

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. There are some unique aspects of terrorism that off-site planning and exercising should address. 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 Grunfest (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 in 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 its 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, TN⁵⁰

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 Wachtendorf⁵⁷ 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 Management: 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 Department⁶¹ 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 Ujihara⁶²).

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 response⁷¹ 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 Nuclear 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*. Quorum 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*. Quorum 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*. Quorum 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