support personnel	NUREG 0654		Not Met	Training for medical support personnel is not discussed in the plan. Entergy claims this requirement is addressed in the Indian Point training program. However, multiple attempts to verify that claim had not connected as of 2/26/03.
II.O.4.i—Licensee headquarters support personnel	NUREG 0654		Not Met	Training for licensee headquarters support personnel is not discussed in the plan. Entergy claims this requirement is addressed in the Indian Point training program. However, multiple attempts to verify that claim had not connected as of 2/26/03.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.P.5—The emergency response plans and approved changes to the plans shall be forwarded to all organizations and appropriate individuals with responsibility for implementation of the plans. Revised pages shall be dated and marked to show where changes have been made.	NUREG 0654	2.P.5	Met	The plan states that copies of the Indian Point plan and procedures are forwarded to the Nuclear Regulatory Commission and county and State agencies involved with the planning effort. While other federal agencies besides Nuclear Regulatory Commission do not have direct responsibility for implementing the Indian Point plan, perhaps consideration should be given to providing copies of the plan to other federal agencies and facilities that might be involved in a large-scale release. While a process may already be in place to accomplish this, it is not discussed here.
II.P.6—Each plan shall contain a detailed listing of supporting plans and their source.	NUREG 0654	2.P.6	Met	A list of the plans directly supporting the Indian Point plan is provided; however, it may be desirable to include the next tier of subordinate plans which support those listed here, since those next-tier plans indirectly support the Indian Point plan.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.P.9—Each licensee shall arrange for and conduct independent reviews of the Emergency preparedness program at least every 12 months. The review shall include the emergency plan, its implementing procedures and practices, training readiness testing, equipment and interfaces with State and local governments. Management controls shall be implemented for evaluation and corrections of review findings. The result of the review, along with recommendations for improvements, shall be documented, reported to appropriate licensee corporate and plant management, and involve Federal, State and local organizations and be retained for a period of five years.	NUREG 0654	2.P.9	Met	The audit approach, using the IP Nuclear Quality Assurance organization, meets the letter of the requirement. However, the intent of this review is directed at improvement of the emergency response system. Therefore, it would be advisable to use reviewers outside of the IP organization with emergency management and planning expertise to maximize potential benefits. Such expertise could be obtained from other Entergy-owned plants, from other utility companies, or from outside consultants. IP brought in a consultant with this expertise to observe their 9/5/02 practice exercise.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Potential Exposure pathways, populations at risk and projected doses	EPA 400 1.4 (1-6)		Not Met	There did not appear to be any mention of projected doses from an event in the plan. Indian Point Energy Center, as a licensee, is technically not required to comply with the EPA 400 Protective Action Guidance document. However, the rest of the Indian Point REP community is using the guidance to varying degree in support of their emergency planning. Since that community may be interested in the integrated planning and consistency aspects of the application of EPA 400 guidance, IEM evaluated IPEC on the same 17 EPA 400 criteria as was used in the State and county compliance matrices. This is not intended to mislead the reader as to IPEC's level of regulatory compliiance. Rather, it is to provide an opportunity for the community to evaluate preparedness enhancement options outside the plant regulatory space, and to stimulate discussion with the plant as applicable.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Cost analysis and radiological decontamination data to form a basis for radiation protection decisions and for recovery.	EPA 400 1.4 (1-7) Appendix C		Not Met	There did not appear to be any cost analysis discussion in the plan. Indian Point Energy Center, as a licensee, is technically not required to comply with the EPA 400 Protective Action Guidance document. However, the rest of the Indian Point REP community is using the guidance to varying degree in support of their emergency planning. Since that community may be interested in the integrated planning and consistency aspects of the application of EPA 400 guidance, IEM evaluated IPEC on the same 17 EPA 400 criteria as was used in the State and county compliance matrices. This is not intended to mislead the reader as to IPEC's level of regulatory compliiance. Rather, it is to provide an opportunity for the community to evaluate preparedness enhancement options outside the plant regulatory space, and to stimulate discussion with the plant as applicable.
Exposure pathways identified and consistent.	EPA 400 2.4; 2.5	2.J.10.m	Met	These are also discussed in more detail in the Dose Assessment Procedures and Accident Assessment Section.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Coordination and recommendations based on plant conditions, for early evacuations and/or sheltering in pre-designated areas. Early estimates of the various components of projected doses to the population at the site area boundary as well as more distant locations. Estimated time frames as soon as relevant source or release data becomes available.	EPA 400 4.1 (4-1)		Met	During the observed exercise, this aspect was coordinated with the local/State authorities and made available on a timely basis. Offsite notifications are covered for the plant in 10 CFR Appendix E Part 50
Designation of an emergency planning zone zone for protective action for plume exposure.	EPA 400 5.2.2 (5-3)		Met	10 CFR Appendix E Part 50 applies to the plant portion of the requirements for the emergency planning zone.
Air sampling techniques/flow rates/ time in plume/ analysis information.	EPA 400 5.3	2.I	Met	The plan refers to the details which appropriately appear in the Implementing Procedures.
Documentation of sequence of events	EPA 400 7.1.3 (7-4)		Met	There appeared to be no requirement for this documentation in the plan. However, a process is discussed in the Implementing Procedures, and its implementation was observed throughout the exercise.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Recommendations for surface contamination limits.	EPA 400 7.6.3 7.6.1		Not Met	No mention of this issue was found in the plan. Indian Point Energy Center, as a licensee, is technically not required to comply with the EPA 400 Protective Action Guidance document. However, the rest of the Indian Point REP community is using the guidance to varying degree in support of their emergency planning. Since that community may be interested in the integrated planning and consistency aspects of the application of EPA 400 guidance, IEM evaluated IPEC on the same 17 EPA 400 criteria as was used in the State and county compliance matrices. This is not intended to mislead the reader as to IPEC's level of regulatory compliiance. Rather, it is to provide an opportunity for the community to evaluate preparedness enhancement options outside the plant regulatory space, and to stimulate discussion with the plant as applicable.
Dispatching information for radiological monitoring teams.	10 CFR App. E Pt. 50	2.I	Met	Specific dispatching information is not included in the plan, but should appear in the Field Monitoring Implementing Procedures. The practice of providing this information was observed during both exercises.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Equipment used (can include diagrams and operational procedures)	10 CFR App. E Pt. 50	Table H-1	Met	The plan provides sufficient information to meet the requirement; however, additional detail regarding the equipment used might be beneficial in an event.
Facilities and supplies at the site for decontamination	10 CFR App. E Pt. 50	2.L	Met	The only decontamination facility that appears to be mentioned in the plan is the Unit 3 first aid room. If other resources are available onsite, they should be mentioned.
Medical Supplies for first aid treatment on site	10 CFR App. E Pt. 50	2.L	Met	The requirement is met, but the plan contains little description of the first aid supplies on hand and no information about the quantities of such supplies. Details may be provided in the Implementing Procedures.

Compliance Review Matrix for the State of New York

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.1.a—Identifies State, Local, Federal, and private sector organizations that are part of the overall response organization	NUREG 0654	Sect. I-IV 1-2,1-2,1-3, 1-2	Met	This section discusses this information in great detail.
II.A.1.e—Provisions made for 24 hour manning of communications links and 24 hour/day emergency response	NUREG 0654	Sect. III 3,22 Proc. B	Met	This section also references each respective county's radiological emergency preparedness program protocol.
II.A.3— Written agreements between various organizations with emergency response roles are included in the plan or the plan includes descriptions of the letters and a signature page from the cooperating organizations.	NUREG 0654	Appx. E 1	Not Met	The plan refers to Letters of Agreement provided in a separate appendix, as permitted by NUREG-0654. However, because the reviewer was not provided with a copy of the appendix, the content and currency of the LOAs could not be verified
II.A.4—24-hour operational capability for a protracted period has been planned for (personnel, food, supplies, etc.) and person responsible for assuring continuity of resources (technical, admin., material) is specified by title.	NUREG 0654	Sect. III 3	Met	This capability is referred to as the Resource Continuity Organization in the plan.
II.E.2—Procedures have been established for alerting, notifying, and mobilizing emergency response personnel.	NUREG 0654	Proc B All Sect III 22,24 Proc. D	Met	These procedures are well established in the plan.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.E.7—Draft messages to the public giving instructions with regard to specific protective actions to be taken by occupants of affected areas shall be prepared and included as part of the State and Local plans. Such messages should include the appropriate aspects of sheltering, ad hoc respiratory protection (handkerchief over mouth, etc.) thyroid blocking, or evacuation.	NUREG 0654	Sect III 6,25 Proc C All Proc B All	Met	This section also refers to the site Joint News Center (JNC) procedures.
II.F.1—The communication plans for emergencies shall include all organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local and State response organizations. Such systems should be selected to be compatible with one another. (See NUREG-0654 for detailed requirements)	NUREG 0654	Sect III 5,20,22,24 App G 12-14 Proc. B All Sect III 5 Proc H	Met	This section also refers to the Nuclear Facility Operator (NFO) Site Emergency Plan.
II.G.1—Each organization shall provide a coordinated periodic (at least annually) dissemination of information to the public regarding how they will be notified and what their actions should be in an emergency. This information shall include, but not necessarily be limited to: educational information on radiation contact for additional information Protective measures special needs of the handicapped	NUREG 0654	Sect II 7 Proc C Att. 5 Proc C 1-3	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the county radiological emergency preparedness program plans on this issue.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.G.2—The public information program shall provide the permanent and transient adult population within the plume exposure emergency planning zone an adequate opportunity to become aware of the information annually. The programs should include provision for written material that is likely to be available in a residence during an emergency. Updated information shall be disseminated at least annually. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway emergency planning zone, appropriate information that would be helpful if an emergency or accident occurs. Such notices should refer the transient to the telephone directory or other source of local emergency information and guide the visitor to appropriate radio and television frequencies.	NUREG 0654	Proc C Proc E	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the county radiological emergency preparedness program plans on this issue.
II.G.3.a—Each principal organization shall designate the points of contact and physical locations for use by news media during an emergency.	NUREG 0654	Sect III 10 Proc C 1-3 Att 1	Met	The State plan contains sufficient detail to meet the requirement. This section also refers to the Joint News Center (JNC) procedures.
II.G.4—A spokesperson is designated who should have access to all necessary information. Arrangements are established for timely exchange of information among designated spokespersons. Coordinated rumor control processes have been established.	NUREG 0654	Proc. C 1-3 Sect III 10	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the county radiological emergency preparedness program plans on this issue.
II.H.3—Each organization shall establish an emergency operations center for use in directing and controlling response functions.	NUREG 0654	Proc. D Sect III 20	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the county radiological emergency preparedness program plans on this issue.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.H.4—Each organization shall provide for timely activation and staffing of the facilities and centers described in the plan.	NUREG 0654	Proc B,D, H Sect III 20	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the county radiological emergency preparedness program plans on this issue.
II.H.7—Each organization, where appropriate, shall provide for offsite radiological monitoring equipment in the vicinity of the nuclear facility.	NUREG 0654	App. G 8,9,14,15 Proc. M	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the county radiological emergency preparedness program plans on this issue.
II.I.8—Each organization, where appropriate, shall provide methods, equipment and expertise to make rapid assessments of the actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways. This shall include activation, notification means, field team composition, transportation, communication, monitoring equipment, and estimated deployment times.	NUREG 0654	Assigned to respective counties.	Met	The State Plan assigns this requirement to the respective county radiological emergency preparedness program.
II.I.9—Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure emergency planning zone as low as 10^{-7} uCi/cc under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detectable capability.	NUREG 0654	Assigned to respective counties	Met	The State Plan assigns this requirement to the respective county radiological emergency preparedness program.
II.J.2—Each licensee shall make provisions for evacuation routes and transportation for onsite individuals to some suitable offsite location, including alternatives for inclement weather, high traffic density and specific radiological conditions.	NUREG 0654	Sect III, 11	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the Nuclear Facility Operator (NFO) and County emergency plan on this issue.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.10—The organization's plans to implement protective measures for the plume exposure pathway shall include: Maps showing evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas Maps showing population distribution around the nuclear facility. This shall also be by evacuation areas (licensees shall also present the information in a sector format) Means for notifying all segments of the transient and resident population	NUREG 0654	Proc. B,C,E Sect III 6,7,10,11,25	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers heavily to the county radiological emergency preparedness program plan on this issue.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.10—Plans to implement protective measures for the 10-mile emergency planning zone shall include: Means for protecting those persons whose mobility may be impaired due to such factors as institutional or other confinement (State & Local only) Provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons within the 10-mile emergency planning zone who may not be able to evacuate immediately Method by which decisions by the State Health Department for administering radioprotective drugs to the general population are made during an emergency and the pre-determined conditions under which such drugs may be used by offsite emergency workers Means of relocation Relocation centers in host areas which are at least 5 miles and preferably 10 miles beyond the boundaries of the plume exposure emergency planning zone (see J.12) Projected traffic capacities of evacuation routes under emergency conditions Control of access to evacuated areas and organization responsibilities for such control Identification and means for dealing with potential impediments to use of evacuation routes, and contingency measures Time estimates for evacuation of various sectors and distances based on a dynamic analysis for the plume exposure pathway emergency planning zone (See Appendix 4)	NUREG 0654	Proc. E 2 Sect III 34 Proc G 8 & Att. 7 Proc. G 8,9 Sect III 11,12 Sect III 14	Met	The State plan refers to the County radiological emergency preparedness program plans and respective site evacuation travel time estimates.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.12—Each organization shall describe the means for registering and monitoring of evacuees at relocation centers in host areas. The personnel and equipment available should be capable of monitoring within about a 12 hour period all residents and transients in the plume exposure emergency planning zone arriving at relocation centers.	NUREG 0654	Sect III 12	Met	The State plan contains sufficient detail to meet the requirement. The State plan also refers to the county radiological emergency preparedness program plans on this issue.
II.L.4—Each organization shall arrange for transporting victims of radiological accidents to medical support facilities.	NUREG 0654	Sect III 13	Met	The State plan refers to the county radiological emergency preparedness program plans (EMS Section) on this issue.
Evacuation (urgent removal of persons/animals) and Sheltering (supplemented by bathing and changing of clothes) to protect the public from exposure to direct radiation and inhalation from airborne plume	EPA 400 1-3 2.3.1 5.5.1 5.5.2 5.5.3 Appendix E	Assigned to respective counties	Met	The State Plan assigns this requirement to the respective county radiological emergency preparedness program.
Relocation and decontamination for protection against whole body dose (external exposure) due to deposited material and from inhalation of any resuspended radioactive particulate.	EPA 400 1.4 Appendix E	Sect III 11,12	Met	Note that relocation and evacuation are two distinct actions. The State plan also refers to the county radiological emergency preparedness plans.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
All PAG's should be consistent for all of the population.	EPA 400 2.1 (2-2)	Sect I 4 Sect III 7,8,26-41 Sect IV 7,8	Not Met	All PAGs are consistent for all of the population except for prisons and prisoner considerations.
Mechanism for obtaining detailed content of the plume.	EPA 400 2.2 (2-4)	Assigned to respective counties	Met	The State plan assigns this requirement to the respective county radiological emergency preparedness program.
Coordination and recommendations based on plant conditions, for early evacuations and/or sheltering in pre-designated areas. Early estimates of the various components of projected doses to the population at the site area boundary as well as more distant locations. Estimated time frames as soon as relevant source or release data becomes available.	EPA 400 4.1 (4-1)	Sect I 4 Sect III 7, 8, 26-41 Sect IV 7, 8	Met	Recommendations were coordinated with the local/State authorities and made available on a timely basis. Offsite notifications are covered for the plant in 10 CFR Appendix E Part 50. The State plan refers to the county radiological emergency preparedness program.
Designation of an emergency planning zone zone for protective action for plume exposure.	EPA 400 5.2.2 (5-3)	Assigned to respective counties	Met	The State plan assigns this requirement to the respective county radiological emergency preparedness program.
Establishment of Exposure Patterns using atmospheric transports and field teams including plume tracking.	EPA 400 5.2.2 (5-4)	Assigned to respective counties	Met	The State Plan assigns this requirement to the respective county radiological emergency preparedness program.
Air sampling techniques/flow rates/ time in plume/ analysis information.	EPA 400 5.3	Assigned to respective counties	Met	The State plan assigns this requirement to the respective county radiological emergency preparedness program.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Procedures for calculating dose conversion factors and derived response levels.	EPA 400 5.4; 5.6	Assigned to respective counties	Met	The State plan assigns this requirement to the respective county radiological emergency preparedness program.
Documentation of sequence of events	EPA 400 7.1.3 (7-4)		Not Met	The State's methodology for event documentation is not specified in the plan.
Recommendations for surface contamination limits.	EPA 400 7.6.3 7.6.1	Assigned to respective counties	Met	The State plan assigns this requirement to the respective county radiological emergency preparedness program.
Dosemetric models, agricultural transport models, dietary intake and other calculations relating to potential dose.	EPA 400 7.6.2 7.4 7.3 Appendix B	Sect III 9,26-33 Proc H Proc J Sect III 34-41 Proc K Proc L	Met	The State plan refers to the county radiological emergency preparedness program plans on this issue.
Disseminating information to the public	10 CFR App. E Pt. 50	Proc C 1-3 Sect III 10	Met	The State plan refers to the county radiological emergency preparedness program plans on this issue.

Compliance Review Matrix for Putnam County

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.1.a—Identification of Response Organizations	NUREG-0654	I.5; III.3; Figure III-1; Table III-3a; Table III-3b	Met	Tables III-3a and III-3b are an excellent display of primary and secondary responsibilities.
II.A.1.c—Organizational Interrelationships Block Diagram	NUREG-0654	Figure III-1; Procedures 1-4, 7-9: Appendix 2, 3; Procedures 5, 6, 10: Appendix 3	Met	Individual organizational block diagrams add good detail to the plan.
II.A.3—Written agreements between various organizations with emergency response roles are included in the plan or the plan includes descriptions of the letters and a signature page from the cooperating organizations.	NUREG-0654	II.2.b; Appendix K	Not Met	The plan refers to Letters of Agreement provided in a separate appendix, as permitted by NUREG-0654. However, because the reviewer was not provided with a copy of the appendix, the content and currency of the LOAs could not be verified.
II.C.1.c—Resources to Support Federal Response	NUREG-0654	I.5.b	Met	The County plan refers to the State REPP plan on this issue.
Potential Exposure Pathways, Populations at Risk, and Projected Dose	EPA 400: 1.4 (1-6)	Refers to State EOP; (Field Monitoring, etc.) I.4.b, III.2.f, III.3.n, Appx. M, Proc. 4, Sec. 4.0, 5.0, 6.0, Att. 4	Met	Capabilities for field monitoring and plume exposure in the emergency planning zone exist; however, information on the potential populations affected and the projected dose comes from the State EOC.

[1] Location of NUREG-0654 requirements is based on the *Putnam County Radiological Emergency Response Plan (Revised 04/02)* Appendix L (NUREG-0654 Cross Reference and Procedure Cross Reference).

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Incident Evaluation Presented to Authorities for Action	EPA 400: 1.4 (1-7)	I.4.b, III.2.f, III.3.n, Appx. M, Proc. 4, Sec. 4.0, 5.0, 6.0, Att. 4	Met	Again, this issue is presented to the State for evaluation and determination via field teams.
Estimate of Total Dose Received Prior to Relocation of Population	EPA 400: 2.1.3 (2-3)	Refers to State plan.	Met	Dose projections are provided via the State Radiological Health Agency located at the State EOC.
Exposure Pathways Identified and Consistent	EPA 400: 2.4; 2.5	Refers to State plan.	Met	The County plan refers to the State REPP plan and states "Not Applicable" ("N/A") in relation to tracking of the radioactive plume using State and/or Federal resources.
Procedures for Calculating Dose Conversion Factors and Derived Response Levels	EPA 400: 5.4; 5.6	Refers to State plan.	Met	The County plan refers to the State REPP plan for Health Physics dose calculations.
Dosemetric Models, Agricultural Transport Models, Dietary Intake and Other Calculations Relating to Potential Dose	EPA 400: 7.6.2, 7.4, 7.3, Appendix B	Refers to State plan.	Met	The County Plan refers to the State REPP plan for Health Physics dose calculations

Compliance Review Matrix for Rockland County

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.3—Written agreements between various organizations with emergency response roles are included in the plan or the plan includes descriptions of the letters and a signature page from the cooperating organizations.	NUREG 0654	APPENDIX K	Not Met	Appendix K contains a list of the letters of agreement, which are kept under separate cover. While the County does have copies of the letters of agreement and provided them to the reviewer upon request, their maintenance under separate cover technically does not fulfill the requirement in NUREG-0654.
II.C.1.c—Licensee, Local, and State resources available to support the Federal response, e.g. air fields, command posts, telephone lines, radio frequencies, etc., are specified.	NUREG 0654		Not Met	There did not appear to be any mention of resources available to support Federal response.
II.F.3—Each organization shall conduct periodic testing of the entire emergency communications system (see evaluation criteria H.10, N.2.a, and Appendix 3)	NUREG 0654	III—12—13 Section (8)	Met	While the plan does not look at evaluation criteria, it does mentions testing procedures.
II.H.10—Each organization shall make provisions to inspect, inventory, and operationally check emergency equipment/instruments at least once each calendar quarter and after each use.	NUREG 0654	II—2.A Appendix G	Not Met	The plan only mentions periodic updates for inspecting, inventorying, and checking equipment.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.2—Each licensee shall make provisions for evacuation routes and transportation for onsite individuals to some suitable offsite location, including alternatives for inclement weather, high traffic density and specific radiological conditions.	NUREG 0654	Appendix D	Met	The plan includes detailed information for evacuating from Rockland County. The Indian Point plan should contain information about evacuation of onsite individuals.
II.K.4—Each State and local organization shall establish the decision chain for authorizing emergency workers to incur exposures in excess of the EPA General Public Protective Action Guides (for emergency workers and lifesaving activities).	NUREG 0654	DOH 7 5.3.6	Met	The plan does establish such a decision chain, but it does not provide a very clear discussion of how it will work.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.N.1.b—An exercise shall include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident scenario requiring response. The organization shall provide for a Federal and State observers/evaluators. The scenario should be varied from year to year such that all major elements of the plans and preparedness organizations are tested within a five-year period. Each organization should make provisions to start an exercise between 6:00PM and midnight, and another between midnight and 6:00AM once every six years. Exercises should be conducted under various weather conditions. Some exercises should be unannounced.	NUREG 0654	Admin 3	Not Met	Rockland County calls for elements of the Plan and all preparedness organizations to be tested every 6 years rather than every 5 years as specified in the regulation.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.N.2.a—Communication Drills. Communications with State/Local governments within the plume exposure pathway emergency planning zone shall be tested monthly. Communications with Federal ER organizations and States within the ingestion pathway shall be tested quarterly. Communications between the nuclear facility, state and local EOC's and field assessment teams shall be tested annually. Communication drills shall also include the aspect of understanding the content of messages.	NUREG 0654	Admin 3	Met	The requirement is met, but only minimal details are provided in the plan.
II.N.2.c—Medical Emergency Drills. A medical emergency drill involving a simulated contaminated individual, which contains provisions for participation by the local support services agencies shall be conducted annually. The offsite portions of the medical drill may be performed as part of the requires annual exercise.	NUREG 0654	Admin 3	Met	The requirement is met, but only minimal details are provided in the plan.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.N.2.d—Radiological Monitoring Drills. Plant environs and radiological monitoring drills (onsite and offsite) shall be conducted annually. These drills shall include collection and analysis of all sample media and provisions for communications and record keeping. The state drills need not be at each site. Where appropriate, local organizations shall participate.	NUREG 0654	Admin 3	Met	The requirement is met, but only minimal details are provided in the plan.
II.P.10—Each organization shall provide for updating telephone numbers in emergency procedures at least quarterly.	NUREG 0654	Admin 7	Met	Time sensitivity for the updating of information is not mentioned.
Protective action for Milk Supply	EPA 400 1-3 & App D DHHS FDA Vol. 47, #205 FDA 82-8196		Not Applicable	Appendix H mentions milk as a method for taking KI, but there is no discussion of protection of the milk supply. However, this is a State responsibility.
Relocation and decontamination for protection against whole body dose (external exposure) due to deposited material and from inhalation of any resuspended radioactive particulate.	EPA 400 1.4 Appendix E	DOH—2 5.5	Met	Note that relocation and evacuation are two distinct actions.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Cost analysis and radiological decontamination data to form a basis for radiation protection decisions and for recovery.	EPA 400 1.4 (1-7) Appendix C		Not Met	The plan does not appear to discuss data collection for cost analysis.
Estimate of total doses received prior to relocation of population.	EPA 400 2.1.3 (2-3)	III—20 7.A	Met	The requirement is met, but the discussion is not very clear.

Compliance Review Matrix for Orange County

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.1.a—Identifies State, Local, Federal, and private sector organizations that are part of the overall response organization.	NUREG 0654	I.5, III.3 Figure III-1a, III-1b Table III-3a, III-3b	Met	Figures III-1a and III-1b are not titled in the report.
II.A.3—Written agreements between various organizations with emergency response roles are included in the plan or the plan includes descriptions of the letters and a signature page from the cooperating organizations.	NUREG 0654	I.6 Appendix M	Not Met	The plan refers to Letters of Agreement provided in a separate appendix, as permitted by NUREG-0654. However, because the reviewer was not provided with a copy of the appendix, the content and currency of the LOAs could not be verified.
II.A.4—24-hour operational capability for a protracted period has been planned for (personnel, food, supplies, etc.) and person responsible for assuring continuity of resources (technical, admin., material) is specified by title.	NUREG 0654	II.2, III.2.b, III.3.a	Not Met	While the plan does treat the issue of 24-hour capability, no specific mention of planning for food resources appears in the sections.
II.C.1.c—Licensee, Local, and State resources available to support the Federal response, e.g. air fields, command posts, telephone lines, radio frequencies, etc., are specified.	NUREG 0654	I.5.b 1.6	Met	Section I.5 does not have a listing of the agencies. State responsibilities/ agencies receive more complete treatment in Section I.6

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.E.5—System established for disseminating appropriate information from licensee to the public, including appropriate notification to the media, e.g., EAS.	NUREG 0654	I.4.e, II.2.d, III.2.d, III.2.e, III.2.h (4), III.2.h (7), III.3.j Procedure 1, Section 7 Procedure 2, Section 7	Met	Although mentioned in the County plan addressing the criteria, III.2.h (4), actually deals with the evacuation procedure and not with notification.
II.E.7—Draft messages to the public giving instructions with regard to specific protective actions to be taken by occupants of affected areas shall be prepared and included as part of the State and Local plans. Such messages should include the appropriate aspects of sheltering, ad hoc respiratory protection (handkerchief over mouth, etc.) thyroid blocking, or evacuation.	NUREG 0654	III.2.e (1) III.3.b, III.3.j Appendix B	Met	Appendix B provides the draft messages. Other sections of the plan dealing with this issue are mostly focused on notification procedure and agencies involved in the process.
II.F.1—The communication plans for emergencies shall include all organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local and State response organizations. Such systems should be selected to be compatible with one another. (See NUREG-0654 for detailed requirements).	NUREG 0654	III.2.c, III.2.b, III.3.b, III.3.e Appendix E Appendix L Figure III-1 Figure III-2 Table III-3a Table III-3b	Met	III.3.b deals with Alert & Notification, which is redundant here.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.G.5—Each organization shall conduct coordinated programs at least annually to acquaint news media with the emergency plans, information concerning radiation, and points of contact for release of public information in an emergency.	NUREG 0654	II.2.f	Met	While this requirement is met, no mention is made of the frequency of this operation.
II.J.10—The organization's plans to implement protective measures for the plume exposure pathway shall include: Maps showing evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas Maps showing population distribution around the nuclear facility. This shall also be by evacuation areas (licensees shall also present the information in a sector format) Means for notifying all segments of the transient and resident population.	NUREG 0654	Appendix R (inserted map) Procedure 5, Attachment 8 Procedure 4, Attachment 5 Appendix S Appendix F Appendix I Procedure 2, Attachment 5 III.2.h, III.3.b, III.2.d, Procedure 1, Section 7.0 Procedure 2, Section 7.0 Procedure 4, Attachment 1 Procedure 5, Attachment 1	Met	The Map in Procedure 2, Attachment 5 is difficult to read. Too many details are incorporated within the same map.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.K.4—Each State and local organization shall establish the decision chain for authorizing emergency workers to incur exposures in excess of the EPA General Public Protective Action Guides (for emergency workers and lifesaving activities).	NUREG 0654	III.2.g Procedure 3, Attachment 6	Met	III.2.g (1) specifically deals with emergency workers.
II.P.4—Each organization shall update its plan and agreements as needed, review and certify it to be current on an annual basis. The update shall take into account changes identified by drills and exercises.	NUREG 0654	II.2.a Procedure 11	Met	No specific required intervals/frequencies for updating the plan are mentioned.
Protective action for milk supply	EPA 400 1-3 & App D DHHS FDA Vol. 47, #205 FDA 82-8196		Not Applicable	There is no mention of protective action for the milk supply. While some sections do talk about protective action for livestock, there is no discussion specific to milk supplies. However, this is a State responsibility. It should be noted that according to the USDA National Agricultural Statistics Service, Orange County does have dairy cattle.
Relocation and decontamination for protection against whole body dose (external exposure) due to deposited material and from inhalation of any resuspended radioactive particulate.	EPA 400 1.4 Appendix E	Procedure 3, Attachment 7 Procedure 10, Attachment 8	Met	Note that relocation and evacuation are two distinct actions.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Restrictions on the use of contaminated food and water.	EPA 400 1-5 Ch.3,Appdx D DHHS FDA Vol. 47, #205 FDA 82-8196	Procedure 3, Attachments 7, 8	Met	This issue has not been highlighted in the plan as a protective action against contamination.
Notification of Authorities. Identification of Principle agencies.	EPA 400 1.4; 5.2.1	I.5 II.2, III.2, III.3, Table III-3a Table III-3b Figure III-1a, III-1b Procedure 1	Met	
Cost analysis and radiological decontamination data to form a basis for radiation protection decisions and for recovery.	EPA 400 1.4 (1-7) Appendix C		Not Met	There is no discussion in the plan of this topic.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Coordination and recommendations based on plant conditions, for early evacuations and/or sheltering in pre-designated areas. Early estimates of the various components of projected doses to the population at the site area boundary as well as more distant locations. Estimated time frames as soon as relevant source or release data becomes available.	EPA 400 4.1 (4-1)	I.4.b, III.2.f. (1), III.3.n Appendix G Procedure 3, Attachments 2,8,9	Met	The County coordinated with the local/state authorities and made this information available on a timely basis.

Compliance Review Matrix for Westchester County

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.1.a—Identifies State, Local, Federal, and private sector organizations that are part of the overall response organization	NUREG 0654	1.E; I II.B Table III-1	Met	The plan provides few details on private sector organizations other than the licensee.
II.A.1.b—Concept of Operations and relationship to the total effort specified for all parties with an operational role	NUREG 0654	Sec. III.B	Met	The plan calls for uncharacteristically heavy County involvement in dose/accident assessment.
II.A.3—Written agreements between various organizations with emergency response roles are included in the plan or the plan includes descriptions of the letters and a signature page from the cooperating organizations.	NUREG 0654	App. B	Not Met	While the County does have copies of the letters of agreement and provided them to the reviewer upon request, their maintenance under separate cover does not fulfill the stated requirement in NUREG-0654. The reviewers applied a literal interpretaion of the NUREG requirement in the case of LOAs.
II.A.4—24-hour operational capability for a protracted period has been planned for (personnel, food, supplies, etc.) and person responsible for assuring continuity of resources (technical, admin., material) is specified by title.	NUREG 0654	II-B	Met	This requirement is met only marginally; the plan contains little discussion of capabilities for sustained operations.
II.C.4—Organizations have identified nuclear and other facilities, organizations, or individuals than can be relied upon to assist in an emergency. Appropriate letters of agreement have been established for this support.	NUREG 0654	App. B	Met	The letters of agreement are referred to in the plan and kept in a separate appendix that was not available to the reviewer.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.D.4—Procedures are in place for off-site agencies to take emergency actions consistent with those recommended by the licensee, taking into account local offsite conditions that exist at the time of the emergency.	NUREG 0654	Vol. 2	Met	Field monitoring and Joint Information Center (JIC) operations are discussed in separate documents which are not provided. Note: It might be helpful to include these details in the Implementing Procedures (Vol 2), rather than binding them separately.
II.E.1—Procedures are established which describe mutually agreeable bases for notification of response organizations consistent with the emergency classification and EAL scheme in Appendix 1. Procedures include means for verification of messages, though this does not need to be in the plan	NUREG 0654	III.E IP#1	Met	The plan is vague on who is notified when, but the Implementing Procedures are relatively clear on this point.
II.E.5—System established for disseminating appropriate information from licensee to the public, including appropriate notification to the media, e.g., EAS.	NUREG 0654	III.B.10 App. K	Met	The plan seems to impliy that the Emergency Alert System (EAS) is activated from the Joint News Center (JNC) by the Public Information Officer (PIO); however, during the exercise the EAS was activated from the EOC.
II.E.7—Draft messages to the public giving instructions with regard to specific protective actions to be taken by occupants of affected areas shall be prepared and included as part of the State and Local plans. Such messages should include the appropriate aspects of sheltering, ad hoc respiratory protection (handkerchief over mouth, etc.) thyroid blocking, or evacuation.	NUREG 0654	App. F App. K	Not Met	Joint News Center (JNC) procedures are bound separately from the main plan and the reviewer was not provided a copy. While it is believed that this information appears in the JNC procedures, compliance could not be verified.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.G.1—Each organization shall provide a coordinated periodic (at least annually) dissemination of information to the public regarding how they will be notified and what their actions should be in an emergency. This information shall include, but not necessarily be limited to: educational information on radiation contact for additional information protective measures special needs of the handicapped	NUREG 0654	III.B.10 Ap.K.6	Met	The plan implies that the Emergency Alert System (EAS) is activated from the Joint Information Center (JIC) by the Public Information Officer (PIO); however, during the exercise the EAS was activated from the EOC.
II.G.3.a—Each principal organization shall designate the points of contact and physical locations for use by news media during an emergency.	NUREG 0654	III.B.10 App. K	Not Met	Joint News Center (JNC) procedures are bound separately from the main plan and the reviewer was not provided a copy. While it is believed that this information appears in the JNC procedures, compliance could not be verified.
II.G.4—A spokesperson is designated who should have access to all necessary information. Arrangements are established for timely exchange of information among designated spokespersons. Coordinated rumor control processes have been established.	NUREG 0654	III. B. 10 App. K	Not Met	Joint News Center (JNC) procedures are bound separately from the main plan and the reviewer was not provided a copy. While it is believed that this information appears in the JNC procedures, compliance could not be verified.)

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.H.3—Each organization shall establish an emergency operations center for use in directing and controlling response functions.	NUREG 0654	III.B, C, E	Met	Very little information is provided on EOC layout, setup, operations, or capabilities. An Alternate EOC is mentioned as well as the County Fire Academy, but no other information is provided.
II.H.12—Each organization shall establish a central point (preferably associated with the licensee's near-site EOF), for the receipt and analysis of all field monitoring data and coordination of sample media	NUREG 0654	III.F IP #3	Met	The plan is unclear, referring to to "Assessment Room" and the County EOC, as if each County and the State do their own independent dose assessments. The language in Implementing Procedure #3 is much clearer and should be considered for inclusion in the main plan document. Compliance was verified through practice during the exercise.
II.J.2—Each licensee shall make provisions for evacuation routes and transportation for onsite individuals to some suitable offsite location, including alternatives for inclement weather, high traffic density and specific radiological conditions.	NUREG 0654		Met	The plan should include provisions to account for the effect of evacuation of onsite personnel through the County's evacuation network, possibly along with the general population.
II.J.9—Each State and local organization shall establish a capability for implementing protective measures based upon protective action guides and other criteria. This shall be consistent with the recommendations of EPA regarding exposure resulting from passage of radioactive airborne plumes, (EPA-520/1-75-001) and with those of DHEW (DHHS)/FDA regarding radioactive contamination of human food and animal feeds as published in the Federal Register of December 15, 1978 (43 FR 58790)	NUREG 0654	III.G IP #3	Met	The plan provides sparse information on this issue, but the Implementing Procedure provides good detail.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.J.10—Plans to implement protective measures for the 10-mile emergency planning zone shall include: a. Maps showing evacuation routes, evacuation areas, prselected radiological sampling and monitoring points, relocation centers, and shelter areas b. Maps showing population distribution around the nuclear facility. c. Means for notifying all segments of the trannsient and resident population d. Means for protecting those persons whose mobility may be impaired due to such factors as institutional or other confinement (State & Local only) e. Provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons within the 10-mile emergency planning zone who may not be able to evacuate immediately f. Method by which decisions by the State Health Department for administering radioprotective drugs to the general population are made during an emergency and the pre-determined conditions under which such drugs may be used by offsite emergency workers g. Means of relocation h. Relocation centers in host areas which are at least 5 miles and preferably 10 miles beyond the boundaries of the plume exposure emergency planning zone (see J.12) i. Projected traffic capacities of evacuation routes under	NUREG 0654	IP#3 IP #9 III.D IP #3 App. A IP #3,4 , 5, 6 IP #2, App. A IP #2 IP #2, 5 App. A App. F App. I	a-Met b-Met c-Met d—Met e—Met f—Met g—Met h—Met i—Not Met j—Met k—Met l—Met	d—Specific highway capacity is not documented. l—Current as of 1993; a new evacuation time estimate is under development, but incomplete at the time of this review.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
emergency conditions j. Control of access to evacuated areas and organization responsibilities for such control k. Identification and means for dealing with potential impediments to use of evacuation routes, and contingency measures l. Time estimates for evacuation of various sectors and distances based on a dynamic analysis for the plume exposure pathway emergency planning zone (See Appendix 4)				
II.J.12—Each organization shall describe the means for registering and monitoring of evacuees at relocation centers in host areas. The personnel and equipment available should be capable of monitoring within about a 12 hour period all residents and transients in the plume exposure emergency planning zone arriving at relocation centers.	NUREG 0654	IP #6 IP #3 Att.11	Not Met	The plan provides no discussion concerning the capability for processing evacuees or the number of monitoring teams available.
II.L.1—Each organization shall arrange for local and backup hospital and medical services having the capability for evaluation of radiation exposure and uptake, including assurance that persons providing these services are adequately prepared to handle contaminated individuals.	NUREG 0654	IP #10 Att. 6 Table 6-2	Met	Meets MS-1 requirements according to the plan.
II.O.4.h—Medical Support personnel	NUREG 0654	IP #13 4.1.5	Not Met	The plan provides information specific only to EMS. There is no mention of hospital training.
II.O.4.j—Personnel responsible for transmission of emergency information and instructions	NUREG 0654		Not Met	This issue is not mentioned specifically.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.P.1—Each organization shall provide for the training of individual's responsible for the planning effort.	NUREG 0654		Not Met	This issue is not mentioned specifically.
II.P.7—Each plan shall contain as an appendix listing by title, procedures requires to implement the plan. The listing shall include the sections of the plan to be implemented by each procedure.	NUREG 0654	Vol. 2 TOC	Not Met	Nowhere does the plan specify which Implementing Procedures refer to which sections of the plan.
Evacuation (urgent removal of persons/animals) and Sheltering (supplemented by bathing and changing of clothes) to protect the public from exposure to direct radiation and inhalation from airborne plume	EPA 400 1-3 2.3.1 5.5.1 5.5.2 5.5.3 Appendix E	Sec. III.G App. A App. D IP #3	Met	Protective measures for plant consideration within each emergency planning zone are covered in 10 CFR Appendix E Part 50
Protective action for Milk Supply	EPA 400 1-3 & App D DHHS FDA Vol. 47, #205 FDA 82-8196	Sec. III, G-5 IP #3 5.4.2 6.4.2	Met	This is primarily a State Agriculture function.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Restrictions on the use of contaminated food and water	EPA 400 1-5 Ch.3,AppdxD DHHS FDA Vol. 47, #205 FDA 82-8196	III.G.5	Met	This is primarily a State responsibility.
All PAG's should be consistent for all of the population.	EPA 400 2.1 (2-2)	III.F/G IP#3	Met	Note: The plan provides for different Early Warning protective action guidelines (EW PAG) for the special risk population of pregnant females in IP#3 Att. 8
Coordination and recommendations based on plant conditions, for early evacuations and/or sheltering in pre-designated areas. Early estimates of the various components of projected doses to the population at the site area boundary as well as more distant locations. Estimated time frames as soon as relevant source or release data becomes available.	EPA 400 4.1 (4-1)	III.F & G IP#3	Met	These were coordinated with the local/state authorities and made available on a timely basis. Offsite notifications are covered for the plant in 10 CFR Appendix E Part 50
Air sampling techniques/flow rates/ time in plume/ analysis information.	EPA 400 5.3	IP #3 Att. 12	Not Met	This issue may be addressed in the separately bound field monitoring procedures manual; however, a copy was not provided to the reviewer, so compliance could not be verified.
Disseminating information to the public	10 CFR App. E Pt. 50	III.B.10 App. F, App. K	Met	Separately bound procedures for the Joint Information Center (JIC) exist but were not provided for review.

Compliance Review Matrix for Millstone Facility

Note: Copies of the Appendices, Section 3, and the majority of Section 5 of the Millstone Plant Emergency Plan were not provided to the reviewer. Due to the lack of a Table of Contents, there was no way to infer the contents of Section 3. However, based on the limited pages from Section 5 that were provided, it appears that Section 5 spells out the roles and responsibilities of all positions within the Millstone Station Emergency Response Organization.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.1.a—Identifies State, Local, Federal, and private sector organizations that are part of the overall response organization	NUREG 0654	1.2	Met	The only private sector organizations noted in the review copy of the plan are hospitals.
II.A.1.c—Interrelationships in response organization illustrated in a block diagram in the plan	NUREG 0654	Figure 1-1, Figure 1-2	Unknown	Figure 1-2 referenced in 1.3, but a copy was not provided to the reviewer.
II.A.1.d—Individual in charge of emergency response for each organization identified by title	NUREG 0654	1, 5	Unknown	Organizations involved in response are noted in Section 1, but the individuals in charge of those organizations are not called out in the sections of the plan available for review. This information could be in Section 5, which was not provided to the reviewer.
II.A.1.e—Provisions made for 24 hour manning of communications links and 24 hour/day emergency response	NUREG 0654	6.1	Met	Licensee has 24-hour manning in the control room. Use of radio-pager for notification implies 24-hour/day ability to receive notification offsite. However, no mention is made in the plan regarding off-site ability to respond on a 24-hour/day basis.
II.A.3—Written agreements between various organizations with emergency response roles are included in the plan or the plan	NUREG	Various	Not Met	The plan notes that arrangements have been made with several organizations,

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
includes descriptions of these matters.	0654			e.g. Haddam Neck Plant (backup decontamination), local community ambulance services (medical transportation), Middlesex Hospital and Lawrence and Memorial Hospital (Medical Treatment). However, there is little detail of the arrangements and no copies of written agreements in the copy of the plan provided for review. Also, note that Haddam Neck Plant ceased operations in December 1996. While it may retain capability to provide backup support to Millstone, if such capability has not been recently verified and agreements to do so have not been recently reviewed, this should be done.
II.A.4—24-hour operational capability for a protracted period has been planned for (personnel, food, supplies, etc.) and person responsible for assuring continuity of resources (technical, admin., material) is specified by title.	NUREG 0654	7, 5.2.17	Not Met	Manager of Resources (MOR) is designated person responsible for continuity of resources. However, the reviewer did not find mention in the plan of planning for a 24-hour operational capability. This may be in procedures for individual facilities, but could not be verified.
II.B.2—Emergency Coordinator designated for all shifts who has authority and responsibility to initiate emergency actions, including providing PARs.	NUREG 0654	Section 5	Unknown	Not evaluated. The position is implied in the plan, but most of Section 5 was not available for review.
II.B.3—Line of succession established for Emergency Coordinator position. Specific conditions established for higher-level utility officials to assume this function.	NUREG 0654	Section 5	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.B.4—Functional responsibilities assigned to the Emergency	NUREG	Section 5	Unknown	Not evaluated. Most of Section 5 was

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Coordinator are specified. Those that cannot be delegated are specified. Decision to notify and recommend PARs to off-site agencies cannot be delegated.	0654			not available for review.
II.B.5—Positions in ERO and major tasks to be performed are specified for functional areas of emergency activity	NUREG 0654	Section 5	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.B.6—Interfaces between on-site functional areas, licensee HQ, local services support, and State and Local government response organization are specified, including a block diagram.	NUREG 0654	Section 5	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.B.7—Corporate support personnel augmenting plant staff shall be specified for logistics support, technical support for planning and reentry/recovery, mgmt. interface with government authorities, and release of information to news media.	NUREG 0654	Section 5	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.B.8—Contractor and private organizations who may be requested to provide technical assistance and augmentation of the emergency organization are specified.	NUREG 0654	Section 5	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.B.9—Services to be provided by local agencies for handling emergencies, e.g., police, ambulance, fire-fighting, medical, hospital, are specified. Transport & treatment of contaminated injured personnel is provided for. Copies of arrangements and agreements between licensee and others are appended to the plan.	NUREG 0654	Various	Unknown	Local police, ambulance, fire-fighting, medical, and hospital agencies are noted in various parts of the plan as having roles. In some cases the specific agencies are not specified by name. The plan states that copies of agreements are available in Appendix B, which was not provided to the reviewer.
II.C.1.a—Person authorized to request Federal assistance is specified by title	NUREG 0654	Section 5	Unknown	Not evaluated. Most of Section 5 was not available for review. Section 1.4 notes that Director of Connecticut OEM is authorized to request this assistance.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
				It is not apparent whether anyone in the Station Emergency Response Organization (SERO) is authorized to do so.
II.C.1.b - Specific Federal resource needs expected and anticipated arrival time for them are specified	NUREG 0654		Not Met	No discussion or reference appeared in the portions of the plan provided to the reviewer.
II.C.1.c - Licensee, Local, and State resources available to support the Federal response, e.g. air fields, command posts, telephone lines, radio frequencies, etc., are specified.	NUREG 0654		Not Met	No discussion or reference appeared in the portions of the plan provided to the reviewer.
II.C.2—Provisions are made for licensee reps to go to offsite EOCs, and for off-site organizations to send reps to the licensees EOF.	NUREG 0654	6.1	Met	The licensee sends representatives to the State Emergency Operations Center (EOC). The Connecticut Department of Environmental Protection (DEP), NRC, and the Town of Waterford send representatives to the Emergency Operations Facility. The plan makes no mention of the licensee sending representatives to local EOCs in New York, Connecticut, or to the New York State EOC.
II.C.3—Radiological labs, their capabilities, and expected availability to provide radiological monitoring and analysis services in an emergency are specified.	NUREG 0654	7.10, Appendix H	Unknown	The plan notes that off-site monitoring instruments and laboratory facilities are available 24 hours a day and are listed in Appendix H. Appendix H was not available in the copy of the plan provided for review.
II.C.4—Organizations have identified nuclear and other facilities, organizations, or individuals than can be relied upon to assist in an emergency. Appropriate letters of agreement have been	NUREG 0654	6.2.4.i, 6.5.3	Not Met	The referenced sections discuss assistance from Haddam Neck Plant for monitoring and decontamination if

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
established for this support.				needed. No mention is made regarding a letter of agreement. No other facilities, organizations, or individuals are discussed in the copy of the plan provided for review. It is unknown if these issues have been revisited in light of the 1996 shut-down of the Haddam Neck Plant.
II.D.1—An emergency classification and emergency action level scheme has been established. The plan identifies parameter values and equipment status for each emergency class.	NUREG 0654	4	Unknown	Section 4 of plan notes that example Emergency action level (EAL) tables are provided in Appendix I, which was not available for review. It also notes that complete EAL tables are in procedure MP-26-EPI-FAP06 rather than in the plan. Millstone Unit 2 and Unit 3 EAL tables were not included in the copy of this procedure provided for review.
II.D.2—The initiating conditions for emergency classification and emergency action levels (EALs) include the example conditions in Appendix 1 and all postulated accidents in the FSAR for the nuclear facility	NUREG 0654	Appendix I	Unknown	Not evaluated. Appendix I was not available in the copy of the plan provided for review.
II.E.1—Procedures are established which describe mutually agreeable bases for notification of response organizations consistent with the emergency classification and EAL scheme in Appendix 1. Procedures include means for verification of messages, though this does not need to be in the plan	NUREG 0654	4, 6.1	Met	No mention is made whether the electronic transmission of notification information provided via the Emergency Response Notification System (ERNS) is followed up by an electronic transmission of written information either by fax or Internet. Licensee should consider this.
II.E.3—Contents of initial emergency messages to be sent from	NUREG	6.1	Not Met	The plan does not specify that

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
the plant have been established with State and Local organizations. It shall include information about: Class of emergency Whether a release is taking place Potentially affect population/areas Whether protective measures may be necessary	0654			information regarding potentially affected populations/areas is transmitted via the Emergency Response Notification System (ERNS). The Nuclear Incident Report Form (MP-26-EPI-FAP07-001) includes information on the class of emergency and whether a release is taking place. It does not include information on potentially affected populations (by zone or otherwise) or whether protective measures may be necessary. It does include wind direction information.
II.E.4—Each licensee shall make provisions for followup messages from the facility to offsite authorities which shall contain the following information if it is known or appropriate: Location of incident and name and telephone number of caller Date/time of incident Class of emergency Type of release, expected duration Estimated quantity of radioactive material released, points, height of release Chemical and physical form of released material, including relative quantities and concentration of noble gases, particulates, and iodines. Met conditions at appropriate levels Dose rates and integrated dose projection at site boundary	NUREG 0654	6.1	Not Met	The plan does not specify the content of follow-up messages to the appropriate level of detail described here. The Nuclear Incident Report Form (MP-26-EPI-FAP07-001) includes information on the following items: Location of incident and name and telephone number of caller Date/time of incident Class of emergency Met conditions at appropriate levels Request for any needed onsite support by offsite organizations Prognosis for worsening or termination of event based on plant information.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Projected dose rates and integrated dose at the projected peak and at 2, 5, and 10 miles, including sectors affected. Estimate of any surface radioactive contamination inplant, onsite, or offsite. Licensee emergency response actions underway. Recommended emergency actions, including protective actions Request for any needed onsite support by offsite organizations Prognosis for worsening or termination of event based on plant information.				
II.E.6—Each organization has established a system for public warning within the 10-mile EPZ. Licensee is responsible for demonstrating that means exist for doing so. State and Local governments are responsible for activating such a system	NUREG 0654	1.5	Met	The plan notes that the Emergency Alert System (EAS) and sirens are used for public warning and that the State Radiological Emergency Response Plan (RERP) contains procedures for providing prompt notification and information to the public. The plan does not provide information regarding which agency or agencies can activate public warning systems for Fishers Island and Plum Island.
II.E.7—Draft messages to the public giving instructions with regard to specific protective actions to be taken by occupants of affected areas shall be prepared and included as part of the State and Local plans. Such messages should include the appropriate aspects of sheltering, ad hoc respiratory protection (handkerchief over mouth, etc.) thyroid blocking, or evacuation.	NUREG 0654	6.6, 1.5, 6.1	Not Met	The plan does not include a discussion of the preparation or content of draft messages to facilitate instructions to the public during an event.
II.F.1—The communication plans for emergencies shall include all organizational titles and alternates for both ends of the	NUREG 0654	7.9	Not Met	The Emergency Response Notification System (ERNS) is the primary means of

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local and State response organizations. Such systems should be selected to be compatible with one another. (See NUREG-0654 for detailed requirements)				communicating with Fishers Island and commercial telephone is the secondary means. Commercial telephone lines are commonly considered to be an unreliable means of communication during a large-scale emergency. Figure 7-1c does not seem to indicate a dedicated phone line or radio linkage to either the New York State Emergency Management Office or to Fishers Island.
II.F.2—Each organization shall ensure that a coordinated communication link for fixed and mobile medical support facilities exists.	NUREG 0654	6.5.5, 6.5.6, 7.9	Met	Communications with hospitals will be via commercial telephone lines. Ambulances can be requested via dedicated or commercial telephone lines. Ambulances can communicate with hospitals via radio.
II.G.1—Each organization shall provide a coordinated periodic (at least annually) dissemination of information to the public regarding how they will be notified and what their actions should be in an emergency. This information shall include, but not necessarily be limited to: educational information on radiation contact for additional information Protective measures special needs of the handicapped	NUREG 0654	8.4	Met	Annual dissemination is via the primary telephone directory serving each emergency planning zone community according to the plan.
II.G.2—The public information program shall provide the permanent and transient adult population within the plume exposure EPZ an adequate opportunity to become aware of the information annually. The programs should include provision for	NUREG 0654	8.4	Met	The plan says that telephone directories containing emergency information are available to transient populations within the emergency planning zone. The plan

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
written material that is likely to be available in a residence during an emergency. Updated information shall be disseminated at least annually. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway EPZ, appropriate information that would be helpful if an emergency or accident occurs. Such notices should refer the transient to the telephone directory or other source of local emergency information and guide the visitor to appropriate radio and television frequencies.				also notes that the State of Connecticut Office of Emergency Management is provided with information for posting or distribution, as appropriate, at selected public areas within the emergency planning zone. The requirement appears to be met. More information on the number and location of signs posted would be helpful in assessing the availability of information to transient populations. Likewise, an effort to distribute information to regular transient populations should be considered.
II.G.3.b—Each licensee shall provide space which may be used for a limited number of the news media at the nearsite EOF.	NUREG 0654	7.7	Met	The plan says that while State and licensee plans do not include use of the Station Emergency Operations Facility for a media center, limited space is available for media briefings or conferences at the facility.
II.G.4—A spokesperson is designated who should have access to all necessary information. Arrangements are established for timely exchange of information among designated spokespersons. Coordinated rumor control processes have been established.	NUREG 0654	6.1, 6.6	Not Met	The Executive Spokesperson (ES) is the designated licensee spokesperson. Information exchange is coordinated with the Nuclear News Manager (NMM). A Rumor Control Liaison (RCL) position is discussed, but no mention is made in the plan of established rumor control processes, although the issue is discussed in the State plan.
II.H.4—Each organization shall provide for timely activation and staffing of the facilities and centers described in the plan.	NUREG 0654	5, 7	Unknown	Not evaluated. Detailed information regarding the activation and staffing of the facilities could not be located in the

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
				copy of the plan provided for review.
II.H.5—Each licensee shall identify and establish onsite monitoring systems that are to be used to initiate emergency measures in accordance with Appendix 1, as well as those to be used for conducting assessment. The equipment shall include: Geophysical phenomena monitors (met, hydrological, seismic, etc.) Radiological monitors Process monitors Fire and combustion products detectors	NUREG 0654	6.2.3.a, 6.2.4.i	Unknown	Other Nuclear Regulatory Commission regulations require the licensee to have the equipment listed in order to operate, so it certainly is installed. However, the plan does not specifically discuss these monitors and their use in initiating emergency measures. They are likely discussed in the emergency action level (EAL) procedure (MP-26-EPI-FAP06) if not in the sample EALs the plan references as being in Appendix I. Appendix I and the EAL attachments to EPI-FAP06 were not included in the copy provided for review.
II.H.6—Each licensee shall make provision to acquire data from or for emergency access to offsite monitoring and analysis equipment including: Geophysical phenomena monitors Radiological monitors Laboratory facilities, fixed or mobile	NUREG 0654	7.10, 7.13	Not Met	The plan notes that off-site monitoring instruments and laboratory facilities are available. It also notes that meteorological data can be obtained from an assisting weather service organization if needed. This requirement may be met; however, it is not possible to say for certain based on the information provided in the plan.
II.H.7—Each organization, where appropriate, shall provide for offsite radiological monitoring equipment in the vicinity of the nuclear facility.	NUREG 0654	6, 7.10	Not Met	No discussion appears in the appropriate sections of the plan regarding whether the licensee has installed off-site radiological monitoring equipment in the vicinity of the nuclear facility.
II.H.11—Each plan shall, in an appendix, include identification of	NUREG	7.4.5, 7.5,	Unknown	Not Evaluated. Appendix E was not

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
emergency kits by general category (protective equipment, communications equipment, radiological monitoring equipment and emergency supplies.	0654	Appendix E		included in the copy of plan available for review.
II.H.12—Each organization shall establish a central point (preferably associated with the licensee's near-site EOF), for the receipt and analysis of all field monitoring data and coordination of sample media	NUREG 0654	7.2.1, 7.10	Met	The Emergency Operations Facility is the central point for coordination of radiological and environmental assessments.
II.I.1—Each licensee shall identify plant system and effluent parameter values characteristic of a spectrum of off-normal conditions and accident, and shall identify the plant parameter values or other information which correspond to the example initiating conditions of Appendix 1. Such parameter values and the corresponding emergency class shall be included in the appropriate facility emergency procedures. Facility emergency procedures shall specify the kinds of instruments being used and their capabilities.	NUREG 0654	4	Unknown	Not Evaluated. The attachments to Procedure MP-26-EPI-FAP06, "Classification and PARs" containing the emergency action level tables were not available in the copy of the procedure provided for review.
II.I.5—Each licensee shall have the capability of acquiring and evaluating meteorological information sufficient to meet the criteria of Appendix 2. There shall be provisions for access to meteorological information by at least the nearsite EOF, the TSC, the Control Room and an offsite NRC center. The licensee shall make available to the State suitable meteorological data processing interconnections which will permit independent analysis by the State, of facility generated data in those States with the resources to effectively use this information.	NUREG 0654	7.13	Not Met	Meteorological data is continuously available in the Unit 2 and Unit 3 Control Rooms as well as in shelters at the base of the two towers. There is no discussion regarding access to meteorological data by other licensee facilities or via interconnections to the State of New York or Connecticut.
II.J.1—Each licensee shall establish the means and time required to warn or advise onsite individuals and individuals who may be in areas controlled by the operator, including: Employees not having emergency assignments	NUREG 0654	6.1, 6.4.1.a	Not Met	The plan notes that radiation alarms, public address system, pager system, and the station emergency alarm are used for notification. The plan does not discuss the time required to warn all on-site personnel by one or more of these

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Visitors Contractor and construction personnel, and Other persons who may be in the public access areas on or passing through the site or within the owner controlled area				means.
II.J.2—Each licensee shall make provisions for evacuation routes and transportation for onsite individuals to some suitable offsite location, including alternatives for inclement weather, high traffic density and specific radiological conditions.	NUREG 0654	6.4.1.d	Not Met	Evacuation of on-site individuals is discussed in the plan. No specific discussion is provided regarding evacuation routes or alternatives for various adverse conditions. There is a discussion regarding the use of sheltering in place if the hazard will be short-lived or if the safety of the evacuation population would be threatened. Procedure MP-26-EPI-FAP06 states "Station personnel do not typically have the necessary information to determine whether offsite conditions would require sheltering instead of evacuation. Therefore, an effort to base [public action recommendations (PARs)] on external factors (such as road conditions, traffic/traffic control, weather, or offsite emergency worker response) should not be attempted." This is information that licensee personnel should maintain an awareness of in coordination with off-site organizations.
II.J.5—Each licensee shall provide for a capability to account for all individuals onsite at the time of the emergency and ascertain the names of missing individuals within 30 minutes of the start of an emergency and account for all onsite individuals continuously	NUREG 0654	6.4.1.h	Not Met	The plan notes that accountability is required to be completed within 45 minutes of its initiation, rather than the 30 minutes required. There is no

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
thereafter.				discussion in the plan regarding maintenance of accountability after the initial assessment.
II.J.8—Each licensee's plan shall contain time estimates for evacuation within the plume exposure EPZ. These shall be in accordance with Appendix 4.	NUREG 0654		Unknown	Not evaluated. No mention of evacuation time estimates (ETEs) appears in the copy of the plan provided for review. However, MP-26-EPI-FAP06 ("Classification and PARs") which was provided for review does not indicate the use of ETEs by the licensee in making protective action recommendations.
II.J.10—The organization's plans to implement protective measures for the plume exposure pathway shall include: Maps showing evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas Maps showing population distribution around the nuclear facility. This shall also be by evacuation areas (licensees shall also present the information in a sector format) Means for notifying all segments of the transient and resident population	NUREG 0654	6.1	Not Met	Except for the means of notifying the resident population, the copy of the plan provided for review does not contain this level of information. It may be provided in parts of the plan unavailable in the review copy or in plant procedures. However, this information is not included in the copy of MP-26-EPI-FAP06, "Classification and PARs" that was provided for review.
II.J.10.m—Bases for the choice of recommended protective actions from the plume exposure pathway during emergency conditions. This shall include expected local protection afforded in residential units or other shelter for direct and inhalation exposure, as well as evacuation time estimates.	NUREG 0654	6.2.2	Not Met	The bases for choosing protective action recommendations (PARs), expected local protection afforded by sheltering, and evacuation time estimates are not provided in the plan. Additionally the copy of MP-26-EPI-FAP06, "Classification and PARs" provided for review does not contain

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
				this information.
II.K.1—Each licensee shall establish onsite exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides (EPA 400) for: removal of injured persons undertaking corrective actions performing assessment actions providing first aid performing personnel decontamination providing ambulance service providing medical treatment services	NUREG 0654	6.5.1	Met	Table 6-1 provides guidelines for the general categories of: Annual Part 20 Mission to protect valuable property Mission to save a life or prevent/mitigate a severe accident Voluntary mission to save a life or prevent/mitigate a severe accident. While it is reasonably apparent how these match the requirement, additional detail might be considered.
II.K.2—Each licensee shall provide an onsite radiation protection program to be implemented during emergencies, including methods to implement exposure guidelines. The plan shall identify individual(s), by position or title, who can authorize emergency workers to receive doses in excess of 10CFR20 limits. Procedures should be worked out in advance for permitting onsite volunteers to receive radiation exposures in the course of carrying out lifesaving and other emergency activities. These procedures shall include expeditious decision making and a reasonable consideration of the relative risks.	NUREG 0654	6.4.4, 6.5.1	Not Met	An on-site radiation protection program has been established for normal and emergency operations. The plan does not identify the individual(s) who can authorize workers to receive doses in excess of 10CFR20 limits. There is no discussion of procedures having been worked out in advance for on-site volunteers to receive radiation exposures, though the plan does mention that risks and consequences of potential exposure and injury will be weighed against the probability of success and the benefits to be gained from such actions.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.K.3.a—Each organization shall make provision for 24 hour/day capability to determine the doses received by emergency personnel involved in any nuclear accident, including volunteers. Each organization shall make provisions for distribution of dosimeters, both self-reading and permanent record devices.	NUREG 0654	6.4.4	Met	Health Physics coverage is provided 24 hours per day during normal operations and emergencies.
II.K.5—Each organization, as appropriate, shall specify action levels for determining the need for decontamination. Shall also establish the means for radiological decontamination of emergency personnel wounds, supplies, instruments and equipment, and for waste disposal.	NUREG 0654	6.4.1.i, 6.4.2, 6.5.3	Not Met	The plan does not specify action levels for determining the need for decontamination, e.g. surface concentration/activity. It is possible that this information is contained in the radiation protection procedures.
II.K.6—Each licensee shall provide onsite contamination control measures including: area access control drinking water and food supplies criteria for permitting return of areas and items to normal use (see Draft ANSI 13.12.)	NUREG 0654	6.4.3	Not Met	The plan does not specify criteria for permitting the return of areas and items to normal use. It is possible this information is contained in the normal radiation protection procedures.
II.K.7—Each licensee shall provide the capability for decontaminating relocated onsite personnel, including provisions for extra clothing and decontaminants suitable for the type of decontamination expected, with particular attention given to radioiodine contamination of the skin.	NUREG 0654	6.4.1.i, 6.5.3	Unknown	The plan discusses available on-site decontamination facilities. It notes that a shower with a holding tank and supplies for personnel decontamination are provided in the Emergency Operations Facility. The plan does not specify the types of decontaminants available or whether extra clothing is included in the supplies. This information may be in Appendix E, which was not provided in the copy of the plan available for review.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.L.1—Each organization shall arrange for local and backup hospital and medical services having the capability for evaluation of radiation exposure and uptake, including assurance that persons providing these services are adequately prepared to handle contaminated individuals.	NUREG 0654	6.5.6	Met	Arrangements have been made with two hospitals. The plan does not specifically discuss the hospitals' capability to evaluate radiation exposure and uptake, though this would a normal hospital lab capability. Training is provided on treating contaminated patients.
II.L.4—Each organization shall arrange for transporting victims of radiological accidents to medical support facilities.	NUREG 0654	6.5.5	Met	The licensee should consider listing local ambulance services that have received proper training from the licensee within the plan.
II.M.1—Each organization, as appropriate, shall develop general plans and procedures for reentry and recovery and describe the means by which decisions to relax protective measures (e.g., allow reentry into an evacuated area) are reached. This process should consider both existing and potential conditions.	NUREG 0654	9	Not Met	The plan only describes when the recovery phase is entered and provides a general description of the recovery organization.
II.M.3—Each licensee and State plan shall specify means for informing members of the response organizations that a recovery operation is to be initiated, and of any changes in the organizational structure that may occur	NUREG 0654	6.1, 9	Not Met	Though this is likely done as part of the process of providing follow-up messages to off-site officials, it is not specifically discussed in the plan.
II.M.4—Each plan shall establish a method of periodically estimating total population exposure.	NUREG 0654	6.2.3, 6.2.4	Met	Methods clearly exist for estimating total population exposure. Licensee and off-site agencies (including New York jurisdictions) should have a pre-existing agreement on the frequency with which these estimates will be periodically revisited by the licensee and the State of Connecticut Department of Environmental Protection (DEP).

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.N.1.b - An exercise shall include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident scenario requiring response. The organization shall provide for a Federal and State observers/evaluators. The scenario should be varied from year to year such that all major elements of the plans and preparedness organizations are tested within a five-year period. Each organization should make provisions to start an exercise between 6:00PM and midnight, and another between midnight and 6:00AM once every six years. Exercises should be conducted under various weather conditions. Some exercises should be unannounced.	NUREG 0654	8.2.2.f	Not Met	The plan notes that plant procedures ensure 6-year exercise cycle objectives are met. The activity described in the plan seems adequate to ensure that all major elements of plans and preparedness organizations are tested within a 5-year period, but the plan does not specifically state this as a goal of the exercise program. The plan also does not specifically address conducting exercises that are not announced or under various weather conditions.
II.N.2.e(2)—Health Physics Drills. Analysis of in-plant liquid samples with actual elevated radiation levels including use of the post-accident sampling system shall be included in Health Physics drills by licensees annually.	NUREG 0654	8.2.2.d	Not Met	The plan does not describe this aspect of Health Physics drills.
II.N.3 - Each organization shall describe how exercises are to be carried out to allow free play for decision making and to meet the following objectives. Pending the development of exercise scenarios and exercise evaluation guidance by NRC and FEMA the scenarios for use in exercises and drills shall include but not be limited to the following: The basic objective of each drill and exercise and appropriate evaluations criteria; The date(s), time period, place(s) and participating organizations; The simulated events	NUREG 0654	8.2, 8.2.2.f	Not Met	The plan does not discuss how exercises are to be carried out to allow free play for decision making and to meet objectives. The elements to be included in exercise scenarios are not specified in the plan. This information may be included in plant procedures.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
A time schedule of real and simulated initiating events; A narrative summary describing the conduct of the exercises or drills to include such things as simulated casualties, offsite fire department assistance, rescue of personnel, use of protective clothing, deployment of radiological monitoring teams and public information activities A description of the arrangements for and advance materials to be provided to official observers.				
II.O.3 - Training for individuals assigned to licensee first aid teams shall include courses equivalent to Red Cross Multi-Media.	NUREG 0654	7.11	Met	EMT qualified personnel are available to provide first aid on-site.
II.O.4 - Each organization shall establish a training program for instructing and qualifying personnel who will implement radiological ER plans. The specialized initial training and periodic retraining programs shall be provided in the following categories:	NUREG 0654		Unknown	See below for specifics.
II.O.4.a - Directors or coordinators of the response organization	NUREG 0654	Table 5-1	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.O.4.b - Personnel responsible for accident assessment	NUREG 0654	Table 5-1	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.O.4.c - Radiological monitoring teams and radiological analysis personnel	NUREG 0654	Table 5-1	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.O.4.d - Police, security and fire fighting personnel	NUREG 0654	8.1.2	Met	The plan discusses annual training in radiation protection, emergency classification, notification, emergency plan overview, and general plant access information.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.O.4.e - Repair and damage control/correctional action teams (onsite)	NUREG 0654	Table 5-1	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.O.4.f - First aid and rescue personnel	NUREG 0654	Table 5-1, 8.1.3	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.O.4.g - Local Support services personnel including Civil Defense/ Emergency Service personnel	NUREG 0654	8.1.2	Met	The plan discusses annual training in radiation protection, emergency classification, notification, emergency plan overview, and general plant access information. It would probably be appropriate for emergency management personnel to receive a different course of training than emergency responders.
II.O.4.h - Medical Support personnel	NUREG 0654	8.1.2	Met	The plan discusses annual training in plant access and the medical treatment of contaminated, injured patients.
II.O.4.i - Licensee headquarters support personnel	NUREG 0654	Table 5-1	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.O.4.j - Personnel responsible for transmission of emergency information and instructions	NUREG 0654	Table 5-1	Unknown	Not evaluated. Most of Section 5 was not available for review.
II.P.5 - The emergency response plans and approved changes to the plans shall be forwarded to tall organizations and appropriate individuals with responsibility for implementation of the plans. Revised pages shall be dated and marked to show where changes have been made.	NUREG 0654	8.3	Not Met	Forwarding of approved changes is not specifically discussed. Plan distribution may be addressed in procedures that were not available at the time of this review.
II.P.7 - Each plan shall contain as an appendix listing by title,	NUREG		Unknown	Not Evaluated. No plan appendices

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
procedures required to implement the plan. The listing shall include the sections of the plan to be implemented by each procedure.	0654			were available for review.
II.P.8 - Each plan shall contain a specific table of contents. Plans submitted for review should be a cross-referenced to these criteria.	NUREG 0654		Not Met	No table of contents or cross-reference to NUREG-0654 criteria appeared in the copy of the plan provided for review.
II.P.9 - Each licensee shall arrange for and conduct independent reviews of the Emergency preparedness program at least every 12 months. The review shall include the emergency plan, its implementing procedures and practices, training readiness testing, equipment and interfaces with State and local governments. Management controls shall be implemented for evaluation and corrections of review findings. The result of the review, along with recommendations for improvements, shall be documented, reported to appropriate licensee corporate and plant management, and involve Federal, State and local organizations and retained for a period of five years.	NUREG 0654	8.3	Met	The plan discusses annual reviews performed by a licensee oversight group or an industry peer evaluation team. The licensee might consider the potential to add value to reviews by using non-utility emergency management professionals to review at least the off-site aspects of their program.
Preliminary evaluations should determine whether conditions indicate a significant possibility of a major release and, to the extent possible, determine potential exposure pathways, populations at risk and projected doses	EPA 400 1.4 (1-6)	6.2.1	Not Met	The reviewer believes this evaluation is performed in response. However, the plan does not specifically discuss inclusion of potential exposure pathways, populations at risk, and projected dose in initial assessment. Note that the list of initial information provided to off-site jurisdictions via the Emergency Response and Notification System (ERNS) (pg. 6-2) does not specifically include this information.
Cost analysis and radiological decontamination data to form a basis for radiation protection decisions and for recovery.	EPA 400 1.4 (1-7)	n/a	Not Met	No cost analysis considerations are discussed in the plan. Discussion of recovery is limited to descriptions of

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
	Appendix C			when the recovery phase is entered and the recovery organization.
Levels of exposure to radiation identified which should initiate protective action.	EPA 400 2.1 (2-1)	6.2.2, 6.4	Not Met	EPA 400 Protective Action Guidelines are referenced, but are not provided in the plan. MP-26-EPI-FAP06 states that "Evacuation of a 5 mile radius and 10 miles downwind (with sheltering of all other subzones) will be recommended for plant conditions in which: c. EPA PAGs (≥1 Rem TEDE or ≥5 Rem CDE Thyroid) are or are suspected to be exceeded beyond 5 miles." This is the only reference to levels of exposure in the copy of the procedure provided for review.
Coordination and recommendations based on plant conditions, for early evacuations and/or sheltering in pre-designated areas. Early estimates of the various components of projected doses to the population at the site area boundary as well as more distant locations. Estimated time frames as soon as relevant source or release data becomes available.	EPA 400 4.1 (4-1)	6.1	Not Met	The plan states that "Details concerning release type, quantities and actual or projected dose rates will be developed, as appropriate and provided to responsible officials, when requested." This implies the information is not necessarily provided when it becomes available, as it should be.
Designation of an EPZ zone for protective action for plume exposure.	EPA 400 5.2.2 (5-3)	1.1	Met	No maps were included in the copy of the plan provided for review. A map of the approximate 10-mile emergency planning zone with identification of planning zones should be provided in the plan.
Air sampling techniques/flow rates/ time in plume/ analysis	EPA	6	Not Met	This level of detail is not provided in the

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
information.	4005.3			plan. Radiological Monitoring Team (RMT) sample types generally described in 6.2.4.h. This information is likely contained in the field monitoring procedure(s). It is not contained in the dose assessment procedure.
Documentation of sequence of events	EPA 400 7.1.3 (7-4)		Not Met	Not evaluated. This issue was not discussed in the sections of the plan provided for review.
Recommendations for surface contamination limits.	EPA 400 7.6.3 7.6.1		Not Met	This issue was not addressed in the plan. It may be addressed in the procedures.
Dosemetric models, agricultural transport models, dietary intake and other calculations relating to potential dose.	EPA 400 7.6.2 7.4 7.3 Appendix B	6.2	Not Met	Models are not specified in the plan. The plan only refers to “computerized methods." It may be specified in the dose assessment procedures.
Equipment used (can include diagrams and operational procedures)	10 CFR App. E Pt. 50	7.5	Unknown	Not Evaluated. Appendix E was not provided in the review copy of the plan.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Procedures for maintaining emergency preparedness	10 CFR App. E Pt. 50	8	Met	Procedure MP-26-EPA-FAP01, "Management Program for Maintaining Emergency Preparedness" is cited.
Organizational charts, individual responsibilities, duties, and who will take charge in the event of an emergency should be specifically mentioned.	EPA 400 10 CFR App. E Pt. 50	Section 5, Fig. 5-1	Unknown	Figure 5-1 provides organization charts. Responsibilities and duties appear in Section 5, most of which was not provided for review.
Licensee's headquarters personnel who will be sent out in the event of an emergency should be identified.	10 CFR App. E Pt. 50		Unknown	Not evaluated. Most of Section 5 was not available for review.
Description of offsite emergency services to be provided in support of the licensee's emergency organization.	10 CFR App. E Pt. 50	Various	Met	The plan identifies organizations for specific services.
Identification of the State and/or local officials responsible for planning for, ordering, and controlling appropriate protective actions, including evacuations when necessary	10 CFR App. E Pt. 50	1, 2	Met	The plan identifies State and local agencies and defines their responsibilities fairly well. Federal agencies are identified, but the plan just states they will respond in accordance with established federal plans.
All communications plans shall have arrangements for emergencies, including titles and alternates for those in charge at both ends of the communications links and the primary backup means of communication.	10 CFR App E Pt. 50		Unknown	This issue is addressed partially in Section 7, though no titles are specified. It is expected that these would appear in Section 5, which was not provided to the reviewer.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Provisions for communications with Federal emergency response organizations. Must be tested annually.	10 CFR App. E Pt .50	8.2.1.a	Met	The plan states these are tested quarterly by the State Office of Emergency Management.
Provisions for communications with the nuclear power control room, the onsite technical support center, near-site emergency operations facility, and among the nuclear facility, the principle state and local EOC's and field assessment teams. Tested annually.	10 CFR App. E Pt. 50	8.2.1.a	Met	The plan states that these are tested monthly.
Provisions for communication with NRC Headquarters and the appropriate NRC regional office operations center from the control room the onsite technical support center and the near site EOF. Tested monthly.	10 CFR App. E Pt. 50	8.2.1	Met	The plan states that these are tested monthly.
Recovery Plan - Criteria to be used to determine when, following an accident, reentry of the facility would be appropriate or when operation could be resumed shall be described.	10 CFR App. E. Pt 50	9	Not Met	Criteria for re-entry and resumption of normal operations are not described in the plan. The plan only provides descriptions of the start of the recovery phase and the recovery organization.

Compliance Review Matrix for Connecticut

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met Or Not Met	Comments
II.A.1.d—Individual in charge of emergency response for each organization identified by title	NUREG 0654		Not Met	Organizations are mentioned in the plan but not specific titles for those in charge.
II.A.2—Functions and responsibilities for major elements in emergency response are specified for each organization and key individuals by title. Legal basis for such authorities is cited.	NUREG 0654	RERP 2.2	Met	Agencies with responsibilities for major elements of the response are mentioned; however, it is not clear who the designated responsible individuals within each agency are.
II.A.3—Written agreements between various organizations with emergency response roles are included in the plan or the plan includes descriptions of these matters.	NUREG 0654		Not Met	There is no mention of any type of written agreement between various organizations in the plan.
II.C.1.c - Licensee, Local, and State resources available to support the Federal response, e.g. air fields, command posts, telephone lines, radio frequencies, etc., are specified.	NUREG 0654		Not Met	There is mention of the Federal role in the plan, but resources available to the Federal response are not included.
II.C.4—Organizations have identified nuclear and other facilities, organizations, or individuals than can be relied upon to assist in an emergency. Appropriate letters of agreement have been established for this support.	NUREG 0654		Not Met	Several organizations were discussed in the plan but the letters of agreement were not included.
II.E.2—Procedures have been established for alerting, notifying, and mobilizing emergency response personnel.	NUREG 0654		Not Met	In section 1.0 Concept of Operations there is mention of alerting and mobilizing emergency personnel. However, the procedures are not included.
II.G.2—The public information program shall provide the permanent and transient adult population within the plume	NUREG		Not Met	Information for the transient population

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met Or Not Met	Comments
exposure EPZ an adequate opportunity to become aware of the information annually. The programs should include provision for written material that is likely to be available in a residence during an emergency. Updated information shall be disseminated at least annually. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway EPZ, appropriate information that would be helpful if an emergency or accident occurs. Such notices should refer the transient to the telephone directory or other source of local emergency information and guide the visitor to appropriate radio and television frequencies.	0654			is not included.
II.H.4—Each organization shall provide for timely activation and staffing of the facilities and centers described in the plan.	NUREG 0654		Not Met	The timeliness for activation and staffing of facilities is not in the plan. It is alluded to but not clearly stated.
II.H.11—Each plan shall, in an appendix, include identification of emergency kits by general category (protective equipment, communications equipment, radiological monitoring equipment and emergency supplies.	NUREG 0654		Not Met	The plan was not designed to include appendices.
II.I.9—Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure EPZ as low as 10^{-7} uCi/cc under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detectable capability.	NUREG 0654	8.1.2.b	Met	The specific information on the equipment is on file with the Connecticut Department of Environmental Protection, Division of Radiation.
II.I.10—Each organization shall establish means for relating the various measured parameters (contamination and activity levels, etc.) to dose rates for key isotopes (Table 3, pg. 18) and gross radioactivity measurements. Provisions shall be made for estimating integrated dose from the projected and actual dose rates and for comparing these estimates with the protective action guides. The detailed provisions shall be described in separate procedures.	NUREG 0654		Not Met	The methods for calculating dose rates are not included in the plan. However, different levels of dose rates are included.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met Or Not Met	Comments
II.J.10—The organization's plans to implement protective measures for the plume exposure pathway shall include: Maps showing evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas Maps showing population distribution around the nuclear facility. This shall also be by evacuation areas (licensees shall also present the information in a sector format) Means for notifying all segments of the transient and resident population	NUREG 0654		Not Met	There is no evacuation map included in the plan.
II.K.5—Each organization, as appropriate, shall specify action levels for determining the need for decontamination. Shall also establish the means for radiological decontamination of emergency personnel wounds, supplies, instruments and equipment, and for waste disposal.	NUREG 0654		Not Met	Decontamination is given brief mention in the plan; however, the levels and means for determining decontamination are not discussed.
II.L.4—Each organization shall arrange for transporting victims of radiological accidents to medical support facilities.	NUREG 0654	RERP 5.0	Met	Section RERP 5.0 could use more detail about medical staging areas.
II.O.4.a - Directors or coordinators of the response organization	NUREG 0654	RERP 15.0	Met	While directors and coordinators are not mentioned directly, they are alluded to throughout the section.
II.O.5 - Each organization shall provide for the initial and annual retraining of personnel with emergency response responsibilities	NUREG 0654		Not Met	The retraining and assimilation of new emergency personnel is not included in the plan.
II.P.7 - Each plan shall contain as an appendix listing by title, procedures requires to implement the plan. The listing shall include the sections of the plan to be implemented by each	NUREG 0654		Not Met	There is no appendix section in the plan.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met Or Not Met	Comments
procedure.				
II.P.8 - Each plan shall contain a specific table of contents. Plans submitted for review should be a cross-referenced to these criteria.	NUREG 0654	Table of Contents	Met	There is no consistent page numbering for quick referencing.
Cost analysis and radiological decontamination data to form a basis for radiation protection decisions and for recovery.	EPA 400 1.4 (1-7) Appendix C		Not Met	A cost analysis is not part of the plan.
Officials to be notified for approval of stable iodine administration.	EPA 400 2.3.2 (2-7)	RERP 10.3.4	Met	The State of Connecticut will only approve iodine for critical State employees; it will be issued via the Office of Emergency Management.
Exposure pathways identified and consistent.	EPA 400 2.4; 2.5	RERP 1.0 Attachment 4	Met	Attachment 4 is a map of the exposure pathway.
Coordination and recommendations based on plant conditions, for early evacuations and/or sheltering in pre-designated areas. Early estimates of the various components of projected doses to the population at the site area boundary as well as more distant locations. Estimated time frames as soon as relevant source or release data becomes available.	EPA 400 4.1 (4-1)	RERP 1.0 Attachment 1	Met	Attachment 1 is a serious of tables that explain the actions to be taken during each level of notifications. Estimated time frames for protective action after new data becomes available is not stated within this section.
Procedures for calculating dose conversion factors and derived response levels.	EPA 400 5.4; 5.6		Not Met	The derived response level for dose is mentioned in the plan, while the procedures for calculating dose are not.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met Or Not Met	Comments
Documentation of sequence of events	EPA 400 7.1.3 (7-4)		Not Met	There is no mention of documenting the sequence of events. Of the sections that were not available for review, there did not seem to be any that might contain this information.

Compliance Review Matrix for Fishers Island

The Fishers Island plan provided for review appears to be essentially an operations plan, composed mainly of various checklists. For the most part, it did not address planning and mitigation issues. It could not be verified whether Fishers Island maintains a separate plan which addresses pre-event planning and mitigation.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.A.1.a—Identifies State, Local, Federal, and private sector organizations that are part of the overall response organization	NUREG 0654		Not Met	State and Federal Agencies are not clearly identified.
II.A.2—Functions and responsibilities for major elements in emergency response are specified for each organization and key individuals by title. Legal basis for such authorities is cited.	NUREG 0654		Not Met	The plan does not cite the legal basis for key elements in emergency response.
II.A.3—Written agreements between various organizations with emergency response roles are included in the plan or the plan includes descriptions of these matters.	NUREG 0654		Not Met	The plan does not clearly address the issue of Mutual Agreements and copies are not included in the plan.
II.C.1.a—Person authorized to request Federal assistance is specified by title	NUREG 0654		Not Met	It would appear that the Chief Executive Officer (CEO) would be responsible for requesting Federal assistance, but it is

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
				not mentioned as a specific CEO task.
II.C.1.c - Licensee, Local, and State resources available to support the Federal response, e.g. air fields, command posts, telephone lines, radio frequencies, etc., are specified.	NUREG 0654		Not Met	Resources for Federal assistance and support are not identified.
II.C.2—Provisions are made for licensee reps to go to offsite EOCs, and for off-site organizations to send reps to the licensees EOF.	NUREG 0654		Not Met	Sending a representative to the Emergency Operations Facility and the Plant sending a representative to Fishers Island is not in the plan.
II.C.4—Organizations have identified nuclear and other facilities, organizations, or individuals than can be relied upon to assist in an emergency. Appropriate letters of agreement have been established for this support.	NUREG 0654		Not Met	The actual Letters of Agreement are not in the plan.
II.E.7—Draft messages to the public giving instructions with regard to specific protective actions to be taken by occupants of affected areas shall be prepared and included as part of the State and Local plans. Such messages should include the appropriate aspects of sheltering, ad hoc respiratory protection (handkerchief over mouth, etc.) thyroid blocking, or evacuation.	NUREG 0654		Not Met	Draft letters for protective action are not in the plan. Also, the specific protective actions that need to be taken are not mentioned.
II.F.1—The communication plans for emergencies shall include all organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local and State response organizations. Such systems should be selected to be compatible with one another. (See NUREG-0654 for detailed requirements)	NUREG 0654		Not Met	Communication plans were not clearly stated. The plan did not mention organizational titles and alternates nor did it include a clear demonstration of a backup communications system.
II.F.2—Each organization shall ensure that a coordinated communication link for fixed and mobile medical support facilities exists.	NUREG 0654		Not Met	The plan provided to the reviewer contains no reference to medical support. This could be due to the fact

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
				that there is only a temporary doctor's office on the island.
II.G.1—Each organization shall provide a coordinated periodic (at least annually) dissemination of information to the public regarding how they will be notified and what their actions should be in an emergency. This information shall include, but not necessarily be limited to: educational information on radiation contact for additional information Protective measures special needs of the handicapped	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of preplanning activities or of dissemination of information on a yearly basis.
II.G.2—The public information program shall provide the permanent and transient adult population within the plume exposure EPZ an adequate opportunity to become aware of the information annually. The programs should include provision for written material that is likely to be available in a residence during an emergency. Updated information shall be disseminated at least annually. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway EPZ, appropriate information that would be helpful if an emergency or accident occurs. Such notices should refer the transient to the telephone directory or other source of local emergency information and guide the visitor to appropriate radio and television frequencies.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of disseminating information to the transient population.
II.G.5—Each organization shall conduct coordinated programs at least annually to acquaint news media with the emergency plans, information concerning radiation, and points of contact for release of public information in an emergency.	NUREG 0654		Not Met	Media training and coordination was not mentioned in the plan; however, there was some mention of the Joint News Center during the emergency.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.H.10—Each organization shall make provisions to inspect, inventory, and operationally check emergency equipment/instruments at least once each calendar quarter and after each use.	NUREG 0654		Not Met	There was no discussion of equipment inspections, inventory, and operability in the plan.
II.H.11—Each plan shall, in an appendix, include identification of emergency kits by general category (protective equipment, communications equipment, radiological monitoring equipment and emergency supplies.	NUREG 0654		Not Met	The plan did not include an appendix or a listing of emergency kits.
II.H.12—Each organization shall establish a central point (preferably associated with the licensee's near-site EOF), for the receipt and analysis of all field monitoring data and coordination of sample media	NUREG 0654		Not Met	The plan did not clearly identify the required information in regard to field data reporting and analysis.
II.J.10—The organization's plans to implement protective measures for the plume exposure pathway shall include:	NUREG 0654			
a) Maps showing evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas		a) LCP 2.0 Attchmt. 4	a) Met	
b) Maps showing population distribution around the nuclear facility. This shall also be by evacuation areas (licensees shall also present the information in a sector format)		b) --	b) Not Met	b) A population data map was not included.
c) Means for notifying all segments of the transient and resident population		c) LCP 4.4 1.2	c) Met	
d) Means for protecting those persons whose mobility may be impaired due to such factors as institutional or other confinement (State & Local only)		d) LCP 4.5 # 1, pg.3	d) Met	
e) Provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons within the 10-		e) LCP 4.2 Attchmt	e) Met	

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
mile EPZ who may not be able to evacuate immediately f) Method by which decisions by the State Health Department for administering radioprotective drugs to the general population are made during an emergency and the pre-determined conditions under which such drugs may be used by offsite emergency workers g) Means of relocation h) Relocation centers in host areas which are at least 5 miles and preferably 10 miles beyond the boundaries of the plume exposure emergency planning zone (see J.12) i) Projected traffic capacities of evacuation routes under emergency conditions j) Control of access to evacuated areas and organization responsibilities for such control k) Identification and means for dealing with potential impediments to use of evacuation routes, and contingency measures l) Time estimates for evacuation of various sectors and distances based on a dynamic analysis for the plume exposure pathway EPZ (See Appendix 4)		10, pg.27 f)-- g) LCP 2.0 2.5 pg.3 h)-- i)-- j) LCP 2.0 2.3 pg. 2 k) LCP 2.1 2.1.1 pg. 1 l)--	f) Not Met g) Met h) Not Met i) Not Met j) Met k) Met l) Not Met	f) The plan mentions public health is responsible, but there is no discussion of the decision methodology. h) The host area is included in the plan but not the reception center location. i) Traffic Capacity during an evacuation is not discussed in the plan. l) Times estimates are not included in the plan
II.J.12—Each organization shall describe the means for registering and monitoring of evacuees at relocation centers in host areas. The personnel and equipment available should be capable of monitoring within about a 12 hour period all residents and transients in the plume exposure EPZ arriving at relocation centers.	NUREG 0654		Not Met	The plan includes no discussion of the functions of a relocation center.
II.K.3.a—Each organization shall make provision for 24 hour/day capability to determine the doses received by emergency personnel involved in any nuclear accident, including volunteers.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of 24-hour surveillance of emergency workers.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Each organization shall make provisions for distribution of dosimeters, both self-reading and permanent record devices.				However, the plan does state that such workers should not be exposed to more than .4R without a supervisor's approval.
II.K.4—Each State and local organization shall establish the decision chain for authorizing emergency workers to incur exposures in excess of the EPA General Public Protective Action Guides (for emergency workers and lifesaving activities).	NUREG 0654	LCP 4.2 Attachment 1 #9 pg.5	Not Met	The plan mentions the need to call to receive new exposure limits but does not mention or demonstrate the decision tree for determining new dose limits.
II.K.5—Each organization, as appropriate, shall specify action levels for determining the need for decontamination. Shall also establish the means for radiological decontamination of emergency personnel wounds, supplies, instruments and equipment, and for waste disposal.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of action levels for decontamination.
II.L.1—Each organization shall arrange for local and backup hospital and medical services having the capability for evaluation of radiation exposure and uptake, including assurance that persons providing these services are adequately prepared to handle contaminated individuals.	NUREG 0654		Not Met	There are no hospitals on Fishers Island, and only a temporary doctor's office. It is expected that the plan will provide details of backup forms of medical support.
II.N.1.a - An exercise is an event that tests the integrated capability and a major portion of the basic elements existing within emergency preparedness plans and organizations. The emergency preparedness exercise shall simulate an emergency that results in offsite radiological releases, which would require response by offsite authorities. Exercises shall be conducted as set forth in NRC and FEMA rules.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of conducting exercises.
II.N.1.b - An exercise shall include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident scenario requiring response. The	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of conducting exercises.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
organization shall provide for a Federal and State observers/evaluators. The scenario should be varied from year to year such that all major elements of the plans and preparedness organizations are tested within a five-year period. Each organization should make provisions to start an exercise between 6:00PM and midnight, and another between midnight and 6:00AM once every six years. Exercises should be conducted under various weather conditions. Some exercises should be unannounced.				
II.N.2.a—Communication Drills. Communications with State/Local governments within the plume exposure pathway EPZ shall be tested monthly. Communications with Federal ER organizations and States within the ingestion pathway shall be tested quarterly. Communications between the nuclear facility, state and local EOC's and field assessment teams shall be tested annually. Communication drills shall also include the aspect of understanding the content of messages.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of conducting drills.
II.N.2.c—Medical Emergency Drills. A medical emergency drill involving a simulated contaminated individual, which contains provisions for participation by the local support services agencies shall be conducted annually. The offsite portions of the medical drill may be performed as part of the requires annual exercise.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of conducting drills.
II.N.2.d—Radiological Monitoring Drills. Plant environs and radiological monitoring drills (onsite and offsite) shall be conducted annually. These drills shall include collection and analysis of all sample media and provisions for communications and record keeping. The state drills need not be at each site. Where appropriate, local organizations shall participate.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of conducting drills.
II.N.3 - Each organization shall describe have exercises are to be carried out to allow free play for decision making and to meet the following objectives. Pending the development of exercise	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of conducting exercises.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
scenarios and exercise evaluation guidance by NRC and FEMA the scenarios for use in exercises and drills shall include but not be limited to the following: The basic objective of each drill and exercise and appropriate evaluations criteria; The date(s), time period, place(s) and participating organizations; The simulated events A time schedule of real and simulated initiating events; A narrative summary describing the conduct of the exercises or drills to include such things as simulated casualties, offsite fire department assistance, rescue of personnel, use of protective clothing, deployment of radiological monitoring teams and public information activities A description of the arrangements for and advance materials to be provided to official observers.				
II.N.4 - Official observers from Federal, State or local governments will observe, evaluate and critique the required exercises. A critique shall be scheduled at the conclusion of the exercise to evaluate the ability of organizations to respond as called for in the plan. The critique shall be conducted as soon as practicable after the exercise, and a formal evaluation should result from the critique.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of evaluating exercises.
II.N.5 - Each organization shall establish means by for evaluating observer and participant comments on areas needing improvement, including emergency plan procedural changes, and for assigning responsibility for implementing corrective actions. Each organization shall establish management control used to	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of plan assessment or implementing procedures.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
ensure that corrective actions are implemented.				
II.O.1 - Each organization shall assure the training of appropriate individuals: Each facility to which the plant applies shall provide site specific ER training for those offsite emergency organizations who may be called upon to provide assistance in the event of an emergency. Each offsite response organization shall participate in and receive training. Where mutual aid agreements exist between local agencies such as fire, police, and ambulance rescue, the training shall also be offered to the other departments who are members of the mutual aid district.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.O.4 - Each organization shall establish a training program for instructing and qualifying personnel who will implement radiological ER plans. The specialized initial training and periodic retraining programs shall be provided in the following categories:	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.O.4.a - Directors or coordinators of the response organization	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.O.4.d - Police, security and fire fighting personnel	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.O.4.f - First aid and rescue personnel	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
II.O.4.g - Local Support services personnel including Civil Defense/ Emergency Service personnel	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.O.4.h - Medical Support personnel	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.O.4.j - Personnel responsible for transmission of emergency information and instructions	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.O.5 - Each organization shall provide for the initial and annual retraining of personnel with emergency response responsibilities	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.P.1 - Each organization shall provide for the training of individual's responsible for the planning effort.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a training program.
II.P.3 - Each organization shall designate an Emergency Planning Coordinator with responsibility for the development and updating of emergency plans and coordination of these plans with other response organizations	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of a Planning Coordinator.
II.P.4 - Each organization shall update its plan and agreements as needed, review and certify it to be current on an annual basis. The update shall take into account changes identified by drills and exercises.	NUREG 0654		Not Met	The plan provided to the reviewer contains no mention of plan update.
II.P.5 - The emergency response plans and approved changes to the plans shall be forwarded to tall organizations and appropriate individuals with responsibility for implementation of the plans.	NUREG 0654		Not Met	The plan provided to the reviewer contains no discussion of plan distribution.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Revised pages shall be dated and marked to show where changes have been made.				
II.P.7 - Each plan shall contain as an appendix listing by title, procedures requires to implement the plan. The listing shall include the sections of the plan to be implemented by each procedure.	NUREG 0654		Not Met	The design of the plan did not include appendices.
II.P.8 - Each plan shall contain a specific table of contents. Plans submitted for review should be a cross-referenced to these criteria.	NUREG 0654	Table of Contents	Met	The plan meets the requirement; however, the page numbering system is not conducive to quick referencing.
II.P.10 - Each organization shall provide for updating telephone numbers in emergency procedures at least quarterly.	NUREG 0654		Not Met	There are no critical phone numbers listed in the plan. Also, there is no discussion of a system for updating the phone numbers.
Evacuation (urgent removal of persons/animals) and Sheltering (supplemented by bathing and changing of clothes) to protect the public from exposure to direct radiation and inhalation from airborne plume	EPA 400 1-3 2.3.1 5.5.1 5.5.2 5.5.3 Appendix E		Not Met	Protective actions for civilians are not addressed in the plan provided.
Protective action for Milk Supply	EPA 400 1-3 & App D		Met	The plan discusses taking protective action for dairy cows in order to protect their milk.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
	DHHS FDA Vol. 47, #205 FDA 82-8196			
Relocation and decontamination for protection against whole body dose (external exposure) due to deposited material and from inhalation of any resuspended radioactive particulate.	EPA 400 1.4 Appendix E		Not Met	The process for relocation and decontamination protection is not mentioned in the plan provided.
Restrictions on the use of contaminated food and water	EPA 400 1-5 Ch.3,Appd xD DHHS FDA Vol. 47, #205 FDA 82-8196		Not Met	The plan does not mention what should be done with contaminated food and water.
Notification and preliminary evaluation of the conditions and	EPA 400		Not Met	The plan does not mention analysis of an event. The plan does discuss the

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
location of the incident	1.4			collection of data, but not the reporting and analysis of the data.
Cost analysis and radiological decontamination data to form a basis for radiation protection decisions and for recovery.	EPA 400 1.4 (1-7) Appendix C		Not Met	The plan provided to the reviewer contains no mention of a decision theory for protective actions and recovery.
Levels of exposure to radiation identified which should initiate protective action.	EPA 400 2.1 (2-1)		Not Met	The plan identifies only the level of exposure for emergency workers; it doe not include the levels of exposure for the public.
All PAG's should be consistent for all of the population.	EPA 400 2.1 (2-2)		Not Met	Public protection is not discussed in the plan.
Estimate of total doses received prior to relocation of population.	EPA 400 2.1.3 (2-3)		Not Met	Population relocation is not referred to in the plan.
Mechanism for obtaining detailed content of the plume.	EPA 400 2.2 (2-4)		Not Met	A mechanism for gathering information about the plume is not identified in the plan.
Levels of PPE identified for radiological workers.	EPA 400 2.5 (2-9)		Not Met	The plan only mentions equipment for measuring dose. All other equipment is not discussed in the plan.
Coordination and recommendations based on plant conditions, for early evacuations and/or sheltering in pre-designated areas.	EPA 400		Not Met	Plume information is not clearly

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
Early estimates of the various components of projected doses to the population at the site area boundary as well as more distant locations. Estimated time frames as soon as relevant source or release data becomes available.	4.1 (4-1)			identified in the plan.
Establishment of Exposure Patterns using atmospheric transports and field teams including plume tracking.	EPA 400 5.2.2 (5-4)		Not Met	Plume information is not clearly identified in the plan.
Air sampling techniques/flow rates/ time in plume/ analysis information.	EPA 400 5.3		Not Met	Plume information is not clearly identified in the plan.
Procedures for calculating dose conversion factors and derived response levels.	EPA 400 5.4; 5.6		Not Met	Plume information is not clearly identified in the plan.
Documentation of sequence of events	EPA 400 7.1.3 (7-4)		Not Met	The method for documenting the sequence of events is not clear.
Recommendations for surface contamination limits.	EPA 400 7.6.3 7.6.1		Not Met	The plan provided to the reviewer contains no mention of surface containment limits.
Dosemetric models, agricultural transport models, dietary intake and other calculations relating to potential dose.	EPA 400 7.6.2 7.4 7.3		Not Met	The plan provided to the reviewer contains no mention of any type of modeling.

Planning Standard/Requirement	Source Document	Where Addressed in the Plan	Requirement Met or Not Met	Comments
	Appendix B			

Appendix D: Detail on Population Basis Review

The emergency planning zone surrounding Indian Point is composed of a number of planning areas that generally cover the area of a ten-mile radius circle. When the circle is used to represent the emergency planning zone, it is normally divided into a number of 22.5 degree wedges or *sectors* that are identified by compass direction. For example, N is oriented north and E is oriented east with three other sectors (NNE, NE, ENE) between. One of the reasons for this method of dividing up the emergency planning zone circle is to identify locations for offsite radiological monitoring, as described in NUREG 0654, section II J. Additional rings can also be used at distances less than 10 miles to further subdivide the sectors. This is one method used to divide the emergency planning zone into standard increments for use in emergency preparedness activities or response. Another way to divide it is to use the emergency response and planning areas that are defined by Indian Point emergency managers. The sectors in the circle and the emergency response and planning areas are two different ways to look at portions of the ten-mile circle. An example of the circle and sector method is shown in Figure D-1.

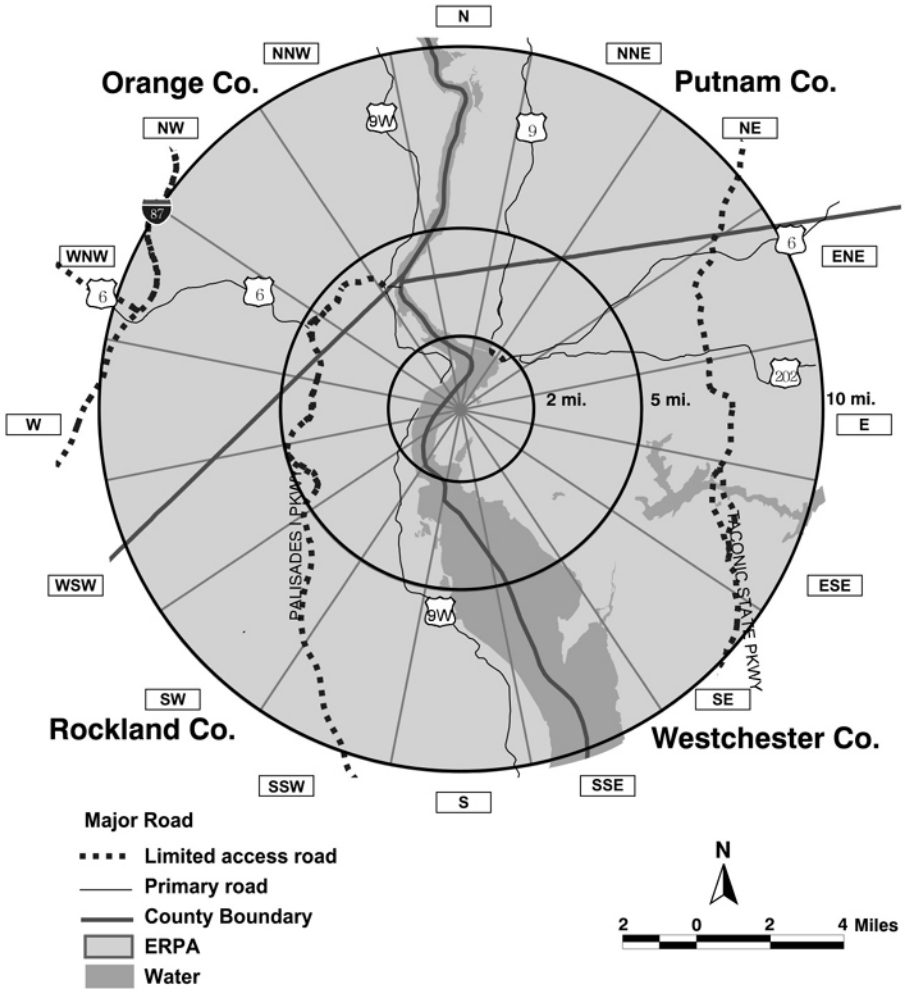

Figure D-1: Indian Point Sector Diagram with 2-, 5-, and 10-Mile Radius Rings

Table D-1: Permanent Resident Population by Emergency Response and Planning Area (ERPA)

ERPA	Population	ERPA	Population
1	2,189	25	1,037
2	22,441	26	5,320
3	1,273	27	2,186
4	3,421	28	25
5	1,110	29	1,095
6	7,606	30	13,036
7	120	31	31,314
8	11,213	32	5,042
9	3,966	33	10,616
10	8,021	34	7,042
11	17,947	35	23,313
12	3,092	36	2,623
13	7,258	37	24,248
14	2,688	38	16
15	1,284	39	63
16	547	40	414
17	2,032	41	105
18	3,598	42–46	0 (Hudson River)
19	6,805	47	334
20	4,110	48	3,508
21	4,776	49	3,256
22	24,443	50	471
23	2,535	51	13,307
24	7,167	**Total All ERPAs**	**298,013**

Table D-2: Permanent Resident Population by Sector

	Population in Circle of Radius			
Sector	2 mile	5 mile	10 mile	Total
N	18	315	10,350	**10,683**
NNE	96	2,732	4,158	**6,986**
NE	2,974	16,061	11,776	**30,811**
ENE	2,141	9,335	24,046	**35,522**
E	814	2,462	10,215	**13,491**
ESE	403	1,492	3,579	**5,474**
SE	1,809	4,428	26,080	**32,317**
SSE	1,899	1,631	13,658	**17,188**
S	747	1,081	27,598	**29,426**
SSW	568	13,663	30,924	**45,155**
SW	78	7,413	12,584	**20,075**
WSW	323	1,285	407	**2,015**
W	256	201	25	**482**
WNW	2	5	2,041	**2,048**
NW	2	154	1,247	**1,403**
NNW	13	1,092	2,237	**3,342**
Totals	**12,143**	**63,350**	**180,925**	**256,418**

Table D-3: Comparison of IEM's and KLD's Population Estimates by 1-Mile Ring[1]

Ring	IEM Ring Population	IEM Cumulative Population	KLD Ring Population	KLD Cumulative Population
0–1 mile	1,374	1,374	1,683	1,683
1–2 mile	10,769	12,143	10,471	12,154
2–3 mile	18,483	30,626	19,443	31,597
3–4 mile	19,632	50,258	19,071	50,668
4–5 mile	25,235	75,493	26,080	76,748
5–6 mile	29,440	104,933	28,093	104,841
6–7 mile	21,728	126,661	21,899	126,740
7–8 mile	28,058	154,719	24,432	151,172
8–9 mile	45,860	200,579	50,010	201,182
9–10 mile	55,839	256,418	56,007	257,189

Table D-4: Peak Transient Population by Emergency Response and Planning Area (ERPA)

ERPA	Population	ERPA	Population
1	2,924	25	140
2	5,269	26	1,956
3	5	27	345
4	2,244	28	250
5	145	29	364
6	3,842	30	5,978
7	44	31	16,288
8	1,117	32	2,983
9	1,802	33	4,776

[1] In table C-3, "cumulative population" means the population immediately to the left (in the ring population column) plus all populations in the ring population column that precede it.

ERPA	Population	ERPA	Population
10	2,892	34	2,947
11	9,329	35	14,245
12	721	36	1,548
13	9,420	37	13,517
14	390	38	0
15	2,619	39	9,544
16	168	40	22,657
17	797	41	2
18	182	42–46	0
19	1,721	47	163
20	330	48	1,670
21	3,213	49	118
22	12,040	50	47
23	1,002	51	6,314
24	17,049	**Total**	**185,117**

Table D-5: Peak Transient Population by Sector

	Population for Selected Rings			
Wedge	0-2 mile	2-5 mile	5-10 mile	Totals
N	25	88	18,244	**18,357**
NNE	0	184	476	**660**
NE	841	2,318	3,188	**6,347**
ENE	1,068	2,018	10,691	**13,777**
E	153	767	14,217	**15,137**
ESE	1,180	187	871	**2,238**

	Population for Selected Rings			
SE	2,779	627	16,235	**19,641**
SSE	854	413	4,326	**5,593**
S	6	1,722	10,143	**11,871**
SSW	0	7,018	19,767	**26,785**
SW	0	5,369	11,941	**17,310**
WSW	46	781	16,059	**16,886**
W	93	1,226	4,784	**6,103**
WNW	235	5,078	1,726	**7,039**
NW	259	1,425	166	**1,850**
NNW	129	1,111	1,060	**2,300**
Total	**7,668**	**30,332**	**133,894**	**171,894**

Permanent Resident Population by Emergency Response and Planning Area and Sector

The estimates of permanent resident populations are based on population counts from the most recent (2000) decennial census taken by the United States Census Bureau. IEM used its geographic information system software to process the geographic data and associated population counts for census blocks in each of the counties surrounding Indian Point. IEM then combined these populations for each emergency response planning area to generate a permanent resident population count. The block data was similarly combined within each sector (circle sector method described previously) to produce a population count for each sector. This work provided two different ways to view population counts for the Indian Point ten-mile emergency planning zone.

Since boundaries of the sectors do not follow census block boundaries, many of the blocks had to be divided into sub-areas by sector boundaries. To do this, IEM overlaid the census blocks with the ten-mile and 50-mile radius sectors, splitting these blocks into sub-areas, and then allocated the block population to the sub-areas based on an area ratio method. The populations of the block sub-areas within the sector boundaries were then combined for each sector. In some cases, it was also necessary to split blocks at emergency response and planning areas boundaries. When necessary, the same method was used to allocate the block population to block sub-areas within each emergency response and planning area.

The area ratio method described above assigns each sub-area a portion of the block population based on the ratio of the area of each block part to the area of the entire block. For example, if a particular sub-area contains one-fourth the area of the total block area, the sub-area receives one-fourth of the block's total population. Figure D-1 illustrates this principle. In the figure, one-fourth of the block's total area is located in the sub-area, so it includes one-fourth of the population. The area ratio method assumes that the population within the block is evenly distributed—a reasonable assumption in most cases. In the absence of additional information, this method is well-accepted for allocating census block populations to sub-block areas.[2]

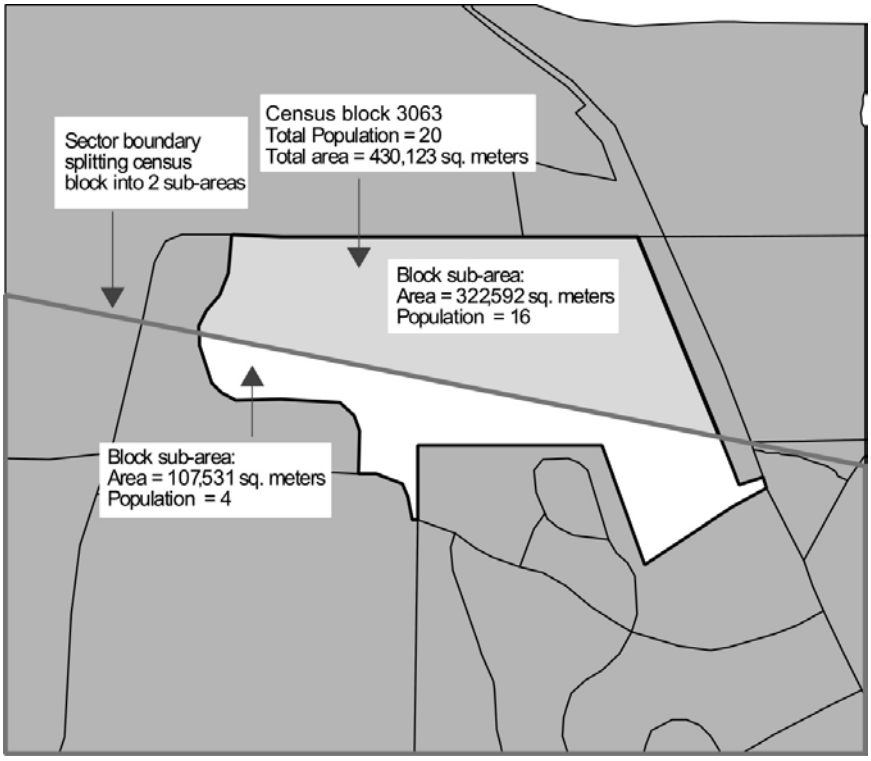

Figure D-1: An Example of the Area Ratio Method Applied to a Census Block Divided into Sub-Areas

[2] Goodchild, M.F., Anselin, L., and Deichmann, U. 1993. "A Frameword for the Aerial Interpolation of Socioeconomic Data." *Environment and Planning* A. 25: 383-397.

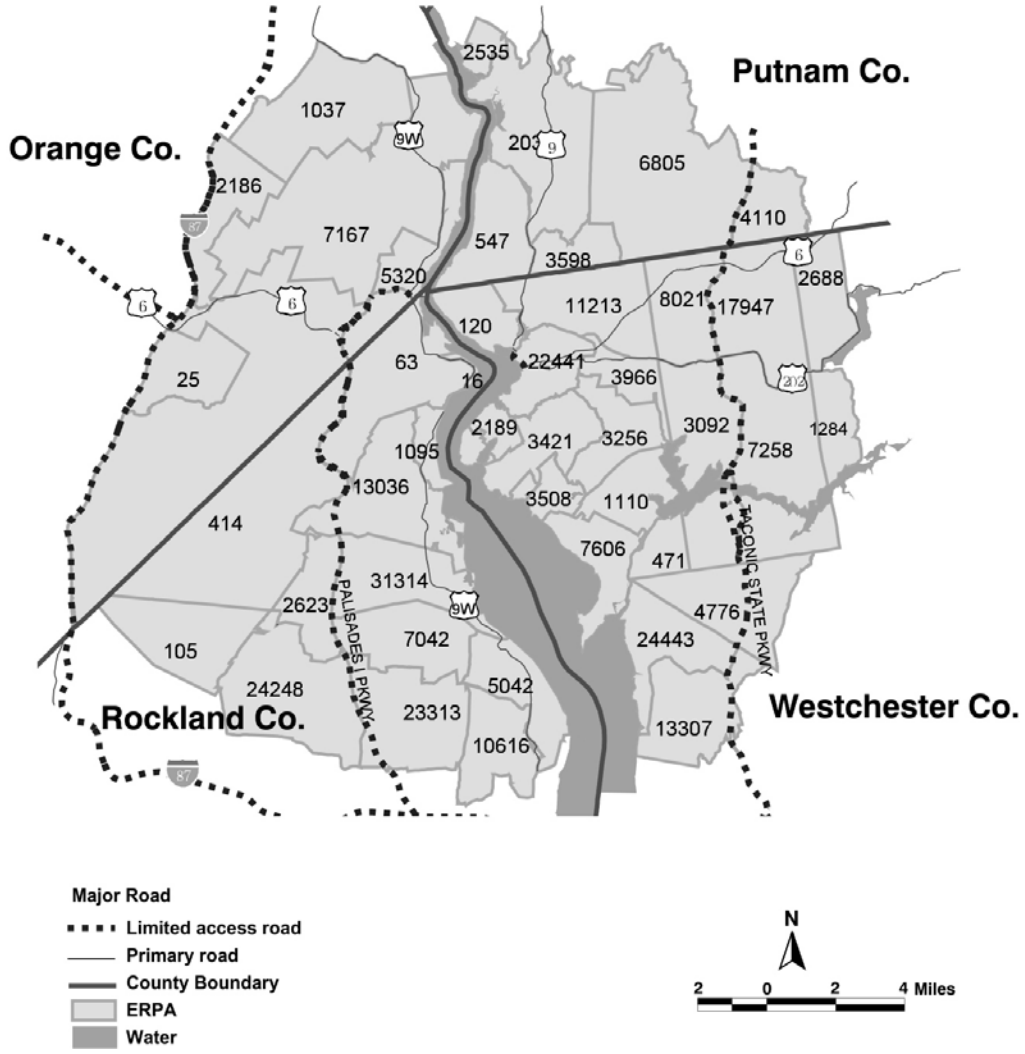

Figure D-2: Permanent Residential Population by Emergency Response and Planning Area

Table D-2 in Appendix D lists the permanent resident population by sector, and Figure D-3 depicts these populations graphically. The population within the ten-mile emergency planning zone when using the circle as the boundary is somewhat less than the total population within the emergency planning zone when totaling all the emergency response and planning area numbers. This is because a number of emergency response and planning area boundaries extend beyond the ten-mile radius circle and therefore capture additional population.

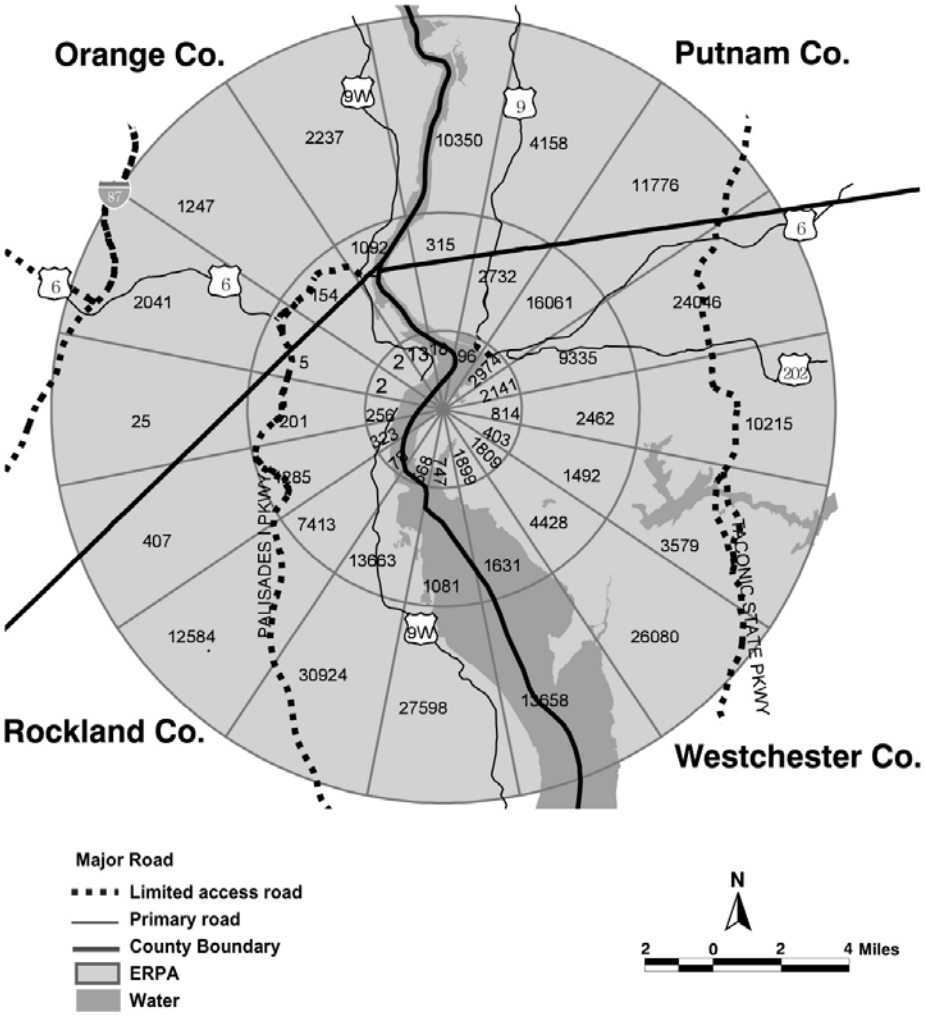

Figure D-3: Permanent Resident Population by Sector

IEM received the permanent resident population estimates by Emergency Response Planning Area developed by KLD Associates, Inc. In general, the population totals agree with IEM's estimates. The total residential emergency response and planning area population for the emergency planning zone area developed by KLD is 298,161, compared to the IEM figure of 298,013—a difference of only 0.05%. IEM also compared the KLD estimate of population within sectors of the ten-mile radius circle (circle sector method described previously). The KLD estimate of total population within the ten-mile circle is 257,189, which is 0.3% higher than the IEM estimate of 256,418 for this area. This difference may be attributable to splitting blocks or slight differences in where the sectors are centered. As with the total emergency response and planning area population comparison the difference is very small.

Although the total permanent resident counts developed by IEM and KLD match closely regardless of which basis (emergency response and planning area or circle/sectors), the counts of these residents within individual sectors of the ten-mile circle are considerably different. The following table illustrates the differences.

Table D-6: Comparison of Permanent Resident Population Estimates for IEM and KLD by 22.5 Degree Sector

Sector	IEM Estimate	KLD Estimate
N	10,683	2,878
NNE	6,986	23,147
NE	30,811	38,230
ENE	35,522	19,832
E	13,491	6,148
ESE	5,474	12,384
SE	32,317	39,517
SSE	17,188	13,669
S	29,426	47,251
SSW	45,155	32,595
SW	20,075	4,406
WSW	2,015	1,140
W	482	882
WNW	2,048	2,118
NW	1,403	1,506
NNW	3,342	11,486
Total	256,418	257,189

The estimates allocated to individual sectors show fairly sizable deviations. Given the density of the population around Indian Point, it is possible that slight differences in the location of the sectors (i.e., if the center points used for the sectors are slightly different) could result in large variations in the populations assigned to each individual sector. As an additional check, IEM compared populations for smaller concentric rings within the ten-mile circle. Table D-3 in Appendix D shows the permanent resident populations accumulated over 1 mile increments within the ten-mile circle and again compares IEM results to those produced by KLD. The relative differences in the populations by concentric rings are not as pronounced as the differences by sector.

The specific sector population differences may or may not be an indicator of a possible impact on evacuation time estimates. During the evacuation modeling process, population is typically

assigned to evacuation links independent of the sector scheme. In the modeling of evacuation, the population is assumed to load from specific population clusters (e.g., from the centroid of a census block) to the closest link[3] on the evacuation network. So, the fact that the population is different by sector does not mean that the way the population is assigned to load on the evacuation network is affected. The State of New York may want to scrutinize the population assumptions published with the new evacuation time estimate report for Indian Point once it is published. Specifically, the evacuation network loading points within sectors should be checked to gain a level of confidence that population was assigned to the network appropriately. Based on information available, IEM cannot determine the specific cause of the difference in the individual sector numbers.

Table D-7: Schools within the Emergency Planning Zone

School	Address	County	Population	ERPA
Alphabet Express	62 Old Middletown Rd., New City	Rockland	29	35
Anne M. Dorner Middle School	70 Van Cortlandt Ave., Ossining	Westchester	872	22
Bais Yaakov Chafetz Chaim	P. O. Box 704, Pomona	Rockland	193	36
Bais Yakov of Ramapo	984 Haverstraw Rd., Suffern	Rockland	155	37
Benjamin Franklin Elementary School	3477 Kahmi Dr., Yorktown Heights	Westchester	794	11
BOCES	200 Boces Dr., Yorktown Heights	Westchester	1771	15
Brookside School	Pinesbridge Rd., Ossining	Westchester	678	22
Brookside Elementary School	2285 Broad St., Yorktown Heights	Westchester	599	11
Brookside Elementary School	8 Pinesbridge Rd., Ossining	Westchester	690	21
Carrie E. Tompkins Elementary School	10 Gerstein St., Croton On Hudson	Westchester	785	6
Christian Cornerstone School	384 New Hempstead Rd., New City	Rockland	118	35
Claremont Elementary School	Claremont Rd., Ossining	Westchester	755	22
Clarksville High School	151 Congers Rd., New City	Rockland	1596	35
Congers Elementary School	9 Lake Rd., Congers	Rockland	343	32
Crompond Elementary School	2901 Manor St., Yorktown Heights	Westchester	548	11
Croton Harmon High School	36 Old Post Rd. S, Croton On Hudson	Westchester	415	6

[3] A link is a section of the evacuation model network that represents one or more roads.

School	Address	County	Population	ERPA
Croton Montessori School	P. O. Box 84, Croton On Hudson	Westchester	10	6
Deverux Millwood Learning Ctr.	14 Schuman Rd., Millwood	Westchester	83	21
Dominican Sister	798 Route 304, Nanuet	Rockland	522	35
Farley James A. Middle School	140 Route 210, Stony Point	Rockland	990	30
French Hill Elementary School	2051 Baldwin Rd., Yorktown Heights	Westchester	508	13
Ft. Montgomery Elementary School	P. O. Box 287, Highland Falls	Orange	212	24
George Wash Elementary School	3634 Lexington Ave., Mohegan Lake	Westchester	415	10
Gerald F. Neary Elementary School	20 George St., Haverstraw	Rockland	512	31
Gittelman Rben Hebrew Day School	360 New Hempstead Rd., New City	Rockland	395	35
Grandview Elementary School	151 Grandview Ave., Monsey	Rockland	532	37
Haverstraw Middle School	16 Grant St., Haverstraw	Rockland	767	31
Hempstead Elementary School	80 Brick Church Rd., Thiells	Rockland	608	31
Hempstead School	80 Brick Church Rd., Spring Valley	Rockland	560	37
Hendrick Hudson High School	2 Albany Post Rd., Montrose	Westchester	809	4
Hillcrest Elementary School	32 Addison Boyce Dr., New City	Rockland	487	35
Hudson Valley New City Unit	240 N Main St., New City	Rockland	23	34
Immaculate Conception School	24 E Main St., Stony Point	Rockland	220	30
Kumon Math and Reading Centers	216 Congers Rd., New City	Rockland	58	35
Lakeland Alternative High School	Rur. Rte. 132, Shrub Oak	Westchester	52	10
Lakeland Copper Beech Middle School	3401 Old Yorktown Rd., Yorktown Heights	Westchester	1008	11

School	Address	County	Population	ERPA
Liberty Elementary School	142 Lake Rd., Valley Cottage	Rockland	518	33
Lime Kiln School	35 Lime Kiln Rd., Suffern	Rockland	990	37
Lincoln-Titus Elementary School	10 Lincoln Ave., Crompond	Westchester	607	4
Link Elementary School	51 Red Hill Rd., New City	Rockland	529	35
Little Tor Elementary School	56 Gregory St., New City	Rockland	359	35
M. L. Colton Elementry School	40 Grandview Ave., Spring Valley	Rockland	41	37
Mohansic Elementary School	704 Locksley Rd., Yorktown Heights	Westchester	500	11
Montgomery Highland FLS/Ft. Sch.	P. O. Box 287, Highland Falls	Orange	573	24
North Garnerville Elementary School	63 Chapel St., Garnerville	Rockland	335	31
North Rockland High School	106 Hammond Rd., Thiells	Rockland	2535	31
Northern Westchester Music School	2014 Crompond Rd.., Yorktown Heights	Westchester	12	13
Peekskill High School	1072 Elm St., Peekskill	Westchester	716	2
Peekskill Middle School	212 Ringgold St., Peekskill	Westchester	507	2
Phoenix Academy High School	P. O. Box 458, Shrub Oak	Westchester	225	10
Pierre Van Crtland Middle School	3 Glen St., Ossining	Westchester	355	22
Pomona Middle School	101 Pomona Rd., Suffern	Rockland	1016	37
Putnam Valley Middle School	142 Peekskill Hollow Rd., Putnam Valley	Putnam	533	19
Ramapo Senior High School	400 Viola Rd., Spring Valley	Rockland	1843	37
Rockland Country Day School	34 Kings Hwy., Congers	Rockland	256	33
Sacred Heart of Jesus School	6 Cozzens Ave., Highland Falls	Orange	285	26
Saint Peters School	21 Ridge St., Haverstraw	Rockland	258	31
St. Anns Parish School	16 Elizabeth St., Ossining	Westchester	430	51

School	Address	County	Population	ERPA
St. Augustine School	114 S Main St., New City	Rockland	277	35
St. Augustine School	Eagle Park, Ossining	Westchester	610	22
St. Gregory Barbarigo School	29 Cinder Rd., Garnerville	Rockland	280	31
St. Patricks School	117 Moseman Rd., Yorktown Heights	Westchester	434	13
St. Paul School	365 Kings Hwy., Valley Cottage	Rockland	468	33
St. Theresa School	300 Dalmeny Rd., Briarcliff Manor	Westchester	234	51
Stony Point Elementary School	7 Gurnee Dr., Stony Point	Rockland	784	30
Street School Community Center	31 Zukor Rd., New City	Rockland	264	34
Summit Park Elementary School	30 Route 45, New City	Rockland	544	37
Sunshine Cmnty. Nursry/Day Care	384 New Hempstead Rd., New City	Rockland	70	35
Thiells Elementary School	78 Rosman Rd., Thiells	Rockland	857	31
Todd Elementary	45 Ingham Rd., Briarcliff Manor	Westchester	889	51
Uriah Hill Elementary School	980 Pemart Ave., Peekskill	Westchester	299	2
W. Haverstraw Middle School	71 Blauvelt Ave., West Haverstraw	Rockland	797	31
Walter Panas High School	300 Croton Ave., Cortlandt Manor	Westchester	1093	9
West Orchard Elementary School	25 Granite Rd., Chappaqua	Westchester	644	21
West Point Elementary School	705 Barry Rd., West Point	Orange	910	24
Yeshiva Avir Yakow Girls School	15 N Roosevelt Ave., Spring Valley	Rockland	2455	37
Yeshiva Zichorn Yaakov	720 Union Rd., Spring Valley	Rockland	92	37
Yorktown High School	2729 Crompond Rd., Yorktown Heights	Westchester	807	11
Yorktown Middle School	2701 Crompond Rd., Yorktown Heights	Westchester	1185	11

Table D-8: Daycare Facilities within the Emergency Planning Zone

Daycare	Address	County	Population	ERPA
Accent On Learning Child Care Center	325 S Highland Ave., Briarcliff Manor	Westchester	118	51
Ages and Stages Nursery School	P. O. Box 239, Congers	Rockland	56	33
Americas Future	18 N Route 303, Congers	Rockland	17	32
Anas Care	1 Centennial Dr., Garnerville	Rockland	13	31
Barbara Ann Biele	3038 Crompond Rd., Yorktown Heights	Westchester	8	11
Bounous Montessori	224 Main St., Cold Spring	Putnam	29	23
Briarcliff Nursery School	P. O. Box 28, Briarcliff Manor	Westchester	61	22
Bright Beginnings	1974 Commerce St., Yorktown Heights	Westchester	66	13
Bubbles Daycare	1 Corinthian Rd., New City	Rockland	7	35
Building Block Child Care Center	845 Fox Meadow Rd., Yorktown Heights	Westchester	89	11
Center Nursery School Yorktown	2966 Crompond Rd., Yorktown Heights	Westchester	32	11
Children Learning Garden Day	365 Columbine Ct., Yorktown Heights	Westchester	19	13
Childrens Garden Day Nursery	470 Mountainview Ave., Valley Cottage	Rockland	21	33
Chris Learning & Fun	4 Havencrest Dr., Thiells	Rockland	6	31
Christian Nursery School	25 S State Rd., Briarcliff Manor	Westchester	68	51
CIC Early Head Start	1 Washington Ave., Spring Valley	Rockland	132	37
Circle School	56 Cleveland Dr., Croton On Hudson	Westchester	41	6
Clarkstown Teddy Bears	58 Endicott St., Congers	Rockland	17	32
Community Nursery School Ctr.	10 Academy St., Cold Spring	Putnam	35	23
Country Cousins Nursery School	P. O. Box 652, Putnam Valley	Putnam	20	19
Creative Playcare	201 Scarborough Rd., Briarcliff Manor	Westchester	19	51
Cricket Town Child Care Too	P. O. Box 630, West Haverstraw	Rockland	83	31

Daycare	Address	County	Population	ERPA
Crickett Town School	P. O. Box 27, Stony Point	Rockland	72	30
Croton Community Nursery School Inc.	25 Van Wyck St., Croton On Hudson	Westchester	36	6
Fidelios Home Day Care	1814 French Hill Rd., Yorktown Heights	Westchester	12	13
Foleys Home Day Care	2731 Hedwig Dr., Yorktown Heights	Westchester	17	11
Fun Times Day Care	13 S Highview Ave., New City	Rockland	8	37
Happy Tots Day Care Inc.	114 Grand St., Croton On Hudson	Westchester	95	6
Julies Little School	82a Oregon Rd., Cortlandt Manor	Westchester	10	8
Kid Time	8 Harrison St., Stony Point	Rockland	9	30
Kids Place	1 Emwilton Pl, Ossining	Westchester	59	21
Mrs. Manners Day Care	1264 Winding Ct., Mohegan Lake	Westchester	11	10
Nabby Day Camp	1 Susquehanna Rd., Ossining	Westchester	500	22
New Square CIC Headstart Inc.	766 N Main St. Ste. 108, Spring Valley	Rockland	22	37
Nice Care Inc.	73 Indian Brook Ln., Garrison	Putnam	15	17
Noahs Ark Nursery School	P. O. Box 342, Mahopac	Putnam	53	20
Only For Kids Inc.	577 N State Rd., Briarcliff Manor	Westchester	82	22
Ossining Childrens Center	90 S Highland Ave., Ossining	Westchester	205	51
Palace Little Peoples	15 Fersch Ln., Congers	Rockland	7	32
Pattan Zee Community Nursery	365 Strawtown Rd., New City	Rockland	25	35
Pied Piper Pre-School	P. O. Box 494, Yorktown Heights	Westchester	50	13
Pitter Patter Child Care	419 Cedar Dr. W, Briarcliff Manor	Westchester	6	51
Playgarten Day Care Center	58 Lake Rd., Valley Cottage	Rockland	125	33
Putnam Assoc. Resource Centers	141 Oscawana Lake Rd., Putnam Valley	Putnam	11	19
Quality Time Play To Learn	2930 Gomer St., Yorktown Heights	Westchester	18	11
Ramapo Community Nurser School	8 Old Schoolhouse Rd., New City	Rockland	21	35

Daycare	Address	County	Population	ERPA
Robin Hill School	70 Wesley Chapel Rd., Suffern	Rockland	72	37
Rockland Learning Center Inc.	136 Concklin Rd., Pomona	Rockland	58	34
Rockn Robins Day Care	78 Kennedy Dr., West Haverstraw	Rockland	18	31
Ruffins Home Day Care	1 Gilda Ct., Spring Valley	Rockland	15	37
Sanford Learning Center	7 Moorea Ct., Garnerville	Rockland	1	31
Seed Day Care Center Inc.	2084 Baldwin Rd., Yorktown Heights	Westchester	86	13
Small Miracles Pre-School Ctr.	17 Campwoods Rd., Ossining	Westchester	119	22
Small Miracles Pre-School Ctr.	17 Campwoods Rd., Ossining	Westchester	118	22
St. Dominics Home	57 Ridge Rd., Valley Cottage	Rockland	13	33
St. Lukes Nursery School	P. O. Box 533, Putnam Valley	Putnam	54	19
St. Pauls Christian Day School	323 S Main St., New City	Rockland	176	35
St. Philips Nursery School	S Mountain Pass, Garrison	Putnam	17	16
Strawberry Road Early Lrng. Ctr.	1770 Strawberry Rd., Mohegan Lake	Westchester	110	10
Teddy Bear Kids Care	89 Havermill Rd., New City	Rockland	7	35
Teddy Bears Childcare	119 W Main St., Stony Point	Rockland	35	30
The Building Block Child Care	845 Fox Meadow Rd., Yorktown Heights	Westchester	80	11
The Little School House	24 Govan Dr., Stony Point	Rockland	17	30
Thiells Pre-School	64 New Main St., Haverstraw	Rockland	18	31
Wescop Yorktown Heights Head Start	1974 Commerce St., Yorktown Heights	Westchester	77	13
YM-YWHA	3566 Crompond Rd., Cortlandt Manor	Westchester	56	10
Yorktown Community Nursery School	P. O. Box 1146, Yorktown Heights	Westchester	41	13

Table D-9: Nursing Homes within the Emergency Planning Zone

Nursing Home	Address	County	Population	Zone
Abbott House	55 Route 9w, Haverstraw	Rockland	24	31
Assisted Living At Northern River	89 S Route 9w, Haverstraw	Rockland	136	31
Atria Inc.	1025 Pleasantville Rd., Briarcliff Manor	Westchester	185	51
Bernstein House	228 Ramapo Rd., Garnerville	Rockland	21	31
Bethel Nursing & Rehabilitation	67 Springvale Rd., Croton On Hudson	Westchester	369	48
Bethel Nursing Home Co. Inc.	17 Narragansett Ave., Ossining	Westchester	128	22
Bethel Senior Residence	62 Springvale Rd., Croton On Hudson	Westchester	175	48
Bethel Springvale Inn	1719 Narragansett Ave., Ossining	Westchester	160	22
Brandywine Nursing Home Inc.	620 Sleepy Hollow Rd., Briarcliff Manor	Westchester	216	51
Camary Statewide Service	P. O. Box 183, Granite Springs	Westchester	17	14
Camary Statewide Services Inc.	P. O. Box 183, Yorktown Heights	Westchester	16	13
Cedar Manor Nursing Home	P. O. Box 928, Ossining	Westchester	233	22
Church St. Community Residence	6466 Church St., Garnerville	Rockland	9	31
Community Based Services Inc.	2466 Broad St., Yorktown Heights	Westchester	30	11
Community Living Corp	725 Kitchawan Rd., Ossining	Westchester	14	12
Cortlandt Hills Group Home	106 Watch Hill Rd., Cortlandt Manor	Westchester	220	4
Country House	2000 Baldwin Rd., Yorktown Heights	Westchester	150	13
Croton House	1 Mount Green Rd., Croton On Hudson	Westchester	13	6
Crystal Run Village Inc.	29 Seymour Dr., New City	Rockland	12	35
Danish Home For The Aged Inc.	P. O. Box 334, Croton On Hudson	Westchester	20	50
Faith Adult Home Inc.	P. O. Box 1078, Ossining	Westchester	14	22

Nursing Home	Address	County	Population	Zone
Field Home-Holy Comforter	P. O. Box 222, Yorktown Heights	Westchester	615	13
Friedwald House	475 New Hempstead Rd., New City	Rockland	330	37
Garnerville Home For Adults	P. O. Box 328, Garnerville	Rockland	45	31
Green Chimneys Childrens Services	183 Cedar Ln., Ossining	Westchester	11	22
Hudson Valley DDSO	52 Moseman Rd., Yorktown Heights	Westchester	10	13
Institute Applied Human D St. J	Drawer 129, Yorktown Heights	Westchester	21	12
Laurel Manor Adult Home	P. O. Box 397, New City	Rockland	47	35
Loeb House Inc.	15 Old Route 202, Pomona	Rockland	33	36
Longhill Road Community	2 Long Hill Rd., Highland Mills	Orange	11	25
Hudson Valley DDSO	63 Park Rd., Stony Point	Rockland	8	30
Micah Manor	P. O. Box 564, Stony Point	Rockland	10	30
Millwood House	45 Shingle House Rd., Millwood	Westchester	12	21
Mount Ivy Intermediate Care Facility	1048 Route 45, Pomona	Rockland	19	34
Northern Riverview Healthcare Center	87 S Route 9w, Haverstraw	Rockland	390	31
Putnam Assn. Resource Center	329 Main St., Cold Spring	Putnam	13	23
Rockland County ARC	25 Hemlock Dr., Congers	Rockland	767	32
Sky View Health Care Center	P. O. Box 130, Croton On Hudson	Westchester	262	6
Sleepy Hollow Adult Home	620 Sleepy Hollow Rd., Briarcliff Manor	Westchester	38	51
Sunrise Assited Living Management	233 N Main St., New City	Rockland	116	35
Tolstoy Foundation	P. O. Box 319, Valley Cottage	Rockland	109	33
Tolstoy Foundation Center	P. O. Box 578, Valley Cottage	Rockland	69	33
Venturesome	16 New York Ave. 18, Congers	Rockland	12	33
Victoria Nursing Home	25 N Malcolm St., Ossining	Westchester	113	22

Nursing Home	Address	County	Population	Zone
Walter Hoving Home Inc.	P. O. Box 194, Garrison	Putnam	70	17
Westledge Nursing Home	2000 Main St., Peekskill	Westchester	213	2

Table D-10: Prisons within the Emergency Planning Zone

Name	Address	County	Population	ERPA
Rockland County Correctional Center	P. O. Box 2393, New City	Rockland	275	35
Sing Sing Correctional Facility	354 Hunter St., Ossining	Westchester	2750	22

Table D-11: Large (Population > 50) Hotels/Overnight Camps within the Emergency Planning Zone

Hotels/Overnight Camps	Address	County	Population	ERPA
American Budget Inn	32 RR 17, Harriman	Orange	68	40
Bear Mountain Inn	Bear Mountain	Rockland	665	39
Best Western	17 Main St., Highland Falls	Orange	409	26
BYO Blair Lodge	221 Peekskill Hollow Rd., Putnam Valley	Putnam	150	19
Camp Addison Boyce	Mott Farm Rd., Tomkins Cove	Rockland	250	30
Day Camp In The Park Inc.	6 Kendall Dr., New City	Rockland	500	35
Holiday Inn Express	1106 Route 9W, Ft. Montgomery	Orange	175	26
Hotel Thayer	674 Thayer Rd., West Point	Orange	2255	24
Lanowa Camp	Gate Hill Rd., Stony Point	Rockland	146	30
Palisade Motel	17 Main St., Highland Falls	Orange	110	26
Peekskill Motor Inn	634 Main St., Peekskill	Westchester	119	2
Pig Hill Inn	P. O. Box 357, Cold Spring	Putnam	21	23
Rockland YMHA-YWHA	900 Route 45, New City	Rockland	54	37
Stony Point Center	17 Cricketown Rd., Stony Point	Rockland	190	30

Hotels/Overnight Camps	Address	County	Population	ERPA
Vacation Camp For Blind	111 Summit Park Rd., Spring Valley	Rockland	250	37
Watergate Motel	RR Box 9A, Croton On Hudson	Westchester	64	6
West Point Motel	156 Main St., Highland Falls	Orange	205	26

Table D-12: Hospitals within the Emergency Planning Zone

Hospital	Address	County	Population	ERPA
Franklin Delano Roosevelt VA Hospital	P. O. Box 100, Montrose	Westchester	991	48
Helen Hayes Hospital	R.R. Box 9w, Haverstraw	Rockland	621	31
Hudson Valley Hospital Center	Cortlandt Manor	Westchester	120	9
Keller Army Community Hospital	US Military Aca. Bldg. 900, West Point	Orange	291	24
St. Marys Rehabilitation Center	P. O. Box 568, Ossining	Westchester	109	21
Stony Lodge Hospital Inc.	P. O. Box 1250, Briarcliff Manor	Westchester	361	22
Summit Park Hospital	50 Sanitorium Rd. Bldg. A, Pomona	Rockland	108	37

Table D-13: Large Industries (Employment > 150) with the Emergency Planning Zone

Large Industry	Address	County	Employment	ERPA
A & T Health Care Llc.	339 N Main St., New City	Rockland	550	34
A. F. G. E. Local Union 2440	Fdr. VA Hosp. Bld. 13 Rm. 17, Montrose	Westchester	160	47
Accent Maintenance Corp	109 Croton Ave. Ste. 10, Ossining	Westchester	750	22
American Lisure Facilities Mgt	2 New Hempstead Rd., New City	Rockland	275	35
Barr Laboratories Inc.	P. O. Box 2900, Pomona	Rockland	170	36
Beacon Community Health Center	1037 Main St., Peekskill	Westchester	230	2
City of Peekskill	840 Main St., Peekskill	Westchester	200	2
Clarkstown Central School Dst	62 Old Middletown Rd., New City	Rockland	153	35

Large Industry	Address	County	Employment	ERPA
Club Fit	P. O. Box 241, Jefferson Valley	Westchester	160	22
County of Rockland	11 New Hempstead Rd., New City	Rockland	500	35
Data Com Direct Inc.	614 Corporate Way, Valley Cottage	Rockland	200	33
Department of Social Services	Sanitorium Rd. Bldg. L, Pomona	Rockland	500	37
Dolce Intrnational/Crotonville	Old Albany Post Rd., Ossining	Westchester	155	22
Elks Lodge B.P.O.E. 1486	80 Main St., Ossining	Westchester	200	22
Empire Medicare	2651 Strang Blvd., Yorktown Heights	Westchester	309	11
Entergy	P. O. Box 215, Buchanan	Westchester	850	1
Geis Toyota Inc.	P. O. Box 671, Peekskill	Westchester	170	8
Gypsum Plant	P. O. Box 711, Stony Point	Rockland	215	30
Home Depot	254 Larkin Dr., Monroe	Orange	200	40
Hudson Valley DDSO	P. O. Box 470, Thiells	Rockland	300	31
IBM	P. O. Box 218, Yorktown Heights	Westchester	3000	13
Indian Point 1 & 2	Bleakley & Broadway, Buchanan	Westchester	700	1
Inn Credible Caters Ltd	P. O. Box 337, Central Valley	Orange	200	27
Interstate Lumber & Mill	P. O. Box 816, Shrub Oak	Westchester	175	10
Jawonio Inc.	260 N Little Tor Rd., New City	Rockland	500	35
Kyto Meridian Diagnostics Inc.	216 Congers Rd., New City	Rockland	170	35
Louis Hornick & Co Inc.	152 Broadway, Haverstraw	Rockland	500	31
Macys	700 Lee Blvd., Yorktown Heights	Westchester	200	11
Mark M. D. Geller	18 Squadron Blvd., New City	Rockland	200	35
Maryland Sisters	10 Pinesbridge Rd., Ossining	Westchester	250	21
Micros-To-Mainframes Inc.	614 Corporate Way, Valley Cottage	Rockland	157	33
Omnicare	704 Executive Blvd., Valley Cottage	Rockland	180	33

Large Industry	Address	County	Employment	ERPA
Philips Research	345 Scarborough Rd., Briarcliff Manor	Westchester	300	51
Putnam-Northern Westchester BOCES	200 Boces Dr., Yorktown Heights	Westchester	750	15
Rockland County Health Dept	50 Sanitorium Rd. Bldg. D, Pomona	Rockland	200	37
Telemarketing Concepts Inc.	P. O. Box 600, Yorktown Heights	Westchester	250	13
Testwell Laboratories Inc.	47 Hudson St., Ossining	Westchester	225	22
Town of Clarkstown	10 Maple Ave., New City	Rockland	313	35
Town of Cortlandt Manor	1 Heady St., Cortlandt Manor	Westchester	200	8
Town of Yorktown Inc.	P. O. Box 703, Yorktown Heights	Westchester	300	13
Tree Preservation Co. Inc.	1950 E Main St. 205, Mohegan Lake	Westchester	160	10
UPS	1785 Front St., Yorktown Heights	Westchester	200	13
Wal-Mart	3133 E Main St., Mohegan Lake	Westchester	300	10
Warehouse NY Power Authority	P. O. Box 215, Buchanan	Westchester	800	1
White Plains Linen	4 John Walsh Blvd., Peekskill	Westchester	325	2

Table D-14: Parks within the Emergency Planning Zone[4]

Park	ERPA	Jurisdiction	Peak Population
Anthony Wayne Recreation Area—Harriman State Park	39	State; Orange	3800
Bear Mountain State Park	39	State	5,033
Beaver Pond Campgrounds—Harriman State Park	40	State	411
Blue Mountains	4, 2	Westchester	82
Congers Lake Memorial Park	33	Rockland	470
Croton Gorge Park	5	Westchester	50
Croton Point Park	6	Westchester	460
Franklin D. Roosevelt State Park	13	State	Still gathering info
George's Island Park	4	Westchester	43
Harriman Group Camps	40	State	3700
Harriman Hikers	40	State	180
High Tor State Park	31, 34	State	300
Lake Sebago Beach—Harriman State Park	40	State	6000
Lake Tiorati Beach—Harriman State Park	40	State	2700
Lake Welch Beach—Harriman State Park	40	State	8400
Mohansic Park and Golf Course	12	Westchester	248
Silver Mine—Harriman State Park	40	State	600

[4] Planners should note, municipal parks, recreation centers and summer camps are not included in this list, but should be taken in to consideration.

Park	ERPA	Jurisdiction	Peak Population
Stony Point Battlefield State Historic Site	29	State	170

Appendix E: KLD's Evacuation Network from Field Survey

Table E-1: KLD's Evacuation Network from Field Survey (Designated Evacuation Routes from County Plans)

ERPA Number	Route Name	KLD Node IDs (upstream node to downstream node)	KLD Number of Lanes	KLD Speed (MPH)	KLD Length (Miles)	IEM Number of Lanes	IEM Speed (MPH)	IEM Length (Miles)
2	Bear Mountain State Pkwy.	701-420-279-278	2	30		1	45	
2	Hudson St.	933-772-764-773	2	30		1	25, 30	
5	Croton Dam Rd.	827-947	2	30		1	30, 25	
6	US 9	784-785	2	30		2	55	
6	CPP	972-1017	2	30		1	15	
8	Oregon Road	906-745-743	2	30		1	30	
9	Crompond Road	712-273	2	30		1	45	
9	Croton Ave.	779-826	2	30		1	30	
10	Locust Ave.	457-732	2	30	.95	1	30	.744
10	East Main St.	468-732	2	30		1	35	
10	Taconic State Pkwy.	753-271	2	30		2	55	
10	Crompond Road	273-713-714	2	30		1	45	
11	Route 202	716-717-718	2	30		1	45	
11	Route 35	840-720	2	30		1	35	
12	Taconic Pkwy.		2	30		2	55	
12	Route 129	817-818	2	30		1	30	

ERPA Number	Route Name	KLD Node IDs (upstream node to downstream node)	KLD Number of Lanes	KLD Speed (MPH)	KLD Length (Miles)	IEM Number of Lanes	IEM Speed (MPH)	IEM Length (Miles)
13	Moseman Ave.	951-843-844	2	30		1	30	
13	Croton Lake Rd.	820-821-838-848	2	30		1	40	
14	Route 6	737-739	2	40		1	40	
14	Tomahawk St.	761-724	1	30	.59	1	30	.334
14	Granite Springs Rd.	763-762-761	2	30	1.36	1	30	1.54
15	Moseman Ave.	844-477-846	2	30		1	30	
15	Route 100	850-846	2	30		1	45	
16	Route 9D	311-310	1	30		1	45	
16	US 9	322-321	2	30		1	50	
17	Route 9D	307-303	1	30	3.42	1	45	2.712
17	US 9	320-319, 318-316	2	30		1	50	
18	Conopus Hollow Rd.	435-328	2	30		1	30	
19	Route 21	346-348	2	30		1	30	
19	Route 15	328-329	2	30		1	30	
20	6N	360-423	2	30		1	40	
21	Taconic Pkwy.	866-865	2	30		2	55	
21	Route 133	1049-1120	2	30		1	35	
22	US 9	1047-867	2	30		2	55	
23	Route 9A	303-302	1	30		1	45	
24	Route 293	553-552	1	55		2	55	
26	Route 9W	508-555-556	1	40, 55		2	30, 40	

ERPA Number	Route Name	KLD Node IDs (upstream node to downstream node)	KLD Number of Lanes	KLD Speed (MPH)	KLD Length (Miles)	IEM Number of Lanes	IEM Speed (MPH)	IEM Length (Miles)
27	Route 34	546-547	1	30		1	50	
27	Route 9	543-323	2	30		1	50	
30	Route 106	153-286	2	30		1	55	
31	Route 202	36-16	1	55		1	40	
32	Route 303	193-67	1	30		1	55	
34	Zukor Rd.	186-185	2	30		1	45	
34	N Little Tor Rd.	40-41	1	30		1	50	
35	PIP	43-9	2	30		2	55	
35	N Little Tor Rd.	177-9	2	30		1	45	
37	Route 202	3-2	1	30		1	50	
37	Route 45	22-166	2	30		1	45	
39	Route 9W	605-512	2	55		1	55	
39	PIP	132-133	2	30		2	55	
48	Route 9A	790-791	2	30		1	35	
48	US 9	781-782	2	30		2	55	
48	Furnace Dock Rd.	799-802	2	30		1	30	
49	Maple Ave.	774-775	2	30		1	30	
49	Furnace Dock Road	775-962-903-776	2	30		1	30	
50	Quaker Bridge Road	851-747	2	30		1	30	
51	Route 9A	876-877	2	30		2	45	
51	Sleepy Hollow Rd. N	887-889	2	30		1	30	

Appendix F: Details on Alert and Notification System Review

Meteorological Conditions around Indian Point[1]

Table F-1: Indian Point Site Wind Direction Distributions at 33 ft. Elevation

Direction	Frequency of Occurrence (%)
N	5.9
NNE	12.7
NE	14.7
ENE	5.6
E	2.2
ESE	1.2
SE	1.4
SSE	2.2
S	6.9
SSW	9.3
SW	8.7
WSW	3.3
W	3.2
WNW	4.2
NW	8.2
NNW	6.2
CALM	4.1

[1] Final Environmental Statement Related to Selection of the Preferred Closed Cycle Cooling System at Indian Point 3 (December 1979), pages 1-12.

Table F-2: Indian Point Site Wind Speed Frequency Distribution at 33 ft Elevation

Wind Speed Category (mph)	Frequency Distribution(%)
0-3	51.3
4-7	34.6
8-12	12.2
13-18	1.7
19-24	0.1
24+	0.0

Table F-3: JFK International Airport (NYC) Temperature, Precipitation and Humidity (Monthly Means)

Month	Temperature (F)	Precipitation (inches)	Humidity(%) Hours 1	Humidity(%) Hours 7	Humidity(%) Hours 13	Humidity(%) Hours 19
Jan	31.4	2.69	69	71	59	64
Feb	32.2	3.05	67	70	58	62
March	39.3	3.77	68	70	57	63
April	49.9	3.59	70	69	55	65
May	59.8	3.54	76	70	57	68
June	69.5	2.98	80	74	61	72
July	75.1	4.04	77	73	57	70
Aug	73.6	4.30	78	76	57	71
Sept	67.0	3.31	79	78	57	70
Oct	57.3	2.76	75	77	54	68
Nov	46.5	3.90	72	74	57	67
Dec	34.9	3.60	71	73	61	66

Functionality of the Sound Propagation Model

The sound propagation model used to generate the siren-level contours is a very simplistic model that essentially adds up the attenuation caused by different factors using empirical formulas for each factor. Attenuation is the process by which the intensity of sound is diminished as sound waves move through the air due to various environmental factors. When sound is produced by a siren the waves travel in all directions. The intensity of sound is distributed between all directions. This phenomenon is known as the spherical spreading of sound. The model uses what is known as an inverse-square-law dependence[2] to calculate the attenuation due to spherical spreading of sound waves in the atmosphere.

Also, since sound waves are essentially compressions and rarefactions[3] of air in the atmosphere, as these compressions and rarefactions move through the air, some of the energy is absorbed internally by the air molecules. This results in lesser energy of motion of the air molecules itself and hence results in the decrease in intensity of the sound waves. The amount of sound wave energy that is absorbed in the air depends upon various factors such as the temperature, humidity, and atmospheric pressure. The sound propagation model used in the study uses seasonal averages of the maximum temperature and early afternoon relative humidity for the region to estimate air absorption coefficients at a single-tone siren frequency of 400 Hz and a dual-tone frequency of 600 Hz.

- In addition, it is an experimentally observed fact that turbulence in air causes scattering of sound waves which, in turn, results in loss of acoustic energy. The model uses two expressions to account for the attenuation due to scattering for the single- and dual-tone sirens.
- Sound waves that emanate from a siren source take several different paths as they travel through the air. Those waves that hit the ground get partially absorbed and so the reflected waves are attenuated by a factor that depends on the type of ground cover. In other words, if the ground cover is heavily forested, the amount of attenuation is different from the amount of attenuation that results from a ground cover that is rural or suburban. The model considers three different kinds of ground cover, namely water, rural/suburban, and heavily forested. Based on the experimental data presented in the report (page A8), it is evident that the formula used for either the heavily forested case or the rural/suburban case fits better at distances closer to the sirens.
- The underlying model used to predict the attenuation caused by barriers is based on the assumption that the barrier in question is thin relative to the distance that the sound wave travels[4]. The actual terrain is treated as a series of thin barriers and the maximum of this series is taken as the resulting attenuation because of the hilly barrier.
- The type of temperature and wind-speed gradient[5] that is present at any time in the atmosphere has a significant effect on the sound wave energy. For instance, a positive

[2] Inverse-square law dependence in general means that the intensity falls as the square of the distance from the source. In other words, if the distance from the source increases by a factor 2, then the intensity decreases by a factor of 4, if the distance increases by a factor of 3, the intensity decreases by a factor of 9 and so on.
[3] Rarefactions as against compressions, are minimum pressure areas in the air
[4] In acoustics, this is called the classical Fresnel Diffraction model
[5] Temperature or wind-speed gradient is defined as the change in the value of temperature or wind-speed with height above ground. So a positive gradient signifies an increase in value over height while a negative gradient signifies a decrease in value over height.

temperature and wind-speed gradient actually results in an increase in sound level than what would be expected under normal conditions. In contrast, if the temperature and wind-speed gradient is negative then there is a significant amount of propagation loss. The sound propagation model used in this study chooses to ignore the effect of the temperature gradient. This makes the model more conservative because the principal effect of ignoring the temperature gradient is to decrease the predicted sound levels in the model.

Appendix G: FEMA Exercise Report Findings

Table G1: Areas Requiring Corrective Action Noted in FEMA Exercise Reports for Indian Point

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
FEMA Agency Narrative Report for Indian Point 3 Nuclear Power Station	Orange County Traffic Control Points		The Orange County radiological emergency response plan incorrectly directed emergency workers to record DRD reading on Attachment 4, which is actually for Environmental Protection Agency guidance on dose limits for emergency workers. The Individual Radiation Exposure Record and Emergency Worker Radiological Exposure Record is where dose limits should be recorded.	November 15, 2000	No recommendation noted.	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action.	The radiological emergency response plan is unclear concerning how and where dose limits should be recorded. The radiological emergency response plan should be rewritten with the dose limits documentation clearly stated.
FEMA Narrative Report for Indian Point 3 Nuclear Power	Orange County Reception Center		During the exercise, the Reception Center Director dispensed with the combined walk-down of functional areas to expedite the evaluation process.	November 15, 2000	No recommendation noted.	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action.	The walk-down of functional areas should be carried out in the next exercise.

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Station			This change in the operational intent was agreed to by the evaluation team.					
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Orange County Reception Center		Police are responsible for security and traffic control; however, no police were observed during the demonstration	November 15, 2000	No recommendation noted.	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action.	Police should be interviewed to make sure they are aware of responsibilities and proper locations.
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Orange County Reception Center		The use of portal monitors for initial monitoring is mentioned in the radiological emergency response plan; however, no portal monitor was shown on the PMC equipment list	November 15, 2000	No recommendation noted.	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action.	The monitors should be placed on the PMC equipment list.
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Orange County Reception Center		The portal monitors were assembled in accordance with instructions in Addendum 10, but the staff did not initially verify proper operation by using a check source.	November 15, 2000	No recommendation noted.	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action. It was later found that the monitors were not in	The portal monitors should be clearly stated in the radiological emergency response plan.

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
							accordance with the FEMA Portal Monitor Standard.	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Orange County Reception Center	Vehicle monitoring station survey vehicle was not adequate. The probe was held several inches above the vehicle and moved the probe approximately one foot per minute, which is too slow.		November 15, 2000	No recommendation noted.	Drill was stopped and controller was immediately told of his error.	Issue not specifically noted as an Area Requiring Corrective Action.	The corrective action should be properly documented.
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Putnam County Emergency Operations Center		The implementation of school procedures at the exercise raised some concern about the completeness of the county's school procedures.	November 15, 2000	The School Procedure for Putnam County should be updated to include information about how and where parents would be notified about protective action recommendations (especially if they occur after parents have already been	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action.	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
					notified to pick up their children at a reception center located outside of the Emergency Planning Zone).			
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Putnam County Field Monitoring Teams		Field Monitoring Team B did not include a filter counting holder, as indicated in the procedure. However, an alternate sample counting geometry was used that is in the procedure	November 15, 2000	A filter counting holder should be included in the supply list.	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action.	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County Field Team Coordination and Dose Assessment		Was unable to access Meteorology Information and Dose Assessment System system (Plume Dose Projection model) because it wouldn't accept the password.	November 15, 2000	Should test to make sure that all passwords are available to access needed software.	No corrective action noted.	Issue not specifically noted as an Area Requiring Corrective Action. The field coordination team was able to make a plume dose assessment using alternative methods.	
FEMA Narrative	State of New York Dose	State did not communicate		November 15, 2000	Using a hard copy system, the State	No corrective	Should be addressed in	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Report for Indian Point 3 Nuclear Power Station	Assessment	the dosimeter correction factor, and associated new exposure reporting limits to Rockland and Westchester Counties. In addition, the State did not provide guidance on how to use this information.			should convey changes to the dosimeter correction factor and corresponding revised exposure reporting limit values. This includes informing emergency field workers. The plan and procedures should be reviewed and revised when needed.	action noted.	an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	State of New York Emergency Operations Facility	Inoperable Utility Supplied Data System in Rockland, Westchester, and Orange Counties. The utility-supplied Meteorology Information and Dose Assessment System terminal and printer was inoperative in the county Emergency Operations Center's for		November 15, 2000	Work with the utility to resolve the cause of the problem with Meteorology Information and Dose Assessment System. If a permanent repair cannot be made, proceed with a different approach.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001.	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		much of the exercise.						
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	State of New York Joint News Center	Rumor control telephone number should be included on documents distributed to the media and public.		November 15, 2000	Place the rumor control number on all documents.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	State of New York Joint News Center	No follow-up messages were sent to the Emergency Alert System station.		November 15, 2000	Ensure that procedures regarding follow-up special news bulletins are followed at the Joint News Center.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	State of New York Joint News Center	At the media briefing conducted at 1035 hours, the Westchester County Public Information Officer announced at 1039 hours that sirens had been sounded at 1041 and the Emergency Alert System		November 15, 2000	When an alert and notification sequence is scheduled, the media briefings should be delayed until after the Emergency Alert System broadcast.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		message had been broadcast at 1044 hours. This was prior to events. The media briefing should have been delayed until after the alert and notification activity had concluded.						
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Putnam County Emergency Operations Center	Emergency Alert System message 4 discusses how traffic control has been established to restrict access to the county. This was found not to be true.		November 15, 2000	Ensure that draft Emergency Alert System messages are reviewed for accuracy before approval is given.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Putnam County Field Monitoring Teams	Procedure 4 in step 2.3 under "Airborne Survey Techniques" calls for a source check on the Eberline RM-14 meter using the Cs-		November 15, 2000	Putnam County Field Team A should receive further training on performing source checks.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		137 check source. These source checks were not performed. The equipment also included a CD V-700 survey meter.						
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Putnam County Field Monitoring Teams	Team B's RM-14 instrument alarm and flashing light could not be turned off during check-out.		November 15, 2000	A spare RM-14 instrument should be available to the Putnam County Field Teams.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Putnam County Field Monitoring Teams	Field Team B did not protect the detector from contamination during particulate air monitoring. The detector should have been covered by thin, transparent plastic to avoid erroneous readings and contamination.		November 15, 2000	Field Team B should receive further training on performing particulate air monitoring.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County Emergency Operations Center	Communication between Rockland and Bergen counties needs to be improved. Bergen County continuously needed to contact Rockland Emergency Operations Center to get information that should have been transmitted.		November 15, 2000	Rockland County should provide a standard operating checklist for the Rockland/Bergen County liaison that will prompt the liason to notify Bergen County.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County Reception Center	There was only one female monitor for the female shower at the Tappan Zee Reception Center, and two are required.		November 15, 2000	Additional female monitors should be trained to assure thatstaffing for the female decontamination area is sufficient.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power	Rockland County Reception Center	Holding areas in the cafeteria at the Tappan Zee Reception center are not designated for evacuees awaiting		November 15, 2000	The diagram of the reception center should include designated areas for evacuees awaiting transportation to shelters or private	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Station		transportation to shelters or private transportation.			transportation.			
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Westchester County Medical Drill	The medical team failed to isolate and control radioactive contamination within the treatment room.		November 15, 2000	No recommendation given.	No corrective action noted.	Should be addressed in an out-of-sequence exercise prior to December 31, 2001	
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School Bus Run	One of the bus drivers at Brega Bus Company was not aware that teachers are required to be with children on evacuation buses.		November 15, 2000	No recommendation noted.	With the concurrence of the controller, the drill play was stopped and the bus driver was informed of the requirement.		
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	A school official at the Cornerstone Christian School in Rockland County was not familiar with the school plan on October 17,		November 15, 2000	Provide training to both the principal and staff of the Cornerstone Christian School on the details and logistics to accomplish all actions needed.	The school received training on November 13, 2000.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		2000.						
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	A school official at the Cornerstone Christian School in Rockland County was only able to provide estimated travel times to reach the school reception center and was unfamiliar with the evacuation time on October 17, 2000.		November 15, 2000	Review the plan to ensure evacuation time estimate form the staff is current and travel planning is accurate	The principal demonstrated that she was familiar with the plan on November 29, 2000. She correctly indicated that the evacuation time estimate for her school is 1 hour.		
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	Copies of the appropriate plans and procedures were not available for review at the Playgarten Preschool, nor were copies of the information that is sent to the parents concerning possible		November 15, 2000	Rockland County Fire and Emergency Services should provide the preschool with copies of the appropriate plans and procedures, which should be kept at hand for reference in event of an emergency.	The director had copies and demonstrat-ed knowledge of the plan on November 29, 2000.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		emergency response actions to be taken in event of an incident						
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	A school official at Playgarten Preschool was not sufficiently familiar with the notification procedures in the event of an incident at Indian Point.		November 15, 2000	The Rockland County Official of Fire and Emergency Services should provide regular training to the director and teachers.	The director had copies and demonstrat-ed knowledge of the plan on November 29, 2000.		
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	No guarantee that teachers would stay with kids during an emergency because of their own family concerns.		November 15, 2000	The Rockland County Official of Fire and Emergency Services should visit the school to determine if the teachers would be willing to stay with their classes if they are evacuated to a host school.	The director confirmed on November 29, 2000, that staff is now aware of their roles and responsibili-ties during a radiation emergency.		
FEMA Narrative Report for Indian Point 3	Rockland County School interviews	School officials at North Rockland High School did not have a copy of		November 15, 2000	Copies of the plan should be kept in appropriate administrative areas.	The principal had a copy of the school emergency plan		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Nuclear Power Station		the radiological emergency response plan or procedures readily available.				available on November 29, 2000.		
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	No accountability system was in place for children who drive themselves off of the Rockland High School campus.		November 15, 2000	Commuter students should be constantly supervised by their teachers. The plan should be revised to indicate that all students will evacuate together on buses.	The principal agreed to recommend-ation, and an announce-ment will be made in the event of an evacuation.		
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	North Rockland High School reported that 86 buses would be needed to evacuate the school. The Rockland County plan states that the school only needs 46, leaving the possibility for a shortage.		November 15, 2000	Determine the correct numbers of buses needed to evacuate and ensure resources are available.	The principal confirmed on November 29, 2000, that the correct number of buses was 46.		
FEMA Narrative	Rockland County School	North Rockland High School		November 15, 2000	The school should review its plans	It was confirmed		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Report for Indian Point 3 Nuclear Power Station	interviews	indicated that the students would be boarding the same buses they take to school (instead of boarding by class) during an evacuation.			and procedures for an evacuation in light of federal guidance on the subject.	that the school district would use the same evacuation procedures for a radiological emergency as are used for winter storm dismissal.		
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	No guarantee that teachers would accompany students on buses during evacuation. This could be a contractual issue.		November 15, 2000	Teachers should be asked of their willingness to board buses with their classes, and if most are unwilling, an alternative procedures should be determined.	The principal confirmed that teachers would ride the school buses.		
FEMA Narrative Report for Indian Point 3 Nuclear Power Station	Rockland County School interviews	School officials were only able to provide estimated travel times to reach the school reception center and were unfamiliar with the evacuation		November 15, 2000	Review the plan to ensure that the evacuation time estimate of North Rockland High School is 1 hour.	Principal confirmed the 1-hour time period on November 29, 2000.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		time estimate.						
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station Ingestion Pathway Exercise	New York State Emergency Operations Center	Implementation issues associated with relocation and re-entry were not adequately communicated to the staff or public, and were not fully coordinated with other organizations.		May 25-27, 1999	A recorder should be designated to ensure that key information is successfully communicated from command and control to staff and the public.	No corrective action noted.		
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station Ingestion Pathway Exercise	New York State Emergency Operations Center	Implementation of protective actions were not fully coordinated with other organizations, such as the affected counties (re-entry policy).		May 25-27, 1999	No recommendation noted.	No corrective action noted.		
FEMA Final Exercise Report for Indian Point 2 Nuclear	New York State Joint News Center	Cellular telephone used by State Sampling Teams did not operate properly.		May 25-27, 1999	An improved communications system should be used for the field teams.	The cellular telephones issued to the three New York State Sampling Teams sent		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Power Station Ingestion Pathway Exercise						into the field during the May 1999 Ingestion Exercise operated without malfunction.		
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station	Putnam County Traffic Control Points	Putnam Valley Police Officer stated he would take one Potassium Iodide tablet upon arrival to the traffic control point.		June 24, 1998	Putnam Valley Police Officers should be given additional training on Potassium Iodide procedures.	Putnam Valley Police Department no longer exists.		
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station	Putnam County Emergency Worker Decontam-ination Station	Monitors were unfamiliar with the minimum reporting levels for contamination on vehicles. Various reports were given.		June 24, 1998	Provide additional training on contamination levels.	ARCA to be corrected during the next biennial exercise.		
FEMA Final Exercise Report for Indian Point 2 Nuclear	Rockland County Emergency Operation Center	Inaccurate monitoring location descriptions. Three out of four sites assigned for		June 24, 1998	All procedures in the radiological emergency response plan which reference monitoring locations should be	The monitoring location descriptions were revised and are now accurate.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Power Station		monitoring could not be identified			checked to ensure that the descriptions are accurate. Each site should be visited for description verification.			
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station	Rockland County Emergency Operation Center	Area personnel dosimeter monitors at the Rockland Emergency Operations Center were not read in accordance with the plan, which includes a prescribed schedule for jurisdictions within the 10-mile Emergency Planning Zone. Outside air ventilation was not closed off as required for a facility within the 10-mile Emergency Planning Zone.		June 24, 1998	Additional training is required to ensure that area personnel dosimeter monitors are read per prescribed schedules and that building air ventilation systems are isolated from sources of outside air when there is potential for exposure.	Radiological monitoring personnel were assigned to provide continual monitoring of the facility and to ensure that area dosimeters were read throughout the exercise.		
FEMA Final	Rockland County	The Emergency Operations		June 24, 1998	The Rockland County Plan	No corrective		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Exercise Report for Indian Point 2 Nuclear Power Station	Emergency Operation Center	Center Director did not adequately advise schools to evacuate during the emergency phase. He waited until the Site Area Emergency ECL to being evacuation of certain schools.			should be revised to allow for evacuation of schools prior to the declaration of the Site Area Emergency ECL.	action noted.		
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station	Rockland County Field Monitoring Teams	Team member was unfamiliar with instrument operability checks. His actions could not be guaranteed to provide adequate test of instrument operability		June 24, 1998	Team members should be given additional hands-on training on each of the instruments that they are expected to check and use. Then each team member should perform all steps to ensure thorough knowledge of operability procedures.	Field monitoring team members demonstrat-ed complete knowledge of the use of the instrumentat-ion.		
FEMA Final Exercise Report for Indian	Rockland County Field Monitoring Teams	Team unfamiliar with air sampling and counting instrumentation.		June 24, 1998	Team members should be given additional hands-on training on each of the instruments	Team members demonstrat-ed familiarizat-		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Point 2 Nuclear Power Station					that they are expected to check and use.	ion with the air sampling instruments and procedures for taking air samples and obtaining field monitoring data.		
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station	Rockland County Congregate Care Center	Rockland County did not demonstrate the ability to provide congregate care for evacuees following an incident.		June 24, 1998	Congregate care provisions should be demonstrated during the week of February 8, 1999	No corrective action noted.		
FEMA Final Exercise Report for Indian Point 2 Nuclear Power Station	Westchester County School Interviews	An Ossining Bus driver was not familiar with the reporting requirements for contamination. He reported 100R—not 1, 3, and 5R.		June 24, 1998	Provide additional training on emergency worker exposure control.	This Area Requiring Corrective Action was cleared by providing additional training on emergency worker exposure control and during a		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
						subsequent interview of another bus driver on July 24, 1998.		
FEMA Exercise Report for Indian Point 3 Nuclear Power Station	New York State Joint News Center	The Joint News Center has very little ventilation and air conditioning is limited. Extreme heat caused increasingly unhealthy working conditions. The Westchester County Commissioner of Health declared that the building be closed after staff experienced adverse health effects.		April 10, 1996	Correct the ventilation and the air conditioning problems.	A total of 18 new air conditioners have been installed in all the working rooms. Also, a powered roof vent has been installed in the main media briefing room.	A new Emergency Operations Center is being built for Westchester County.	
FEMA Exercise Report for Indian Point 3 Nuclear	Orange County Field Monitoring Teams	The radiological staff demonstrated insufficient familiarity with the use of the		April 10, 1996	Additional training may be needed for field team personnel.	The radiological monitoring staff demonstrat-ed a	There was no reference date for when the corrective action	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Power Station		instrumentation by misinterpreting range settings and by using a calibration source without removing a shielding cover.				thorough understand-ing in the use of instrumentat-ion in the performance of field activities related to field team monitoring operations.	occurred.	
FEMA Exercise Report for Indian Point 3 Nuclear Power Station	Rockland County Emergency Operation Center	The Bergen County Emergency Operations Center was not given information on the decision to terminate the exercise. The Bergen County Liaison was released from the Bergen County Emergency Operations Center at 1415 and was not replaced.		April 10, 1996	No recommendation noted.	Rockland County staff person serving as Rockland County Liaison to Bergen County remained at the Bergen County Emergency Operations Center until the end of the exercise.		
FEMA	Rockland	Workers in		April 10,	No	Vehicle		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Exercise Report for Indian Point 3 Nuclear Power Station	County Emergency Worker Personnel Monitoring Center	emergency worker monitoring and decontaminat-ion were aware of their dose limits of 1R, 3R and 5R, but vehicle monitors were unsure of dose limits and the units mR versus R.		1996	recommendation noted.	monitors were aware of dose limits. Signs and personal cards also listed exposure limits.		
FEMA Exercise Report for Indian Point 3 Nuclear Power Station	Rockland County Emergency Worker Personnel Monitoring Center	Vehicle monitors did not monitor the wheel wells in order to determine if contamination existed in the wheel well area.		April 10, 1996	No recommendation noted.	Vehicle monitors correctly filled out the vehicle contaminat-ion report form.		
FEMA Exercise Report for Indian Point 3 Nuclear Power Station	Westchester County Field Monitoring Teams	Field monitoring Team 1 did not always read their dosimeters every 30 minutes		April 10, 1996	No recommendation noted.	Field Team HD-1 scrupulously read their dosimeters every 15 minutes and recorded all information		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
FEMA Exercise Report for Indian Point 3 Nuclear Power Station	Westchester County Reception Center and Congregate Care Center	There were four trained monitors; however, two monitors took an extreme amount of time monitoring the evacuees.		April 10, 1996	No recommendation noted.	Portal Monitors monitored evacuees in 1- seconds and once contaminat-ion was found, hand-held instruments were used to scan.		
FEMA Exercise Report for Indian Point 3 Nuclear Power Station	Westchester County Emergency Worker Personnel Monitoring Center	Vehicle monitors rested their hands on the contaminated tire then continued to monitor the vehicle causing the potential contamination of worker and monitoring equipment.		April 10, 1996	No recommendation noted.	Monitors followed proper procedures while conducting vehicle monitoring.		

Table G2: Areas Requiring Corrective Action Noted in FEMA Exercise Reports for Millstone

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
FEMA Narrative Report for Millstone Power Station	Fishers Island EOC		The Supeintendent of the Fishers Island School District stated during the interview at the EOC that she felt the evacuation plan for Fishers Island school children is totally inadequate. She also stated that if the order to evacuate is given, the she may not accompany school children to the host community.	May 1, 2002	If the School Superintendent has any recommendations or concerns about the evacuation plans, she needs to address them to Town of Southold Emergency Management Officials. The Superintendent may not have all the information she need on the evacuation plan.		Other Officials with authority would accompany school children on the ferry to the host community. School children on Fishers Island would be evacuated at the same time as the general population.	
FEMA Narrative Report for Millstone Power Station	Fishers Island EOC		The Town of Southold Emergency Management official is giving Fishers Island EOC staff EAS messages verbaly over the telephone and not using the pre-scripted PARs that are included in the plan. To avoid any misinformation that may result in the translation of writing	May 1, 2002	If the Town of Southold wants Fishers Island to activate their siren before the Connecticut Area IV Coordinator starts the call down siren activations, they must provide EOC staff with a pre-scripted PAR. It may be best to			

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
			down important information over the phone, it is best to have the Communications Officer at the EOC to read from pre-scripted messages from the plan. This also results in Fishers Island in activating their siren before the Area IV Coordinator starts the call down activation of the other municipalities' sirens which could lead to confusion.		wait for the Area IV Coordinator to start the call down and have Fishers Island do it in sequence with the others and this way they assure themselves of receiving the proper pre-scripted PAR chosen for EAS broadcast. This will also eliminate any confusion that may result in having Fishers Island activate their siren well ahead of everyone else.			
FEMA Exercise Report for Millstone Power Station	State of Connecticut State Emergency Operations Center	The State OEM and the towns did not coordinate effectively, e.g., implementing the same precautionary activities and protective actions. This had the		May 1, 2002	The State OEM Director must reinforce to State agencies that all direction given to towns be coordinated through the Director's office. The State must ensure that towns are compliant with its direction and do		These issues will need to be corrected by additional planning, further training in local and State coordination protocols and, possibly,	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		potential to negatively impact public safety.			not take independent actions once a Declaration of a State of Emergency has been made.		some changes in procedures.	
FEMA Exercise Report for Millstone Power Station	State of Connecticut OEM Area IV, Colchester	Area IV staff did not inform the State EOC of early dismissal of schools in the Town and City of Groton		May 1, 2002	Conduct training on the need to pay more attention to incoming messages and ensure the messages are distributed to appropriate staff members for proper action. Change the plan to reflect a requirement for the Area IV Coordinator to advise the State EOC of any actions taken by EPZ communities.		This prevented the Director and the State Media Center from providing information to the public as to the status of the school children in the Groton School District. The lack of information about the Groton School District would have brought undue stress and concern to the parents who	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
							have children in these schools.	
FEMA Exercise Report for Millstone Power Station	Connecticut State Transportation Staging Area		The Radiological Officer did not brief emergency workers concerning potential allergic reactions to ingesting Potassium Iodide. However, the information packets did contain the caution in a conspicuous location where the workers should see it as they filled out information on their "Potassium Iodide (KI) Report."	May 1, 2002	Include a statement in the briefing that persons who are allergic to iodine should not ingest KI.	The Radiological Officer successfully redemonstrated the briefing and included the warning to emergency workers.		
FEMA Exercise Report for Millstone Power Station	State of Connecticut State Emergency Operations Center	A new pager system from Millstone for use by key personnel was used throughout the exercise. The system generally reached one of several pagers, but was unreliable for all key persons		March 15, 2000	Determine the problem of erratic readouts on pagers and correct these problems in order to obtain accurate and complete pager messages. Demonstrate at next scheduled exercise.	During the May 2002 exercise, no failures of the pagers or garbled messages were reported.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		to receive messages. Typically, out of five pagers, one would receive a complete message, and the other pagers received garbled messages, if received at all.						
FEMA Exercise Report for Millstone Power Station	Joint Media Center	Although the EAS messages and press releases generally provided clear, thorough, and consistent emergency information for the public, several statements in Press Release #7 regarding precautionary protection of food, milk, and water supplies were unclear		March 15, 2000	The wording of statements in press releases should be carefully reviewed for clarity and specificity prior to release to minimize the possibility of misinterpretation by the public. Demonstrate at next scheduled exercise.	During the May 2002 exercise, all EAS messages and press releases were well written and provided clear, thorough, and consistent emergency managemen t information for the public and news media.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		and subject to misinterpretation.						
FEMA Exercise Report for Millstone Power Station	Joint Media Center	The Status Board at the Joint media Center was not consistently maintained nor updated in a timely manner beyond the Site Area Emergency ECL. Media representatives were not being consistently apprised of the status at the plant.		March 15, 2000	The Status Board should be consistently and regularly updated to reflect current conditions. Each press briefing should begin with an update of the current status detailing conditions at the plant and the current emergency classification level. Demonstrate at next scheduled exercise.	During the May 2002 exercise, the staff consistently updated the status board to reflect the emergency conditions of the incident. The media briefings provided the current status of conditions and public information staff were available in between briefings to answer questions in further detail or provide access to program area specialists.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
FEMA Exercise Report for Millstone Power Station	Connecticut State Transportation Staging Area (TSA)	KI was not issued with dosimetry; therefore, if KI is recommended after the emergency driver leaves the TSA, it could not be taken until the KI was issued.		March 15, 2000	One option would be to change procedure to include issuance of KI to drivers going into the 10 mile EPZ. Demonstrate at next scheduled exercise.	During the May 2002 exercise, the TSA issued KI to drivers when they picked up their dosimetry packets and received a briefing on dosimetry and KI.		
FEMA Exercise Report for Millstone Power Station	Connecticut Department of Environmental Protection (DEP)	The DEP did not estimate a projected dose based on a projected time of release when source term information was first made available. Previously they made protective action recommendat-ions based on plant conditions only, with		August 21, 1997	DEP procedures should be revised to include preparing timely estimates of the projected dose as part of a complete accident assessment. The State plan should contain a default projected time of release for use when the Utility does not provide a definative value.	Resolved during March 2000 exercise.	While this DEP procedure is an acceptable, timely and conservative protection of public health, accident assessment is not complete without also making timely dose projections to assure that the recommend-	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		furthur considerations based on field team, dose rate information.					ed protective actions are adequate and to give a full picture of accident conditions.	
FEMA Exercise Report for Millstone Power Station	Connecticut Department of Environmental Protection (DEP)	The current ADAM dose projection code (v1.2) does not directly estimate the total effective dose equivelent (TEDE) as required by the State Plan. Rather it gives the deep dose equivelent (DDE).		August 21, 1997	The ADAM code should be upgraded or replaced. The new code should provide estimates of the projected dose (TEDE) and the committed thyroid dose equivelent (CDE). Both values are needed for comparison with PAGs to evaluate need for Protective Actions.	Resolved during May 2000 exercise using ADAM and the IDA computer programs.	This means that it does not include adequate consideration of the radiation dose due to inhalation of radionuclides and for radiation dose due to radionuclides on the ground. In addition, the code does not directly and easily estimate a projected dose due to a source term that could continue for	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
							extended periods.	
FEMA Exercise Report for Millstone Power Station	Joint Media Center	EAS message #1 stated that "the Governor has not recommended any actions by the public" when, in fact, he had ordered the closure of state parks and placing farm animals on stored feed. Moreover, a related news release (#3) added advisory topics, including harvested crops, milk supplies, and water cisterns, which had not been included in the Governor's precautionary measures.		August 21, 1997	Steps should be taken to ensure that the content of EAS messages and news releases accurately reflect the decisions of the Governor or his designee. Demonstrate at the next scheduled exercise.	During the March 2000 exercise, the press releases accurately reflected the precaution-ary and protective action decisions of the Governor and State agency officials.		
FEMA	Joint Media	The issue of		August 21,	Clarify the use of	During the		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
Exercise Report for Millstone Power Station	Center	what to leave behind when evacuating was not mentioned in media briefings, news releases or printed materials for the public. In briefings the term precautionary action was used, while visual aids used the term protective actions. News release #5 includes inaccurate information, stating that the Governor upgraded the situation. During the 1330 news briefing the Millstone NPS presenter did not have visual aids present. It was apparent		1997	terminology, specifically the terms "precautionary action" versus "protective action". Provide a visual status board with curent information about the incident in progress. Have graphic displays readily available or pre-set for presenters. Hold pre-briefings before the actual media briefing to ensure consistency of message by participating organizations and to anticipate media questions. Demonstrate at the next scheduled exercise.	March 2000 exercise, visual aids were available and used to clarify presented topics. Prior to the briefing, all particpating organizat-ions coordinated the material to be presented to ensure consistency and clarity. Care was taken to ensure all terms were used appropriate-ly and correctly.		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		that spokespersons had not coordinated their information prior to the news briefings.						
FEMA Exercise Report for Millstone Power Station	Joint Media Center	The brochure containing agricultural information was deemed inappropriate for distribution by state officials and yet was not withdrawn from the Media Center.		August 21, 1997	Steps should be taken to ensure that only accurate and appropriate informational materials are available for distribution to the public. Demonstrate at a future exercise.		No note in future exercise reports of when or how this issue was resolved.	
FEMA Exercise Report for Millstone Power Station	Connecticut State Department of Health (DHS) Laboratory	Procedures used for monitoring for contamination on persons were not adequate to detect levels of contamination in excess of FEMA guidance. The		August 21, 1997	The plan for operation of the radiation laboratory should be modified either to be specific about radioactive contamination monitoring procedures for persons, samples, and equipment, or		Plans for the radiation laboratory operations do not include monitoring procedures for portable instruments, but procedures	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		distance from the probe to the surface of about four to six inches was too great, the path width of about six inches was too wide and the probe speed of about two feet/second was too fast for the instrument/detector (CD-V 700) being used.			to refernce other parts of the plan where these procedures are provided. Laboratory staff responsible for radioactive contamination should receive training on this topic.		are included in Attachment 11 to Section CTAP-4.3 of the State Plan. This document includes specifications for probe distance of one-half inch and probe speed of six inches per second. No note in future exercise reports of when or how this issue was resolved.	
FEMA Exercise Report for Millstone Power Station	Connecticut State Department of Health (DHS) Laboratory	Contamination control for surfaces was not apparent for the exercise. However, the spread of contamination to the		August 21, 1997	The State Plan should be revised to include contamination control procedures for laboratory operations as discussed in FEMA REP-14, Section D.25-2. However,		No note in future exercise reports of when or how this issue was resolved.	

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		Chemistry and Industrial Hygiene Laboratory and the Radiation Laboratory could seriously delay the determination of appropriate protective actions. No temporary coverings were provided for the floor at the reception area, the hot sample storage area, or the wheel-carts at the reception area. No provisions were made to add another plastic bag to "hot" samples or to smear them to determine whether the measured radiation might be coming from contamination			they are not discussed in the State Plan for laboratory operations. Demonstrate at a future exercise.			

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
		on the exterior surfaces.						
FEMA Exercise Report for Millstone Power Station	Connecticut State Compensatory Plan	There was no precautionary briefing prepared for any female troopers that may have assisted with emergency worker duties.		August 21, 1997	A briefing for women emergency workers must be given to warn of the radiological issues of someone who is pregnant or thinks she might be. Include in the briefing a signature card for the woman to sign that states that she has had the briefing and understands its contents. Demonstrate at a future exercise.	During the March 2000 exercise report, it was noted that new procedures and forms have been developed for female troopers. Precaution-ary briefing was not demonstrat-ed other than discussion on the new procedures to handle female troopers that may assist in emergency worker duties. Female troopers now sign a		

Report	Jurisdiction	Area Requiring Corrective Action	Other Significant Finding	Date of Exercise	Stated Recommendation	Corrective Action	Additional Comment	IEM Recommendation
						Declaration of Pregnancy.		
FEMA Exercise Report for Millstone Power Station	Connecticut State Compensatory Plan	Electrical leakage check dates were not available for any DRD.		August 21, 1997	Provide the dates. Demonstrate at a future exercise.		No note in future exercise reports of when or how this issue was resolved.	

Appendix H: Nuclear Regulatory Commission Inspection Report Findings

Table H-1: Nuclear Regulatory Commission Inspection Reports Summary for Indian Point

The table below lists the reports that IEM used in data collection. Only the findings relevant to emergency preparedness are included in the table. Mitigation of the accident, although usually a part of the emergency management system, is not included in the table.

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
50-247/02-03	May 11, 2002	Licensee implemented changes to the accountability process that decreased the effectiveness of the Emergency Plan.	Changing commitments in the E-Plan without prior approval impacts the Nuclear Regulatory Commission's ability to perform its regulatory function and potentially creates an ineffective response to a radiological emergency. The consequences of this change were minimal because it did not preclude the function of accountability from being performed, albeit delayed.	No Color
50-247/02-02	March 30, 2002	Licensee completed site wide accountability in 38 minutes for this first-time site wide accountability drill. The Nuclear Regulatory Commission concluded that the intent of planning standard contained in 10CFR 50.47(b)(10) was met for this untimely accountability.		

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
50-286/01-09	November 17 2001	Failure to conduct triennial hydrostatic tests on self-contained breathig apparatus (SCBA) air cyclinders.	"This finding is greater than minor because, if left uncorrected, indadequetly tested respiratory equipment could have been used by personnel in the event of an emergency. This finding is of very low safety significance because unqualified equipment was not actually used, all of the affected air cylinders dislayed proper air pressure indicating that the cylinders maintained the requisite integrity, and a sufficient supply in excess of requirements was available for use."	GREEN—Non Cited Violation
50-286/01-09	October 31 2001 ("Off Year" Annual Emergency Preparedness Exercise)	Operators declared a General Emergency for a weather event because of lack of sufficient control by exercise controllers.	No additional detail available	No finding of significance
50-286/01-09	October 31, 2001	Joint News Center objectives not met.	No additional detail available	No finding of significance
50-286/01-09	October 31, 2001	Weaknesses in the Simulator Crew	No additional detail available	No finding of significance
50-286/01-09	October 31, 2001	I&C and Ops personnel did not adhere to the accountability process	No additional detail available	
05000247/ 2001-007	June 25, 2001	Indian Point facility did not conduct a bi-weekly silent test of the siren system.	"This was considered to be more than minor because of a delay in identifying and repairing sirens that would have been utilized to notify portions of the public in the	GREEN—Very low safety significance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			event of a radiological emergency. However, there have been no significant problems with the sirens, the test results are in the green band for the siren testing performance indicator, and route alerting was available to compensate for any inoperable sirens."	
05000247/ 2001-007	June 25, 2001	When the sirens were tested on December 18, 2000 and January 9, 2001 some sirens (3 and 5 respectively) were found to be inoperable.	This issue affects the emergency planning cornerstone and was determined to be more than minor because there was a delay in detection and repair of the sirens. The Performance Indicator for the Alert and Notification system remained in the GREEN band (99.1% average) for the year 2000.The Nuclear Regulatory Commission also determined that route alerting remained available to compensate for the inoperable sirens.	
05000247/2001-002	January 16—February 9, 2001	The Emergency Response Data System (ERDS) was found inoperable during an exercise in November 2000 and again during a test conducted in the first quarter of 2001. The system engineer stated that the cause of the failure was that the modem assigned to the ERDS had been borrowed and reconfigured prior to both tests.	This issue is determined to be of very low safety significance because the licensee retained capability to communicate via the telephone system.	GREEN

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
		The system functioned during this inspection. But, there were no procedures for the activation of the backup system, if needed.		
05000247/2001-002	January 16—February 9, 2001	Licensee could not locate Emergency Operations Facility inventory records.		GREEN
05000247/2001-002	January 16—February 9, 2001	Licensee not able to produce third quarter records for operational check of the emergency communications link between facilities and could not verify that tests had been conducted.	Determined by Nuclear Regulatory Commission to be of very low safety significance because licensee had installed spare operable telephone lines.	GREEN—Failure to conduct and/or document quarterly communications test is a non-cited Violation
05000247/2001-002	January 16—February 9, 2001	Ten individuals assigned to the offsite and onsite monitoring teams had let their respirator qualifications lapse.	There was confusion between the Emergency Preparedness and Health Physics organizations regarding the necessity for maintaining respirator qualifications for emergency responders. Deemed to be very low safety significance because sufficient responders with respiratory qualifications available to fill positions.	GREEN—non cited Violation
05000247/2001-002	January 16—February 9, 2001	Licensee not effective in diagnosing underlying causes for problems to prevent recurrence.	Several problems found in exercises were to be corrected with additional exercises, post-exercise critique and lessons learnded sessions with ERO emergency facility leads. But, this process did not include an assessment of the effectiveness of training in resolving these	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			issues, qualifications of responders, or lessons learned from discussions with affected individuals.	
05000247/2001-002	January 16—February 9, 2001	Drills conducted in the past two years consistently identified problems with the site Public Address System. A contingency measure finally established to use bullhorn in areas determined to be inaudible.	Workaround did not fix the system weakness of the Public Address System. This was eventually fixed with a new system design, implementation, and testing.	
05000247/2001-002	January 16—February 9, 2001	Number of discrepancies found with equipment inventories. Facility inventories are to be conducted on a quarterly basis. Licensee could not provide inventory records not verify that those inventories were actually conducted.	Five radiological instruments were out of calibration at the Emergency Operations Facilities. The Monthly inspection of full-face respirators was not conducted in April and June 2000. A radiological instrument located in one of the field kits had low batteries, and no batteries were found in the kit. Expired calibration sticker on a meter was not replaced when calibrated the previous month. Inventory lists were not updated to reflect the addition of several radiological check sources.	GREEN—Very low safety significance as sufficient resources available to respond in case of an emergency.
05000247/2001-002	January 16—February 9, 2001	Training program issues	Training program procedure did not describe if a drill or exercise was needed for initial qualification or re-qualification.	GREEN—very low safety signifance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			Training program procedure lacked specificity in tracking of findings from training exercises. Critiques from classroom training indicated confusion with terminology, questions on activation, request for additional practice for making classifications, and confusions about which procedures are current. No formal method for reviewing critques and documenting their resolution. Classes addressing problems found during exercise included the facility leads only and not the organization as a whole.	
05000247/2001-002	January 16—February 9, 2001	Exercise program issues	The corrective actions were general, simply indicating that more exercises were needed and lessons learned should be discussed with the facility leads. There was only one additional exercise as a follow-up and lessons learned were not gathered until November 2000. The condition reports did not capture the findings in the Joint News Center. Corrective actions were only generally described and not pertinent to all the significant	GREEN—very low safety significance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			issues. Licensee did not retain any original player or controller comments, or trend and assess exercise performance. Emergency Planning organization noted that significant improvement had been accomplished but these were not recognized by other facility personnel. The Emergency Planning organization did not take actions to raise confidence with other facility personnel.	
05000286/ 2000-006	September 30, 2000	Emergency plan did not contain any details regarding the training of emergency response organization (ERO) members contrary to the requirements of 10 CFR 50 Appendix IV.F.1.	This issue was more than minor because if left uncorrected could result in dilution of ERO training commitments and would affect the emergency planning cornerstone.	GREEN—non-cited violation
050000247/ 2000-006	May 15—June 2, 2000	Equipment reliability problems with the ERO notification systems were identified by the licensee in CR 199909377 during monthly notification drills on November 30, 1999 and December 17, 1999. As of the June 1, 2000 exercise, some problems with the notification systems remained uncorrected. The problems as described in section 1EP3 were not only related to equipment reliability but also to the adequacy of procedures and related training for personnel		GREEN—very low safety significance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
		responsible for activating the notifications systems. The 10 CFR 50.47(b)(14) requires in part that findings identified as a result of exercises or drills will be corrected.		
050000247/ 2000-006	May 15—June 2, 2000	Two problems reflected decreases in the effectiveness of the E-Plan per 10 CFR 50.54(q) which were not approved by the Nuclear Regulatory Commission. One change removed several ERO position descriptions and another change removed the ERO training program description. These two changes were decreases in effectiveness, because these descriptions are required by 10 CFR 50 Appendix E IV.A.2 and IV.F.1. In response to all 19 problems, the licensee initiated Condition Report (CR) 200003878 (a related CR is 199905877).		GREEN—very low safety significance
050000247/ 2000-006	May 15—June 2, 2000	The description of the Joint News Center was inadequate in that roles, responsibilities and the facilities were insufficiently described. A more detailed description was in the Media Relations Emergency Plan but this document was not considered an E-Plan implementing procedure per 10 CFR 50, Appendix E, section V. Also, if changes were	The inspection team identified procedural and related training problems. The licensee's Emergency Preparedness staff did not ensure that the Joint News Center activities met the commitments stated in the E-Plan for the overall maintenance and operation of the Joint News Center, because the Media Relations Emergency Plan was	GREEN—very low safety significance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
		made regardiing the function of the Joint News Center, the change would not be subject to a review for a decrease in the effectiveness of the IP2 E-Plan.	not an E-Plan Implementing Procedure. In addition, the licensee did not adequately describe the function of the Joint News Center or the roles of the Joint News Center staff in the E-Plan as required in 10 CFR Appendix E (section 1EP4). Further, changes made to the Media Relations Emergency Plan were not reviewed to ensure the changes did not decrease the effectiveness of the commitments made in the E-Plan.	
050000247/ 2000-006	May 15—June 2, 2000	Siren testing equipment, used to verify siren operability, was not sufficiently described in the IP2 E-Plan.		GREEN—very low safety significance
050000247/ 2000-006	May 15—June 2, 2000	Decrease in the effectiveness of the E-Plan because descriptions of some onsite Emergency Response Organization and the training program.		GREEN—non-cited violation
050000247/ 2000-006	May 15—June 2, 2000	Failure to correct Emergency Response Organization notification findings as a result of drills or exercises as early as November 1999.	Problems with the notification process still existed as demonstrated during the event of February 15, 2000, and as late as June 1, 2000, as evidenced by equipment reliability problems and inconsistent activation by assigned personnal.	GREEN—non-cited Violation
050000247/	May 15—June 2, 2000	Failure to conduct off-hour excercises at the required	E-Plan Section 8.1.3, Drills and Exercises, commits the licensee	GREEN—non-cited

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
2000-006		frequency.	to conduct an off-hours exercise once every six years. Prior to the February 15, 2000, event, the last off-hours exercise was conducted in 1993 and thus exceeded the six year periodicity.	violation
050000247/ 2000-006	Response to ALERT on February 15, 2000	Failure to augment the Emergency Response Organization within 60 minutes of the declaration of the Alert contrary to the Indian Point 2 emergency plan. Full staffing and activation did not occur because notification of the Emergency Response Organization and site access was delayed. Although licensee had conducted monthly pager/Community Alert Notification System tests prior to the event, they did not have a mechanism in place to review the data to determine if the pagers and CANS were operating properly. During the event, some pagers did not activate and the CANS did not notify all responders. Several procedures and related training problems were underlying causes as to why the licensee did not meet the augmentation times within the required 60 minutes. The licensee's procedues stated that before the pagers were	The Technical Support Center was supporting the event by 90 minutes after the Alert was declared; and was not fully staffed until 2 hours and 51 minutes after Alert was declared. This was atributed to the inability to staff core physics engineer, electrical and mechanical engineers. The OSC was not fully staffed until 1 hour and 46 minutes after Alert declared because of the inability to staff Health Physics positions. The EOF was not fully staffed until 1 hour and 46 minutes after the Alert was declared due to the inability to staff the onsite and offsite monitoring teams. The Joint News Center was not staffed until 2 to 2.5 hours from Alert declaration. No activation or staffing requirements were listed in the Media Relations Emergency Plan for the facility.	WHITE -Low to moderate safety significance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
		activated, the activator needed to fill out a questionnaire sheet for gathering facts about the event. This effort took approximately 15-20 minutes. Also, when the activator went to activate the CANS, he found the outgoing message to be incorrect and they had to record a different message prior to sending out the signal. There are no procedures or related training describing the duties of security guards (once the main entrance has been secured) regarding how to allow access for the Emergency Response Organization personnel for onsite response to the ERFs. As a result, security personnel were uncertain as to where to send responders for accountability and facility assignments. Some responders were also unfamiliar with where to report.		
050000247/ 2000-006	Response to ALERT on February 15, 2000	Failure to account for onsite radiation workers within 30 minutes of initiation contrary to the IP2 E-Plan and implementing procedure.	The licensee was not able to complete its accountability process until 138 minutes after the initiation of the accountability process. Accountability is the initial action to ensure that a range of protective actions for	WHITE -Low to moderate safety significance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			emergency workers is properly taken. Initially, accountability was considered completed in 75 minutes when apparently all personnel had been located. Howeverr, about that time, it was realized that acountability of individuals had not been maintained as individuals had entered and left the protected area while the accountability was being performed. The accountability process was performed a second time and completed 138 minutes after initiation. The accountability peocedure and training were inadequate for describing the accountability process and when accountability was considered to be accomplished. Once accountability was complete, access was to be controlled. The Unit 3 gate, which is also an entrance to the Unit 2 owner controlled area, was not guarded until midnight and not locked until 3:00am on February 16, 2000. This permitted Emergency Response Organization staff to bypass the main gate and enter from the Unit 3 side which contributed to the	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			delay in response personnel manning their ERF stations and to delay in accounting for personnel. There was no security procedure in place for ensuring the owner controlled area was secured.	
050000247/ 2000-006	Response to ALERT on February 15, 2000	Failure to properly disseminate information about the Alert conditions. There was confusion in the public domain about whether there was a radiation release and its magnitude, and one official was not notified in accordance with a pre-arranged agreement. This was contrary to the IP2 E-Plan.	During the event, problems were identified in the operation of the Joint News Center. There was an apparent lack of coordination of information from the licensee to the counties and state prior to issuance to the general public, which resulted in the issuance of conflicting information regarding the radiological release. In addition, a local official was not notified of the event in accordance with Appendix 5 of the Media Relations Emergency Plan, because of an incorrect telephone number.	WHITE -Low to moderate safety significance
050000247/ 2000-006	February 15, 2000	During the event, several equipment problems were observed in the Technical Support Center. Specifically, the Emergency Data Display System (EDDS) had been removed from the facility and the Nuclear Regulatory Commission required Emergency Response Data System (ERDS) was not made operable until about 3:00 a.m. on February 16, 2000 (approximately seven and one-half hours after the	Part 10 CFR 50.72(a)(4) requires that ERDS be activated as soon as possible but not later than one hour after declaring an emergency class Alert or higher.	GREEN—very low safety singnificance

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
		Alert declaration). The ERDS problem was due to an inoperable telephone line that had been previously identified, but uncorrected, by the licensee.		
050000247/ 2000-006	February 15, 2000	At approximately 2:00 a.m. on February 16, 2000 the licensee stopped the continuous staffing of the ENS line apparently due to shift relief without a replacement. At 7:00 a.m., on February 16, 2000, the Nuclear Regulatory Commission requested that a communication link be established and continuously manned. At about 9:00 a.m. on February 16, 2000, the licensee established a mutually agreeable communication link.	10 CFR 50.72(c)(3) requires that licensees maintain an open, continuous communication channel with the Nuclear Regulatory Commission Operations Center upon request by the Nuclear Regulatory Commission.	
050000247/ 2000-006	February 15, 2000	During the event, there were several examples where the technical support staff was narrowly focused or failed to implement timely and effective corrective actions to relsolve problems which complicated the event response.	During this inspection, it was determined that the licensee re-organized the TSC and added personnel to provide additional support for an emergency. The licensee had been conducting drills regularly since the event. During the June 1, 2000 exercise, drill participants demonstrated pro-active thinking when addressing simulated malfunctions and degrading plant conditions.	
050000247/	September 22, 1999	Shift Manager did not properly implement Emergency Action	EAL Training problem.	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
99012	exercise	Levels for the Alert classification when sufficient information was available. The controller had to prompt the Shift Manager to make the classification.		
05000247/ 99012	September 22, 1999 exercise	Following the General Emergency classification, the Emergency Director gave a briefing to the State and County agencies. The briefing was not adequate because it did not contain correct radiological information, the basis for the protective action recommendation and the Emergency Director did not refer to the dose assesment staff for correctly answering the state's questions.	Based on discussions with the Emergency Director, the inspectors determined that this was a player stimulation problem that appeared to be isolated to that one briefing.	
05000247/ 99012	September 22, 1999 exercise	The Licensee conducted facility debriefs with the players to solicit their input for feedback regarding the facilities, equipment, procedures, and ERO performance. The Nuclear Regulatory Commission's observations were that CON Edison's critique of the TSC and OSC was not sufficiently self-critical.		
05000247/ 99012	September 22, 1999 exercise	The licensee found one individual in a key ERO position (radiation protection coordinator) that was not qualified.	This type of finding was also identified during Nuclear Regulatory Commission program inspection (50-247/96-07). Licensee representatives	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			acknowledged weak administative controls in this area and documented this issue in CR's 1999-06868 and 07449.	
50-286/98-09	December 30, 1998 partial participation exercise and inspection	Minor simulator glitches impacted the final declaration transitioning from a site area emergency to a general emergency; however, emergency preparedness drill faciliators took control to keep the exercise focused on drill objectives.		non-cited Violation
50-247/98-07	June 22 - 26, 1998 inspection	In the Appendix containing forms for the Implementing Procedures, the forms were inconsistently labeled.	Some forms referenced the applicable procedure, some had revision dates, and some forms had neither.	
50-247/98-07	June 22 - 26, 1998 inspection	The licensee's Central Information Group uses a procedure to notify and mobilize the Emergency Response Organization. This procedure was not considered by the licensee to be an implementing procedure and therefore has not been subject to effectiveness reviews.	This procedure is important to the licensee's response to an off-hour emergency.	
	June 22—26, 1998 inspection	Disagreement between the Plan and the Implementing Procedure as to whether the facility is activated at an alert or site area emergency.		
50-247/98-07	June 22 - 26, 1998	Implementing Procedure on On-Site Medical Emergency was	The procedure has sections for "Precautions and Limitations" and	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
	inspection	inconsistent and incomplete.	"Equipment and Materials" which provide no information. However, precautions and equipment are stated in other parts of the procedure. Further, there is no guidance to contact human resources (to notify the next of kin for an injured person) not guidance to contact public affairs to disseminate information about the injury or accident.	
50-247/98-07	June 22—26, 1998 inspection	Frequency of review of Implementing Procedures is not adequate	Implementing Procedure cover sheets show a biennial review date. Implementing procedures are to be reviewed every year.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	Procedural implementation at the TSC was weak.	Controlled drawings were not relocated to the TSC. The noble gas monitor was not initially set up. The required radiological surveys were not performed at the required 30 minute intervals and documented on Forms 9, 10, and 20. At facility closeout and watch changeover all forms were to be collected, marked as record and summarized. This was not done.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	A repair team was dispatched while a simulated radiological release was in progress without their knowledge.	Consistent information flow and display was lacking in the Technical Support Center. Command and control by the	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			Technical Support Center Manager was weak. The delay of information, in conjunction with the weak command and control, resulted in the faulty dispatch.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	Licensee critique of the OSC and Technical Support Center was not sufficiently critical to result in improvements in those facilities.		
50-247/98-07	June 23, 1998 biennial full-participation exercise	The Technical Support Center layout and the positioning of the Technical Support Center staff were not efficient or effective for command and control by the Technical Support Center.	The Technical Support Center is divided by partitions and has separate rooms and therefore impacts communications. Also, the positioning of the telephones required the Technical Support Center to reach over his desk to the communicator's desk to receive incoming calls.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	When the pagers were activated for the notice of Unusual Event, the pagers mistakenly indicated a code informing Emergency Responses Organization members to report to their assigned facilities.	Some of the pagers also did not activate. The inspectors recognized that pager performance is affected by location and structures. However, the licensee's decision to not announce plant conditions or emergency classifications over the plant public address system, combined with weak communications and sporadic pager performance can result in uninformed Emergency Response Organization members.	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
50-247/98-07	June 23, 1998 biennial full-participation exercise	Accountability of individuals in the Technical Support Center was not maintained. All non-essential personnel were to be evacuated as soon as possible following a Site Area Emergency. When the Site Area Emergency was declared, the inspectors did not hear the site evacuation alarm nor heard an announcement in the Technical Support Center of the evacuation of non-essential personnel.		
50-247/98-07	June 23, 1998 biennial full-participation exercise	Problems were identified with the flow of information to the Technical Support Center and the display of information within the Technical Support Center. The inspectors observed several occasions during which the Technical Support Center staff experienced delays in being made aware of changes in critical plant conditions or parameters.		
50-247/98-07	June 23, 1998 biennial full-participation exercise	The white board titled “Priority Work” was actually a sequential listing of tasks to be accomplished. Completed tasks were not removed from the list. The board was not used as a tracking mechanism or to prioritize tasks. There was no indication in the Technical Support Center that repair teams had been dispatched		

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
		or of the status of the tasks.		
50-247/98-07	June 23, 1998 biennial full-participation exercise	The licensee's event board contained insufficient information to reconstruct the event scenario or provide comprehensive information to Technical Support Center staff.	At 3:50 PM, the only information on the board was: loss of power, General Emergency, and MOV 859B shut. No times were given for the events.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	A weakness exists in the licensee's process of dispatching teams if respirator qualifications are checked after the teams are formed and briefed.	The inspectors noted that it took about one hour from the time a team is formed until it is dispatched. An unnecessary delay in performing the assigned task would be created by a team member's expired respirator qualification being discovered at the control point.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	During initial activation, the OSC manager (OSCM) received a briefing on plant status from the POM; however, this information was not passed along to the repair teams in the OSC.	The first two repair teams were dispatched to the Technical Support Center for their assignments without knowing the status of the plant.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	The OSCM did not receive a beeper page for declaration of the Site Area Emergency or general emergency, nor was this information relayed from the Technical Support Center or Emergency Operations Facility.		

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
50-247/98-07	June 23, 1998 biennial full-participation exercise	The inspectors observed that immediately following the exercise termination, there were no facility debriefs conducted with the players. Without input from the players, the licensee missed a valuable source of feedback regarding the facilities, equipment, and the Implementing Procedures.		
50-247/98-07	June 23, 1998 biennial full-participation exercise	Inspectors determined that the licensee's critique of the OSC and Technical Support Center was not sufficiently self-critical to result in improvements in those facilities.		
50-247/98-07	June 23, 1998 biennial full-participation exercise	During the exercise, the inspectors observed several occurrences of casual controller interaction with the players. In the Technical Support Center, the HP controller continuously engaged in personal conversation with the exercise players. Neither the HP controller nor the controller accompanying the repair teams took notes during the exercise.	A review the controller training lesson plan indicated that it consisted of only one page with "eight subject highlights" that was used to train the controllers. The lesson plan lacked detail and did not communicate the Emergency Preparedness department's expectations to the controllers.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	Inconsistencies were noted in radiological and meteorological data in the first submittal of exercise scenario. Post accident sample system data and offsite contamination data were missing from the scenario packages.	There were numerous discrepancies identified by the inspectors with the scenario package. Many typographic errors were present in the scenario narrative and time line. Specific examples were provided to the licensee who made	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			corrections in those instances. However, the subsequent scenario package submittal still contained other typographical errors.	
50-247/98-07	June 23, 1998 biennial full-participation exercise	Inspectors found several areas where EP programmatic controls were lacking. Instead of good programmatic controls, the licensee's EP program is dependent upon the EP staff's memory and the trust that supporting organizations are performing their duties.	No documentation of completion of shared offsite responsibilities with Indian Point 3 EP personnel. Each licensee maintained documentation that their own assignments had been completed and communicated verbally to the other. The practice of annual and biennial procedures reviews, as stated in Section P.3.b, is inefficient and weak. Also, the EP department has no ownership of the procedure that notifies and mobilizes the ERO during off-hours. Therefore, the EP department does not perform effectiveness reviews of a procedure that implements the Plan. In addition, there was no procedure to direct the EP trainer to notify ERO members that their qualifications are going to expire. Related to this, there was no procedure directing the EP staff to inform those responsible for updating the Community Alert Network system (the system used	

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			to notify ERO members of emergencies) regarding changes to ERO members' qualification status. The inspectors determined that the licensee does not require respirator qualification to be a prerequisite for being in the Emergency Response Organization. The Emergency Preparedness department does not verify the status of respirator qualifications for maintenance personnel who are in the ERO. This would result in non-respirator qualified individuals responding to an event for which they may need to don respirators.	
50-286/98-02	May 18, 1998	Licensee determined that the status of 21 tone alert radios, distributed within the 10-mile emergency planning zone, was unknown.	The licensee has no formal procedure in place to monitor the status of the tone alert radios but committed to formalize a process by which the tone alert radios are controlled. The tone alert radios supplement the primary notification system (the sirens) in areas where sirens are less effective.	

Table H2: Regulatory Commission Inspection Reports Summary for Millstone

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
50-336/01-07 and 50-423/01-07	August 12—September 29, 2001	The testing process in place for the ANS biases the ANS PI data.	No additional detail available.	No finding of significance.
50-336/01-07 and 50-423/01-07	August 12—September 29, 2001	EPZ siren testing and maintenance procedures require clarity.	No additional detail available.	No finding of significance.
50-336/01-07 and 50-423/01-07	August 12—September 29, 2001	Second quarter EPZ siren system PI data submitted incorrectly.	No additional detail available.	No finding of significance.
50-336/01-07 and 50-423/01-07	August 12—September 29, 2001	ERNS system stopped working during monthly communication drill.	No additional detail available.	No finding of significance.
50-336/01-07 and 50-423/01-07	August 12—September 29, 2001	Conflicting priorities during emergency events.	No additional detail available.	No finding of significance.
50-336/01-07 and 50-423/01-07	August 12—September 29, 2001	Missed opportunities to improve SERO performance based upon the results from the monthly call-in communication tests.	The inspector noted that the licensee did not fully utilize the ENRS test data to assess the SERO's capability to respond and activate the emergency response facilities within 60 minutes of event notification. The inspector trended the ETAs provided by the SERO responders and found that in every test conducted in 2000 and 2001 to date, the licensee would have had an aaverage of 5-6	This issue is considered an unresolved item (URI) pending the licensee's review of the data entered into the ERNS. Once that information is received, the NRC will review the issue and assess its potential safety significance.

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
			minimum staffing positions not filled within 60 minutes.	
05000336/2000-006 and 05000423/2000-006	February 15—April 1, 2000	The licensee's corrective action system identified concerns and critique items from past emergency preparedness exercises or drills. Actions taken by the licensee were effective in minimizing the potential for recurrence. However, in many instances, the licensee repeatedly changed due dates and took approximately 6 to 12 months to resolve and close condition reports.		No finding of significance.
05000336/2000-006 and 05000423/2000-006	February 15—April 1, 2000	There was an inadvertant activation of the SERO pagers in January 2000 apparently due to procedural and human errors. The vendor continues to troubleshoot the problem.	Since January 2000, the licensee has continued to perform pager tests to identify operational problems and ensure the adequacy and dependability of the system. Should the pager system fail, the licensee maintains two backup methods for ensuring immediate notification to SERO and offsite officials.	No finding of significance.
05000336/2000-006 and 05000423/2000-006	February 15—April 1, 2000	The licensee conducted emergency response training as required. However, the EP staff identified continual problems with SERO members not following administrative emergency response procedures for keeping EP apprised of changes to the SERO (i.e., additions,	Senior management expressed comcern with this finding and stated that they intend to provide support and oversight to the emergency response program in resolving this issue.	Non-Cited Violation

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
		terminations, etc.)		
50-245, 336, 423/97-81	August 20—September 8, 1997, biennial full-participation exercise.	Failure to maintain emergency preparedness facilities. An apparent violation was identified concerning control of information, documents, and equipment in emergency response facilities and for the failure to inventory equipment following use.	Maps, status boards, diagrams, and the "Minimum Staffing Chart" were not controlled. Inadequate back-up telephone directory for the Utility. The reference library contained uncontrolled drawings and documents. Lack of control for lockers containing inventoried equipment in that they may be accessed by licensee personnel not directly involved in the emergency response program.	NRC Violation
50-245, 336, 423/97-81	August 20—September 8, 1997, biennial full-participation exercise.	Improper implemetation of dose assessment standards, EPA-400, and 10CFR20 requirements.	The combination of the misuse of the term TEDE, lack of a rapid means to compute TEDE, mathematical errors, complex options, questionable assumptions, and typographical human factors problems in the dose assessment procedures warrants a complete review and upgrade program. Inability to perform dose assessment in a timely manner to provide protective action recommendation upgrades.	NRC Violation
50-245, 336, 423/97-81	August 20—September 8, 1997, biennial full-participation exercise.	Decrease in effectiveness of the emergency plan without prior NRC approval.		NRC Violation
50-245, 336, 423/97-81	August 20—September 8, 1997, biennial full-	Inadequacy of oversite review of 10CFR50.54(t) and oversite requirements, such as evaluation		NRC Violation

Inspection Report No.	Date(s) of Inspection/Drill/Exercise	Finding	Additional Comments	Rating
	participation exercise.	for adequacy of emergency preparedness program capabilities and procedures.		

Appendix I: 2002 Indian Point Practice and Full-Scale Exercise Observations

There are five primary management processes that make up an emergency response system when viewed using the P3A framework (discussed in Chapter 10):

- Communication
- Coordination
- Resource Management
- Command and Control
- Personnel Management

The table below lists the raw observations made by the James Lee Witt Associates/IEM team during the September 2002 practice exercise and full-scale exercise conducted at Indian Point. The observations are grouped according to the type of observation based on the statement of work for this study (the category column) and the P3A management process that the type observation corresponds with. The jurisdiction column either lists "General," which means the same observation applied to more than one REP stakeholder, or the individual stakeholder is listed. The Description column contains the actual observation.

Exercise	Jurisdiction	Management Process	Category		Description
Full-Scale	General	Coordination	Emergency Operations Management		Counties and State did not communicate regarding Dose Assessment
Full-Scale	General	Command and Control	Protective Action Decision-Making		Dose was not factored into Protective Action Decision-making
Practice	Indian Point	Command and Control	Field Measurement and Analysis		(9) the ED did not acknowledge early enough that a release was in progress (19 minutes later than it should have been acknowledged).
Practice	Indian Point	Communication	Support / Operations / Facilities		(1) The RECS line did not work properly.

Exercise	Jurisdiction	Management Process	Category		Description
Practice	Indian Point	Communication	Emergency Operations Management	Emergency Manage-ment Notification	(10) There were a couple of phone numbers used for notification of off-site agencies that were not correct (primarily fax numbers).
Full-Scale	Indian Point	Communication	Emergency Management Notification		(2) Site Area Emergency was declared, but there was no announcement, so word was not spread within the Indian Point Emergency Response Organization; This is especially important although SAE is not a release off-site, precautionary protective actions are taken at this stage. These could be delayed as a result of not getting this information.
Full-Scale	Indian Point	Communication	Emergency Management Notification	Support / Operations / Facilities	Rockland, State, Orange could not get EOF on phone when protective action recommendations were revised emergency response and planning area 31 decision, etc.

Exercise	Jurisdiction	Management Process	Category		Description
Practice	New York State	Resource Management	Protective Action Decision-Making	Field Measure-ment and Analysis	In addition, observers documented discrepancies with dose assessment. Dose assessment was analyzed and evaluated by the State Department of Health. There were times when the scenario data and Indian Point EOF data were different, and the health officials chose plant data over the scenario data because, they said, conservative methods were used to do the dose assessments. When the data was finally evaluated, the initial reading was off by a factor of 10, and the stack reading from Indian Point was possibly off by another factor of 10. The met data given to the Command Center and to the Assessment and Evaluation personnel were different. These complications caused problems with running dose assessment and protective action recommendation decisions.

Exercise	Jurisdiction	Management Process	Category		Description
Full-Scale	New York State	Command and Control	Emergency Management Notification		No effective communication plan within the Assessment and Evaluation group structure, both up and down lines of authority to disseminate field data so that decisions could be make quickly with that data.
Full-Scale	New York State	Coordination	Protective Action Implementation	Public Information	Distribution and storage of potassium iodide (KI) as well as relocation for captive populations was not considered during the exercise as well as those employees at the Prison facilities. There was no mention of congregate care facilities for captive populations as well.
Practice	Orange County	Command and Control	Protective Action Decision-Making		A single coordination management issue was noted. The decision to issue potassium iodide (KI) to the general public was not in accordance with state guidance. This decision was based upon guidance given to the county executives from the Director of Public Health. The

Exercise	Jurisdiction	Management Process	Category		Description
					Director of Public health did not coordinate with State Health before offering advice in this matter.
Full-Scale	Orange County	Coordination	Protective action decision-making		There is still work to do on West Point involvement, according to observers.
Practice	Orange County	Communication	Emergency Management Notification		A general announcement to the EOC staff was not made when the event escalated from Alert to Site Area Emergency. A placard stating this was posted at the front of the EOC in a predominant location, but some personnel were unaware of the SAE until it was announced during an EOC staff update briefing. This is especially important although SAE is not a release off-site, precautionary protective actions are taken at this stage. These could be delayed as a result of not getting this information.
Full-Scale	Orange County	Coordination	Emergency Operations Management	Protective Action Decision-Making	Conflict with Rockland Co. on home rule of emergency response and planning area 39—who had

Exercise	Jurisdiction	Management Process	Category		Description
					decision-making authority
Full-Scale	Putnam County	Communication	Protective Action Implementation		(4) No one observed or announced set-up access control, and the Sheriff's Department brought it to attention.
Practice	Rockland County	Resource Management	Field Measurement and Analysis		The radiological dosage calculations provided by Indian Point were in error by a dangerous amount.
Full-Scale	Rockland County	Coordination	Emergency Operations Management		Conflict with Orange Co. on home rule of emergency response and planning area 39—who has decision-making authority.
Practice	Westchester County	Coordination	Protective Action Decision-Making	Protective Action Decision-Making	Coordination management issues were documented in two areas: protective action decision-making and school protective actions. It was noted that there seemed to be little sense of urgency as the Counties and State discussed the utility protective action recommendation. As a result, 40 minutes elapsed between receipt of the utility protective action

Exercise	Jurisdiction	Management Process	Category		Description
					recommendation by the Counties and public receipt of the protective action decision. Given that the release began 27 minutes after public broadcast of the protective action decision, those 40 minutes would have significantly reduced the number of people evacuating through the plume.
Practice	Westchester County	Coordination	Protective Action Decision-Making		There was also no discussion of whether the licensee evacuation protective action recommendation could be completed prior to a release, or of sheltering as an option.
Practice	Westchester County	Command and Control	Protective Action Implementation		In regard to the school protective actions issue, Westchester County officials made the decision to delay sirens and EAS after an Alert was declared because they were concerned that parents would rush to the schools to get their children, and thus cause traffic congestion. When they finally did decide to move the schools, it was done mainly

Exercise	Jurisdiction	Management Process	Category		Description
					because of that concern and less because of the actual risk to the children. Further, the decision was made for all schools not affected by the evacuation protective action decision to dismiss normally, even though the commuter train service had been suspended. There was no discussion observed about elementary or middle school children being sent home to empty houses, although a school representative told the IEM observer upon questioning that schools would only send children home where they knew a caregiver was present; how they determine the presence of a caregiver is unknown.
Full-Scale	Westchester County	Coordination	Protective Action Decision-Making		(2) Personnel also did not talk about hazard arrival time when making protective action decision.
Full-Scale	Westchester County	Coordination	Protective Action Implementation		(4) Sirens sounded before schools were informed of the event. This is a significant issue due to increased traffic congestion

Exercise	Jurisdiction	Management Process	Category		Description
					around schools after sirens are sounded might reduce the potential for an expedient evacuation of the school (which should get priority under current plans).
Full-Scale	Westchester County	Communication	Protective Action Implementation		(1) EOC personnel did not talk about traffic control points (TCPs) in Command Center.
Full-Scale	Westchester County	Resource Management	Protective Action Implementation		Issue about shutting down trains right away—traps workers that relied on that mode of transportation to get to work.
Practice	Indian Point	Communication	Public Information		(5) The ED got backed-up in getting press releases out through the Joint News Center.
Practice	Indian Point	Communication	Public Information		(6) The Executive Director did not document Phase B condition.
Practice	Indian Point	Communication	Emergency Operations Management		(6) There was a miscommunication when an EOF Communicator thought he had sent one team into the field and discovered later that the team had not been dispatched.

Exercise	Jurisdiction	Management Process	Category		Description
Practice	Indian Point	Communication	Public Information		(7) Perhaps protocols for radio talk should be instituted since the public can listen.
Practice	Indian Point	Communication	Emergency Management Notification		(11) The EOF Communicator #2 had to deliver Part 2 (of form) information telephonically-the information is usually faxed because it contains much technical information.
Practice	Indian Point	Coordination	Emergency Management Notification		(1) The Emergency Director's procedure indicates that Institute for Nuclear Power Operations (INPO) and American Nuclear Insurers (ANI) should be notified, but notification did not occur.
Practice	Indian Point	Coordination	Emergency Management Notification		(2) The liaison bridge did not work for New York State, Rockland, and Orange, which made obtaining information on the Counties more time-consuming.
Practice	Indian Point	Resource Management	Field Measurement and Analysis		(1) MRPDAS did not operate properly until late in the day, and it had bad data at one point.

Exercise	Jurisdiction	Management Process	Category		Description
Practice	Indian Point	Resource Management	Support / Operations / Facilities		(3) The executive conference phone did not work.
Practice	Indian Point	Resource Management	Support / Operations / Facilities		(4) Facsimiles to Counties via the group fax machine did not work.
Practice	Indian Point	Resource Management	Support / Operations / Facilities		(9) Two alternate fax machines broke down.
Practice	Indian Point	Personnel Management	Emergency Operations Management		(1) The EOF Manager should identify specifically who should be manning security at the EOF, including what standards they are to follow and what training is required (volunteers manned security at the practice exercise).
Full-Scale	Indian Point	Resource Management	Support / Operations / Facilities		The following resource management issue was documented: the phone number to Peekskill was not reliable and caused complications when sending facsimiles.
Full-Scale	Indian Point	Personnel Management	Public Information		(1) Rumor control; for example, a citizen called a plant official regarding a news story on CNN and no one was sure what actions to take.

Exercise	Jurisdiction	Management Process	Category		Description
Practice	Indian Point	Communication	Emergency Operations Management		(2) The ED did not use the correct turnover form when he assumed the role from the Control Room Supervisor; This is a logging issue.
Practice	New York State	Communication	Emergency Management Notification		(2) RECS notices were placed on the table in the Command Center and were, on occasion, reviewed, but they were not date-and-time stamped as they were received, and at times, the notices could not be immediately located.
Practice	New York State	Communication	Support / Operations / Facilities		(3) The executive coordination telephone system was partially non-functioning, and the backup system did not have speakerphone capability; problems with the telephone system included (a) the ring on the phone lines in the Command Center was so weak that at times, no one noticed the ring, (b) projections were not changed in the Ops Center or in the Command Center on a regular basis, and (c) Counties were dropped off of the phone bridge network

Exercise	Jurisdiction	Management Process	Category		Description
					frequently.
Practice	New York State	Communication	Emergency Management Notification		(4) There was no debriefing in any form after the exercise.
Full-Scale	New York State	Coordination	Protective Action Decision-Making		Only Westchester County seemed to notice that Emergency Action Level (EAL) 2.2.2 meant that two of three fission product barriers were lost, and they revised protective action decisions to evacuate. This is a coordination effort because the other jurisdictions did not act.
Full-Scale	New York State	Resource Management	Protective Action Decision-Making		(3) The State RECS data did not get where it should have been (dose assessment).
Practice	Orange County	Resource Management	Support/ Operations/ Facilities		Technological difficulties were observed throughout the exercise, including problems with the copier, video-teleconferencing equipment, LAN hookup for the County Attorney's laptop, executive conference telephone line,

Exercise	Jurisdiction	Management Process	Category		Description
					and the PA system.
Full-Scale	Orange County	Resource Management	Emergency Management Notification	Support / Operations / Facilities	We observed communication problems, including video-conferencing with the executive hotline.
Full-Scale	Orange County	Personnel Management	Emergency Operations Management		The County Health Official was not willing to make decisions and had to defer to State.
Practice	Putnam County	Communication	Emergency Operations Management	Emergency Manage-ment Notification	(3) The communication between EOC support staff was generally adequate, with the exception of the director not knowing about the release immediately after notification.
Practice	Putnam County	Communication	Support / Operations / Facilities		(4) The executive hotline had several problems: (a) Putnam County was dropped from the call several times, (b) New York SEMO was difficult to hear, (c) only one person could use the backup phone system at a time, and (d) an individual had to relay information to others in the EOC when the backup system was in-use.

Exercise	Jurisdiction	Management Process	Category		Description
Practice	Putnam County	Communication	Support / Operations / Facilities		(5) The radio system used by the EOC to communicate with its field teams was jammed during the exercise, and the radio operator was able to switch to the Westchester County system to re-establish communications; many EOC personnel seemed to think the jammed repeater was intentional but had no evidence to support this claim.
Practice	Rockland County	Communication	Support / Operations / Facilities	Emergency Manage-ment Notification	Poor communication management with telephone systems, dedicated lines (RECS and executive hotline), conference back-up (commercial lines), and the lack of use of the available RACES Teams were notable communication issues.
Practice	Rockland County	Coordination	Emergency Operations Management		There was very little coordination with State Emergency Management Office (SEMO) and no mention of FEMA or Nuclear Regulatory Commission at Rockland County or over the executive hotline

Exercise	Jurisdiction	Management Process	Category		Description
					(when it was operational).
Practice	Westchester County	Communication	Support / Operations / Facilities		The executive coordination telephone system was inoperable, and the backup system did not have speakerphone capability. This hindered the ability of others in the command group to hear and understand what other counties and the State were trying to communicate. In addition, volume fluctuated and some messages were garbled.
Full-Scale	Westchester County	Resource Management	Support / Operations / Facilities		(1) there were problems with the executive hotline; Putnam could only be contacted via backup system.
Full-Scale	Westchester County	Communication	Protective Action Implementation		Westchester County not catching dismissal of SIP schools to emergency response and planning area's that were evacuating (latch-key kids) until after dismissal.
Practice	Indian Point	Communication	Protective Action Decision-Making	Protective Action Implemen-tation	(2) Missing and unavailable data on key plant parameters made the technical liaison's work

Exercise	Jurisdiction	Management Process	Category		Description
					more difficult.
Practice	Indian Point	Communication	Field Measurement and Analysis		(12) There were discrepancies between Reuter/Stokes, dose projections, and field data. The observer recalled that this was an artifact of the exercise scenario, not error on part of Indian Point.
Practice	Indian Point	Communication	Emergency Operations Management		(1) Activation of the EOF was not announced as procedure dictates.
Practice	Indian Point	Communication	Emergency Management Notification		(3) The ED was not prepared to answer JNC's question about how many people were released from the plant.
Practice	Indian Point	Communication	Protective Action Implementation		(4) The ED did not make an announcement using the words "release non-essential personnel," as required by procedure.
Practice	Indian Point	Communication	Emergency Operations Management		(8) The ED never signed into the EOF sign-in board.
Practice	Indian Point	Communication	Emergency Management Notification	Emergency Operations Manage-ment	(3) The Dose Assessment Coordinator would like to have done more frequent briefings to state and county liaisons because

Exercise	Jurisdiction	Management Process	Category		Description
					field data was getting through the JNC. but not to the state and county liaisons.
Practice	Indian Point	Communication	Field Measurement and Analysis		(4) The Dose Assessment Coordinator caught a notification form with the wrong wind direction on it and corrected it in time.
Practice	Indian Point	Communication	Emergency Management Notification		(8) The radiological field teams requested laminated cards featuring the phonetic alphabet.
Practice	Indian Point	Resource Management	Field Measurement and Analysis		(2) Simulator information errors were an annoyance to exercise play.
Practice	Indian Point	Communication	Support / Operations / Facilities		(5) One county and New York State were assigned the same phone number in the EOF, but a work-around was set-up for the exercise.
Practice	Indian Point	Resource Management	Support / Operations / Facilities		(6) The executive hotline is for county executive use, but it rang three times in the EOF, and each time was being used to transmit radiological data.
Practice	Indian Point	Resource Management	Support / Operations / Facilities		(7) The personal computer that is labeled “EOF Manager” does

Exercise	Jurisdiction	Management Process	Category		Description
					not meet current station standards.
Practice	Indian Point	Resource Management	Support / Operations / Facilities		(8) The SAS/Proteus Operator procedure is obsolete now.
Practice	Indian Point	Resource Management	Support / Operations / Facilities		(10) MS2 cable was identified as defective a couple of months ago and remains so.
Practice	Indian Point	Personnel Management	Emergency Operations Management		(2) There should be two technical liaisons to State/Counties to provide adequate support.
Full-Scale	Indian Point	Communication	Protective Action Decision-Making		(3) The protective action recommendation status board was updated long after ORAD flagged the need to change protective action recommendations.
Practice	New York State	Communication	Support/ Operations/ Facilities	Emergency Manage-ment Notification	(7) Hourly briefings were not carried out on-time, and sometimes no at all, in the case of the met data; some briefings were mock, and some were delayed because of technical difficulties.
Practice	New York State	Communication	Emergency Management Notification		(8) Policy dictates that the utility makes an updated notification using the RECS phone every 30 minutes, but a “report by

Exercise	Jurisdiction	Management Process	Category		Description
					exception" process would be faster and less cumbersome, allowing fewer individuals to be involved and therefore speeding-up the decision-makers' communication process.
Practice	New York State	Personnel Management	Training		Training more specific to radiation emergencies and fast-breaking events (including terrorism) is recommended.
Full-Scale	New York State	Communication	Emergency Operations Management		(1) The flow of information in the Operations Center was adequate once the staff switched to a paper system.
Full-Scale	New York State	Communication	Emergency Operations Management		(3) The County Department of Health (DOH) and State DOH did not communicate.
Full-Scale	New York State	Communication	Emergency Operations Management		(4) The Emergency Director told FEMA that all four counties had been notified but did not verify the information until 40 minutes later.
Full-Scale	New York State	Coordination	Public Information		In addition, the Governor's office declared a "State of Disaster Emergency" without a clear explanation of

Exercise	Jurisdiction	Management Process	Category		Description
					what that term meant.
Full-Scale	New York State	Resource Management	Protective Action Decision-Making		(2) The form the State sent to the EOF with protective action recommendations/ protective action decisions did not show changes, and the EOF had to send it back to the State four times.
Full-Scale	New York State	Resource Management	Support / Operations / Facilities		(4) The speakerphone with JNC was unplugged until 0934 hours.
Full-Scale	New York State	Resource Management	Field Measurement and Analysis		(5) MRPDAS had bad data at State initially and had to reload.
Full-Scale	New York State	Communication	Emergency Operations Management		Proper documentation at the EOC (State) for complex and even minor incidents is a must and was very limited during this exercise
Practice	New York State	Personnel Management	Emergency Operations Management		Organizational charts should in some way reflect shift changes that may occur or can be anticipated.
Full-Scale	New York State	Personnel Management	Emergency Operations Management		Organizational charts should in some way reflect shift changes that may occur or can be anticipated

Exercise	Jurisdiction	Management Process	Category		Description
Practice	Orange County	Coordination	Support / Operations / Facilities		Likewise, the main RAD Monitor was new to the position and was not particularly aggressive in offering an opinion.
Practice	Orange County	Personnel Management	Emergency Operations Management		The only exception to CADEMO's successful leadership was that EMO personnel made the decision to delay the initiation of computer call-down of EOS staff 20 minutes as initial notification was concurrent with the morning commute. This resulted in the EOC not being fully-staffed until 1 hour and 20 minutes after event notification.
Full-Scale	Orange County	Resource Management	Support / Operations / Facilities		The only other resource management issue was that the facility is small (particularly the executive decision room).
Practice	Putnam County	Communication	Emergency Management Notification		(6) There was a lack of EOC briefings, perhaps attributable to the "separate" exercises being conducted-the out-of-sequence play and the real-time play; EOC staff were not even

Exercise	Jurisdiction	Management Process	Category		Description
					briefed regularly during out-of-sequence play (see coordination issues below).
Practice	Putnam County	Coordination	Emergency Operations Management		The EOC was fully staffed until 1200 hours, and after 1200 hours, only dose assessment, public information, and executives continued to play. This caused the exercise to be played out-of-sequence for about half of the players, which created some confusion for players continuing in real-time.
Practice	Putnam County	Resource Management	Support / Operations / Facilities		Small technical problems, like printer and copy machine failure, were handled quickly.
Practice	Putnam County	Resource Management	Support/ Operations/ Facilities		It was also noted that the Putnam EOC facility is confined, which makes multiple conversations a distraction.
Full-Scale	Putnam County	Resource Management	Support / Operations / Facilities		(2) The EOC facility, including floor space and acoustics, are not optimal.
Full-Scale	Putnam County	Resource Management	Support / Operations / Facilities		(2) The executive hotline did not work, but the secondary system did.

Exercise	Jurisdiction	Management Process	Category		Description
Full-Scale	Rockland County	Communication	Support / Operations / Facilities		Communication was without problems, except for issues concerning the executive hotline.
Full-Scale	Rockland County	Coordination	Emergency Operations Management		The SEMO representative disagreed with his post assignment in the operations room as opposed to the command room. He spent his time in the command room and left messages with another player to take messages and contact him if necessary.
Full-Scale	Rockland County	Resource Management	Support / Operations / Facilities		Projectors may be more effective than televisions to share GIS, transportation information, etc.
Full-Scale	Rockland County	Resource Management	Support / Operations / Facilities		RACES was under-utilized; it can send picture data via cameras, but no personal computer in the EOC could accept the data.
Practice	Westchester County	Communication	Emergency Management Notification		It was also documented that policy dictates that the utility makes an updated notification using the RECS phone every 30 minutes, but a “report by exception” process would be faster and less

Exercise	Jurisdiction	Management Process	Category		Description
					cumbersome.
Practice	Westchester County	Resource Management	Support / Operations / Facilities		(2) The EOC complex is antiquated and small for the size of the EOC staff. The ceiling is too low to allow for any type of overhead projection system, and the acoustics are poor.
Full-Scale	Westchester County	Coordination	Emergency Operations Management		Because a school representative showed up late, county transportation back-filled the school for the first hour, which is a coordination management issue.
Full-Scale	Westchester County	Resource Management	Support / Operations / Facilities		(2) The EOF could only be reached on primary system.
Full-Scale	Westchester County	Resource Management	Support / Operations / Facilities		(3) The phones were placed in the middle of the facility; the County Executive may want to consider moving the phones in the future.
Practice	Indian Point	Communication	Field Measurement and Analysis		(5) The communication with field data teams went well
Practice	Indian Point	Communication	Emergency Management Notification		(9) The EOF Communicator #2 got

Exercise	Jurisdiction	Management Process	Category		Description
					notification/update forms out in a timely manner
Practice	Indian Point	Command and Control	Emergency Operations Management		We did not document any command and control management issues for the practice exercise
Full-Scale	Indian Point	Communication	Emergency Operations Management		(1) Regular, timely briefings provided adequate summaries of current conditions
Full-Scale	Indian Point	Coordination	Emergency Operations Management		We did not document any coordination management issues
Full-Scale	Indian Point	Communication	Emergency Management Notification		Key EOF staff (Emergency Director and ORAD) did a good job of communicating directly with State and county liaisons
Full-Scale	Indian Point	Personnel Management	Field Measurement and Analysis	Support / Operations / Facilities	(2) Indian Point field teams were active and well-coordinated throughout the exercise
Full-Scale	Indian Point	Personnel Management	Emergency Operations Management		(3) The EOF staff stayed active after release, until the end of play
Practice	New York State	Communication	Support / Operations / Facilities		(1) The utility tech representatives were knowledgeable

Exercise	Jurisdiction	Management Process	Category		Description
					and explained the physical plant problems
Practice	New York State	Coordination	Emergency Operations Management		The State EOC showed excellent coordination with the Counties, despite technical difficulties with the executive hotline. For example, school administrators were given notice to evacuate before any public notification through respective counties. No other coordination management issues were noted for the State EOC
Practice	New York State	Resource Management	Support / Operations / Facilities		(1) The EOC installed plasma screens to project information in the Command Center and Ops Center on large-projection televisions
Practice	New York State	Resource Management	Support / Operations / Facilities		(2) There were computers at every station, and the machines seemed to function well
Practice	New York State	Resource Management	Support / Operations / Facilities		(3) The GIS group provided excellent maps
Practice	New York State	Command and Control	Protective Action Decision-Making		The Assistant Director was helpful and knowledgeable about his roles and duties. He

Exercise	Jurisdiction	Management Process	Category		Description
					relied little on his emergency managers and agency representatives when making decisions, but did rely on them for information and assistance
Practice	New York State	Personnel Management	Emergency Operations Management		The State EOC took this practice drill seriously-the EOC was fully staffed, and participants were serious and attentive
Full-Scale	New York State	Communication	Emergency Operations Management		(2) Agency briefings were good-on-time and thorough
Full-Scale	New York State	Resource Management	Support / Operations / Facilities		(1) There was a good back-up plan for phones when they went down
Full-Scale	New York State	Command and Control	Emergency Operations Management		No command and control management issues were noted
Full-Scale	New York State	Personnel Management	Emergency Operations Management		No personnel management issues were observed
Practice	Orange County	Communication	Emergency Operations Management		Effective communication on the part of EOC personnel was documented. Of particular note is that EOC personnel who were assigned to specific situations (i.e., fire, schools, etc.) reported to the executive

Exercise	Jurisdiction	Management Process	Category		Description
					decision area, in a separate room, to be briefed on incidents and engage in further discussion if necessary. This helped keep noise in the main EOC to a minimum and effectively targeted specific personnel to deal with a problem without outside distraction. Another communication management issue was that periodic EOC updates contained necessary information but were concise, allowing personnel to proceed with response activities
Practice	Orange County	Resource Management	Support / Operations / Facilities		Available resources were effectively utilized by EOC personnel: the main entrance, JNC, and break areas were reconfigured from the existing floor plan (secondary entrance used as main entrance, office equipment relocation, etc.) to minimize traffic flow and distractions
Practice	Orange County	Resource Management	Emergency Operations Management		Resources at the EOC were "adequate." Almost all EOC staff, including

Exercise	Jurisdiction	Management Process	Category		Description
					administrative assistants, were from other county offices. In some cases, personnel did not have experience in the EOC, but experienced staff provided guidance and direction to newcomers
Practice	Orange County	Command and Control	Emergency Operations Management		We did not observe any command and control management issues at the Orange County EOC
Practice	Orange County	Personnel Management	Emergency Operations Management		Observers noticed strong leadership from EOC staff, particularly CAD Emergency Management Office (EMO).
Practice	Orange County	Personnel Management	Emergency Operations Management		Additional taskings/injects were dealt with in an effective manner and did not detract from "main REP issues." The County Executive Officer, who was the main decision-maker, had confidence in his personnel and deferred to their expertise when appropriate
Full-Scale	Orange County	Communication	Emergency Management Notification		We did not note any communication management

Exercise	Jurisdiction	Management Process	Category		Description
					issues
Full-Scale	Orange County	Command and Control	Emergency Operations Management		Delegation of tasks in command and control was appropriate
Practice	Putnam County	Communication	Protective Action Decision-Making		(1) Protective action decisions at the county level were timely
Practice	Putnam County	Communication	Protective Action Implementation		(2) No problems were apparent in the implementation of protective actions
Practice	Putnam County	Resource Management	Support / Operations / Facilities		According to the EOC director, a new facility is scheduled to begin construction soon
Practice	Putnam County	Command and Control	Protective Action Decision-Making		The County Executive and the EOC Director showed aggressiveness in decision-making, and although they remained relatively isolated from the rest of the EOC, they appeared to be well-informed.
Practice	Putnam County	Personnel Management	Emergency Operations Management		We did not notice any personnel management issues during this practice exercise
Full-Scale	Putnam County	Communication	Emergency Operations Management		(1) Inter-EOC communication was adequate
Full-Scale	Putnam County	Communication	Emergency Operations Management		(2) Regular briefings from command room to Operations Center

Exercise	Jurisdiction	Management Process	Category		Description
					seemed effective
Full-Scale	Putnam County	Communication	Protective Action Decision-Making		(3) Briefing to dose assessment field team was thorough
Full-Scale	Putnam County	Coordination	Emergency Operations Management		No coordination management issues were observed
Full-Scale	Putnam County	Resource Management	Protective Action Implementation		(1) Traffic control set-up was done well
Full-Scale	Putnam County	Command and Control	Emergency Operations Management		No command and control management issues were documented by
Full-Scale	Putnam County	Personnel Management	Emergency Operations Management		We did not observe any personnel management issues
Practice	Rockland County	Resource Management	Support / Operations / Facilities		(1) The facility for Command and Control and EOC is very usable; it has been remodeled recently, and with the exception of a few mechanical glitches, worked well for team-type interaction
Practice	Rockland County	Resource Management	Support / Operations / Facilities		(2) The staff was creative in recovering from equipment problems and remained calm
Practice	Rockland County	Command and Control	Emergency Operations Management		The Command and Control element worked well with EOC staff, and

Exercise	Jurisdiction	Management Process	Category		Description
					information-sharing was excellent
Practice	Rockland County	Command and Control	Emergency Operations Management		The Chief Executive was prepared and willing to listen to staff; he was not hesitant about making tough decisions
Practice	Rockland County	Personnel Management	Field Measurement and Analysis		It was noted that the Radiological Monitoring Team was well-equipped to handle their duties
Full-Scale	Rockland County	Communication	Support / Operations / Facilities		The staff rebounded well from hotline problems, however
Full-Scale	Rockland County	Command and Control	Emergency Operations Management		The County Executive, Chief of Staff, and Operations Chief worked well as a team, discussed information, and then the Executive made decisions.
Full-Scale	Rockland County	Personnel Management	Emergency Operations Management		The EOC Manager was an effective leader; he kept his staff motivated and was involved with injects, primarily law enforcement.
Practice	Westchester County	Resource Management	Support / Operations / Facilities		(1) The EOC is initiating an e-mail-based messaging system that will end reliance on multi-part message forms and

Exercise	Jurisdiction	Management Process	Category		Description
					automatically build a message log. The new system seemed to work well after some initial set-up issues.
Practice	Westchester County	Command and Control	Emergency Operations Management		It was noted that the Assistant County Executive who was in charge reported that it was his first time filling that role. He was knowledgeable about his duties and relied on his emergency managers and agency representatives (especially the schools) for information and advice on which to base decisions.
Practice	Westchester County	Command and Control	Emergency Operations Management		Also, we found the command group staff to be experienced in REP and anticipated escalation rather than adjusting only when situations changed.
Practice	Westchester County	Command and Control	Support / Operations / Facilities		In addition, the utility tech reps were considered knowledgeable. One of them in particular is an active volunteer fire and hazmat responder as well as an Entergy engineer, and was clearly well-respected and

Exercise	Jurisdiction	Management Process	Category		Description
					seen as a trusted agent by County decision-makers.
Practice	Westchester County	Personnel Management	Emergency Operations Management		We did not note any personnel management issues for the Westchester County EOC.
Full-Scale	Westchester County	Command and Control	Emergency Operations Management		IEM observers did not note any command and control management issues.
Exercise	**Jurisdiction**	**Management Process**	**Category**		**Description**
Practice	General	Coordination	Public Information		Upon arrival at JNC, staff did not know the protocol for getting the keys to the building, which delayed entry.
Practice	General	Coordination	Public Information		The start up of the JNC was slow. Registering all of the staff was problematic and a little unorganized.
Practice	General	Coordination	Public Information		The JNC will not declare itself operational until all staff has signed in. It did not seem like the staff was aware of this since many were present for awhile before signing in

Exercise	Jurisdiction	Management Process	Category		Description
					or had to be reminded.
Practice	General	Communication	Public Information		Most of the Counties were having trouble with the phones and computers. Email was not working.
Practice	General	Coordination	Public Information		Unable to synchronize clocks in work rooms.
Practice	General	Communication	Public Information		Agency liaison did not keep Counties up-to-date about change in emergency status, For example, a general emergency was declared at 1250 and as of 1310, Counties still had not gotten any information regarding the general emergency.
Practice	General	Communication	Public Information		Status posters in work rooms were not being changed.
Practice	General	Communication	Public Information		Status reports from plant were not given often enough.
Practice	General	Communication	Public Information		Agency liaison did not utilize the bell when he went to work rooms to deliver news;

Exercise	Jurisdiction	Management Process	Category		Description
					therefore, many in the room were not aware of his presence.
Practice	General	Communication	Public Information		Public inquiry did not know about change from Site Area Emergency to General Emergency.
Practice	General	Communication	Public Information		Since email was down, Counties were delayed in putting out press releases. For approval they had to fax to county office and then manually input any changes.
Practice	General	Communication	Public Information		The fax machines were backlogged, which caused a further delay of the press releases getting to county offices in a timely manner.
Practice	General	Communication	Public Information		The distribution of press releases to the county rooms was erratic and slow.
Practice	General	Communication	Public Information		Distribution of press releases for people outside JNC was also very slow or they were not receiving any at all.
Practice	General	Communication	Public Information		The public inquiry room was not

Exercise	Jurisdiction	Management Process	Category		Description
					receiving some press releases.
Practice	General	Communication	Public Information		The first press briefing did not take place until an hour and half after the first press release was sent out. There did not seem to be any sense of urgency.
Practice	General	Communication	Public Information		In many cases, the spokespeople told the media they would get back to them on certain questions. At the next briefing they usually addressed the questions; however, it seemed like too much information for a trivial question and took up too much time. Some of the questions addressed in the follow up seemed like they were moot points.
Practice	General	Communication	Public Information		The second press briefing was too long. The length of all the briefings was not realistic.
Practice	General	Communication /Coordination	Public Information		Important events are unfolding while spokespeople are in media briefings. A staff member

Exercise	Jurisdiction	Management Process	Category		Description
					should either be coming up to inform spokespeople of changes or telling them the have to stop the briefing because press releases are giving out contradictory or inaccurate information.
Practice	General	Communication	Public Information		Spokespeople could have explained certain terms more clearly. For example, there was no clear explanation of a protective action versus a precautionary action.
Practice	General	Communication	Public Information		Spokespeople did not let the media know what documents (background information) or experts were available. Counties need to make it easier for the press.
Practice	Entergy	Communication	Public Information		Entergy spokesperson was a little belligerent towards the press. It makes him seem less credible.

Exercise	Jurisdiction	Management Process	Category		Description
Practice	General	Communication	Public Information		Counties do not give media any idea when next briefing will take place.
Practice	General	Communication	Public Information		Rumors were being addressed in briefing but media outlets were not being called to correct rumors.
Practice	General	Coordination	Public Information		The security in the media room was lax as media was able to get into unauthorized areas of the building.
Practice	General	Communication	Public Information		A special news bulletin that further explained the EAS announcements was sent out 43 minutes later. This happened on two occasions.

Exercise	Jurisdiction	Management Process	Category		Description
Full-Scale	General	Coordination	Public Information		For the start-up of JNC, staff arrived quickly after page was sent. Registration was efficient.
Full-Scale	General	Coordination	Public Information		Most staff knew to sign in on the main board, but some had to be

					reminded to check in.
Full-Scale	Orange County	Coordination	Public Information		The JNC was delayed in declaring itself operational because it could not establish the video link with Orange. They finally decided to go ahead without link.
Full-Scale	General	Communication	Public Information		As of 0922, there was no posting in the Utility Room about the emergency.
Full-Scale	General	Communication	Public Information		The Agency Liaison kept the Counties abreast of all news from the plant as well as changes to the status of the emergency.
Full-Scale	Orange County	Communication	Public Information		Orange County was not getting updates about the plant.
Full-Scale	Putnam County	Communication	Public Information		Putnam County heard about the release from their health department 10 minutes before the State announced the release.
Full-Scale	General	Communication	Public Information		Phone numbers on press releases were incorrect or did not list a number for further information.

Full-Scale	Putnam and Orange Counties	Communication	Public Information		Putnam and Orange did not have a number to contact for further information
Full-Scale	Orange County	Communication	Public Information		Orange County was missing multiple press releases from the other counties.
Full-Scale	General	Communication	Public Information		Three press releases had significant mistakes.
Full-Scale	General	Communication	Public Information		There seemed to be some inconsistency between the information the Counties would say they were going to address at the briefing and what they actually said at the briefing. It was mostly in reference to questions reporters asked and filling in holes from the previous briefing.
Full-Scale	General	Communication	Public Information		Press briefings were too long for the media.
Full-Scale	General	Communication	Public Information		There was a delay is announcing the General Emergency. Once there is a status change the Counties should report to the media promptly.
Full-Scale	Putnam County	Communication	Public Information		At the first briefing the only press

					release available was Putnam County's.
Full-Scale	General	Communication	Public Information		When spokespeople were interrupted by media questions they said they would go back and answer their question at the end of the briefing. When it was time for questions, the spokespeople often did not address the earlier questions.
Full-Scale	General/Outside media	Communication	Public Information		The questions asked by the media were too easy. Media would not be that forgiving during a real emergency.
Full-Scale	Orange County	Communication	Public Information		The Orange County video link was not operational until the 5th press briefing around 0300. In the morning, they said they would try to get Orange County into the press briefings by phone; however, nothing was done. They seemed to forget about it. During the exercise the reporters at the JNC had no way to ask Orange County any questions. The State was updating for

					Orange.
Full-Scale	General	Communication	Public Information		Wind direction/Wind speed posters need to be posted so the media can see what the spokespeople are referring to.
Full-Scale	General	Communication	Public Information		Plant status posters might also be helpful.
Full-Scale	General	Communication	Public Information		It would be helpful for someone who is aware of the current situation to remain in the press briefing room to answer basic questions from the media (i.e. explaining the plume).
Full-Scale	General	Communication	Public Information		The timing of press releases to the briefing room was erratic. The Counties need to coordinate and make sure that the releases get up in a timely manner.
Full-Scale	Putnam County	Communication	Public Information		The first Putnam County press release was up too early.
Full-Scale	General	Communication	Public Information		The EAS message was not upstairs until 44 minutes after announcement.
Full-Scale	Entergy	Training	Public Information		While the county spokespeople did a good job handling the media, the

					Entergy spokesperson might benefit from media training. Some of his answers to the media were curt and he was ignoring some questions. He also promised to get back to important questions but then did not.
Full-Scale	General	Communication	Public Information		The first EAS came out at 1004 but was not brought up to the media room until 1048.
Full-Scale	General	Communication	Public Information		Two of the four EAS messages went out while the Counties were briefing. In a real situation, this would create problems since the media could not cover the live press briefing while the EAS message is being aired.
Full-Scale	General	Communication	Public Information		The second EAS went out without knowledge of the change to a General Emergency.
Full-Scale	General	Communication	Public Information		EAS #3 said there was a release in plant, however at that time there had been no release.
Full-Scale	General	Communication	Public Information		At the 5th press briefing, it was announced that all

					ERPA were sheltered, where in fact they were evacuated.
Full-Scale	General	Communication	Public Information		At the 5th press briefing, spokesperson announced that briefing #3 was incorrect, which occurred one and half hours earlier.
Full-Scale	General	Communication	Public Information		Overall, many of the briefings were out of sync with what was occurring at the plant. Many times the information was not updated immediately but at the next briefing, which sometimes occurred more than an hour later.

Appendix J: Advocacy Issues

In the summary that follows, and in the report generally, "advocacy groups" is a non-pejorative term of convenience, and is meant to encompass environmental and public health groups and individuals who share and vocalize a concern for the adequacy of the Radiological Emergency Preparedness plans at Millstone and/or Indian Point. They include Indian Point Safe Energy Coalition, Riverkeeper, STAR, Citizens Awareness Network, citizens, and many other citizen organizations. That the term is broad is evident from the fact that some it is meant to encompass emphasize that they are not against nuclear energy per se. That the term is only for convenience is evident from the fact that many who are responsible for portions of the plan(s) have also expressed reservations about some of its more salient aspects.

After the 9/11 attacks, Richard Brodsky, Chairman of the Standing Committee on Environmental Conservation, requested an inquiry into the Indian Point Emergency Evacuation Plan.[1] A hearing called by Chairman Brodsky, Chairman of the Committee on Energy Assemblyman Paul Tonko, and Chairwoman of the Committee on Government Operations Rosanne Destito, was assembled in White Plains, New York, on December 20, 2001. The committees heard testimony from state and county officials, Entergy, and the public. The committees expressed concern about a number of issues:

- The evacuation plan relied on assumptions that were "clearly inconsistent with experience, evidence, and expert opinion, and, until corrected, remove the [p]lan from reality and practical ability to actually protect the public health and safety" (for example, the plan assumes that people outside the recommended areas will not evacuate);
- The plan assumes that parents will evacuate without picking up children from school. Parents are expected to meet their children at designated places outside the area at risk. Children who live inside the risk area, but are at school outside the risk area during an emergency will be picked up by their parents as they are evacuating the area;
- Planning assumes that emergency officials can give evacuation information to the public, and that the information will enable certain populations (like school children) to be evacuated earlier than other populations;
- The Indian Point emergency plans fails to consider radiation release from spent fuel pools;
- Planning assumes that emergency workers will return to the risk area during a radiation emergency;
- Planning appears to assume that there will be a significant amount of time between notification of government officials of the need to evacuate and the actual radiation release;
- Planning assumes that sheltering-in-place is adequate protection in the event of a sudden release of radiation;
- The plan relies on objective data (such as population estimates) that is outdated and incorrect;

[1] Brodsky, Richard and Paul Tonko. *Interim Report on the Evacuation Plan for the Indian Point Nuclear Facility*. February 20, 2002.

- Planning for the evacuation of the transit-dependent population is suspect—the plan assumes that 50% of the transit-dependent will evacuate in the cars of others;
- The number and availability of buses for a general evacuation (both of school children and the general population) is unclear;
- There are no planned alternatives for contaminated water supply;
- Protection of pre-school children is inadequate;
- Potassium iodide is provided only for emergency workers;
- Evacuation plans for colleges apparently do not exist; and
- Evacuation plans remain untested.

Advocacy groups often recommend increasing the area to be evacuated in an emergency. Currently, evacuation plans cover only areas within a ten-mile radius of the facility. Also, there is concern about the protection of special populations, such as people dependent on public transportation, people confined to their homes for a variety of reasons, hospitalized patients, and people in institutional settings.

Additionally, advocacy groups note that the worst-case scenario assumed by the Indian Point emergency plan is not a "meltdown," but instead, a gradual release of radiation. Other concerns include the capacity of area hospitals to treat workers and citizens in the event of an emergency at Indian Point. Concern has also been expressed that medical personnel may not report to hospitals and medical centers in case of a radiation emergency. Although evacuated citizens are expected to go to reception centers, many are concerned that reception centers are too close since they are not much farther than 10 miles from the Indian Point facility.

Advocacy groups have also concentrated on Indian Point's vulnerability to an act of terrorism in light of the events of September 11, 2001. There is concern that terrorists could create "dirty bombs," from radioactive spent fuel rods. A number of groups have raised issues regarding the level of security at Indian Point and the increased probability of terrorist strikes against the plant. A congressionally-sponsored document called "Security Gap," which was released in March 2002,[2] raises the concern that the current plan to handle a radiological emergency at Indian Point does not account for the heightened risk of terrorist attacks. The congressman adds that "the [Nuclear Regulatory Commission] has historically failed to adjust security regulations to meet the evolving threat [of terrorism] and has not permanently revised security regulations following the events of September 11." Other general concerns of advocacy groups include maintenance and upkeep of Indian Point,[3] and the safety of the water supply of New York residents.

Unlike Indian Point which is located amidst functioning communities, a large body of water separates the Millstone plant from Long Island, and there are no population centers within ten miles of the plant. Accordingly, the debate surrounding the threat the Millstone plant poses to New York communities is less intense and there seems to be a lower level of general awareness.

[2] "Security Gap" is a summary of NRC responses to correspondence from a United States Representative, Member, Energy and Commerce Committee. The document was made public on March 22, 2002.
[3] According to the source "Rating Upgrade Not Reassuring," a leak of highly flammable hydrogen was discovered inside the Indian Point 2 reactor on August 31, 2002, and Entergy did not repair the leak until October.

Nevertheless, many elements of the Millstone and Indian Point debates are virtually identical, including rejection of the relevance of the ten-mile emergency planning zone, concern for the inadequacies of the roadways, large populations just outside the ten-mile emergency planning zone who perceived themselves at risk and lacking effective protective action strategies, and cynicism and distrust of the nuclear industry and of government planning. Also, advocacy groups near Millstone can easily remember the success with Shoreham. As with Indian Point, there are locally elected officials who have made opposition to Millstone a major component of their official political stance. A telling argument advocacy groups use is that the area derives no benefit from the plant, but is placed at risk by its existence.

Appendix K: Results of the Comment Period

Executive Summary

On January 10, 2003 James Lee Witt Associates (JLWA) completed a draft comprehensive and independent review of emergency preparedness for the area around the Indian Point Energy Center (Indian Point) and for that portion of New York in proximity to the Millstone plant in Connecticut. Because of the importance of the subject to the citizens and stakeholders in the area, and because we thought consideration of comments would improve the report, JLWA thought it appropriate that the public have an opportunity to provide comments on any aspect of it. The State concurred in this assessment and approach.

Although JLWA received 72 submissions that contained hundreds of individual comments, few changes in the draft were required due to factual errors. The comments that addressed major, substantive issues were not sufficiently compelling that the draft's major findings, conclusions and recommendations needed to be changed in the final report. Changes to the final report are explained in this appendix.

Based on the submissions and comments received, as well as the public debate that followed the release of the draft report, JLWA finds it both necessary and appropriate to emphasize or clarify some issues we may not have accentuated in the draft:

- Closing the plants would not remove the need for improvements in emergency preparedness.
- The existing plans should be followed during an emergency. Our intent was not to discredit the plans, but to improve them.
- Almost all of the inadequacies that we pointed out would exist without a possible terrorist threat, and should be addressed.
- The plants and those with responsibility to protect the population in the adjacent communities meet current NRC and FEMA regulatory requirements. FEMA and NRC regulations are in need of review, however.
- There are unique aspects of a terrorist-caused incident that should be considered in planning and exercising.
- We make no assertions that a terrorist attack would cause a faster or larger release.
- Some have attempted to discredit us and this report on the basis that it is not scientific. We are confident that our emergency management credentials qualify us to present our findings, conclusions and recommendations.

The above points and issues are thoroughly addressed in what follows. In addition, many other issues with which the public is concerned are discussed, such as shadow evacuation, first responder and parental behavior, the potential for a release, the adequacy of the ten-mile EPZ, the findings of disaster research, and exercising for rapid and large releases.

Background

Prior to the release of the January 10, 2003 draft review JLWA sought and was granted a time extension from the State to incorporate a public comment period into the report. Because of the importance of the subject to the citizens and stakeholders in the area, and because we thought consideration of comments would improve the report, we thought it appropriate that the public have an opportunity to provide comments on any aspect of it. The State concurred in this assessment and approach.

The draft review was made available for public comment on the JLWA website Friday, January 10, 2003. The public comment period closed Friday, February 7, 2003.

We received submissions from 72 sources. They came from the following sources: energy producers and affiliates, local and county government, activist groups, other groups, and individuals. We thank those who took the time and effort to constructively comment.

The contents of submissions and comments range from praise to censure, from general to specific, and from questioning our motivations to suggesting additional improvements we should recommend. This range of reaction was expected. The remainder of this appendix will tell how we treated the comments received, and the results of the process, including the changes now found in the text of the report.

Process

We assigned codes to the issues raised in the submissions so that we could provide an indication in this final report of the frequency of specific issues. Issues of a technical nature requiring the input of our technical subcontractors, Innovative Emergency Management Inc., were forwarded for their review.

After the initial review of the responses, issues were grouped and summarized to encompass variations in the statement of the issue without over generalizing and, thus blending separate issues. The issues were then analyzed and divided into the categories found below:

A. Issues with which we agree, but did not emphasize or clarify sufficiently in the draft.
B. Comments with which we agree, and that require modification of the draft.
C. Comments with which we disagree and will not modify the draft.
D. Comments with which we may or may not agree, but that do not require a change in the draft.
E. Comments that may be relevant to issues in or tangential to the draft, but that fall outside of the scope of our work.

Comments, Issues, and Analysis

A. Issues with which we agree, but did not emphasize or clarify sufficiently in the draft.

We are aware of the public and political reactions that have resulted from the issuance of the draft report. The issuance of the draft for public comment is evidence of our concern that our report not be used in a way that would mislead or misinform the public. We are also concerned about possible misrepresentation of the report. As a consequence we feel it both necessary and appropriate to emphasize some issues we may not have accentuated or clarified sufficiently in the draft.

1. Closing Indian Point would not remove the need for improvements in emergency preparedness. We believe most people recognize that closing the plant would not remove the source of radiation and that special provisions for the protection of people, common to all nuclear plants, would need to remain in place. We are concerned that decision makers and the general public not lose sight of the need to make improvements. This will require federal, state, local, business and citizen support, including financial support, as those responsible struggle with some very difficult issues.

   It is possible that visible improvements would be of value in raising public confidence about the degree of protection available, and that that enhanced public confidence may result in behaviors that improve the effectiveness of a response.

2. The existing plans should be followed during an emergency. Our intent was not to discredit the plans, but to improve them. Our experience leads us to believe public safety is enhanced by adherence to the recommendations of public authorities charged with the protection of public safety. Those authorities should use the plans they have, adjusting them according to circumstances and their best judgment. A plan should be viewed as a living document that is constantly evolving and being improved.

3. The media and others are focusing on the terrorist threat to the plant itself. We have not focused on any possible threats to the plant. The draft report identified a variety of significant issues that need to be addressed, regardless of a terrorist threat. We are concerned that the issues that exist independent of a possible terrorist threat are not getting the attention they deserve.

4. Both Millstone and Indian Point meet current NRC and FEMA standards. The NRC has stated as recently as November 18, 2002, that FEMA's preliminary assessment of the capabilities of, and compliance by, the State and its jurisdictions, based on the September 24, 2002 exercise, indicates the off-site emergency plans are adequate to protect public health and safety. Although we may come to different conclusions regarding adequacy apart from the standards, and believe NRC and FEMA requirements need revision, we recognize that those requirements are the product of many years of serious thought and strenuous effort dedicated to the public well-being.

Related to this issue is the high standard to which we hold ourselves. In other words, is there anything short of perfection that will satisfy us? We neither expect nor require perfection in a plan. We note in the draft that disaster experience shows how people can rise to an occasion, how responses can be effective in spite of defective plans, and how plans for one event can be used for other events. Nevertheless, we have not seen a plan that had no room for improvement, and our task was, in part, to recommend improvements whether or not the plans met current requirements. In so doing we needed some standard to measure the effectiveness of protective measures. We used the EPA Protective Action Guideline as the one most applicable, recognized and defensible. The result of these considerations and our review was a set of recommendations that do involve a high standard of protection. We do not consider that standard impossible or unreasonable, but readily recognize that some in our profession may disagree.

5. <u>There are some unique aspects of terrorism that off-site planning and exercising should address.</u> There may be some planning and response considerations that are not addressed in "tried and true" planning and exercising. For example, there may be impacts on the thinking, emotions and reactions of the population and responders when the report of an accident says "radiological release" and "terrorism" in the same sentence. Although we do not know for certain what those impacts are, they should not be ignored using the argument that the off-site response to a terrorist-induced event would be the same as the response to any other event.

   Another example is an incident that involves multiple, nearly simultaneous obstruction of evacuation routes in addition to those that would occur in a "normal" evacuation. Because these obstructions can be assumed to be deliberately designed to cause disruption, they may also be more difficult to address than normal traffic problems.

   Another example would be actions that target responders.

   An additional question that needs to be explored is whether there would be higher levels of convergence (arrival of people into the area) in a terrorist event than has already been documented for radiological events such as Three Mile Island. We expect, too, that spontaneous evacuation may be more of a problem than it would be in a non-terrorist event.

   The bombing of the Murrah Federal Building in Oklahoma City in 1995 demonstrated how the presence of a crime scene significantly changes the communications and coordination aspects of a disaster response. Those who are responding to a terrorist assault are no longer available for normal event law enforcement activities, such as the safe evacuation of the affected populace.

   In the response to a terrorist event at Indian Point or Millstone, it may well be that news media, law enforcement and/or others reduce the degree of control over the content and timing of information that the plant authorities would otherwise have. Agencies, such as the FBI, will likely insist on involvement in both on-site and off-site activities in ways not contemplated in existing plans and exercises.

6. We attempted to take no position on whether a terrorist act could cause a faster or larger release. On page 240 we stated, "When considered together, however, it is our conclusion that the current radiological response system and capabilities are not adequate to overcome their combined weight and protect the people from an unacceptable dose of radiation in the event of a release from Indian Point, **especially if the release is faster or larger than the typical REP exercise scenario (often called "design-basis release")** (emphasis added). On page viii of the Executive Summary, we shortened the highlighted phrase to "… especially if the release is faster or larger than the design-basis release." We considered these to be equivalent statements. Nevertheless the phrase in the Executive Summary caused confusion, and charges that we assert a terrorist attack can result in a faster and/or larger release, an issue upon which we intended to take no position. Consequently, we have changed the wording in the Executive Summary.

7. We were asked to provide our observations and recommendations as experts in the field of Emergency Management. We did not attempt to adjudicate disputes among scientists, such as the probabilities of a release. We disclaimed such intentions on page 19 of the draft. Nevertheless, some have attempted to discredit us and the draft on the basis that it is not scientific.

   We are confident that our emergency management credentials qualify us to present our findings, conclusions and recommendations. We would suggest that nuclear engineers and others who take us to task for inadequate scientific rigor in what we say about emergency management might first consider their own qualifications in our field. They are entitled to disagree, as might some of our colleagues in emergency management, but they should not scorn our findings, conclusions and recommendations on the grounds that they lack scientific demonstrability.

8. Emergency management is not the only issue involved in the debate about nuclear power plants. We made it clear in the draft that alternate sources of energy and economic considerations are important, even though we were not asked to address them. Most public enterprises involve some degree of risk. Although we have questioned the degree to which the public is protected in the event of a release, we have not addressed the degree of risk people are willing to accept in exchange for benefits they receive, which is another legitimate aspect of the debate.

B. Comments with which we agree, and that require modification of the draft.

(Note: Comments are summarized. Each comment includes a number in parentheses, representing the number of correspondents that raised a recognizable version of that issue.)

1. *Comment (1): Given the reaction to the draft, the final report should emphasize some of the qualifications JLWA made, or should have made, regarding its scope and findings, so as to minimize misuse of the report and promote the public's understanding of the issues and JLWA's position.*

   Response: We agree, and have emphasized issues and qualifications in A above.

2. *Comment (2): The report should provide some of the typical probabilities of a severe accident, as determined by the referenced "probabilistic risk studies." The probabilities should also be compared to the probability of other events that the reading public may be familiar with, in order to provide an accurate picture of the risk involved.*

   Response: We agree the information has value and have included it in Section 3.1 of the text.

3. *Comment (2): Spontaneous evacuation is not indisputable (page ix). Most people are somewhat reluctant to abandon their homes, even under an obvious threat such as severe weather or spreading fire. Many educated people do not have an irrational fear of radiation and the EPA threshold of one REM is not a significant dose. There would not be panic, unless there were a full-scale terrorist assault on the plant. Also, spontaneous evacuation typically facilitates an official evacuation because a portion of the population has loaded onto the evacuation network before the peak loading.*

   Response: We agree spontaneous evacuation is not "indisputable", as is evidenced by these comments, and have dropped that word on page ix of the draft accordingly. We did not use the word "panic" anywhere in the draft report, but we do agree a terrorist attack would aggravate whatever spontaneous and shadow evacuation might otherwise be the by-product of an accident.

   We have not tried to determine what most people would do. We agree that some will stay in their homes in spite of the most clear threat, and warnings from public officials. We stated that a percentage sufficiently large to have public safety implications will probably evacuate unnecessarily, and that the plans should accommodate this likelihood. The draft is not incorrect in this regard.

   It is possible that spontaneous evacuation may facilitate official evacuation, as asserted in one of the comments. If there is a long time of uncertainty during a slow evolving crisis, spontaneous evacuation may have the potential to reduce peak loads later. Such may be the case for slow-moving events such as hurricanes, or a slowly building nuclear plant emergency. But the assumption that spontaneous evacuation is beneficial cannot be supported under a variety of other conditions. If there is significant evacuation from the non-recommended areas, the recommended population may not be able to evacuate rapidly from the region. This is especially true in regions where the available road capacity is not in balance with existing, ambient traffic. It is especially the case for acute emergencies where there is little forewarning, and preemptive evacuation must be completed swiftly to reduce exposures.

   The problem is compounded if people are biased toward using specific destinations or routes. In a survey of Shoreham area residents, researchers (Ziegler et al.[1]) found that 60-70% of the residents on the east side of the Shoreham plant indicated that they preferred

[1] Ziegler et al., 1981. "Evacuation from a Nuclear Technological Disaster" in Geographical Review, 71:1-16.

destinations in the next county, New York City or even beyond. Other researchers have noted that the movement of some evacuation traffic may be directional – many people utilizing a limited set of evacuation routes. This type of behavior is also recognized in the transportation engineering discipline and given the term "user equilibrium." Such behavior may create localized congested areas that could result in much longer evacuation times for some evacuees. Depending on the location of the hazard, these longer evacuation times may result in greater exposure.

What happens typically in disasters is not necessarily applicable to the Indian Point area in a radiological event, especially considering its relatively dense population, high level of public awareness, and problematic road network. Our concerns remain valid; unnecessary evacuation may adversely affect the timely evacuation of those who should evacuate, and the plans and exercises should reflect this reality.

4. *Comment (1): JLWA was not asked to look at the economic benefits of the plant, and therefore should not have that type of information in the report. If that information is provided, it should be balanced by the costs born by the public for the continued operation of the plant.*

   Response: We agree with the logic of the criticism and have deleted the appropriate paragraph from page 7 of the draft.

5. *Comment (5): The draft fails to mention contributors and their qualifications. Such a listing is standard practice in reports of this type.*

   Response: We agree contributors and their qualifications need to be identified. See the Contributors List following Chapter 11 and preceding the Appendices.

6. *Comment (1): The remarks on page 173 pointing out the relative values of interviews versus actual drills in a government's exercise program also apply to businesses and others. JLWA recommendations should reflect this important finding.*

   Response: We agree, and have inserted language in Section 11.2.2.2.

7. *Comment (1): The listing of parks within the EPZ on table D-14 is incomplete. Municipal parks, recreation centers and summer camps need inclusion in County and local planning.*

   Response: We agree. The table should be expanded. Because we would not be able to obtain the information in time to insert it, we have added a footnote to alert planners of the need to expand the list.

8. *Comment (1): The final report should clearly recommend inclusion of the dangers of radiation in the Planning for Emergency booklet.*

Response: It is true that our recommendation is only implied by our remarks on page 153 of the draft, and is not explicitly stated. It is stated more clearly in Section 7.2.1 of the final report.

9. *Comment (2): The draft report incorrectly attributes the location of the primary meteorological tower for Indian Point.*

   Response: The comments are correct. The location of the primary meteorological tower is incorrectly specified in the draft report as mounted on one of the Indian Point containment structures. IEM meteorologists collected detailed information on the weather instrumentation, data handling, archiving and maintenance in a conference call with Entergy personnel prior to publication of the draft report. In the notes captured from this telephone exchange, the location of the primary meteorological tower was recorded as mounted on the containment building for the Unit 1 reactor. This is the non-operational unit at Indian Point so the note was not questioned further in the pre-draft review. Based on the comments, IEM conducted a follow-up verification visit to the Indian Point Emergency Operations Facility in February 2003. During this visit, we confirmed the actual location of the primary tower. It is located in the southern portion of Indian Point, adjacent to the loop road immediately southwest of the Indian Point Training Center.

   The first sentence of the second paragraph on page 31 of the draft report and the second paragraph of page B-4 have been changed accordingly.

10. *Comment (1): The reference to the use of several Personal Home Alert Devices (PHADS) in use on home electric meters is incorrect. These devices are not used at Indian Point or in the surrounding community.*

    Response: The comment is correct. Based in part on this comment, IEM conducted a follow-up visit to the Indian Point Energy Center Emergency Operations Facility in February 2003. During this visit IEM confirmed that the PHAD devices were not used to support Indian Point alert and notification. IEM then sourced the comment in the draft. It appears that tone alert radios (TARS, a total of 378 of these devices are used in the community) used in one county were described as "personal home alert devices" to a plan reviewer. Further research on the term led to the reference and specification for PHADS and subsequently an incorrect attribution in the alert and notification section of the draft report.

    We have deleted the 4th, 5th and 6th sentences of the first paragraph of Section 5.3.1 on page 106 of the draft report.

11. *Comment (29): The assumption that the consequences of an event at Indian Point caused by terrorist action are unique because they involve the potential for a quicker or larger release, is not correct. The existing planning basis for US nuclear facilities encompasses the times postulated for credible terrorist initiated releases, and there is not a credible terrorist initiator that can cause a larger radiological release than already postulated for plant upset conditions. Thus terrorism is already covered in the plans.*

Response: NUREG-0654, Table 2 provides planning-basis guidance regarding time factors associated with releases. This information is provided below:

Time Factor	Range of Times
Time from the initiating event to start of atmospheric release	0.5 hours to one day
Time period over which radioactive material may be continuously released	0.5 hours to several days
Time at which major portion of release may occur	0.5 hours to 1 day after start of release
Travel time for release to exposure point (time after release)	5 miles – 0.5 to 2 hours 10 miles – 1 to 4 hours

The JLWA/IEM review team was provided with an executive summary of the study, "Deterring Terrorism: Aircraft Crash Impact Analyses Demonstrate Nuclear Power Plant's Structural Strength," prepared by the Electric Power Research Institute (EPRI) at the request of the Nuclear Energy Institute (NEI). This report was finalized in December 2002, shortly before public release of our draft report. After release of the draft, we received and reviewed their executive summary, which was the only part of the study readily available to us in writing, and the general study conclusion that aircraft impact on structures housing reactor fuel poses a low risk of resulting in a radiological release. We also reviewed other information that challenged the conclusions of the aircraft crash analysis.

The JLWA/IEM team was also provided with an executive summary of a draft study requested through the NEI by the Nuclear Regulatory Commission (NRC) to assess the consequences of a hypothetical terrorist ground attack on a commercial nuclear power plant. The study, also completed by the EPRI, was completed as a draft and was also dated December 2002. The executive summary was the only part of this study readily available to us. Based on the fact that the study conclusions are still in draft and subject to scientific peer review, we considered the executive summary conclusions with that caveat.

JLWA received a number of comments either challenging or supporting the draft report position that Indian Point REP planning, and more notably exercising, needed to address faster times to release (the term fast breaking event was also used in the draft report). Based on our review of past full scale exercise reports, we found that the scenarios did not have a time to release less than 3.5 hours. In February 2003, IEM also reviewed additional Indian Point plant drill scenarios and participation matrices. Although some had times to release less than the full scale exercise times, they did not have the level of participation of an FSE, and were "faster" in part to fit condensed schedules to allow play to finish within the short time allowed for the drills. (See the separate response specific to release durations, in this appendix below, for more details).

From the initial review (and the February 2003 follow-on review) we concluded that the low end of the time range specified in NUREG 0654 is not being sufficiently exercised. Thus, we brought attention to the need for more planning and exercise attention on fast breaking releases. In addition to developing scenarios for full participation exercises that have shorter times to release, the participating organizations need to focus on measuring how quickly the population is being affected compared to the speed with which they are accomplishing protective actions. Simply running a faster scenario and stopping short of that type of performance measurement is inadequate to effectively judge how well the population was protected. Both activities are needed, and this was the basis for some of the recommendations in the draft report.

We approached release size in a similar manner; as stated in the draft report, a wide range of planning accidents should be considered. These accidents should have a large variation in quantity of radiological material released and consequences to the population. We did not see evidence of consideration of wide variations in releases in our initial review or in our observation of the practice and full scale exercises. Historical exercise reports do not contain detailed information on the size of the release (release quantity, rate, mix of isotopes, etc.), so we were not able to look at this question historically.

There was an additional limitation on the amount of detailed plant-specific planning-basis information, especially the types of accidents that were covered in the plant probabilistic risk assessment (PRA) and associated updates. In the February follow-on effort we attempted to explore the issue of the range of PRA accidents analyzed for Indian Point and their connection to the exercise scenario development. We sought but did not receive plant information specific to this purpose. Unless we can verify where the "band" of exercise releases falls within the larger continuum of planning-basis accidents, we can not assume that there is coverage at the "larger release" end of the scale.

Releases have been postulated by other stakeholders and technical reports that certainly exceed the size observed in the 2002 FSE. Although some, including those aligned with the nuclear power industry, dismiss the necessity to exercise larger releases because they are low credibility and probability events, this is not sufficient reasoning to exclude these scenarios from exercises. Such decisions require scientific consensus and participation of the REP stakeholders responsible for protection of the public.

There were a number of comments that took positions, both pro and con, on the relative likelihood of large accidental releases, fast-breaking events, and nuclear accidents in general. There were a number who stated that nuclear accidents from terrorists or other causes, with larger or faster release characteristics, were not credible or were already subsumed in both planning and practice. We maintain that it is not our mandate to pass final judgment on the validity of one side of the probability debate or the other. We leave that to the scientific community to come to consensus on the issue. In the absence of an industry independent consensus scientific position, we will continue to evaluate Indian Point emergency preparedness on the basis that a large, rapid release of radiological material to the atmosphere is possible, and that a possible cause may be terrorism. This

position is further supported by the fact that large and rapid releases are mandated as part of the planning basis for nuclear plants.

Based on our evaluation:

- In the case of faster times to release and impact time on the population, we saw evidence that a portion of that planning basis was not being exercised. Since the exercise is the test of the emergency plan and response system, it follows that the statement "already covered in plans" is suspect as related to the faster onsets.
- In the case of larger releases, we can not verify that the larger end of the accident spectrum is being accommodated. Without demonstrated coverage of larger releases and consequences for the population, we will continue to state that it is needed in planning and exercising.

We do concede that selected statements in the draft report align specifically with assumptions or conclusions on one or the other side of the scientific debate. We have made selected wording changes in the final report based on our original and now reaffirmed position, for internal consistency. Those changes can be found in Sections 3.1, 8.1.4.1, and 8.1.4.2.

12. *Comment (1): Footnote 13 on page 22 of the draft ascribes a fuel reprocessing facility example to a "nuclear plant site."*

    We agree the plant is mislabeled and have changed the text in Section 3.3. The reference is still valid for the point being made in the text.

13. *Comment (5): Statements in the draft report about Indian Point's ability to monitor releases from the spent fuel pool were incorrect.*

    Response: To determine the validity of the comment, we performed a follow-up visit to Indian Point in February 2003, and gathered additional details on the Fuel Storage Building (FSB) monitoring and ventilation systems. We determined that, in the event of a release inside the structure, FSB ventilation systems isolate and reroute through the containment ventilation system. Under this configuration, effluents from the FSB would, in fact, be monitored. In addition to this capability, area monitors within the FSB will provide indication of increased ambient radiation levels associated with an accident at the spent fuel pool, which will provide a rough indication of the magnitude of a release. We have changed Sections 3.4 and 3.5.2 accordingly.

14. *Comment (3) The draft states that there are perceived safety risks associated with distributing potassium iodide tablets, mentions possible side effects or dangers and appears to raise the question whether its benefit is commensurate with the risks. These statements are misleading, incorrectly giving the impression that risks are on the same order as the benefits.*
    - *KI is an FDA approved and recommended over-the-counter substance.*
    - *Studies after Chernobyl clearly illustrate the potential benefits and low risk associated with use of KI in a radiological accident.*

- *The report should be stressing use of KI much more heavily than it does.*
- *Education about KI needs to be improved.*

Response: We recognize the potential value of Potassium Iodide (KI) usage during radiological releases that include radioactive iodine, as demonstrated by a number of post-Chernobyl studies. The federal government has also recognized this, as illustrated by the requirements in NUREG-0654/FEMA-REP-1, Rev. 1, Section II.J.10.e & f requiring state and local plans to address administration and provisions for use of radio-protective drugs (KI) during emergencies. We also acknowledge that the potential side effects are likely to affect only a small percentage of the population. However, although the risk of side effects from ingestion of KI is low, it is not non-existent. Thus, the statements in the report regarding risks are appropriate and supported by fact. The degree to which that low level of risk of side effects is acceptable varies, as became apparent in our discussions with school officials in the area around Indian Point (see Section 4.5.7 of the report).

As to the question of education on use of KI, we agree that it is important and facts regarding KI use are not widely understood. Our review of public information provided by the Counties included an assessment of KI information and recommendations for improvement (see pages 152, 155, and 156 of the draft). We mention that KI is not a substitute for taking other emergency precautions such as evacuation, sheltering, and control of foodstuffs.

We believe that sufficient information already exists in the public domain for politicians, emergency managers and members of the public to make informed decisions regarding KI distribution planning and usage. For example, in addition to the information cited in various comments from the public, the Nuclear Regulatory Commission (http://www.nrc.gov/what-we-do/regulatory/emer-resp/emer-prep/potassium-iodide.html) has extensive information regarding KI in emergency planning. The FEMA website also has information regarding KI, including the recently issued "Federal Policy on Use of Potassium Iodide (KI)" (http://www.fema.gov/library/not02367.pdf).

To make our comments regarding KI more balanced, we have added text in Section 11.1.1.3 of the report.

15. *Comment (1): The draft report says that post-disaster research indicates that a majority of the people (approximately 60-70% in addition to the 10-15% earlier identified) will leave after officials state that they should evacuate. Research indicates that the percentage of people evacuating from an area is highly variable and ranges from less than 50% to nearly 100%.*

Response: There are a multitude of factors that affect the decision to evacuate from an area. People unfamiliar with disaster research may think that response to disaster warnings is a stimulus-response model, that is, emergency officials provide the warning stimulus, and people respond by evacuating. Such is not the case. Numerous empirical studies (see additional related responses below) have documented that evacuation behavior during emergencies results from a complex process. People receive warnings

and become aware of a problem, they seek confirmation that the threat actually exists, they are eventually convinced or not convinced that there is a threat (warning belief), they realize that they are personally at risk (personal risk perception), and they have or seek the knowledge and means to take action to protect themselves (access to automobiles, knowledge of routes to take, adaptive plan for family, etc). Disaster researchers have documented a difference in the evacuation behavior of various minority groups. There are also variations by age and marital status or number of people in the household.

Evacuation response also varies based on the actions of emergency managers. If the warning is provided by a credible source, if messages are clear and communicate both the threat and information that can be used to determine if individuals are at risk, and/or if warning messages are repeated, more people tend to evacuate.

Each segment of the population distinguished by age, ethnicity, number of people in households, and other factors may be expected to have a varying rate of compliance with evacuation recommendations or orders. Disaster research indicates that such rates may vary between less than 20% and as much as almost 100%.[2]

We agree the relevant statement on page 204 of the draft could be better framed, and have altered it accordingly.

16. *Comment (1): The draft report does not cite the case studies that indicate that spontaneous evacuation may be as low as 10-15%. Nor does it document why it states that that estimate may be low for Indian Point.*

Response: During the Three Mile Island (TMI) crisis, at least one person in 66% of the households within five miles of the plant evacuated. About 60% of all people within five miles of the plant evacuated.[3] Other researchers found that from 51 to 57% of the people from the five mile radius evacuated.[4,5,6]

A total of about 144,000 people (or about 50,000 households) are judged to have evacuated from the 15 mile radius of the TMI plant.[7,8] This represented about 60% of the

---

[3] Flynn, C.B., 1979. Three Mile Island Telephone Surveys, Preliminary Report on Procedures and Findings. Social Impact Research Inc., Seattle, Washington.

[4] Ziegler et al, 1981. "Evacuation from a Nuclear Technological Disaster" in Geog. Review, 71:1-16.

[5] Kraybill, D. 1979. Three Mile Island: Local Residents Speak Out. The Social Research Center, Elizabethtown, PA.

[6] Smith, M.H., 1979. "The Three Mile Island Evacuation: Voluntary Withdrawal from a Nuclear Power Plant Threat", unpublished paper, Long Island University, C.W. Post Center, Department of Sociology, as cited in Houts et al., 1988.

[7] Hu, T. W. and Slaysman, K.S., 1984. "Health-Related Economic Costs of the Three Mile Island Accident" Socio-Econ Plan Sci, 18:183-93.

[8] Flynn, C.B., 1979. Three Mile Island Telephone Surveys, Preliminary Report on Procedures and Findings. Social Impact Research Inc., Seattle, Washington.

people in the five mile zone. About 40% of those within 15 miles of the plant evacuated. Data aggregated by researchers indicates that about 10% of the households living between 16 and 25 miles of the plant had at least one person evacuate.[9] At a distance greater than 40 miles from the TMI plant, 1% of the people are estimated to have evacuated.

Addressing the large number of empirical findings, the draft report notes that the extent of spontaneous evacuation within the 50 mile radius of a nuclear plant may be 10-15%. Much larger percentages of the people may evacuate in areas close to the plant, much smaller percentages in areas further away from the plant. As radius increases, the size of the area within the circle increases much more. Given an even population density, the number of people increases rapidly also. Even if the percentage of spontaneous evacuation in these farther areas is lower, the absolute number of people evacuating can be high.

However, distance from the plant site is not the determining factor. In reviewing data on who evacuated and who stayed, even the variables that were statistically significant only explained less than 30% of the variance in the data collected by the Nuclear Regulatory Commission.[10]

Disaster researchers have investigated the evacuation response of people to natural hazards. Perry, Lindell and Greene examined the evacuation behavior of four United States' communities threatened by flooding. The researchers found that people's perception of personal risk was an important factor in the decision to evacuate. Other factors were: receipt of warning from credible official sources, prior knowledge of the existence of an evacuation plan, and visible environmental clues of the impending event.[11]

These investigations also showed that when people perceived the disaster warnings to be confusing or not believable, the propensity was not to evacuate. The experience at TMI showed that this relationship is quite different for technological hazards. If there is confusing information or if people do not believe the threat messages for a "dread" hazard, there is greater evacuation. At TMI, almost 80% of the people cited confusing information as a reason for leaving. In most natural disasters, the problem faced by emergency officials is to convince people to leave the area for their own protection. At TMI, the number of people that were advised to evacuate within five miles was less than 3,500.[12] A total of about 144,000 people within a 15 mile radius of the plant evacuated.

---

[9] Houts, P.S, Clear, P.D. and Hu, T.W., 1988. The Three Mile Island Crisis: Psychological, Social, and Economic Impacts on the Surrounding Population. The Pennsylvania University Press, University Park, PA.

[10] Ibid.

[11] Perry, R.W., Lindell, M.K., and Greene, M.R., 1981. Evacuation Planning in Emergency Management. Lexington Books, Lexington, MA.

[12] Ziegler, D.J. and Johnson, J.H., 1984. 'Evacuation Behavior in Response to Nuclear Power Plant Accidents" in Professional Geographer, 36(2): 207-215.

Lindell and Barnes surveyed students on their intention to evacuate during a chemical or nuclear disaster. Even when these students were told that officials would recommend sheltering, many more students than would be expected based on natural disaster behavior stated their intention to evacuate.[13]

Public opinion surveys in the area around the Umatilla Chemical Depot also indicate a similar reluctance to shelter and a preference for evacuation. A concerted public education campaign has changed the stated intention of some residents of the area in favor of shelter-in-place. Over a five year period, the percentage of people expressing the intent to shelter-in-place changed from a low of 26% to a high of 46%.[14] However, a sizable percentage still express the intention to evacuate.

17. *Comment (1): One correspondent identified additional amateur radio communications capabilities for New York State.*

    Response: The capabilities identified will be added to the communications capabilities list for New York State found in Section 5.4.2.2.

18. *Comment (1): The correspondent clarified amateur radio communications capabilities for Westchester County, and the codification of the authority under which RACES operates.*

    Response: The majority of this information is now added to the communications capabilities list for Westchester County (Section 5.4.2.3) because it enhances the report content. However, we believe it is unnecessary to establish the codification of RACES authority in the report. The State and Counties should already be aware of this codification.

19. *Comment (1): The correspondent notes that FCC rules prohibit the use of encryption (via ciphers and codes) in the Amateur Radio Service, and that when RACES is used as a backup to a secure primary communications path, communications cannot be secure. It is also noted that Standard Incident Command System procedure in multi-agency response is to use plain language.*

    Response: The comments in Section 5.4.3.4 regarding Security Solutions were not directed specifically at the Amateur Radio Service. However, we have noted this restriction in the report at Section 5.4.3.4.

20. *Comment (1): The draft report challenged a county executive and deputy on their level of commitment to Indian Point REP and their knowledge of radiological emergencies. There*

[13] Lindell, M.K. and Barnes, V.E., 1986. Protective Responses to Technological Emergency: Risk Perception and Behavioral Intention. Nuclear Safety, 27:457-467.

[14] IEM, Inc., 2003. Umatilla CSEPP Public Affairs IPT Survey: Fall 2002 Final Report. Baton Rouge, LA, IEM/TEC03-004.

is ample evidence of this executive's knowledge of REP, active participation and commitment to the program, and by implication the same goes for the deputy.

Response: We agree that the observation in Appendix I of the draft report is not an accurate representation. JLWA acknowledges the level of commitment and detailed knowledge of REP practices and challenges possessed by both individuals cited in the draft and regrets the implication to the contrary. We have removed the comment from Appendix I.

21. *Comment (1): Table 3.1 in the draft report contains doses associated with health effects and some regulatory doses. Other dose limits such as occupational dose limits would be useful to add for comparison and would help illustrate the conservative nature of the EPA Protective Action Guidelines.*

    Response: We concur that comparative information of the type suggested would enhance the report and have added some material to the cited section in response to the comment.

22. *Comment (3): The draft report identifies planning standards as "not met" when they were actually met. The JLWA/IEM team did not examine data that was readily available and that would have demonstrated compliance with the standards. The JLWA/IEM team should defend the logic behind reviewing the February 2001 draft Indian Point Emergency Plan.*

    Response: The JLWA Draft Report acknowledged that certain plan review compliance items could have been missed by reviewers and the reasons why (page 41). Based on Entergy's offer to assist in resolving the verification issues, JLWA conducted a follow-up site visit to Indian Point in February of 2003 in an effort to resolve missing items. During this visit, additional information from two counties, and subsequent verification activities by the JLWA team resulted in a number of changes to the plan compliance reporting, now reflected in the final report.

    Plan reviewers specifically decided to review and report on a draft emergency plan for the plant. At the start of the plan review, separate approved emergency plans existed for Indian Point Units 2 and 3 (the two operational reactors). During initial discussions with Entergy emergency preparedness managers, we noted that a system of separate plans for two units at the same site operated by a single company was in itself a problem, in part because it required the other New York REP jurisdictions to familiarize and integrate with two different plans developed by different staffs. In response, Entergy offered that they were developing a consolidated emergency plan for the center, though at the time it was still in draft and out for review. Given that one of the stated purposes of the JLWA/IEM review was to identify areas for improvement in the REP program for Indian Point, reviewers felt that reviewing and commenting on the draft consolidated plan would provide the greatest value to the State of New York, because it would likely incorporate improvements already made over the separate plans. A hardcopy of this plan was provided to us by Entergy emergency preparedness managers during a joint JLWA/IEM plant visit in early August 2002.

Our focus in reviewing Indian Point plans and associated implementing procedures and in observing the emergency response organization in action during two exercises was on how Entergy's planning and operations impacted various aspects of the integrated emergency planning and response system (State, County, Plant). Consequently, we put initial focus on obtaining documents and interviewing responsible personnel associated with Off-site Notification, protective action recommendations and decisions, and Off-site Dose Assessment. We thought, based on NUREG-0654 Plan Evaluation Criteria (Section 2 in that document), that the Emergency Plan itself would address the regulatory requirements to a sufficient level of detail without having to resort to review of procedures in most cases. This proved incorrect in a few cases. However, the cases where selected implementing procedures or other types of companion planning documents were not obtained, even when available, are few. For the plant, IEM evaluated a total of 153 individual regulatory criteria (this does not count the 17 EPA 400 criteria discussed in the Appendix C table in the draft report). Of these, only eight required access to additional implementing procedures (approximately 5%). IEM further disagrees with the assertion that all data was "readily available" since we have both documented and anecdotal examples to the contrary. However, it is not our intention to get into such a debate since our focus is on correcting the report where correction is warranted.

We have made specific changes to the Appendix C table entries to reflect data and planning documents received from the plant and Counties after the issuance of the draft report. Further changes can be found in Chapter 4, most notably in the general statements on page 41.

23. *Comment (2): Indian Point and the Counties already employ "reverse 911" systems capable of calling phones in identified geographical areas.*

Response: We agree the comment in the draft report requires clarification. The draft report did not state that reverse telephone calling systems (often referred to as "reverse 911" systems) were not operated by the Indian Point REP organizations. Use of the systems to notify key personnel was noted during our plan review and in some exercise observations. What the draft report did state was, "We recommend that a "reverse 911" system be used in coordination with the existing public alert and notification systems for Indian Point and Millstone to increase the speed, credibility and understandability of the warning around the facilities."

The intended point was to suggest that the reverse calling systems be used in a REP emergency to notify businesses and the public in general, thereby augmenting other warning systems such as sirens, tone alert radios and Emergency Alerting System broadcasts. Emergency preparedness research clearly shows that the population response time can be lessened by combining warning mechanisms.

We acknowledge that Indian Point and Westchester, Orange and Putnam Counties all have and utilize a Dialogic Communications Corporation system of this type and that

Rockland County uses a different system called CityWatch. Based on our review of plans and procedures and our observation of the response activity during the full scale exercise, we did not see evidence that these systems were being used to fully augment the warning capability (i.e., used to directly notify the general population and the many small businesses and institutions that are not already equipped with tone alert radios). We agree Rockland County uses their system in the recommended manner but did not insert that observation in the draft report as an exception to our general observations.

REVERSE 911® is now a registered trademark for a particular reverse telephone calling system offered by a vendor. Based on the discussion above and this point, wording has been changed in the final report (Sections 5.3.2.55 and 11.2.7.3).

24. *Comment (4): Correspondents took exception to the draft report characterization of "old plastic overlays" being used in place of modern computer models to facilitate dose assessment and the exchange of information about the plume. A large number of comments were also received concerning radiological plume modeling. High points from those comments are:*
    - *There is a statement in the draft report that indicates wind direction is not applied for cross valley plume directions and wind speeds greater than nine miles per hour. The comment contends that wind direction is always used for the prediction.*
    - *The draft report improperly defines the Indian Point accident release rate estimate as a "simple scheme" when in fact it is complex, and does not assume a leakage rate, it measures or calculates one.*
    - *Several comments challenge the statement made in the draft report that there is not an automated way to communicate assessment data in the region.*
    - *A new computer system would maybe result in modest, incremental improvements but the present system has 30 years of weather data and it seems adequate.*
    - *More precise plume modeling will require more complex inputs which in turn will increase the probability for errors, and therefore is not justified.*
    - *The recommendation for implementation of more advanced dose assessment capability will require additional meteorological input from additional data sources. The report should specifically recommend design and installation of these additional sources.*

    Response: First, we would like to address one group of comments in particular: the use of radiological plume overlays, whether or not they are "automated" and how the information is communicated via automation. We maintain that the majority of the comments submitted are already addressed in a careful read of Section 3.5.1 of the draft report. We further maintain that the information reported in that section is accurate, with the exception of one minor factual error that we have corrected—the misstated location of the 400 foot meteorological tower. There may be some misinterpretation by the reader as to the use of the overlay data with maps and the implication that physical use of paper maps and plastic overlays represent the primary or only mechanism to conduct dose assessment. We do clearly state on page 28 of the draft that Modular Emergency

Assessment and Notification System (MEANS) software is one of two ways dose assessment is done at Indian Point.

Since the MEANS software effectively implements information contained in the overlays, to include using the same meteorological inputs to select the overlay data that would be used in selecting the appropriate plastic overlay, we do not regard it as a significantly different capability. MEANS does automate the use of overlay information. The "graphical plume" cited in some of the comments is effectively the appropriate overlay (selected on the basis of wind speed, wind direction and atmospheric stability as stated in the draft) portrayed on a geographic information system (GIS) map on a separate computer. A thematic layer in a GIS depicting isopleths (lines) attributed with dose variables is a way to graphically portray some plume information, but it is fundamentally no different than the plastic overlay "picture" and is not the type of graphical portrayal of the plume prediction we recommend implementing in the draft report. Technology now exists to provide a graphical portrayal of a radiological plume reacting to real-time meteorological changes and enhanced via graphical mechanisms to communicate hazard information in a way that is meaningful to the lay public.

To clarify selected points of the final report, we added some content that makes clear the process and our statements about the process. It is important to note that a map and plastic overlays are in fact used operationally in the IPEC EOF based on our observations during the full scale exercise. Based on our observations, we do not believe they are only backups as stated in some comments. What we did observe during the exercise was an Indian Point staff member directing monitoring teams from the map table, using the plastic overlay, in parallel to the MEANS operator running the dose assessment on the computer and generating standard forms that are read over the RECS phone system and/or faxed to the off-site REP jurisdictions. This observation is not intended to denigrate the well-trained staff of the EOF who can use the existing systems effectively. It is intended to establish that we had a basis for our observation in the draft report.

Regarding the issue of sharing automated information about the dose assessment, it is true that information can be shared using computers. It is important to define specifically how that is done before passing judgment on our recommendation concerning more fully integrated systems sharing information in real-time. First, MRPDAS data is sharable between the plant's EOF and the counties. The specific data is meteorology from plant instruments, forecast meteorology derived from the instrument histories, plant monitor locations and readings and fixed monitoring readings from the ion chamber monitors surrounding the plant. We note that this information does not comprise a dose assessment. The Counties access the information by dial up modem, connecting to the plant's system via a phone data line in the same way a person would dial up an Internet connection from their service provider.

MEANS data is shared via voice phone or facsimile as previously mentioned. MRPDAS does not pass information to MEANS via an automated link in the EOF. Again, this is not intended to imply that the EOF staff can not effectively conduct the activities in the current configuration. It is to once again illustrate the basis for our statement regarding

integrated systems in the draft report. The Counties have a copy of the GIS-based software program that will display the appropriate overlay information on input of the three meteorological variables previously discussed. This "graphical display system" is not linked with Indian Point or with the other counties. So, automation is being used to share the overlay information but on a single computer requiring manual inputs. The Counties also have a separate computer program that automates the hand calculations for dose. This software, provided by Indian Point, is also run stand-alone on the computer (i.e., not linked). We did find one misstatement in the report associated with data sharing that we have corrected in the final report (MEANS is the software that generates voice and fax dose assessment reports, not MRPDAS).

We agree that Indian Point and the Counties use automation in the dose assessment process and we have described the specifics above. We do not believe we have mischaracterized this automation use since much of it is acknowledged in the draft report already. The collection of separate software packages described, running on separate computers, depending on physical transfer of inputs or dial up modem technology is simply not the automation enhancement we describe at the bottom of page 37 in the draft report. We stand by that recommendation and the more general recommendation in Chapter 11 of the report.

We concur that the plant's EOF staff do not ignore the wind direction, even when dealing with the cross-valley plume condition at higher wind speeds. The statement in the draft report was not intended to mischaracterize the case of a wind speed greater than nine miles per hour. It was intended to differentiate the cross-valley overlays from the up- or down-valley overlays discussed in the latter part of the paragraph. It is not a factual error as charged in the comment; we fully understood how the overlay selection and application worked prior to publishing the draft report. A sentence in Section 3.5.1 was added to make clear what we intended to convey.

The description of the release rate estimation as a "simple scheme" was not meant to imply a lack of rigor in estimating releases. This wording was changed to make the statement more clear in that regard.

Although adequate for the purpose of estimating dose in the 10-mile EPZ, data developed in 1972 and 1977 and used to group release conditions, characterized under the banner of "generally conservative," that does not specifically deal directly with the critical timing issue of when dose levels above guidance intersect with the population as they implement protective actions, can not be characterized as state-of-the-art. JLWA was tasked as part of our work to examine the state-of-the-art in hazard prediction and compare it to the process at Indian Point. We accomplished this and concluded that technology has advanced in plume modeling as well as generally in computing power, speed and connectivity such that there is a clear state-of-the-art technology available beyond what is implemented at Indian Point.

This is not a challenge to Indian Point's well-trained staff, or their ability to effectively estimate dose in the 10-mile EPZ. We contend that the assessment needs to go beyond

estimation of dose and the assumption that people will successfully evacuate based on a default protective action. Based on issues raised in this report on the potential speed of the radiological plume, factors affecting the speed with which the population can protect themselves, and the fact that that particular intersection of radiological hazard with responding population is not being specifically measured in exercises or other analytical activities we are aware of, we stand behind our original recommendations.

Concerning the sharing of information about a release with counties and their public, we feel that a picture really is worth a thousand words. Currently, the picture of the plume is, in essence, a computerized rendition of the overlays showing lines attributed with dose variables. A better picture is possible with current dispersion modeling technology, using real-time input of weather and forecast variables. A better picture can only help in the communication and sharing of information that the lay person already has a difficult time interpreting. We base these judgments on a number of years experience, particularly the last five years, disputing with quantitative results the simple hazard prediction constructs based on "tried and true" assumptions.

We have also had firsthand experience with emergency response operations where the complex interaction of variables has not resulted in additional operator load as far as inputs or handling of outputs. With the state of automation systems today and the ability to integrate systems, most of the complexity of inputs and outputs can be handled by instruments and the automation. We do not agree that applying the advanced technology results in more potential for error. We concede that the bulk of this experience is in the context of chemical plumes, but we contend that on the variables we cite as issues in the report, the observations apply to the case of a radiological release, particularly as related to the transport and diffusion of the plume, and the measurement of time to dose in the EPZ versus where people are in time during an emergency.

As to comments regarding specific recommendations on adding instruments or the fact that application of newer technology will represent a dollar resource requirement, we feel such observations are implicit in our recommendations already.

There were selected statements made in the report that can be misinterpreted by a reader. It was not our intent to incorrectly convey our position, or present a misleading picture of how these operations are carried out today at Indian Point. We made selected changes in the report to reduce the possibility of misinterpretation.

25. *Comment (4): The draft report states Indian Point has not exercised "fast-evolving accidents" in the last seven years. The plant had a number of exercises and drills in that time period that involved fast-evolving accidents based on the cited definition in the draft report (less than six hours between initiator and time to release).*

Response: The French standard for time to exposure in the population surrounding a nuclear facility was quoted on page 185 of the draft because we did not find a similar standard in the U.S. regulatory base. It is a starting point that illustrates two things. First, there are nuclear planning and response practices outside the U.S. that recognize the

difference between a rapid-onset radiological event and a slower progressing one. Second, there is a recognized criterion for the speed with which the population can be exposed to radiation. We concur that Indian Point has exercised scenarios with times between initiator and release less than six hours. Specific times we reviewed, partly in response to comments on the draft report statement, appear in the table below. However, there is no evidence that the time to impact on the population is being measured in association with the exercises, and there is a difference between time to release and the time that a dose of concern is attained in the populated area surrounding Indian Point.

Plant	Exercise/Drill Date	Initial Declaration	Start of Release	Time from Initiating Event to Start of Release
IP2	9/24/02	8:37	13:46	5:09
IP2	9/17/02*	09:00	09:45	0:45
IP2	9/12/02**	09:00	11:00	2:00
IP2	9/5/02	8:20	13:39	5:19
IP3	11/15/00	9:18	13:01	3:43
IP2	6/24/98	8:30	12:45	4:15
IP3	4/10/96	7:55	13:03	5:08

*This was an additional practice drill conducted prior to the 2002 Full Scale Exercise. Although it appears to involve a very rapid release, it involved a portion of the overall event timeline, had limited participation of key REP personnel and appears to have been compressed in time to fit the drill window (drill information provided by Indian Point).

**This was a similar practice drill, again with the appearance of a relatively fast release. It too involved a portion of the event timeline, limited participation of the REP jurisdictions and was compressed (drill information provided by Indian Point).

We agree that the statement in the draft report could be misleading as to the specific release timing on exercises at Indian Point, based on the way it is measured and reported. We have changed the statement in Section 8.1.4.2 of the report to elaborate and make clearer the intended point. However, we maintain that the lower end of the planning basis for onset times as specified in NUREG 0654 is not being sufficiently exercised and that this is a significant preparedness issue.

26. *Comment (4): Several comments questioned the specific applicability or credibility of postulated accident scenarios, claiming either that scenarios were inappropriately dismissed or included to support a particular position. These comments included references to severe and worst case accidents, and the use of the term "design-basis accident" which is also used in the report.*

Response: The comments presented arguments either for or against consideration of specific events, and there appeared to be enough mixing of terminology that clarification of the various terms and our use of "design-basis" is warranted.

Accident scenarios are postulated for different purposes, and it is important to understand the context for an accident scenario before attempting to draw conclusions from its use.

One of the most common misapplications of accident scenarios arises from the use of worst-case, severe accident, or design-basis accidents in discussions of planning or what plans are based on. We intend to provide here some clarification on the scenario type definitions used in the draft report, and the appropriate applicability of each as reflected in the report's conclusions.

A design-basis accident is defined by the NRC as: "A postulated accident that a nuclear facility must be designed and built to withstand without loss to the systems, structures, and components necessary to assure public health and safety."[15] A severe accident is: "An accident more severe than a design-basis accident and involving significant core degradation."[16] Note that the likelihood or credibility of the accident is not considered in these definitions, nor is a specific chain of accident initiators required to be defined. That is to say, in these cases, assumptions about plant states, systems, or personnel responses are not required to be based on credible, or even possible, initial conditions. These scenarios have many uses, including ensuring robust designs that will survive postulated upsets, establishing conservative safety limits, or evaluating the significance of particular parameters as they relate to possible radioactive releases.

In contrast, a primary goal of planning-basis accidents is to ensure response capabilities are sufficient to respond to a variety of events, from small scale to massive. In order to be effective tools, planning-basis events need to reflect, as closely as possible, a realistic and credible initial condition. The state of the plant, capability and availability of systems and personnel, and projected responses of the population all have a tremendous impact on the estimated consequences to the public. If these assumptions do not reflect a credible starting point, then planning proceeds from flawed assumptions and can not provide adequate assurance of public protection in the event of an accident.

What the draft report recommends is that, in light of a new appreciation for the credibility of previously unconsidered events, a thorough review of the planning basis should be undertaken. The context for the original planning basis has changed after September 11, 2001, and it is not appropriate to assume that the "conservatism" inherent in the design-basis results in planning and exercising that effectively support protection against emergent threats in the current environment.

On page 240 of the draft we stated, "When considered together, however, it is our conclusion that the current radiological response system and capabilities are not adequate to overcome their combined weight and protect the people from an unacceptable dose of radiation in the event of a release from Indian Point, **especially if the release is faster or larger than the typical REP exercise scenario (often called "design-basis release")** (emphasis added). On page viii of the Executive Summary, we shortened the highlighted phrase to "… especially if the release is faster or larger than the design-basis release." We considered these to be equivalent statements, as may be clearer in light of the above

[15] NRC glossary: http://www.nrc.gov/reading-rm/basic-ref/glossary/design-basis-accident.html

[16] IAEA website: http://www.iaea.or.at/ns/CoordiNet/safetypubs/iaeaglossary/glossarypages/p.htm#desigbasisaccident

observations. Nevertheless the phrase in the Executive Summary has caused confusion, and charges that we assert a terrorist attack can result in a faster and/or larger release, an issue upon which we intended to take no position. Consequently, we have changed the wording in the Executive Summary.

C. Comments with which we disagree and will not modify the draft.

(Note: Comments are summarized. Each issue includes a number in parentheses, representing the number of correspondents that raised a recognizable version of that issue.)

1. *Comment (3): The draft report acknowledges the greater degree of preparedness possessed by communities near nuclear power plants, when compared to other communities, but does not factor this into our overall conclusions.*

   Response: As we were reviewing the plans and capabilities of the communities as they existed at the time of our review, it follows that we did take into account whatever higher degree of preparedness the communities possessed. This consideration of relative preparedness is found in Chapter 11 of the draft on page 241.

2. *Comment (5): The plants have structures and systems in place that minimize or eliminate the potential for a release. Also, the probability of release is vanishingly small, such that elaborate plans are overkill.*

   Response: We agree that the "defense-in-depth" approach minimizes the potential for a release; few will agree that the possibility has been eliminated. We have no reason to dispute the probabilities of release used by the NRC. Our partial agreement with the correspondents does not affect the report, however, because we were not asked to look at the safety of the plant. We looked at plans and associated capabilities that presume the possibility of a release. Also, emergency management is designed to address risks, which includes both probabilities and consequences. The consequences of a release can be large, thus the risk can be significant.

3. *Comment (29): JLWA's assertion that there are unique consequences of a terrorist-caused event at Indian Point is not correct. Since terrorism initiators are subsumed in the planning basis for nuclear facilities, off-site plans already cover terrorist initiated radiological releases. There is no evidence that a terrorist attack would pose any unique challenges to off-site response systems.*

   Response: We do not believe that there is much scientific data that will inform emergency planners on the specific challenges of a radiological release combined with a terrorist initiator. There is data on terrorist events and there is data on accidental radiological releases. But a terrorist attack resulting in a radiological release has not happened, to our knowledge. Thus we are not willing to state, as have some correspondents, that REP plans are grounded in sound research and "tried and true" principles, therefore they are sufficient to protect the public when a release is cause by an act of terror. We choose to err on the conservative side, and to take a closer look at the question.

We offer some examples of things we consider as possible unique aspects of a response to a terrorist-induced radiological release. We have been charged with speculation in our report. Our contention is we are simply combining relevant information in a logical way to assess preparedness in a realistic way. The equation has changed fundamentally and we choose to think about the changes. The following are examples of possible unique consequences of a terrorist caused event:

- There may be impacts on the thinking, emotions and reactions of the population and responders when the report of an accident says "radiological release" and "terrorism" in the same sentence. We do not know as a certainty what those impacts are, but that does not mean they should be ignored using the argument that the off-site response to a terrorist-induced event would be the same as the response to any other event.
- Attacks may be initiated on targets in disparate geographical locations, and/or multiple attacks may be directed to magnify consequences at a specific location. An example would be an incident that involves multiple, nearly simultaneous obstruction of evacuation routes, in addition to those that would occur in a "normal" evacuation. Because these obstructions can be assumed to be deliberately designed to cause disruption, they may also be more difficult to address than normal traffic problems.
- Another example would be actions that target responders.
- An additional question that needs to be explored is whether convergence (arrival of people into the area) would be observed at greater levels in a terrorist event than the levels already documented for radiological events such as Three Mile Island. We are not postulating that it would increase, only that it should be considered.
- Spontaneous evacuation may be more of a problem than it would be in a non-terrorist event.
- The effect on law enforcement can be considerable. The bombing of the Murrah Federal Building in Oklahoma City in 1995 demonstrated how the presence of a crime scene significantly changes the communications and coordination aspects of a disaster response. Those who are responding to a terrorist assault are no longer available for normal event law enforcement activities, such as the safe evacuation of the affected populace.
- In a terrorist event, it may well be that news media, law enforcement the FBI and/or others become involved in ways that reduce the degree of control over the content and timing of information that the plant would otherwise have.

4. *Comment (14): JLWA's premise that the plant's (Indian Point's) emergency planning does not accommodate the ramifications of a terrorist-caused release is incorrect. The radiological emergency plans, which are symptom-based, are effective whether the radiological emergency is caused by mechanical failure, human error, natural disaster, or terrorism. Terrorism doesn't create any unique planning challenges; why a release occurs is not important, actions to protect will be the same. The existing security and*

emergency plans of Indian Point do, in fact, deal explicitly with terrorism. These plans were revised in accordance with NRC guidelines that were issued in early 2002.

Response: There are aspects of the plant's response to a terrorist-initiated event that would be different from a "normal" event and should be exercised. For example, the security involvement in on-site and off-site response would be more highly pronounced, if for no other reason than that the plant site would be a crime scene. While Indian Point Security Plans may discuss this in some detail (we did not review plant security), the integration and coordination of on and off-site security and emergency response efforts is not discussed in the Indian Point Emergency Plan.

It appears from our plan and exercise reviews that such a scenario has not been exercised, (other than possibly tabletop play), with both plant organizations (Security and ERO) and the off-site communities playing in full. We believe such an exercise should be conducted, to practice the response, to further identify unique aspects and to see how well any plans currently in place would function. For instance, such an exercise might reveal potential resource conflicts within law enforcement agencies regarding assisting with crisis management as opposed to consequence management.

The Indian Point Emergency Plan contains no discussion of how it integrates the various threat levels in the Homeland Security Alert System. For instance, would Indian Point activate its ERO 24 hours a day in response to some escalated threat level? What parts and for how long?

There are some unique ramifications for the plant of a terrorist-caused release; planning and exercising should consider them.

5. *Comment (4): When the draft reads "… it is our conclusion that the current radiological response system and capabilities are not adequate to overcome their combined weight and protect the people from an unacceptable dose of radiation in the event of a release …" the implication is that many will die. That is unnecessarily alarmist. Also, if the plan reduces the public dose, it is not entirely ineffective. In fact, if everyone were exposed to 1.1 REM the plan would have to be considered very effective if otherwise they would have received a much higher dose. The EPA protective action guidelines are 50 times below where any potential health effects could be seen in the population and are thus extremely conservative.*

   Response: Estimates of early injury or death are highly scenario dependent and were not ventured. We used the existing EPA Protective Action Guideline for general population exposure. Our scope did not include debating the specific values set by EPA in that guideline, and whether they are too conservative or not conservative enough. We were asked to evaluate Indian Point emergency preparedness within the context of currently published standards for radiological exposure. It should be noted, however, for those who might trivialize the EPA standard, that there are long term effects as well as immediate effects, and that what for an adult is a small dose can be more serious for small child.

6. *Comment (1): JLWA does not adequately emphasize the difficulty of evacuation in a snow storm, when there are traffic accidents, or when terrorists would deliberately attempt to block avenues of evacuation.*

   Response: It is true that these events can significantly complicate emergency operations. That is particularly true for region-wide events such as weather. But it is also true that existing plans have provision for unexpected contingencies, and that disaster experience demonstrates that even unforeseen events can usually be handled adequately.

   As to the unique challenges posed by terrorism, however, we agree that a terrorist effort to disrupt traffic is an extreme event that is not currently addressed in the plan. Such incidental disruption is especially difficult because it would be in large part additive to normal complications and unforeseen difficulties, it would divert some public safety resources from the difficult and important work they would be doing in a "normal" evacuation, and it would engender public attitudes about the nature of the threat that would aggravate any preexisting tendencies to spontaneously evacuate. We believe we have addressed the need to have specific consideration of a terrorist-caused event included in the plans.

7. *Comment (2): The difficulty of educating the public should be emphasized. Also, how would you convince people a plan, even an improved one, would work when their daily experience on the roads convinces them otherwise?*

   Response: We do not think we have minimized the difficulties of public education; an improved education program is a major endeavor. There are many aspects of public education that would be of benefit to the people of the region, and that may enable them to see the plans in a new light while not contradicting their daily experiences.

8. *Comment (5): The comment in the draft about some advocacy groups contributing to the public burden of misinformation does not identify specific groups. Also, it is one-sided in that it ignores the misinformation routinely put out by the Entergy and the nuclear industry. The public's anxiety is a product of the refusal of the "experts" to confront the defects in the plan and the misleading statements from the plant.*

   Response: We do not intend to identify specific groups. We believe those we spoke of identify themselves by what they say. Our intention was to point out that harm to the public could arise from misuse of data. We understand that, from the perspective of some, the plant's statements may have a similar effect. But we did not observe how the plant's statements would aggravate problems such as spontaneous evacuation, and we do not want to revisit the report on the basis of speculation. It may also be relevant here that we have compared the effectiveness of advocacy groups in influencing public opinion with the effectiveness of those responsible for public planning, and believe the former to be more effective, a point to which no correspondent took exception.

9. *Comment (5): The final report should list all our contacts and our methods of selecting them. JLWA methods are not scientific. Many who attend local meetings fear and oppose nuclear power, so JLWA may have given their opinions undue weight.*

   Response: We have documented our contacts but do not intend to identify them because we promised that individuals would not be named in the report. Our methods for selecting those with whom we spoke were outlined in the first section of Appendix A of the draft. Our purposes determined our methods, and these purposes are similarly explained in the first section of Appendix A. That section reads: "A significant part of our effort was outreach into the community at large. The purpose of this activity was three-fold: to assess the degree to which individuals and community groups and their members are aware and informed; to gain an understanding of the varied community concerns; and to solicit a range of ideas regarding the best way to resolve major issues." It was not our intent to perform a scientifically valid survey of public opinion, as a review of the above objectives will disclose. We recognized the need for such a survey, however, when we discussed the need for a baseline public opinion survey, and subsequent updates, on page 238 of the draft.

   We also addressed this issue on page 64. Our goal was to gain insight into significant segments of the preparedness picture that would not otherwise be obtained. "Our goal was not to conduct a survey of opinions and expected behaviors of the kind we recommend elsewhere in this report. In this regard, we recognize the limitations inherent in using personal views, even when those views relate solely to the area of professional expertise of the person interviewed. We know too that what people say they would do in an event is not necessarily what they will do in a real event. People often rise to the occasion. Nevertheless, it is legitimate to attach importance to views that are repeated by a number of individuals, in a variety of occupations and differing circumstances. It is legitimate to give weight to attitudes and beliefs when our prior emergency management and disaster experience indicates those attitudes and beliefs may become important to effective response to a real event. Had we not … used the information received because of its inherently subjective nature, we would have a less complete view of the preparedness of the region and of the effectiveness of the plans."

   We did observe the high degree of representation in public meetings of those who oppose the operation of the plant(s). We have taken that into consideration. While we were, and remain, respectful of them and their opinions, we do not feel we gave their opinions undue weight.

10. *Comment (8): The outreach effort was deficient in that JLWA did not interview plant and County emergency managers, or Local Emergency Planning Committees (LEPC).*

    Response: Our interview effort was designed to reach out into the community at large. From our perspective as emergency managers, that meant going outside of the immediate emergency management community.

We have an excellent idea how emergency managers think, and what their standards are. We were readily accessible to them; when we had questions, we asked. They were often present when we solicited ideas and feedback; they provided us tours of their facilities and described their capabilities. We know how their plans are made and how to review them; we had ample opportunities to see plant and County emergency managers in action during the exercises that were held. As noted above, the goal of our outreach effort was to gain insight into significant segments of the preparedness picture that would not otherwise be obtained.

11. *Comment (1): There were a number of issues on page 224 and in Section 4.5 "Related Planning and Preparedness Reviews" that are worthy of further consideration in the final report.*

    Response: Two categories of issues are found on page 224. The first category contains issues some people found to be missing or inadequately addressed in the current plans that we felt should be addressed by future, broadened planning groups. The second contains examples of issues we mentioned but did not provide definitive recommendations on because of the need for the addition of location specific considerations. We have reviewed our reasons for declining to further analyze and recommend on these issues and consider them sound.

    One of the purposes of Section 4.5 was to take note of issues that were frequently raised in our discussions with first responders, officials from supporting facilities, and others having an interest in the plans. We have discussed many of them. Others we simply mention because: a. they are too dependent upon location; b. they require input from a variety of stakeholders; c. sufficient information was not available; and/or d. analysis was beyond the scope of our contract.

12. *Comment (4): Compliance with regulations leads to safety. Regulations are designed to provide systems and structures that protect from radiation exposure. Thus the implication that regulations and radiation protection are unrelated is false.*

    Response: We agree that compliance with regulations increases safety. We readily acknowledge that the nuclear industry has a good safety record, and that the efforts of those at all levels of government and in the private sector have helped make the industry relatively safe. We did not state nor did we mean to imply that regulations and radiation protection are unrelated. We remain convinced, however, that the regulations need review for reasons detailed in the draft, and that the plans, while based on existing regulations, can similarly be improved. We emphasize the need for a focus on the goal of protection from radiation exposure in the further improvement of the plans and exercises.

13. *Comment (6): Emergency workers will do their jobs. They were trained to do it, believe in it, and will do it. Disaster research and 9/11 prove that this is true. Many of those in the area volunteered to go to Manhattan on 9/11.*

Response: We agree in general that the above is true, and we have great respect for emergency responders. We do not believe our findings are contradicted by current disaster research nor are they inconsistent with disaster experience. Fortunately, in this nation we do not have much experience with nuclear power plant accidents.

Frequently we were told that many emergency workers (of the facility we were visiting) would chose to "take care of" their families because of the widespread belief that the plans are inadequate and because radiation is "different" from other threats. In the context of the discussions, "take care of" meant turning from their emergency responsibilities to care for their families personally. The degree to which this happened was expected to vary depending upon whether the person was off duty (and was being called to duty) or on duty at the time of the accident. As we were not doing scientifically valid research we could not determine percentages, or variations among the many occupations that can be considered "emergency workers." What struck us most was the unexpected frequency and frankness with which this problem was acknowledged and even emphasized by fire chiefs, police officers, hospital workers and others whom we thought might be offended by the question.

We agree that our contention that widespread disbelief in the effectiveness of the plans can actually impact the effectiveness of those plans is subject to challenge. We welcome research into this area, but, absent definitive findings or experience to the contrary, will not alter what we think is true.

14. *Comment (2): The Homeland Security Act mandates the performance-based architecture JLWA recommends and establishes the Department of Homeland Security (DHS) as responsible for coordination of all agencies, at all levels, in the planning for the protection of all key assets. Thus the JLWA effort is redundant, and parts of it are moot by virtue of being within the purview of DHS. The final report should identify those items now to be solved at the federal level rather than at the local level, and JLWA should publicly defer to DHS.*

    Response: We are certain that the involvement of DHS in these issues will be a positive development. We were, however, requested by the State of New York to provide our review, consistent with their legal authorities and requirements.

15. *Comment (1): JLWA released sensitive information that will be of assistance to terrorists. Terrorists can maximize their damage with our help.*

    Response: The State of New York and JLWA are also sensitive to this issue. A security review was performed prior to the release of the draft, and materials that had the potential of being of value to criminals or terrorists were removed.

16. *Comment (1): JLWA did not discuss local events that stressed the emergency plans and demonstrated that evacuation would not work. Examples: the evacuation of the Palisades mall and the partial evacuation of Haverstraw.*

Response: During our outreach effort we heard about these two incidents several times, from police officers, transportation officials, and others. Usually they were referred to in the context of the difficulty or impossibility of evacuation, but they were sometimes cited as evidence that evacuation, though difficult, was not impossible. We did not perform independent research into these events. Thus, although Palisades was mentioned in the report, neither event was discussed, nor did we conclude from these incidents that evacuation would or would not work.

17. *Comment (1): The final report should offer solutions to what we see as the consequences of a terrorist attack and the problems of spontaneous evacuation. These solutions can then be considered for action by DHS, which now has the responsibility.*

    Response: We have made recommendations dealing with these two issues. DHS and other responsible parties are encouraged to consider them.

18. *Comment (1): The Planning for Emergency booklet says Three Mile Island did not affect public health and safety. That is disputable. The final report should recommend a balanced account of the affects of the accident, or deletion of the reference.*

    Response: We have pointed out the potential harm to the credibility of the plant and public officials due to the way the issue is treated in the booklet. We expect those responsible will consider our observations when the booklet is reissued.

19. *Comment (1): The report should address the need to incorporate contingency plans for major construction projects, such as the Millennium Pipeline Project, that will cause temporary disruptions to emergency evacuation routes.*

    Response: We agree that major construction projects that disrupt evacuation routes necessitate ad hoc adjustments in an evacuation due to an emergency. We do not believe that those responsible for planning and response are unaccustomed to such adjustments, and that a specific recommendation from us is warranted.

20. *Comment (4): The final report should confirm that, or at least address whether, the population will be protected if the recommended improvements are made.*

    Response: Just as the population has changed, road networks and other relevant factors have also changed since the plant(s) were built and the plans were first devised. We also expect there to be other changes before our recommendations are fully implemented. Thus, we cannot say that plans and capabilities, enhanced as we recommend, will protect the population in an overall environment that we cannot predict. Further, as exercises are one of the most effective methods to assess protection, and we have recommended significant changes in the exercise program, we believe an assessment of the degree to which the population is protected must be conducted after an improved exercise program has been implemented.

21. *Comment (3): The final report should not conclude evacuation will not work. That is speculative. JLWA's assumptions are inconsistent (e.g., people would ignore emergency instructions but obey speed limits).*

    Response: We believe we have devoted adequate attention to the issue of evacuation and the related phenomena of shadow and spontaneous evacuation. Absent a sufficiently realistic test, we provided our professional opinion based on our experience, relevant research, and our independent review. We doubt the correspondent's implication that evacuation will be less of a problem because people will be leaving the impacted areas faster than the speed limits allow.

22. *Comment (10): Most people will comply with instructions. Police and others can deal with the few that do not. Also, JLWA is wrong in saying the plans are defective in that they "appear based on the premise that people will comply with official government directions rather than acting in accordance with what they perceive to be their best interests." If government directions are clear, concise and stated with certainty, are specific in the action to be taken, and if they are perceived by individuals to be protective, people will likely follow directions.*

    Response: The percentages of people involved in the phenomena of shadow and spontaneous evacuations were discussed in the draft in Chapters 5 and 10, on pages 92-94 and 203 respectively. The issue is further discussed in several other places throughout the draft. The percentages and relevant research are further addressed in this appendix, above. Regardless of the actual percentage or number (which is scenario dependent), it appears that sufficient numbers of people will not wait for instructions, or will not do as they are instructed, for a variety of reasons, and that evacuation of those at risk will thereby be jeopardized. It is possible that some may even distrust government directions that are clear, concise and stated with certainty.

    We concluded that the plans for school evacuation are also problematic based on discussions with police and elected officials which revealed what could be a general unwillingness to divert the necessary resources and use sufficient force to prevent parents from attempting to take their children from school.

    Also, we see no inherent contradiction between our quoted statement and the purported rebuttal found in the comment. The problem arises when the plans assume people will act in a way that many have indicated conflicts with what they perceive as protective of their health and safety (e.g., when plans assume that people will not evacuate, when many perceive evacuation as a better option).

    The draft report is concerned that plans assume that people in some zones will evacuate when told and people in other zones will not evacuate when they are told to stay in the area. More than five decades of disaster studies have indicated that people do not react in this stimulus-response model to directions from emergency officials.[17] They receive

[17] Mileti, D.S. and Beck, E.M., 1975. "Communication in Crisis: Explaining Evacuation Symbolically" in Communication Research 2: 24-49.

warnings, attempt to confirm them[18,19,20,21,22,23,24], make judgments about the threat and their level of risk[25,26,27,28,29,30,31,32], and decide on whether the suggested actions would reduce the threat to them and their families.[33] In the final analysis, especially for "dread" hazards, people take actions that are perceived to be in their best interests.

23. *Comment (3): Exercises are useful in disclosing problems that need to be addressed. The alternative is to do an actual evacuation.*

    Response: Exercises are indeed useful and much progress has been made under the exercise program as it is currently employed across the nation. We believe it can be

---

[18] Danzig, E.R., P. W. Thayer, L.R. Galater, 1958. The Effects of a Threatening Rumor on a Disease-Stricken Community. National Research Council Disaster Study No. 10. Washington: National Academy of Sciences.

[19] Drabek, T.E., 1969. "Social Processes in Disaster: Family Evacuation" in Social Problems, 16:336-349.

[20] Drabek, T.E. and Stephenson, J.S. III., 1971. "When Disaster Strikes" in Journal of Applied Social Psychology, 1 (2):187-203.

[21] Quarantelli, E.L., 1984. "Perceptions and Reactions to Emergency Warnings of Sudden Hazards" in Ekistics, 51 (309):511-515.

[22] Mileti, D.S., Drabek, T.E. and Haas, J.E., 1975. Human Systems in Extreme Environments: A Sociological Perspective. Boulder, CO: Institute of Behavioral Science, University of Colorado.

[23] Sorensen, J.H., 1987. "Warning Systems in the 1983 Cheyenne Flash Flood" in What We Learned Since the Big Thompson Flood, by Eve Gruntfest (ed.), pp. 174-183. University of Colorado, Boulder, CO.

[24] Sorensen, J.H. and Mileti, D.S., 1990. "Risk Communication in Emergencies" in R.E. Kasperson and J.M. Stallen (eds.), Communicating Risk to the Public. Klumer Academic Publishers, Dordrecht, The Netherlands.

[25] Clifford, R.A., 1956. The Rio Grande Flood: A Comparative Study of Border Communities. National Research Council Disaster Study No. 7. Washington: National Academy of Sciences.

[26] Demerath, N., 1957. "Some General Propositions: An Interpretative Summary." *Human Organization* 16: 28-29.

[27] Moore, Harry et al., 1964. …and the Wind Blew. The Hogg Foundation for Mental Health, The University of Texas, Austin, Texas.

[28] Mileti, D.S., 1975. Natural Hazard Warning System in the United States: A Research Assessment. Boulder, CO: Institute of Behavioral Science, University of Colorado.

[29] Mileti, D.S., Drabek, T.E. and Haas, J.E., 1975. Human Systems in Extreme Environments: A Sociological Perspective. Boulder, CO: Institute of Behavioral Science, University of Colorado.

[30] Perry, R.W., Lindell, M.W. and Greene, M.R., 1981. Evacuation Planning in Emergency Management. Lexington, MA: Lexington Books.

[31] Perry, R.W., Greene, M.R. and Mushkatel, A., 1983. American Minority Citizens in Disaster. Final Report to the National Science Foundation. Seattle, WA: Battelle Human Affairs Research Center.

[32] Houts, P.S, Clear, P.D. and Hu, T.W., 1988. The Three Mile Island Crisis: Psychological, Social, and Economic Impacts on the Surrounding Population. The Pennsylvania University Press, University Park, PA.

[33] Sorensen et al., 2002. Planning Protective Decision-Making: Evacuate or Shelter-in-Place? Oak Ridge National Laboratory, Oak Ridge, TN.

better, however. We recognize that an actual evacuation would teach us much that an exercise cannot, but we did not and do not recommend such a test, as is further addressed in this appendix, below.

24. *Comment (1): The final report should make clear that JLWA conclusions and recommendations, to the extent they relate to the location of the plant in a high population area, are generically applicable to every similarly located facility, and are not unique to Indian Point.*

    Response: The comment appears logical, but we have not looked at other similarly located facilities nor have we determined what would be the specific grounds upon which we would assert a facility is "similar." Further, while population figures are certainly relevant, they are not adequate as a basis on which to generalize recommendations and conclusions. For example, evacuation issues involve at a minimum both the distribution of that population and the nature of the road system.

25. *Comment (1): The final report should state that our conclusions and recommendations do not justify calling for discontinuing the operations of the plant.*

    Response: We stated on the first page of the Executive Summary that we were not asked to look at some factors that are highly relevant to decisions regarding the future status of the plants. We believe, however, that those who have a legitimate role in making such decisions, such as FEMA, would not err by taking our findings, conclusions and recommendations into account. Emergency Management remains the final tier of the "defense-in-depth" concept.

26. *Comment (4): The final report should mention the extensive efforts undertaken by Indian Point to enhance its security, increase its outreach and public education activities, and make other improvements.*

    Response: We commend Entergy and local governments for the efforts they are expending on behalf of the safety of the communities in the area adjacent to Indian Point. However, we maintain that our conclusions about the capabilities and conditions of the plant were an accurate reflection of the situation as it existed at the time, were not in error, and therefore it is not appropriate to alter the report due to subsequent activities undertaken by the plant.

27. *Comment (6): JLWA does not confine itself to hard science. JLWA speculates and offer unsubstantiated opinions. The report is vague. We misuse published research on disaster behavior.*

    Response: As mentioned above in this appendix, we were asked to perform the review of State and local emergency plans and capabilities because of our emergency management expertise. The focus of our effort was not on the hard sciences, though several members of our team are indeed qualified in those fields. We do provide opinions, but they are not divorced from our disaster experience or disaster literature, and they are supported by the

considerable body of information we gathered during our review. The one charge that we misuse published research (as opposed to deviating from it) was not accompanied by an example or other evidence. The assertion that we deviate from published research is considered in this appendix below.

28. *Comment (1): JLWA cites multiple inadequacies of a hospital outside the ten-mile zone and does not mention the level of preparedness of hospitals within the zone that work collaboratively with the plant.*

    Response: We do not disagree with this. However we state clearly in the introduction to the section that "…readers are reminded that our evaluation represents a limited snapshot of one hospital in one county. It should not be construed as representative of medical preparedness overall for the Indian Point emergency planning zone." We also noted the location of that hospital as outside of the ten-mile zone. While we visited a number of medical facilities, our resources were not adequate to encompass a second in-depth review similar to that performed. So while the comment is correct, the draft report is also correct.

    It is also relevant to note that medical care is not found among the major problem areas we found (page viii).

29. *Comment (2): JLWA's criticism of activist groups is a politically motivated attempt, in collaboration with Entergy, to damage the integrity of those groups. It damages JLWA credibility as objective and independent.*

    Response: Even a casual reading of the conclusions found in our draft should not result in a charge of collaboration with Entergy. We would have made no comment about how activist groups are pursuing their agenda(s) had we not believed that one consequence of the approach chosen spreads misinformation that has the potential to impact public safety negatively.

30. *Comment (3): JLWA was captured and seduced by the rhetoric of the advocacy groups. The draft report appears skewed to the viewpoints of certain elected officials, sensationalizing media and a vocal minority of anti-nuclear activists.*

    Response: See the charge of collaboration with Entergy, above. We were requested to do an independent review, and we did.

31. *Comment (1): JLWA did not request key documents in preparing the reports.*

    Response: The key documents reported as missing and not requested were not identified by the correspondent. Documents identified in advance as necessary for the completion of the review were included in our contract and termed "Government Furnished Information." The State made vigorous attempts to provide them, and we made independent efforts as well. Where a document was not received, its absence was noted in the appendix dealing with plan review. We also identified and obtained many other

documents during the course of our review. An additional number of documents were volunteered by interested parties, including Entergy and advocacy groups, for which we remain grateful.

32. *Comment (1): JLWA highlights minor issues. For example, JLWA finds that "County booklets are not available on an Indian Point Emergency Center website."*

    Response: Our findings do cover a wide range of importance. Some, like the example given above, are minor. Nevertheless, even small improvements add up, and we saw no reason to withhold what we or others might consider to be valid but relatively minor observations.

33. *Comment (6): There is evidence that radioactive contamination can occur beyond the ten-mile planning zone. For example, the Chernobyl accident impacted hundreds of miles beyond this zone; a 1997 Brookhaven National Lab report claims a spent fuel pool release could render 2790 square miles uninhabitable; the American Thyroid Association recommends Potassium Iodide (KI) be made available to populations within 200 miles of the plant; federal bio-terrorism legislation calls for distribution of KI within a 20 mile radius of the plant; and the 50 mile radius around the plant is currently an ingestion planning zone.*

    Response: We consider the scientific and regulatory debate regarding the adequacy of the ten-mile zone to be outside of the scope of our contract and our expertise. The existence of that zone, and the dispute about its adequacy, did not interfere with or confine our recommendations, so we did not address it in the draft report. Considering the limited resources available and foreseeable, we think it is wise to focus nearest the plant and work outward as needs dictate and resources allow.

34. *Comment (4): The JLWA report adds to the fear and emotion surrounding the issue of Indian Point.*

    Response: Just as our report may be used in ways we did not foresee or intend, so also the reactions of some to an independent report may not be what we would hope to see or have reason to expect. That reaction is not grounds to change the report.

35. *Comment (5): Considering the high level of radioactive waste that resides in the spent fuel pool, and the possibility that the pool, rather than the reactor in the containment building, might be a target of terrorists, the draft should have addressed more thoroughly the need to address this threat in the plan.*

    Response: We were not asked to address the probability of a successful attack on spent fuel pools, or other aspects of the security of the plant(s).

36. *Comment (1): JLWA erred in saying that, "It is anticipated that the difficulties (of an evacuation from east to west on Long Island) do not lie primarily in the potential exposure of people to harmful dose levels, given Suffolk County's distance from*

Millstone; rather, it represents a potential load on resources and transportation infrastructure." The potential exposure to harmful dose levels is the primary problem. Also, there should be monitoring equipment and radiological response plans for all of the County within fifty miles of Millstone.

Response: This set of comments does not differ in kind from the comments focused on the inadequacy of the ten-mile planning zone addressed above. Thus, our answer above is applicable here. The "potential load" refers to the limited roadways and the difficulties caused by unnecessary evacuation (e.g., ambulances getting to emergency calls).

37. *Comment (1): Some counties were much more helpful and proactive in the course of the review. That attitude is important and is worthy of notice in the report.*

    Response: We agree that the degree of cooperation exhibited by emergency managers of the four counties ranged from better than we could have hoped for, to uncooperative. We do believe that attitude is important to effectiveness in most organizations. However, we could not recognize counties for their contributions and cooperation without using names and comparisons we wish to avoid. Consequently, we decided that after issuance of the final report we would write to the County Executives of those counties whose cooperation was commendable.

38. *Comment (1): The draft ignores the fact that emergency preparedness programs are based on a commitment to safe plant operations and to the "defense-in-depth" concept. They are the best emergency programs in the world. Decades of reviewing and exercising the plans attest to their effectiveness in protecting the public.*

    Response: Pages 14 and 40 of the draft prominently mention the role emergency preparedness programs play in the defense-in-depth concept. We note on page 241 that "…communities that have undergone nuclear planning are more rigorously prepared and capable than most communities that do not have nuclear power plants in their midst," and we go on to give examples.

    Lacking a better indicator, such as a real event, we concur that reviews and exercises give some indication of a plan's ability to protect the public. However, because our review surfaced major problems unaddressed in the plans, and significant issues with the exercise program, we do not agree with the broad reassurance of effectiveness forwarded by the correspondent.

39. *Comment (2): The draft implies that no performance-based exercise process was used for the September exercise and associated activities. FEMA adopted the process in 2002 and used it in the September exercise.*

    Response: We agree FEMA adopted the process and is attempting to implement it. Reducing the evaluation areas to six (with multiple sub-elements) is not a trivial step in that direction. Recognizing that, however, is not to acknowledge that a true performance-based exercise and evaluation process occurred. We did not observe a significant change

in the September 24, 2002 exercise from how previous exercises were conducted. The correspondents may not credit FEMA for the difficulty of the task it has undertaken, or for the time it will take to change accustomed behavior.

40. *Comment (1): Section 11.2.2.1, page 228, states that cities are not involved in emergency planning, training and exercising for Indian Point. The only city within the EPZ – Peekskill - is routinely involved in these activities, most recently on September 24, 2002.*

    Response: The correspondent neglected to note the sentence immediately above the statement criticized. The paragraph reads: "As noted earlier, we use the term "cities" generically, recognizing that there is a relationship among towns, cities and villages that is complex and not well known to many who will read this report. Cities are not principal players in the planning, training, and exercising at the Indian Point region. We recommend that cities become more involved in the response planning, training and exercising in the region." Several instances of this need were observed during our review, and one (Highlands) was specifically mentioned in the draft on page 69.

41. *Comment (1): The regulatory requirement for an emergency planning zone is a circle with a ten-mile radius. The report creates a 50 mile Ingestion Pathway Emergency Planning Zone without providing the supporting evidence for the creation of such a zone.*

    Response: The 50-mile zone was created by federal agencies many years ago, to address ingestion issues. It may be that the correspondent is concerned we are recommending expansion of the inhalation planning zone to 50 miles. If so, that issue is addressed above where we address the ten-mile planning zone.

42. *Comment (1): Past experience has shown that parents trying to reach their children at school is not a significant problem. The likelihood of it being an issue is small because most scenarios progress over many hours and days. For faster events, most parents would not have time to become aware of the evacuation and respond by going to the school. Most rational people, upon hearing of a school or area evacuation, would try to contact authorities or the school to see what is happening, before just driving around.*

    Response: September 11th was instanced innumerable times by school officials, public safety officials, parents and others as sufficient evidence to show that parents trying to reach children at school would be a major problem in the Indian Point area. Many went on to say that a large percentage of those aware of school evacuations (including school employees, transportation employees, public safety employees, and the children themselves) would quickly contact their families and perhaps their friends and neighbors, thus the word could get out well before the sirens sounded.

    The likelihood of the issue being small is true only if school is not in session. We would hope that most people, upon receiving warning, would not try to contact authorities or the school, but would turn to the media to receive information and instructions.

43. *Comment (3): The ten-mile evacuation zone is extremely conservative. Consequently, there is no need for training in shelter-in-place beyond that zone.*

    Response: While we have declined to become involved in the dispute over the adequacy of the ten-mile zone, we are comfortable recommending shelter-in-place training beyond that zone because it may reduce the spontaneous evacuation problem, because it has value in connection with threats other than the radiological threat, and because some residing outside the zone may work within, travel through, or relocate into the zone.

44. *Comment (1): Why does JLWA say concerns about public safety are understandably high (page 1)? The final report should point out that many, especially those with some education about nuclear power, have no concerns at all, whereas others still hold the erroneous belief the plant can explode like a nuclear bomb. The final report should expand the statement to tell the whole story instead of implying there is common concern for safety at Indian Point.*

    Response: Concerns about public safety in the area around the Indian Point facility are understandably high because of the large concentrations of population in the area. Public safety around nuclear power plants is a concern shared by federal, state and local authorities, and many others, and is one of the reasons radiological emergency preparedness plans exist. While some residents may not share that concern, it is not a reason to alter the statement.

45. *Comment (1): Why does JLWA say public confidence is an important factor in the successful implementation of an emergency response? Most people haven't the time or desire to become knowledgeable enough of the details to form an opinion. Their confidence level is based on what they hear.*

    Response: Apart from the consideration that opinions are not always preceded by research, we say that public confidence is important because it has a role in determining the extent to which there is spontaneous evacuation, the degree to which there is compliance with official directions, and the extent to which those with emergency responsibilities remain (or report) to perform those duties. Plans and exercises that are improved with wider involvement of the public, and visible progress toward accomplishment of other of our recommendations, may well raise public confidence, and thereby may make any future response more effective.

46. *Comment (1): In the draft's main conclusion, on pages viii and 240, JLWA says, "None of these problems, when considered in isolation, precludes effective response. When considered together, however, it is our conclusion that the current radiological response system and capabilities are not adequate to overcome their combined weight and protect the people from an unacceptable dose of radiation in the event of a release from Indian Point…" However JLWA does not provide supporting analysis or explanation of the supposedly debilitating synergistic effect of these individual – and in many cases separable– factors. Also, JLWA does not identify any specific recommended action which must be taken in order to have a satisfactory response process.*

Response: The factors we mentioned, "…significant planning inadequacies, expected parental behavior that would compromise school evacuation, difficulties in communications, outdated vulnerability assessment, the use of outdated technologies, lack of first responder confidence in the plan(s), problems caused by spontaneous evacuation, the nature of the road system, the thin public education effort…" and high population area, were not said to be synergistic. Some may in fact aggravate the effects of others, such as high population coupled with the nature of the roads, so some may be synergistic. In our main conclusion, however, we contended only that they are additive. The evacuation issue boils down to time; you have a hazard advancing and you have a number of things to do to get people out of harm's way. The steps take time, and problems or inadequacies often add to that time. The steps may synergistically or otherwise interrelate in complex ways, but they all eat into the time available, which may be short.

Our assertion that the more significant problems a jurisdiction has in formulating an effective response the less likely that jurisdiction is to mount an effective response, is not only self-evident, but is also buttressed by prior analysis and explanation in the report. For example, we faulted the exercise program for focusing on separate factors, as if the ability to spell words is the same as the ability to write a sentence. One of the main thrusts of our analysis is that the separate consideration of problems, without consideration of how they may be additive, is a mistake. The interrelationship of some problems is a consideration missed by those who fault us for not identifying any specific recommended action which must be taken in order to have a satisfactory response process.

47. *Comment (1): JLWA identifies many challenges to protecting the public, implying that they are extraordinary and perhaps intractable. They are neither unusual nor unmanageable. All come into play in all emergency management applications, including industrial accidents, natural disasters, and sabotage or terrorism events.*

    Response: One of the reasons communities around nuclear power plants are generally better prepared is because the standard of preparedness required is higher. Dismissing consideration of the problems and challenges on the grounds that they are found to some degree in all emergency management applications is therefore a flawed argument because other, non-radiological applications of emergency management have different and generally lower standards of protection.

    We did not imply that the problems are intractable. We withheld judgment on that, saying on pages viii and 240 that, "Should our recommendations be successfully implemented it is possible that an improved exercise program will demonstrate that a different conclusion (about protection of the people) is warranted…."

48. *Comment (1): The report says that "the current planning assumption, that the public will not act in ways that will compromise the effectiveness of the response, can lead to serious miscalculations." Rigid public conformance with directions is not essential for effective*

emergency response. Protective action directions are conservative in nature, and in most cases variations in individual response would have little health consequence.

Response: We agree rigid conformance is not necessary, in part because protective action decisions, if properly made, are conservative (erring on the side of safety). Responses by individuals, especially if those individuals are not at risk of radiation exposure, usually have little consequences for public health. It does not follow, however, that responses by many individuals, as in the case of significant spontaneous and/or shadow evacuation or parents going to schools, would not have serious consequences. Given the potential for serious consequences, we continue to believe that planners should not assume the public will not act in way that will compromise the effectiveness of the response.

49. *Comment (1): The viewpoints of people living or working within one mile of Indian Point are not included. School bus officials of the Hendrick Hudson School District were not interviewed. Buchanan and Verplanck Fire and Police Department officials do not recall speaking to JLWA*.

Response: We did not believe it appropriate to design our outreach effort to give communities housing the plant and its workers special consideration. It was unfortunate that most officials from the communities of Buchanan and Verlanck chose not to participate in the series of meetings set up by the Town of Cortlandt, specifically for the communities close to the plant. These meetings included special sessions for chief elected and appointed officials, for public safety officials (police, fire, EMS and ambulance), for educators, including private and nursery schools, and for public works officials. An evening forum open to the public was also included, and was well attended. A meeting scheduled with Hendrick Hudson Central School District officials was cancelled by them in favor of their participation in the schools portion of the Cortlandt series mentioned above. Our calls and email requesting a meeting with the business agent or other officials of local 1-2 of the Utility Workers Union were not returned. Nevertheless, we believe many of the workers from this union participated with us in a televised Buchanan town meeting.

It was our practice in the community outreach phase to meet with any interested group that asked us to do so, at the place of their choosing. When we learned prior to the completion of the draft that officials from Buchanan wanted to meet, we made a special trip to Buchanan to meet with the Mayor and the Town Council, the town's representative to the plant and citizens of the community in a public meeting in Buchanan, at which time we addressed their questions and heard their remarks.

The correspondent raising this issue did not identify conclusions and recommendations that would have been different, but did note that we would have found their training in relevant skills to be good and that most were prepared to perform evacuation. By no means do we dispute these contentions.

50. *Comment (1): JLWA says on page 225 that, "Planning, response, and public education all need to take into account the general findings of disaster researchers on how people behave during emergencies as well as specific findings from the region on the expected actions and intentions of the people living and working around both nuclear facilities, both within and outside of the ten-mile EPZ." Behavioral intent studies have proven to be of limited use, because individuals' perceptions of what they would do in an emergency may differ from their actual behavior in that situation, for a variety of reasons.*

    Response: We agree, and state on page 64 that, "We know too that what people say they would do in an event is not necessarily what they will do in a real event." Also, in a footnote on page 215, documenting studies relating to parents going to the schools, we observe that "All of these studies catalog stated intentions. All intentions do not translate into actual behavior." The very existence of these studies suggest that "limited use" is not "no use".

    Professional pollsters have skills in dealing with intentions; we believe those same skills should be brought to bear on the issue to better inform decision makers and planners on some of the problems involving public safety around Indian Point.

51. *Comment (1): JLWA errs in saying "...parents will go to the schools and thereby prevent orderly evacuation. A public information campaign will not solve this problem…" Also, JLWA is not consistent with psychological research when we mention the "...expectation of widespread counterproductive behavior due to fear."*

    Response: The correspondent missed the important difference between what we assert and what others asserted to us. The quotes above are from our summaries of what we were told during our meetings with the Stony Point Police and the Rockland County Police Chiefs Association respectively.

52. *Comment (1): The draft report addresses evacuation only, when in most cases sheltering would be the preferred method for protecting citizens. Training and exercising shelter-in-place combined with evacuation of some small additional population is not recommended. Consequently, JLWA assists the anti-nuclear groups in misleading the public.*

    Response: Even a casual reading of the report will disclose that sheltering considerations are found throughout, including effectiveness, techniques, training and the relationship to reduced numbers involved in evacuation. These considerations are found most conspicuously in the Executive Summary, in the introduction to Chapter 3, in the Performance Analysis of Radiological Emergency Plans Section, in the Related Planning and Preparedness Reviews Section, in the Evacuation Time Estimates Review part of the report, in the Review of Public Information, in the Exercise Analysis Chapter, and in our conclusions and recommendations in Chapter 11. As examples, on page 214 is found, "Sheltering is a proven protective action…" and on page 23 it states, "The primary protective actions are evacuation and sheltering…Sheltering can provide a substantial

amount of protection in situations in which evacuation is potentially a more dangerous option… sheltering is generally more effective (than evacuation) for short duration plumes."

The correspondent's assertion that we did not address sheltering effectiveness is incorrect.

53. *Comment (1): The final report should list our assumptions and definitions.*

    Response: We recognize that many reports containing technical information provide definitions at the end or beginning of the report. We chose to include them in the text. Our relevant assumptions are also found in the text, where the context and intent are clearer.

54. *Comment (1): JLWA was not tasked to study the physical security of Indian Point, or the credibility of a terrorist attack or other potential initiators of a radiological event. Therefore JLWA is not is a position to offer credible assessments of the likelihood or consequences of terrorist-induced radiological accidents.*

    Response: The correspondent lumps together likelihood and consequences, two vastly different considerations. We were not asked and did not attempt to assess the likelihood of a terrorist-induced accident. We were asked and are qualified to assess the consequences for off-site safety of such an event. How the consequences of a terrorist event differ from other initiators of an event is discussed earlier in this appendix.

55. *Comment (1): The executive summary says that "… effective public education must be designed and initiated if aspects of the plan that are sensitive to public response are to be effective." Public education is not an absolute pre-condition for effective response. There are many examples of effective public response in locations which have had no or weak public education.*

    Response: The sentence quoted was in the Recommendations section of the Executive Summary. Had the sentence been in the analysis or findings portion of the report, then the comment might have been of some value by way of clarification. Believing as we do that the effectiveness of the plan is influenced by what people think about it, (this issue is addressed in this appendix below) we stand by our statement, and agree with the further observation of the correspondent that despite the lack of direct causal relationship, most emergency planning experts concur that public education helps prepare people for effective response.

56. *Comment (1): The draft states that "people make their own calculations and decisions of what they will do when warned by emergency officials. This decision making and subsequent mobilization to take action is* ***influenced*** *by what they hear from emergency officials, who they hear it from, how often, and how it is interpreted by them. However, emergency officials cannot* ***control*** *this social process." (original emphasis) But not all people make their own decisions about what to do when warned. Some may evacuate by*

default because they are already out of the area and others may be told what to do by family or influential others. Also, while officials cannot control the social process of response, they can have a major influence over the process.

Response: Neither of these comments contradicts what is found in the draft report, nor do they significantly add to it. As a result it will not be changed.

57. *Comment (1): The draft report states that "It is ultimately individual decisions which dictate the public's behavior in an emergency situation. If the public does not trust the information being given to them about what they should do in the event of an emergency, they are more likely to disregard the procedures laid out for them in the emergency response plans and presented to them in the emergency response booklets." People are more likely not to respond to a warning if they do not trust the source of the warning. There are other factors that influence warning response, such as the warning may contradict what others are hearing or may be perceived to be non-protective.*

    Response: "If the public does not trust the information" can encompass not trusting the source, perceiving contradictions in the advice, thinking the information is non-protective, etc. Far from contradicting the draft, the comment supports it.

58. *Comment (1): The executive summary mentions expected parental behavior that would compromise school evacuation. When time allows and evacuation by family units is facilitated by public officials, it is likely to occur, but not all parents will do it. When time does not allow and authorities stress that such parental behavior will endanger children's safety, it is much less likely to occur, but will not be eliminated.*

    Response: The correspondent's objection does not contradict the draft, and serves only to support the draft's remarks about the importance of public education.

59. *Comment (1): Figure 3-6 on page 30 of the draft report is incorrect because it does not show the effect of the wind shift at the source of the release.*

    Response: The figure is correct as currently portrayed in the report. It is an actual dispersion model run using meteorology from instruments at an actual hazardous materials location.

    There are a number of possible reasons for the lack of a resolvable plume shift at the point of release, but the purpose of the figure is not to provide a high resolution of plume behavior at the source. The purpose of the figure is to illustrate with a simple, but real example, how different the spatial impact of the plume can be when comparing predictions that can accommodate real-time meteorological changes versus steady state meteorological inputs. This point is illustrated mainly by comparison of the area (or number of planning zones) impacted by the safety envelopes surrounding each plume. The area of impact on the right of the figure is much smaller since the model can predict the path of the plume using the meteorology as it is changing in time.

60. *Comment (2): The draft report does not distinguish between major preparedness problems and relatively minor discrepancies. More specifically, the draft report incorrectly characterizes some findings as significant when they are not. For example, on page 209, the draft implies that the potential for some individuals to be occasionally out of earshot of sirens or tone-alert radios is a significant deficiency in the emergency notification system.*

    Response: We did not characterize people being out of earshot of sirens and tone alert radios (TARs) as a significant deficiency. That is not what the words on the cited page in the draft say. What they do say is that people may not hear sirens indoors and typically can not hear TARs outside when the devices are located inside. The statement is not based on speculation (a general charge made by one correspondent). The statement is based on the observations of practicing emergency managers and the public in a number of communities in the U.S. where both sirens and TARs are used. The statement is further based on firsthand experience with TARs and their distribution, to include physically listening to TAR tones inside a structure and attempting to detect the tone from outside.

    The statements on page 209 need to be considered in the context of the rest of Section 11.1.1.2 of the draft report, which addresses alert and notification system synergies and the accompanying social process. As the section title implies, "reaching and warning people" is not limited to post-release functioning of specific devices.

    We stated that the existing standard for coverage and decibel level was met. Meeting the standard does not automatically solve the problem we raised, however, nor does it guarantee the best emergency notification of the public. As we pointed out, research indicates that a number of alert and notification devices used in combination are more effective. So, meeting an existing standard does not necessarily equal best or most effective practice, nor does it mean that the existing system is without problems.

61. *Comment (1): The report suggests that it is possible that sirens can't be heard inside a house. Specifications should be provided and the NRC should bear the cost of replacing ineffective sirens.*

    Response: The report does note that some sirens may not be heard indoors (page 209), but notes that a combination of sirens, tone alert radios, and EAS would provide a means reaching more people, faster (page 204).

62. *Comment (3): The draft report faults advocacy groups for using CRAC 2 numbers. Those are the only numbers on deaths and injuries the federal government has issued concerning the likely effects of a major release at Indian Point. If the numbers were updated they would be worse. What numbers would JLWA/IEM have advocacy groups use?*

    Response: It has been our experience in the field of emergency management that if you are truthful, straightforward and honest with citizens they are more likely to take the

appropriate actions to protect themselves and their families. Throughout the course of our outreach effort, we had growing concerns that, for some, the goal to close the plant seemed to be considered more important than using data in a responsible way. We gave as an example what we thought was irresponsible use of CRAC 2 numbers, especially when they were used without the caveats noted by the NRC. The way the numbers were used by some left us with the impression that the primary objective was not public education, but the engendering of emotions. Unfortunately, in our opinion, those efforts may contribute to the difficulties of effectively implementing protective actions should there be a release. That is why we took notice of them.

We looked for better information on probabilities of accidents, both prior to preparation of the draft and in association with this response to the three comments. Unfortunately, we could not find substantive information in the public domain that would adequately answer the objection about better data. We did find NRC testimony that addresses the misuse of CRAC 2, but we recognize that those using the data may want another source, and the testimony does not provide the alternate numbers the correspondent properly noted are missing.

There is an important perspective to this issue that we alluded to in Section 11.2.1.1, but did not elaborate upon. We believe many groups in the community can make positive contributions to the planning and exercising processes, including the consideration and evaluation of objectives, standards, and means by which progress is measured. We specifically recommend in the report that a more diverse group of stakeholders should be invited to participate in and contribute to these processes. But there is a low tolerance among emergency managers, ourselves included, for those who may knowingly undermine the important work of public safety professionals and pursue alternative goals. We are concerned that in pursuing their own agendas, some individuals and groups may jeopardize their opportunities to constructively participate in the planning and exercising processes.

63. *Comment (1): The final report might address the idea of providing Geiger counters to all public institutions within the state, so that officials have timely and reliable information on local levels of contamination.*

Response: This report focused on identifying emergency preparedness issues and providing recommendations for areas of improvement. We specifically did not make recommendations on specific equipment types or vendor-specific solutions for several reasons. To do so would require that we design specific solutions, compare options and costs, and coordinate with site stakeholders—activities that are required when important resource and implementation decisions are made.

In the case of Geiger counters, a careful evaluation would be needed, with input from site planners and decision makers as to the pros and cons of their distribution and use. A determination would need to be made as to whether a Geiger counter is the best device to deploy for use in a public facility. Also, responsible site officials would need to evaluate whether fixed monitors and/or properly directed field monitoring teams would serve the same needs during an event.

64. *Comment (1): The draft report states RACES was underutilized because computers in the Rockland EOC could not accept picture data. The correspondent states that RACES recognizes the potential to improve real-time data collection capability but is now sticking to its core competency of voice communications.*

    Response: The cited comment in the draft report appendix (page I-24) deals specifically with taking advantage of newer technology or technical capability using a specific communication system. The draft report contains a recommendation to the State encouraging the REP jurisdictions to pursue and implement newer technology where it exists, and recognizes some examples of initiatives already underway. The use of RACES to communicate image information would be an example of embracing an existing communications technology in response operations. The correspondent provides a good explanation of the current limitations in implementing the capability. RACES representatives can be of assistance to those looking at preparedness improvement priorities.

65. *Comment (2): JLWA did not review any emergency implementing procedures. Also, should not JLWA consult with emergency response organization officials to clarify "not mets" in the plan review compliance matrix? Isn't failure to comply with regulatory requirements a serious violation? Does JLWA suggest that in the case of Indian Point, the "violations" have persisted for over 20 years?*

    Response: These comments and questions address the plan compliance reviews contained in Chapter 4 and Appendix C of the draft report. The assertion that JLWA did not review any nuclear facility emergency implementing procedures is incorrect. A number of implementing procedures were in fact reviewed and this fact is noted in the draft report. Examples include procedures listed in Appendix B (Indian Point), and pages 32 and 33 of the draft report (Millstone). IEM also used IP-EP-610 as part of the plan review reported in the draft report. Additional procedures for Indian Point were reviewed in a follow-up visit to the Indian Point EOF in February 2003. The specific procedures accessed in that February visit impacted only eight of over 150 compliance elements in the Indian Point plan review (about 5%). We do not regard their absence in the initial review process as a significant limitation to the review detailed in the draft report, but we will incorporate changes in the final report that reflect verification conducted using the additional documents (see Comment B-22 above). We note that publication of the draft did have the salutary effect of surfacing planning documents that we had earlier not been able to obtain.

    As to the first question posed, consultation as described was done in two ways. First, we read and responded to the input of Indian Point and county emergency staff as reflected in their comments on the draft report. Surfacing such comments was one of the purposes in publishing the draft. Second, through the follow-up visit to the Indian Point EOF described above.

As to the second question, failure to comply with regulatory requirements posed in NUREG 0654 and the applicable Code of Federal Regulations is not necessarily a "serious violation." A judgment must be made as to the potential impact of an omission on the organization's ability to respond to a radiological event and on the public safety implications. We attempted to characterize the findings we felt were most significant in the Chapter 4 discussion. Whether or not an omission is significant enough to characterize as a "deficiency," using the NRC and FEMA definition, is up to those agencies.

Finally, in reference to the third question, JLWA does not suggest that the regulatory agencies have allowed such "violations" to persist for over 20 years. There is no such statement in the draft report. In the draft report we have characterized emergency plans as living documents involving changing processes. The plans change over time and the limitations, if any, in the plans change as well. The regulatory agencies have a process for identifying plan issues and reporting them in public documents, and a process that drives the responsible REP organization to comply with requirements. In the draft report we stated that this system is demonstrated to work better for the licensee than the civil jurisdictions.

66. *Comment (1): Compared to other events, such as Bhopal, the health effects JLWA is concerned about are trivial. Even in a fast-moving event like Chernobyl fewer than fifty people were killed and most of those were emergency responders. The latent effects are about 1400 cases of cancer.*

    Response: We are using the generally accepted EPA standards, about which more is said in this appendix, above.

67. *Comment (1): Why is it not reasonable to have a real nuclear safety drill, involving evacuation of communities? It is done for factories and schools. It would serve to educate the public about appropriate protection measures and train emergency workers.*

    Response: We agree these benefits would derive from a real and extensive evacuation exercise. Nevertheless, we do not consider such an exercise to have benefits commensurate with the risks and costs. For example:

    - Businesses and other institutions would have to allow workers to take time to participate. It is likely the businesses would in turn want to be compensated for lost time. We do not know if individuals would request similar compensation. But, we suspect there would be issues associated with individual choice and willingness as well.
    - The population would need to physically move on the roads and out of the area of the 10-mile EPZ. Where would they go? What are the capacities at locations where they might temporarily stage? These are important questions without good answers. Another is how much of a disruption would the "practice" traffic have on commerce and associated economic activities when the roads are filled with evacuees?

- Practicing on such a large scale would result in physical disruption of the transportation infrastructure and congestion of the roadways. This could in turn hinder response by police, fire and medical services personnel to real world events—those will not pause for the sake of the practice.

Based on these and other issues, we feel that it would be more prudent to use computer modeling and simulation to measure the performance of evacuation and the consequences of a radiological release to the evacuating population. We stated this point in the draft report.

68. *Comment (3): The draft's consideration of the Chernobyl accident and it's implications for planning for emergencies at Indian Point is minimal. Current plans ignore lessons learned under the questionable rationale that "it can't happen here." KI should be distributed in a much wider radius than is currently being contemplated by plans around Indian Point.*

    Response: Engineered safety systems that were not present in the design of the Chernobyl reactor are incorporated into US reactor designs. Scientific analyses to this effect are available in the public domain. While credible severe accident scenarios do exist for US reactors, the expected off-site consequences are not comparable with those of the Chernobyl event. We believe there is sufficient scientific consensus on this issue and will not address it further.

    The radius of KI distribution is beyond the scope of our review.

69. *Comment (1): The draft inaccurately asserts that an NRC study demonstrated the possibility of a spent fuel pool fire. A spent fuel pool fire is not credible as a planning-basis event.*

    Response: It must be acknowledged that there is a significant difference in the appropriate application of worst case, severe accident, design-basis accidents, and planning-basis events. While emergency planning needs to encompass a wide spectrum of potential events, we agree that it is not practical to attempt to plan for all conceivable events.

    The assertion that troubles the correspondent is not found in the draft report. Validating the credibility of any specific scenario is outside the scope of our effort. Nevertheless, thorough review of the planning basis is appropriate to properly evaluate the credibility of previously unconsidered or inadequately considered events. The evaluation of initiators that would result in a spent fuel pool fire could be explicitly addressed in such a review and included in or excluded from the resulting updated planning basis as appropriate.

70. *Comment (4): The draft asserts that emergency personnel would have a conflict between their emergency roles and roles in their personal lives. Disaster research has not shown*

such role conflicts to be likely. JLWA misuses and/or is unaware of the disaster literature.

Response: The issue of role conflict for emergency personnel has been discussed at least since 1954, when was mentioned by Killian.[34] There has been meager research on this topic. One of the few researchers who have studied this issue has noted that emergency personnel would not abandon their emergency roles if the roles are clearly defined and accepted. If emergency roles are ambiguous or expectations are not clear, there may be role abandonment.[35] Other researchers did not find any evidence of role conflicts among emergency personnel.[36,37] Dynes and Quarantelli concluded that role conflict may not exist.[38] Dynes suggested that role conflict does not occur because training of first responders emphasizes the importance of their roles during disasters, and solidarity with their fellow first responders makes them committed to their duties.[39] Also, a number of responders in any major disaster come from outside the region, and their families are less likely to be affected by the disaster. Dynes also states that emergency personnel have better information on the scope of the disaster and may be better able to ascertain that their families are not in danger, may have made prior arrangements for the protection of their families, and are able to communicate with their families and ensure their safety.

However, later researchers have noted that role conflict is possible and does occur occasionally, especially in radiological emergencies. Johnson found that almost one-third of the public school teachers around the Diablo Canyon facility would have loyalties other than assisting in a full-scale evacuation of schools.[40] Three Mile Island area hospitals had trouble keeping the full complement of medical personnel during the TMI crisis.[41]

---

[34] Killian, Lewis M., 1954. "Evacuation of Panama City fire 'Hurricane Florence". Committee on Disaster Studies, National Academy of Sciences, Washington DC.

[35] Moore, Harry et al., 1964. …and the Wind Blew. The Hogg Foundation for Mental Health, The University of Texas, Austin, Texas.

[36] White, Meda M., 1962. Role Conflict in Disasters: Not Family but Familiarity First. Disaster Study Group, National Academy of Sciences. Washington, DC.

[37] Bates, F.L. et al., 1963. The Social and Psychological Consequences of a Natural Disaster: A Longitudinal Study of Hurricane Audrey. Disaster Study No. 18, National Academy of Sciences, Washington DC.

[38] Dynes, R. and Quarantelli, E., 1973. "Images of Disaster Behavior: Myths and Consequences". Preliminary Paper #5. The Disaster Research Center: Ohio State University, Columbus, Ohio.

[39] Dynes, R., 1974. Organized Behavior in Disaster. The Ohio State University, Disaster Research Center, Columbus, Ohio.

[40] H. J. Johnson, Jr. 1985. "Role Conflict in a Radiological Emergency: The Case of Public School Teachers." *Journal of Environmental Systems*, Vol. 15, pp. 77-91.

[41] C. Maxwell. 1982. "Hospital Organizational Response to the Nuclear Accident at Three Mile Island: Implications for Future Oriented Disaster Planning." *American Journal of Public Health*, Vol. 72, pp. 275-279

At Shoreham nuclear power plant, school bus drivers in Suffolk County stated that they would have trouble attending to their emergency roles because of "role conflict."[42]

A number of emergency organizations develop plans for emergency personnel to take care of their families first – even admitting families of emergency personnel to shelter in designated facilities or at/near the Emergency Operations Centers. We observed this in Suffolk County.

Other researchers have pointed out that volunteers especially at medical facilities, assist in evacuations.[43] Many of the volunteers are members of the emergency response personnel families.

Slovic suggests that on the issue of role conflict it might be more appropriate to look toward chemical warfare than the experience with natural hazards.[44] Even trained soldiers have demonstrated panic reactions when faced with chemical warfare agents.[45,46,47,48]

Finally, we gave some credence to the statements of emergency responders around the Indian Point nuclear power plant who stated that they believed that there would be a conflict in their emergency and personal roles.

We are not unaware of, nor do we misuse, the disaster literature.

71. *Comment (1): Sound emergency plans should be based on relevant findings from disaster research. Emergency plans can also be based on behavioral intent surveys, as long as there is some documented empirical relationship between stated intents and actual disaster behavior.*

---

[42] Social Data Analysis, Inc. 1982. "Responses of Emergency Personnel to a Possible Accident at the Shoreham Nuclear Power Plant". New York: Setanket.

[43] Vogt, B., 1990. Evacuation of Institutionalized and Specialized Populations, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

[44] Slovic, Paul, 1995. "Risk Perception and Public Response to Emergencies" in Preparing for Nuclear Power Plant Accidents, edited by Golding, Kasperson, and Kasperson. Westview Press, Boulder, Colorado.

[45] Brooks, F.R., D.G. Ebner, S.N. Xenakis, and P.M. Balson, 1983. "Psychological Reactions During Chemical Warfare Training" in Military Medicine 148:232-235.

[46] Dupuy, T.N., G. Hammerman, C. Smith, and B. Bader, 19884. Human Impact of Technological Innovations on the Battlefield. Report H3433. US Army Medical Research and Development Council, Detrick, MD.

[47] Hammerman, G. 1985. Implications of Present Knowledge and Past Experience for a Future Chemical/Conventional Conflict. Institute of Defense Analysis: Alexandria, VA.

[48] Ursano, R.J., 1987. Proceedings of the Conference on Individual and Group Behavior in Toxic and Contaminated Environments. Department of Psychiatry, Uniformed Services University of the Health Sciences, Bethesda, MD.

Response: We agree that emergency plans should be based on findings from disaster research. However, not all areas covered in emergency plans, response and public education are adequately covered by disaster research. Also, as new emergency situations arise, and after September 11, 2001, there is the potential for the public to behave differently from behavior manifested during previous disasters.

Public opinion surveys provide a gauge for the changing perceptions of the public. Public opinion surveys generally provide indications of the actions and behavior of the public. We agree that stated intentions may not translate into actual disaster behavior. However, the stated intentions, and change in intentions over time, do indicate the current prevailing issues for the public in any specific region.

In fast-changing disaster situations, it is prudent to use both of these tools (disaster research and public intent surveys) to guide planning, response and public education.

Since disaster researchers have not explored every issue involved in a complex planning, response, and public education framework needed at Indian Point, emergency officials should supplement their knowledge of how people behave during emergencies with specific findings from the region on expected actions and intentions of the people living and working around nuclear facilities, both within and outside of the ten-mile EPZ. Emergency officials should look for a documented research link between stated intentions and actual disaster behavior. We will not change the draft because Section 11.2.1.2 of the draft deals with the issue adequately.

72. *Comment (1): Section 4.5.2.3. states that 9/11 demonstrates that the assumptions in the plan about public behavior are erroneous. However, research conducted to date on public response to the events of 9/11, particularly in New York City, indicate that the public exhibited behavior consistent with current knowledge about human behavior in emergencies (Tierney, 2002, Sorensen, 2002).*

Response: The author of the comment neglected to notice that the Section cited deals with what we were told in our outreach effort, not what we ourselves might contend. Nevertheless, we will deal with the comment on its merits.

We assume the two documents referred to are:

- Tierney, K.J., 2002. "Strength of a City: A Disaster Research Perspective on the World Trade Center Attack"[49]

- Sorensen et al., 2002. "Planning Protective Decision-Making: Evacuate or Shelter-in-Place?" Oak Ridge National Laboratory, Oak Ridge, TN[50]

[49] Tierney, K.J., 2002. "Strength of a City: A Disaster Research Perspective on the World Trade Center Attack".

[50] Sorensen et al., 2002. Planning Protective Decision-Making: Evacuate or Shelter-in-Place? Oak Ridge National Laboratory, Oak Ridge, TN.

The comment appears to contest the observation that the public may not cooperate fully with the county's plans and take appropriate actions. Disaster researchers have documented that a large percentage of the population threatened by natural disasters comply with evacuation recommendations from local officials. However, disaster research also documents that for technological hazards, such as the accident at Three Mile Island, people may not follow the advice of local officials and will evacuate, even when such a recommendation is not forthcoming from emergency officials.

During the World Trade Center attacks in 2001, some of the people in the Twin Towers followed official recommendations, while others did not. "Furthermore, if the recommended protective action is not perceived to be an effective means of protection, people will likely do what they judge to be effective. For example, in the World Trade Center attacks of September 11, 2001, people in the second tower were told to stay in their offices after the first plane hit the other tower; however, many chose to evacuate because they perceived staying in the building was risky."[51]

The thrust of the comments seems to be concerned that the draft report suggests that there will be a near unanimous rejection of the recommendations of local officials. Actually, the report points out the opposite problem – plans should not expect 100% compliance with recommendations. In JLWA/IEM's experience with emergency management around chemical weapons stockpile sites, we have observed similar assumptions of a stimulus-response model of public behavior. Emergency officials have often assumed that the public will comply 100% with their warnings, even in a technologically related event.

Many people make their own judgments about risk and the actions they should take to ensure their own and others safety. For most technological (and especially radiological) disasters, there are few environmental clues of an impending threat. In the absence of such clues, the onus is on emergency officials to provide adequate, timely and meaningful warning that can convince people of the need for action. Emergency officials must also provide sound advice on protective actions that can ensure safety.

Despite these actions, emergency officials should plan that significantly fewer than 100% of the people at potential risk will follow the official recommendations. Actions can and should be taken to continue to monitor the response and take intervention actions to raise the response rate.[52]

[51] Ibid.

[52] Mileti, D.S. and Sorensen, J. H., 1995. "Warning Systems: A Social-Science Perspective" in Preparing for Nuclear Power Plant Accidents, edited by Golding, Kasperson, and Kasperson. Westview Press, Boulder, Colorado, pp. 337-375.

73. *Comment (1): Traffic accident rates are lower during emergency evacuations and empirical evidence indicates that people would comply with traffic guides and barriers. The draft errs when it states otherwise.*

    Response: The draft report does not dispute the lower accident rates or compliance with traffic barriers. Section 11.1.1.3 of the draft report states, "A key question that the Counties and State are currently dealing with is whether or not the evacuation time can be reduced by directing traffic on major roads to flow in an outbound direction only. Such a strategy allows, for example, all lanes (normally both directions) of an interstate to be used "one way" to evacuate people out of hazardous zones to safe areas. The issue thus far is debated in terms of the resources required to direct traffic, and the likelihood of traffic accidents and/or citizen non-compliance with directions. This issue needs to be considered in the wider context of people protection and time available for taking protective actions." The draft report pointed out that emergency personnel at the Indian Point site need to consider how to best protect people within available time.

    The issues were also considered in Chapter 4 of the draft. In that case we were reporting concerns expressed to us by elected officials and law enforcement personnel in our outreach effort.

74. *Comment (1): The draft report recommends a compendium of knowledge on public behavior be compiled to inform planning, response and public opinion. There are a number of disaster compendiums already available.*

    Response: That many compendiums exist is not in doubt. We simply believe that these compendiums should be collected and used in emergency planning.

75. *Comment (1): The JLWA report criticizes systems that are established, regulatory compliant processes based on real world experience with radiological and other types of accidents. Specifically the draft report comments on over-reliance on out-dated sirens, and concludes that additional and improved systems are needed.*

    Response: We do not argue that the cited warning systems and their installation and use for Indian Point REP are not based on principles established in real world emergencies. Further, there is no statement in the report that implies these systems have no regulatory compliance basis or that such compliance is not audited. However, the compliance basis, and the associated warning equipment is dated. There are acknowledged issues with gaps in coverage, and other limitations that we pointed out in the draft. Newer technology is available today, as well as additional reinforcing warning mechanisms that, when combined with existing gap coverage (TARS for example), will further help reinforce public warning. We argue that maximizing the opportunity for each individual to get the warning, and get it faster or more directly, is an appropriate preparedness goal that should get priority attention.

    We can not agree with simply dismissing what we feel is an important need because existing systems are in compliance with regulations. In fact, this type of comment is

precisely the reason we concluded that a compliance mentality may be hindering improvements.

76. *Comment (1): The time it takes to evacuate an area is not solely a function of the number of people evacuated. Since higher density population areas have more response resources, to include road capacity than lesser populated areas, it is not unreasonable to expect comparable response. Also, communities with large populations are more likely to adopt new emergency practices.*

    Response: We generally agree with the first two sentences. In fact there are a large number of variables beyond road capacity and the amount of transportation and responder resources. One such variable goes beyond the total road capacity. The population will use many roads to begin evacuation, but it is a common paradigm in transportation engineering that certain roads or collections of roads (sometimes referred to as arterials) will get the majority use when people are evacuating an area. The relationship of the population density to the capacity of these arterials to carry people out of the EPZ is not linear as is implied by the comment. It may not be unreasonable to expect a correlation between increasing population and increasing road network capacity, but it is not guaranteed.

    On the issue of larger communities embracing innovations, we acknowledge the research that has demonstrated this. Further, we acknowledged selected innovations in emergency preparedness in the draft report. Nevertheless, we maintain that the focus on compliance to existing standards that we remarked upon in a number of subject areas is not representative of the innovative behavior suggested in the comment. The frequent allusion to "tried and true processes" is not suggestive of a willingness to consider adopting new or revised emergency practices.

77. *Comment (1): In Section 5.4.3 JLWA mentions that APCO (Association of Public-Safety Communications Officials) recommendations for a communications plan that responds to terrorist events would also apply to REP events. The communications plan for REP situations would be the same for terrorist-induced accidents.*

    Response: The intent of the cited statement in the draft report is not to specifically differentiate a terrorist-REP category of communications. We researched emergency communications practices as part of the review. The APCO guidance published for a terrorist-event communication plan was judged a good model to apply within REP, and was advanced in the report as a suggestion with that in mind.

78. *Comment (1): In Section 8.1.4.2., the draft quotes an International Atomic Energy Agency statement that nuclear power plants are attractive targets to terrorists. Nuclear power plants are unattractive terrorist targets because of security and safety systems, and a low risk of health consequences.*

    Response: The IAEA position has not to our knowledge changed in spite of the obvious debate on the issue. Our draft report immediately states the contrary position of the NRC

in an effort to provide some balanced perspective for the reader. We did not attempt to adjudicate the issue.

79. *Comment (1): On page I-10 the draft report says "(7) Perhaps protocols for radio talk should be instituted since the public can listen…." FCC rules forbid use of ciphers or codes in the Amateur Service.*

    Response: This observation, from the Indian Point practice exercise held on September 5, 2002, reports on a recommendation raised for evaluation during the post-exercise "hotwash" held at the Indian Point EOF. The recommendation was raised in recognition of the fact that radio communication between EOF communicators and Indian Point field monitoring teams can be heard by members of the public, during exercises and during real events, so personnel using those radios needed to be conscious of what they say to whom, and by what means.

80. *Comment (1): The draft report did not point out that a delay in issuing an evacuation order to Putnam County residents meant they would be in their cars with a radiological plume overhead and therefore subject to greater exposure than if they had sheltered in their homes.*

    Response: The third paragraph on page 204 of the draft report is essentially the response to this comment. The reason such a statement is not in the draft report is that we can not support such a conclusion without modeling the plume, the timing of response decisions and the assumed actions of the people on the evacuation network. Then comparison would need to be done with similar modeling with an assumption that people stayed in their homes. The capability to do such analysis exists, as we pointed out in the draft report.

    This type of performance-based evaluation can be complex and the setup for it is time consuming and requires input from many organizations. It can be done if stakeholders decide it is a priority and want to factor it into any improvement plans. We agree that when evacuation dosage is high, sheltering may be the preferred option.

81. *Comment (1): The draft's term "Fast breaking events" is contested because:*
    - *Regardless of the cause of a release, the meteorological conditions are the delivery mechanism to the public,*
    - *For low wind speeds, plume concentrations are higher but public exposure is low due to slower plume travel, but for higher winds the plume dissipates more quickly exposing a lower dose to the public.*

    Response: We generally agree that the meteorological conditions are the delivery mechanism for a radiological plume; however that is not really the issue with the point we make in discussion of the "fast breaking" event. The plume will travel as fast as the wind takes it if a release occurs. A fast breaking event refers to the amount of time between the event initiator and the release to the atmosphere. Less time between initiator and release will translate directly to less warning and response time, which can create

conditions for greater exposure versus a slower evolving event. In other responses we provide more detailed discussions on the observed exercise times between initiator and release and the observation that there is little evidence to show that the fast breaking releases, especially down to the half hour minimum time to release in the NUREG 0654 planning basis, are getting sufficient attention.

82. *Comment (1): On page 16, the draft asserts that overly complex plans tend to be not as useful during emergencies. The correspondent requests documentation of this assertion.*

    Response: As far back as 1980s, researchers had suggested that complex and overly detailed plans tend to be ignored during events.[53] More recently, Kreps mentions the same issue.[54]

    A team of disaster researchers observed the actions of emergency officials during the response and recovery from the World Trade Center disaster.[55] They reported the tension between detailed planning and improvisations during response. Anticipation, inherent in detailed planning, needs to be balanced with the ability to be resilient and creative. Kendra and Wachtendorf recommend that planning and training should focus on the ability to enhance creative solutions to the unique problems created by a disaster.

    A similar approach of developing resiliency is also mentioned by Weick et al. when discussing high reliability organizations.[56] An earlier report by Kendra and Wachtendorf[57] on the 9/11 events elucidates the four factors involved in resiliency. First is the ability to improvise and be creative. The second factor is the ability to understand the interconnection of one's roles with the roles of others in the whole response structure such that individuals can assume other's responsibilities if needed. The third factor is the wisdom to know the limits of what is known, and to seek new information where necessary. The fourth is the respectful interaction, where people share information openly, accept other people's information, and integrate the information as they go along.

83. *Comment (1): There is generally not a problem with spontaneous evacuation. Rather, the problem is a massive inflow of people into the stricken area.*

---

[53] Quarantelli, E. L. 1982. "Ten Research Derived Principles of Disaster Planning." *Disaster Management 2: 23-25*.

[54] Kreps, Gary A. "Organizing for Emergency Management." *Emergency Mangement: Principles and Practice for Local Government.* Eds. Thomas E. Drabek and Gerard J. Hoetmer. Washington, D.C.: International City Management Association, 1991.

[55] Kendra, J. and T. Wachtendorf, 2002. Creativity in Emergency Response After the World Trade Center Attack. Disaster Research Center, University of Delaware, presented at the 9th Annual Conference of the International Emergency Management Society, Waterloo, Canada, May 14-17, 2002.

[56] Weick, K.E., Sutcliffe, K.M., and Obsfeld, D., 1999. "Organizing for High Reliability: Processes of Collective Mindfulness" in Research in Organizational Behavior, 21: 81-123.

[57] Kendra, J. and T. Wachtendorf, 2001. Elements of Community Resilience in the World Trade Center Attack. Disaster Research Center, University of Delaware.

Response: Convergence on the disaster site is a known and long-documented problem during response to emergencies.[58] After the immediate impact of an event, people, resources and information flow toward the disaster site.[59] The convergence occurs both from people moving to the disaster site as well as emergency personnel rushing in to help. Among the people rushing to the site are representatives of the media.

People move to a disaster area for a variety of reasons. During the train derailment at Mississauga, Ontario, many parents found themselves outside the area recommended for evacuation and tried to enter the area around the plant to evacuate their children.[60] Researchers have noted that families try to congregate together, if possible, before evacuating from the area. Some of this family unification may involve travel toward the hazard rather than away from it.

Disaster researchers have also noted that post-event coordination among emergency response agencies is problematic. Many organizations tend to seek aid from surrounding communities. This causes some part of the convergence at the disaster site.

In the aftermath of the September 11 attacks, the convergence phenomenon was observed. A report prepared on the response of the New York Fire Department[61] reported that many fire and EMS units that had not been assigned to the incident contacted the Fire and EMS Dispatch Centers and repeatedly requested authorization to dispatch. Some of these units were dispatched, complicating the response effort. A small number of fire units (4 out of the total 200 fire units that responded) converged on the World Trade Center without being dispatched. Many more ambulances (both EMS and privately operated) dispatched without authorization from the EMS Dispatch Center.

Disaster research has also noted a corresponding outflow of people, resources, and information from the community. Spontaneous evacuation of people is one such outflow. Both issues of convergence and outflow exist and must be dealt with in planning and response. Within radiological emergency planning, the issue of convergence is dealt with by planning for establishment of access control on roadways leading into affected areas.

---

[58] Fritz, C. and J.H. Mathewson, 1957. Convergence Behavior in Disasters: A Problem in Social Control. National Academy of Sciences, Washington, DC.

[59] Quarantelli, E.F., 1984. Sociobehavioral Responses to Chemical Hazards: Preparation for and Responses to Acute Chemical Emergencies at the Local Community Level. Disaster Research Center, University of Delaware.

[60] Burton et al., 1981. The Mississauga Evacuation: Final Report. University of Toronto Institute of Environmental Studies, Toronto, Canada.

[61] McKinsey & Company, 2002. "Increasing FDNY's Preparedness." Report available on-line at http://www.mipt.org/pdf/fdnylessonslearned9-11.pdf

84. *Comment (2): Empirical literature has not documented a relationship between public confidence and the effectiveness of the response. Empirical literature has also not documented a relationship between emergency responder confidence and organizational effectiveness of disaster response organizations.*

Response: If emergency plans are predicated on a specific citizen response, and significant portions of the public respond in other ways, the effectiveness of the plans is in doubt. Citizens who evacuated from the second World Trade Center tower, contrary to some emergency instructions, saved their lives. However, under other potential conditions, the actions of the public may reduce the effectiveness of emergency plans.

As is discussed and documented in responses above, natural hazard emergencies had indicated that official emergency warnings did not motivate some people to evacuate from an area. During the Three Mile Island crisis, however, a reverse problem was noted. Many more people evacuated from the region than the group targeted in emergency warnings. A number of surveys conducted after the event noted that 80% of the people evacuated as a result of confusing warning information. Almost as many people evacuated because they believed that an evacuation order or recommendation was imminent. People stated that they believed that they were at risk, despite official warnings that suggested that they were not at risk.

A Kanawha Valley interest group's newsletter, discussing the public's lack of confidence in in-place protection, advocated that people should flee from the area at the first indication that a chemical disaster may be occurring (as mentioned in Glickman and Ujihara[62]).

During the events of 9/11, many people in the second World Trade Center tower evacuated from the building even though officials were recommending that they remain in the building.

The current public concern about the effectiveness of sheltering-in-place using duct tape and plastic may be another example of the problem of public confidence. In the event of a terrorism event, many citizens who are doubtful that tape and plastic can enhance safety may not shelter-in-place. Previous disaster experience on the percentage of people that are expected to follow the directions of emergency officials may not be a wholly adequate indicator of the behavior of the population.

Public opinion surveys in the area around the Umatilla Chemical Depot also indicate a similar reluctance to shelter and a preference for evacuation. A concerted public education campaign has changed the stated intention of some residents of the area in favor of shelter-in-place. Over a two-and-one-half year period, the percentage of people

[62] Glickman, T.S. and Ujihara, A.M. (eds.), 1989. Proceedings of the Conference on In-Place Protection during Chemical Emergencies, November 30-December 1, 1988. Center for Risk Management Resources for the Future, for the EPA and FEMA. Washington, DC.

expressing the intent to shelter-in-place changed from a low of 26% to a high of 46%.[63] However, a sizable percentage of people still express the intention to evacuate.

Citizens can take actions, and have decided that their safety is best protected by taking actions, contrary to those suggested by emergency officials. This may or may not indicate that they have a lack of confidence in officials directing emergency actions. It may also indicate a lack of confidence in the specific protective actions recommended by emergency officials. However characterized, in our judgment there is a relationship (direct or indirect) between public confidence and the effectiveness of emergency actions.

An additional issue relates to the notion of controllability of a disaster. Quarantelli mentions that people's perceptions of a nuclear accident are that such phenomenon are uncontrollable.[64] This perception of a lack of control over events can be expected to be higher for terrorism induced events. Perceptions of a lack of control have some relationship to behavior in a disaster, including the propensity to evacuate.

On the emergency responder perspective, a large number of emergency personnel would be expected to take actions in case of a radiological emergency at Indian Point. Their actions are usually more effective to the extent they are coordinated. If some emergency personnel do not have confidence in the emergency plans for the region, they may act in ways that do not advance a coordinated response. Kaperson, Golding and Tuler note that: "A lack of coordination can lead to confused, delayed, and inappropriate responses (by emergency organizations)."[65]

Finally, we make a distinction between the "organizational effectiveness of disaster response organizations" and the effectiveness of emergency plans. Emergency organizations are but one part of the emergency response system. A very important and large part of this system is the public. People faced with disasters make their own judgments of the credibility of the warnings, the personal level of threat, effectiveness of various actions to reduce the threat, etc. Disaster response organizations may be "organizationally effective" (i.e., they could manage their communications, coordination, command and control, resource allocation, personnel management, and other internal functions well). However, the overall response of the community may not be effective, because people perceive a different reality from that espoused by emergency officials and take actions that they perceive are beneficial for their own and others' well-being.

---

[63] IEM, Inc., 2003. Umatilla CSEPP Public Affairs IPT Survey: Fall 2002 Final Report. Baton Rouge, LA, IEM/TEC03-004.

[64] Quarantelli, E. L., 1984. Evacuation Behavior and Problems: Findings and Implications from the Research Literature. Disaster Research Center, University of Delaware.

[65] Kaperson, R.E., Golding, D. and Tuler, S., 1995. "Designing Effective Decision Systems for Responding to Nuclear Plant Emergencies" in Preparing for Nuclear Power Plant Accidents, edited by Golding, Kasperson, and Kasperson. Westview Press, Boulder, Colorado, pp. 289-309.

The report points out the need to focus on the effectiveness of the response. Like other organizations, both public and private, the emergency response organizations around Indian Point need to focus on the outcomes of their actions. The report suggests that one of the measures for such effectiveness could be "dose savings", i.e., the reduction of exposure to the people.

85. *Comment (1): Research does support the statement that people with emergency plans are more likely to respond to emergency warnings. But, research does not support the statement found on page 229 that a focus toward family planning would lead to more effective public education programs.*

Response: Public education is focused on activities prior to an emergency or event. Therefore, we are excluding from the following discussion emergency warning, rumor control and emergency public information actions during an event.

Education is expected to affect knowledge, attitudes, and behavior.[66] A classic view of public disaster education appears to be to provide information prior to an event, affecting knowledge and attitudes. At the time of an event, the expected awareness levels and attitudes are expected to translate into behavior.

Disaster researchers have found that provision of information on hazards prior to an event seems to be remembered for a period of time but then forgotten.[67] Also, people report that information through brochures and other traditionally used public education materials have been deemed by recipients as being not useful.[68] Researchers have also found that knowledge gained from public education programs has not translated into appropriate behavior.[69,70] A study of earthquake education and its application to hurricane response[71] indicated that the public education program attracted the same groups of people that were attracted to other public education programs. That is, "earthquake education workshops did not contribute to the general level of preparedness among the respondents we interviewed, controlling for other relevant variables" (page 19).

---

[66] Sorensen, J. H. and Mileti, D.S., 1995. "Pre-Emergency Information Programs for Accidents at Nuclar Power Plants" in Preparing for Nuclear Power Plant Accidents, edited by Golding, Kasperson, and Kasperson. Westview Press, Boulder, Colorado, pp. 310-336.

[67] Waterstone, M., 1978. "Hazard Mitigation Behavior of Urban Flood Plain Residents". Natural Hazards Research Working Paper #35. Institute of Behavioral Science, University of Colorado.

[68] Sorensen, J.H., 1983. "Knowing how to Behave under Threat of Disaster: Can it be Explained?" Environment and Behavior, vol 15, no. 4, pp. 438-457.

[69] Sims, J.H. and Bauman, D.D., 1983. "Educational Programs and Human Response to Natural Hazards" in Environment and Behavior, vol 15, no. 2, pp. 165-189.

[70] Sorensen, J.H. and Mileti, D.S., 1990. "Risk Communication in Emergencies" in R.E. Kasperson and J.M. Stallen (eds.), Communicating Risk to the Public. Klumer Academic Publishers, Dordrecht, The Netherlands.

[71] Faupel, C.E., S.P. Kelley, and T. Petee, 1992. "The Impact of Disaster Education on Household Preparedness in Hurricane Hugo" in International Journal of Mass Emergencies and Disasters, vol. 1, no. 1, pp. 5-24.

Important public education objectives for emergency management programs include involving people in emergency issues as a part of the democratic process, and educating people in order to improve public response during an event.[72]

Development of family disaster plans during the pre-event phase is an important behavioral activity. Development of family disaster plans was relatively rare in the 1970s. Two studies in the 1970s found that few people had disaster plans. Bourque et al. found that very few people had made any preparations or developed plans for earthquakes prior to the 1971 California earthquake.[73] Worth and McLuckie found that only 3% had developed family disaster plans prior to the 1965 Colorado floods.[74]

By the 1980s, studies were documenting more active preparedness. Hodler found that 81% of those surveyed after a tornado struck Kalamazoo, MI had a family disaster plan and 93% of those with plans followed their plans.[75] Most of the survey respondents had a good knowledge base of tornadoes and their destructive potential. Perry and Lindell found that 69.9% and 48.8% of people in two communities near Mt. St. Helens had family disaster plans.[76] Family disaster plans have been associated with more appropriate response actions.[77,78,79,80]

Perry and Mushkatel have also documented that people are reluctant to evacuate unless they are sure that family members are accounted for.[81] Development of family disaster plans has the potential to resolve issues of difficulties in reaching and accounting for the safety of family members.

---

[72] IEM, Inc., 1998. Strategic Public Education Plan for Anniston Site. Baton Rouge, LA.

[73] Bourque, L. B., L. G. Reeder, A. Cherlin, B. H. Raven, and D.M. Walton, 1973. The Unpredictable Disaster in a Metropolis: Public Response to Los Angeles Earthquake of February, 1971. Los Angeles, CA: Survey Research Center, University of California, Los Angeles.

[74] Worth, M.F. and McLuckie, B.F., 1977. "Get to High Ground! The Warning Process in Colorado Floods June, 1965", Disaster Research Center Historical and Comparative Series. Disaster Research Center, The Ohio State University, Columbus, Ohio.

[75] Hodler, T.W., 1982. "Residents' Preparedness and Response to the Kalamazoo Tornado" in Disasters, Vol. 6, No. 1, pp 44-49.

[76] Perry, R.W. and Lindell, M.K., 1986. Twentieth Century Volcanicity at Mt. St. Helens: The Routinization of Life Near an Active Volcano. Final Report to the National Science Foundation. Arizona State University, Tempe, AZ.

[77] Perry, R.W., 1979. "Evacuation Decision-Making in Natural Disasters" in Mass Emergencies, vol 4, pp. 25-38.

[78] Perry, R. W. and Greene, M.R., 1982. "The Role of Ethnicity in the Emergency Decision-Making Process" Sociological Inquiry, vol 52, no. 4, pp. 306-334.

[79] Perry, R.W. and Greene, M.R., 1983. Citizen Response to Volcanic Eruptions: The Case of Mt. St. Helens. New York: Irvington Publishers.

[80] Perry, R.W., Lindell, M.W. and Greene, M.R., 1981. Evacuation Planning in Emergency Management. Lexington, MA: Lexington Books.

[81] Perry, Ronald W. and Mushkatel, Alvin H., 1984. Disaster Management: Warning Response and Community Relocation. Quorom Books, Westport, Connecticut.

There is yet another potential advantage of family disaster planning. Development of a family disaster plan is an active action to protect the family. People taking such action are expressing a confidence in their ability to affect their own safety. This process has important implications for another finding by social science researchers. Willingness to take action in the face of an impending emergency may be related to a person's locus of control or belief in whether internal or external factors control outcomes. In a survey of Three Mile Island residents conducted for the Pennsylvania Department of Health.[82] residents were asked for their reasons to evacuate or to stay. Of those that did not evacuate, between 62-66% of the people within 5 to 55 miles of the TMI plant cited at least one of the reasons as "the situation was in God's hands." Sims and Bauman had noted the same phenomenon in an investigation of tornado deaths in Illinois and Alabama.[83] Survey data from the two states indicates a higher preponderance of people that have an external locus of control in Alabama. A higher preponderance of survey respondents from Illinois indicated that events were controllable through personal action, or demonstrated an internal locus of control. Perry and Mushkatel found that, in general, people with an external locus of control did not develop family disaster plans. Of the people polled, they found that 94.7% of Caucasian-Americans with an external locus of control did not have a plan and 80% of African-Americans with an external locus of control did not have a plan. Only in the case of Mexican-Americans was the finding different; 40% of those with an external locus of control claimed to have a family disaster plan.[84]

Therefore, for both natural and technological events, there was a perception of external control of events by some people. Clinical psychologists call this variable "self-efficacy."[85] Commenting on this factor, Perry and Mushkatel mention that "an individual who believes that in spite of any action he or she may undertake, it is not possible to achieve protection, is less likely to perceive the need for preparedness activities."[86]

We believe that development of family disaster plans is an important component of public education programs. It helps people respond better during emergencies. By engaging people prior to an event, it actively involves them in understanding and relating to the hazard. If those are some of the objectives of an emergency public education program, a focus on family disaster planning is indeed an effective strategy.

---

[82] Houts, P., R.W. Miller, G.K. Tokuhata and K.S. Ham, 1980. Health-Related Behavioral Impact of Three Mile Island Nuclear Incident. Report submitted to the TMI Advisory Panel on Health Studies of the Pennsylvania Department of Health, Harrisburg, PA.

[83] Sims, J.H. and Bauman, D.D., 1983. "Educational Programs and Human Response to Natural Hazards" in Environment and Behavior, vol 15, no. 2, pp. 165-189.

[84] Perry, Ronald W. and Mushkatel, Alvin H., 1984. Disaster Management: Warning Response and Community Relocation. Quorom Books, Westport, Connecticut.

[85] Bandura, Albert, 1977. "Self-efficacy: Toward a unifying theory of behavioral change." In Psychology Review, 84, pp. 191-215.

[86] Perry, Ronald W. and Mushkatel, Alvin H., 1984. Disaster Management: Warning Response and Community Relocation. Quorom Books, Westport, Connecticut. p. 37.

86. *Comment (1): The correspondent agrees that emergency preparedness at Indian Point could be improved by knowledge on how people tend to behave during emergencies. But the correspondent does not agree that preparedness at Indian Point is "largely not based on a scientific understanding of human behavior". The draft report is also faulted for not demonstrating the nature of the scientific understanding of human behavior.*

    Response: Many of our responses to comments (addressed above) from this single correspondent indicate facets of how the public may be expected to respond to disasters, based on post-disaster empirical research and supplemented with information from public intent surveys. The plans we reviewed did not, in our judgment reflect that body of knowledge.

    The correspondent faults the draft report for not demonstrating the scientific understanding of human behavior. Scientific knowledge on how people have behaved in disaster situations is elucidated in hundreds of reports and documents covering over fifty years of disaster research. It is not possible or advisable to re-create that scientific knowledge in a review of preparedness at Indian Point.

    We apologize to readers who may have found tedious the reviews of the disaster and behavioral literature contained in the many responses above. Because of this one correspondent's assertions that our recommendations are illogical and/or conjectural, incompatible with accepted practice, contradictory to consistent findings of emergency preparedness experts, and incompatible with disaster research and experience, we found it necessary to demonstrate the contrary.

D. Comments with which we may or may not agree, but that do not require a change in the draft. (Note: Comments are summarized. Each issue includes a number in parentheses, representing the number of correspondents that raised a recognizable version of that issue.)

1. Although the plan may have defects, it is still useful in addressing a wide range of emergencies. (1)
2. Evacuation will not work because the roads are not good, as is evidenced every work day. (5)
3. Evacuation will not work because those spontaneously evacuating will impede those in harm's way. (1)
4. Many of our recommendations go well beyond the requirements of the regulations. Consequently, they should not be construed as planning or operational deficiencies. (2)
5. The bulk of the responsibilities for emergency management resides at the State and local levels, and is not a responsibility of the plants. State and local governments should receive support and funding in the fulfillment of these responsibilities. (1)
6. The draft report is being used for purposes JLWA did not intend. (4)
7. The sirens within the ten-mile EPZ should have voice capability. (1)

8. Evacuation routes and feeder roads should have reader boards to provide emergency messages. (1)
9. Warnings systems should be multilingual. (1)
10. The public outreach and education effort should be revamped and a private/public partnership forged to educate on sheltering, discourage shadow evacuation and promote responsible protective actions. Surveys should be used to measure progress and adjust the education effort accordingly. (2)
11. Functioning local response planning groups should register as FEMA Citizen Corps Councils, and the circle of planning broadened to be more representative of the community. (1)
12. Because of the location of some EOCs, mutual aid agreements should cover the relocation of EOCs and other government offices. (1)
13. Evacuation routes should have priority in government snow and ice removal plans. (1)
14. Many public sector emergency service employees are also volunteer first responders, so the same resource may be counted twice. An inventory should be conducted to determine the impact of this. (1)
15. Emergency managers should see their customers as more than the recipients of emergency management services in time of crisis. Customers should be viewed as the recipients of (and even participants in) on-going services like public education and outreach, drills and exercises, emergency planning activities, and the evaluation of the work of those engaged in the services and systems of emergency management. (1)
16. The ten-mile zone is an appropriate emergency planning zone. If some evacuation is necessary, only a portion of the zone would be affected, not the whole zone. The projected radiation dose resulting from most major reactor accidents is not a threat to health and safety beyond that zone, and evacuation beyond the zone is unnecessary. (1)
17. Sheltering is often more effective than evacuation. If needed, evacuation should be performed so that those closest to the plant are evacuated first. (1)
18. Exercises have to be practical and within a reasonable cost. Large scale evacuation exercises are not practical. Considering the low probability of a significant release, there is a point of diminishing returns with respect to emergency planning. Considering the relative dangers of other types of facilities, the requirements and plans for nuclear power plants are excessive. (1)
19. It is unwise to site a nuclear power plant in a heavily populated area. (1)
20. The federal government should assist in the implementation of the report's recommendations. In particular they should act on the need for a higher standard of emergency preparedness at Indian Point in light of 9/11 and heretofore unseen threats to the plants. (2)
21. The cooperation of government and the plant with other stakeholders in emergency planning activities is critical to the success of any plan. (1)
22. The lack of specific exercise requirements, a consequence of a focus on results, makes it easier to hide inadequacies. As it is, federal exercise policy scores agencies on adherence to their plans – even if they are inadequate. (1)
23. Reception centers perform important functions – monitoring, decontamination and family reunification. They accommodate only 20% of the population. Where should the others go for monitoring and decontamination? If they show up, can they be

accommodated within the NRC standards? If they don't, how can the spread of contamination be prevented? (1)

24. To address the problem of parents going to schools and blocking the busses, devise a traffic management plan that provides for the flow of traffic and educates parents about the problem and plan. Busses should be mobilized at the Alert level so that they can get to the schools earlier. If nothing further happens at the plant, you at least have had a real test of the plan. (1)
25. States should have the technical capability to promptly identify and evaluate conditions that call for a precautionary response, to track the plume and do dose projections, and to classify the severity of the event. (1)
26. Emergency preparedness should be regarded as a safety system equivalent to an in-plant system. As such, significant degradation of state emergency preparedness should be grounds for shutting down the plant. (1)
27. Radio communications among response agencies are inadequate. (2)
28. The evacuation of schools before general evacuation will not work. (2)
29. The evacuation information booklet has major inadequacies. (2)
30. Drivers of busses may not do their jobs. (1)
31. The public should be trained how to shelter-in-place. (1)
32. Plans are based on compliance with regulations. (1)
33. People will not comply with government direction unless they see it as in their self interest. (1)
34. Response exercises are of limited use. (5)
35. In a major disaster, the local phone system will be overwhelmed. (1)
36. The size of the population to be evacuated is important in judging whether evacuation will work. (3)
37. Even if the plant closes tomorrow we will still need to upgrade the plans. (4)
38. The plant creates jobs. We cannot afford to close it. (3)
39. The JLWA/IEM team did an honest, detailed and valuable report. (15)
40. Although there is much wrong with the report, there are many valuable ideas from which emergency managers can profit. (8)

E. Comments that may be relevant to issues in or tangential to the draft report but that fall outside of the scope of our work. (Note: Comments are summarized. Each issue includes a number in parentheses, representing the number of correspondents that raised a recognizable version of that issue.)

1. The final report should provide a model analysis of protective actions which best accomplish dose savings under different accident release scenarios. That analysis, while complex, is simpler than what JLWA recommends, and would serve as guidance to State and local planners. (1)
2. You cannot divorce the evacuation plan from the safety of the plant, so the draft should have reviewed the safety of the plant. (2)
3. The final report should ask the State to allow JLWA to perform a thorough and independent traffic study that considers factors the current Entergy contractor may not properly consider. (1)

4. The draft report should have taken a position on the future status of the plant; otherwise JLWA dodges responsibility for the comments submitted. (1)
5. Nuclear power plants in the U.S. are the most secure industrial facilities in the world. (5)
6. Southern New York State is facing a significant energy shortfall. Discontinuing operations at Indian Point would aggravate that condition and have a deleterious impact on the economy. Nuclear power provides emission free electricity. (6)
7. The debate, and the draft report, negatively affects the morale of the workers and the feeling of security of the residents of the communities. The continued publicity about accidents may have a negative effect on public mental health. (2)
8. JLWA recommendations constitute an unnecessary burden on the government and the plant, especially when they go beyond the requirements of the regulations. They distract owners and operators from their jobs. (4)
9. The final report should address recovery and re-entry issues. In particular it should address possible improvements in connection with the New York reservoir system, instead of merely observing that the plans were silent about the site-specific sensitivity of the system to a release. Also, it should address who decides when, where and by what routes re-entry is possible after an event. It should look at decontamination of roads, structures and land; relocation of residences and businesses; long term monitoring of agricultural products; and the provision of health care. The draft should also have looked at business losses and other economic issues. (7)
10. The final report should provide an estimate of the cost of addressing the problems JLWA identified, and of implementing the recommendations. Cost information bears on the ability of the government and others to carry out our recommendations. (2)
11. JLWA should meet with and assist local planning groups that are demonstrating progress in implementing the recommended improvements. (1)
12. The final report should further address temporary shelters for evacuees. In particular, it should discuss allocation of shelters, their equipment and supplies, how long they can function, and procedures for reuniting families. (1)
13. The final report should address false Entergy claims that Indian Point releases no emissions, that TMI produced no negative health impacts, and that the energy they produce is irreplaceable in the region's energy supply. (1)
14. Indian Point is not fully protected and secure. (2)
15. A set of procedures is needed to protect planners and exercise evaluators from retaliation for reporting problems. Many more problems exist than we uncovered, because many problems do not make it into exercise reports. (1)
16. JLWA did not explain why FEMA withheld approval of the State plan from 1981 to 1996. (1)
17. The draft should be further revised, and then reissued for public review, allowing more time for comment. (1)
18. JLWA does not examine the evacuation of lower Manhattan on September 11, 2001. Certainly hundreds of thousands were successfully evacuated then. (1)

Afterword

We have mentioned in the report how highly we respect those who have dedicated their professional lives to the protection of their neighbors, their communities, their state and their nation. We also respect those within what we have called "advocacy groups," a term of convenience that includes individuals of diverse interests and opinions, some of whom may be found among the professionals mentioned above. We recognize there are many other concerned and dedicated individuals and organizations that play a legitimate role in the issues we discuss.

There are few among these groups and individuals who will read the report and agree with all of it. Many may even take offense at some parts of it. We accept that as inherent in the nature of an independent, comprehensive report.

We have made observations that we believe will benefit the citizens of the State of New York, and we have made them in the hope that that potential benefit might be realized.

James Lee Witt

Appendix L: Response to the FEMA Report

To be published the week of March 10, 2003.