

Rebuttal to Respondents to Testimony on the Environmental Justice Contention Report

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This author provided expert testimony on behalf of Intervener Clearwater, Inc. entitled "Environmental Justice Impacts from The Proposed Relicensing of the Indian Point Nuclear Power Complex: A Focus on Sing Sing Prison" on October 5, 2011. Ex. CLE000012. The testimony provided a detailed assessment of potential significant adverse and disproportionate Environmental Justice impacts to inmates at Sing Sing prison associated with a potential radiological emergency at the Indian Point nuclear complex.

In the end of March 2012, both Energy and NRC staff filed a response brief to my testimony. NRC staff filed "NRC Staff Testimony of Jeffrey J. Rikhoff and Patricia A. Milligan Regarding Contention Cw-Ec-3a (Environmental Justice)." Ex. NRC000063. Entergy filed "Testimony of Entergy Witnesses Donald P. Cleary, Jerry L. Riggs, and Michael J. Slobodien Regarding Contention Cw-Ec-3a (Environmental Justice)." Ex. ENT000258.

Here I offer rebuttal to these two responses.

I. Uncontested Findings

ENTERGY and NRC staff responses did not attempt to refute several key assertions in my testimony, which as a result stand without dispute.

- 1.** Applicant Entergy and the NRC staff carry the burden of proof to show the adequacy of their analysis of Environmental Justice impacts in this matter. In particular, the NRC is required to consider potential adverse Environmental Justice Impacts in its review of requested permit extensions for the Indian Point Nuclear Reactors.
- 2.** Reflecting uncertainty over whether the above responsibility was met, the Atomic Safety and Licensing Board accepted as an issue for adjudication the potential for disproportionate significant adverse impacts to the inmate population of Sing Sing Prison during a nuclear emergency at Indian Point.
- 3.** Sing Sing constitutes a legitimate Environmental Justice population under NRC regulation.

4. Neither NRC staff nor Entergy conducted a site-specific assessment of the impacts upon Sing Sing prisoners of an Indian Point nuclear emergency.
5. By their discussing shelter in place and evacuation as forms of potential mitigation for a nuclear emergency at Indian Point, there is a *de facto* acceptance by Entergy and NRC staff of emergency response as a legitimate topic for review in assessing potential environmental justice impacts.
6. Shelter-in-place is the intended emergency response action for Sing Sing prisoners should a nuclear emergency occurs at Indian Point.
7. Neither NRC staff nor Entergy conducted a site-specific assessment of the ability for Sing Sing prison to physically or organizationally protect inmates sheltered in place during an Indian Point nuclear emergency.
8. At some juncture in an emergency, the State of New York Department of Corrections might change course and seek to evacuate Sing Sing prisoners.
9. Neither NRC staff nor Entergy has carried out a site-specific assessment of the ability for safe evacuation of Sing Sing inmates affected by an Indian Point nuclear emergency.¹
10. The current and continuing disaster in Japan at Fukushima Daichi indicates that a Katrina scale total disaster can occur in contemporary nuclear plants with widespread and poorly predictable primary, secondary and cumulative impacts; such an event does not require immediate fatalities in order to be considered highly significant.
11. Special populations, including Sing Sing prisoners, would be differentially treated during a radiological emergency at Indian Point and even be allowed to receive higher doses of radiation than the general population.

II. Rebuttal of Contested Issues

Both Entergy and NRC staff responses parrot the logic of the FSEIS as if it were not successfully challenged. They seemingly forget that the Atomic Safety and Licensing Board (“ASLB”) ruling on Environmental Justice coupled with Clearwater’s initial evidence created a burden for their response to prove its adequacy. No proof is offered. Instead, lame excuses are made. Here I examine the proffered excuses.

¹ NRC Staff does cite the completely unsupported opinion of a NYSDOC official within whom they had a phone conversation. Neither NRC staff nor the cited official offer any details or analysis of the evacuation plan.

1. The respondents attempt to excuse their failure to conduct the necessary site-specific analysis of Environmental Justice by contending that their EJ obligations were met, pro forma, because they conducted a global survey of the extended region around Indian Point.

A. Respondents attempt to dodge their responsibility by noting that Sing Sing prisoners were subsumed within the huge population surveyed in their "four state study of 13,000 census block groups." After all, the sample was so big that Sing Sing must be in there somewhere!

B. Furthermore, following the same reasoning, they argue that the Sing Sing population was by definition included in the census data for group quarters for institutional populations.

C. As a result, respondents argue, "[n]o member of a minority or low-income population was excluded from consideration in the FSEIS" NRC Staff Testimony of Jeffrey J. Rikhoff & Patricia A. Milligan Regarding Contention CW-EC-3A (Environmental Justice) ("Staff Testimony") at A27 (Ex. NRC000063).

D. The fallacy of this "nobody is excluded" reasoning is obvious. Being included in the population of a large superficial survey does not mean that any real analysis of Sing Sing inmates occurred. In fact, we know it did not. So, following this logic, to be included is to be ignored. "I know it's in there somewhere, but I just don't see it."

E. These excuses by the NRC staff indicate a deeper methodological issue of asking wrong questions and looking in the wrong places. Obscured by the scale of analysis, site-specific details are missed in the NRC Staff's approach. They are out of sight, and thus out of mind. Thus, NRC Staff overlooked the substantial Environmental Justice impacts I discuss in my report. It is not just about Sing Sing inmates. The analysis offered by NRC staff and Entergy is meaningless for addressing such questions as whether any particular EJ group might suffer disproportionate significant adverse effect. Even if it were true that there was no discernible impact for the general population, it does not follow that there is no impact for specific Environmental Justice populations. That is why a site-specific analysis is required.

F. The CEQ EJ guidance cited by Entergy dictates that the analysis must neither dilute nor exaggerate findings. Entergy specifically cites the CEQ guidance to the effect that the selection of the "appropriate unit of geographic analysis (must be) chosen so as to not artificially dilute or inflate affected minority populations (. . .)". Testimony of Entergy Witnesses Donald P. Cleary, Jerry L. Riggs, & Michael J. Slobodien Regarding Contention CW-EC-3A (Environmental Justice) ("Entergy Testimony") at A32 (Ex. ENT000258). Any good researcher works at the level of analysis that best illuminates the phenomenon they are attempting to study rather than the level that most obscures it. NRC methodology, in opting for the latter, should be modified accordingly to comply with the CEQ EJ guidance.

G. Respondents rely on census block "group" scale data exclusively. Their justification is that income data is unavailable for the more locally sensitive Census Blocks. This explanation would be convincing were it not for the fact that race data is available at the more localized scale. Block group data may be required for income but it certainly is not for race. And Block Group data, therefore, may be appropriate for income, but again, it certainly is not for race.

H. The difficulty here is that the inappropriate reliance upon "group" level data risks washing out (i.e., diluting) the presence of minority EJ populations. Proof of this risk is present in this very instance. The NRC Staff analysis overlooked the EJ issues for Sing Sing. And Sing Sing's population characteristics are so clear that it meets the EJ threshold for either Census Block or "groups" level of analysis.² It is striking that the respondents omitted an analysis of disproportionate adverse significant effect for Sing Sing inmates from their respective analyses. This is interesting in its own right, but it further underscores the real risk that NRC Staff overlooked other Environmental Justice populations that deserve detailed consideration in the FSEIS.

The NRC Guidance makes clear that the assessment of impact to specific communities requires an understanding of the peculiar nature of those communities.³ In my testimony, I accordingly document the contextual implication that Sing Sing is a high security prison with a particular focus on the implications for the EJ population of inmates residing there. NRC staff failed to achieve this understanding in the FSEIS and neither respondent has shown evidence of thinking past the most general, innocuous and unrevealing level of analysis. Although the requirement to do site-level analysis is acknowledged, it is not in fact done. Moreover, absent an alternative study, there is no basis for the respondents to question the conclusions of my testimony. To a surprising degree they in fact fail to do so.

2. The second prong of the respondents' response is that there is no risk and, therefore, there is no obligation to assess potential disproportionate significant adverse impacts for EJ populations.

² Within the 4-state study of 13,000 census blocks, Sing Sing is represented within one of several EJ Census Block Groups identified within the ten-mile exposure boundary. Entergy Testimony at A13, A79 (Ex. ENT000258).

³ As Clearwater reasoned in its issues brief, NRC has a legal obligation to make site-specific environmental justice assessments of the potential impacts of its major actions (NUREG-0586 Supplement 1 (Nov. 2002) at 4-65.) Although the EJ screening approach contained in the NRC guidance is fundamentally demographic and statistical, this approach is intended to be "flexible and supplemented by the EIS scoping process to ensure minority or low income groups are properly identified. *Id.* If potentially affected minority or low-income communities are present, the Commission requires the NRC Staff to "(1) To identify and assess environmental effects on low-income and minority communities by assessing impacts peculiar to those communities; and (2) to identify significant impacts, if any, that will fall disproportionately on minority and low-income communities. Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory & Licensing Actions, 69 Fed. Reg. 52,040, 52,048 (Aug. 24, 2004).

A. Respondents' argument that EJ obligations are satisfied apparently rests on a simple syllogism. The GEIS found no significant risk from continued operation of nuclear power plants. Therefore, no identified EJ population can be subjected to significant adverse and disproportionate harm. Entergy Testimony at A80 (Ex. ENT000258). Using the same logical dead end, NRC staff argue Staff Testimony at A7 (a), A22 (Ex. NRC000063) that they are not required to consider EJ impacts of a severe accident at Indian Point nor impacts of evacuation of special needs populations and prisoners because nuclear power plants are expected to operate safely. This rhetorical and tautological position represents just the kind of regulatory rationalization for permitting environmental injustices that Executive Order 128928 was intended to overcome. The Commission has also tacitly rejected this argument, because the Commission took action to require more in-depth EJ assessment in response to the Executive Order. Had the Commission adopted the Staff's current argument, it would not have required the additional EJ analysis.

B. Ironically, NRC staff accuses Clearwater of exactly the same kind of tautological thinking that they then proceed to engage in themselves. Staff Testimony at A7 (b), A22 (Ex. NRC000063). Clearwater, according to NRC staff, assumes that a radiological emergency will occur at Indian Point (and that emergency planning is deficient), both dismissed by NRC Staff as unreasonable assumptions. The tautology is that both assumptions presage impact. Meanwhile, NRC Staff (and Entergy) assume that no accident will occur (and emergency planning will work) and therefore there will be no impacts. Here the tautology is that both assumptions assume no impact.

C. Clearwater is appropriate in asking what impacts might result should an accident occur. An Environmental Impact Statement was required out of recognition that potentially significant adverse impacts might occur as the result of re-permitting Indian Point. In fact, such "what if" thinking is the very basis of NEPA, which seeks to identify potential significant adverse impacts before a project is approved so that potential mitigations can be developed, alternative courses of action compared and, most importantly, so that decision makers have as full an understanding as possible of the consequences of their decision.

D. On the other hand, tautological thinking on the part of NRC Staff defeats the purpose and intent of NEPA and attempts to cut off from review questions crucial to a "hard look" and necessary for the preparation of an impact assessment properly informative to decision makers. Such an approach defeats the public interest and, in this case, deprives at least one Environmental Justice community of consideration for impacts they might be left to bear should a nuclear emergency occur. Entergy can understandably (if inappropriately) use this

argument as a means of protecting and advancing its corporate interests. But why would NRC Staff fail to carry out a full and competent review? Perhaps the NRC Staff regards NEPA as a box that has to be checked prior to reaching the inevitable result that the extended license will be issued. Or perhaps the Staff sees no gain in carrying out a review that would inevitably find problems that are difficult to solve.

E. Regulatory (double) bind reflects a condition when proper conduct results in intolerable outcomes. One is damned if one acts properly and if one does not. Examples of regulatory bind are given in Chapter 5 of my book *Contaminated Communities*, and include situations where agencies have no means to address the conditions that would occur if they acted rationally, communicated clearly or exceed the limitations of their mandate or resources. In this instance, NRC staff may have concerns that a full EJ review in the FSEIS would negate their ability to issue a permit and create precedent problems affecting other permit reviews. The regulatory cost of admitting some risk of a severe accident, given the practical difficulty of talking about low but still measurable probabilities and "appropriate" risks and tradeoffs, invites the more expedient practice of acting as if risk were zero. This, in turn, provides a convenient basis for rationalizing away potentially affected EJ populations. Recognizing the kinds of impacts discussed in my report and testimony may be too troublesome for NRC Staff to deal with. Finding a basis to ignore the impacts is safer than addressing them.

F. A heuristic is a mental shortcut often taken as a way of avoiding overwhelming complexity. While cognitive psychologists speak of heuristics held by individuals, I have focused on shared group heuristics. There is a "regulatory heuristic" evident in NRC Staff's "no accident means no impact" rationalization. The erasure of risk means the erasure of impact. Reliance upon this heuristic allows regulatory decision making unencumbered by uncertainty and for tradeoffs and costs to be overlooked.

G. By extension, there is a "Fallacy of Low Probability" inherent in probabilistic risk assessment. Beginning with the Rasmussen Reactor Safety Study, risk is calculated as severity multiplied times probability. That calculus allows for high levels of severity to be tolerated (as "acceptable risk") if classified as sufficiently "unlikely." Better yet, it is erased at a likelihood of "zero". Tempting and convenient for those advancing permits through a minefield of possible objections.

H. The fallacy occurs because even unlikely nuclear emergencies still occur and maybe even "zero" likelihood emergencies. A "high impact" event need only occur rarely or even once to be significant. NRC Staff should know this. Yet, their brief is replete with regulatory heuristics. Even the Fukushima disaster failed to serve as a wakeup call. Its occurrence is treated as if it were not generalizable to NRC regulated reactors.⁴ This glimpse into NRC's regulatory heuristic helps to explain why a deficient impact assessment was produced. In fact, as Clearwater contended, in order to examine the potential impacts of a permit extension for Indian Point, one must assume that severe accidents will occur, independent of a consideration of frequency.

I. NRC Staff also engage in "Regulatory Complacency," evident in the failure to meet standards set for environmental impact statements, emergency response plans and more recently environmental justice impacts. There is a de facto agreement between regulators and professionals that a "hard look" is unnecessary and undesirable.⁵ Such agreements also explain why all emergency response plans essentially look alike. To qualify as mitigation, however, assumptions must be tested against realities. Untested assumptions shared by regulator and applicant are used to justify the failure to conduct a detailed analysis of the consequences of an emergency at Indian Point, including potential EJ impacts for Sing Sing inmates. The claim that it is unnecessary because there is no risk is a symptom of regulatory complacency. And the ultimate indication of complacency is that, regardless of the excuse, NRC Staff completed an SEIS that failed to provide the required analysis.

J. In his insightful analysis of the Bhopal Disaster, Bogard (1989) observed that mitigation is an indirect admission of hazard. The failure of the mitigation becomes the realization of that hazard. By extending Bogard's logic we can see that NRC Staff exhibit a "Fallacy of Mitigation" whereby a mitigated hazard is confused with the absence of that hazard. Mitigation does not erase risk, but rather attempts to block its effects. But can such steps actually be counted on to mitigate a low probability, potentially high consequence emergency

⁴ An NRC Study of the implications of Fukushima for U.S. Reactors fails to go near any admission that a disaster in Japan has significant implications for thinking about American reactor safety. Some worthwhile preventative steps are proposed. But, while there is no consideration of the ground level impacts to the Japanese public affected by the disaster, better public education is recommended to control for irrational fear on the public's part. Charles Miller, Amy Cabbage, Daniel Dorman, Jack Grobe, Gary Holahan, & Nathan Sanfilippo, U.S. Nuclear Regulatory Commission, *Recommendations for Enhancing Reactor Safety in the 21st Century: The Near-Ter Task Force Review of Insights From the Fukushima Dai-ichi Accident* at vii-x (July 12, 2011).

⁵ Michael R. Edelstein. "SEQR and You will Find 'ER: The Integration of Sustainability Planning and Impact Assessment, Part 1." *Environmental Law in New York*, March 2010, 21, 3, pp. 41-47. March 2010.

at Indian Point? The assumption that mitigation will work is accepted out of complacency when there is instead a need for proof. Specifically, the statement that sheltering in Sing Sing is protective is different than presenting the results of a comprehensive analysis to determine just how protective sheltering at Sing Sing will be.

K. For all the discussion of zero risk, the NRC Staff's reference to mitigation (i.e., the emergency response plan) constitutes a backdoor admission that risks claimed not to exist are in fact real. *E.g.*, Staff Testimony at A36 (Ex. NRC000063). After all, if there is zero risk, why would there even be a need to discuss shelter in place and evacuation? NRC Staff cannot have it both ways.

L. Regulatory capture may also be at play. I was hardly the first to observe this phenomenon, discussed most recently in light of the BP Oil Disaster in the Gulf of Mexico.⁶ Regulatory capture occurs when regulators and industry get too cozy, when revolving doors are evident between them, when the regulators' mission coincides too closely with the industry they regulate and when professionals involved on either the government or industry side share the same training, jargon and disciplinary biases. In its excellent discussion of the Lessons of Fukushima, Greenpeace devotes an entire chapter to this question, concluding both that it was a major contributing factor to that disaster and that it is a serious problem for U.S. nuclear regulation as well. TESSA MORRIS-SUZUKI, DAVID BOILLEY, DAVID MCNEILL, & ARNIE GUNDERSEN, GREENPEACE, LESSONS FROM FUKUSHIMA 37-45 (Feb. 2012) (“Greenpeace: Lessons From Fukushima”) (Ex. CLE000050).

M. The Fallacy of Technological Confidence is also evident in the Entergy and NRC Staff responses. *E.g.*, Entergy Testimony at A54, A55 (Ex. ENT000258); Staff Testimony at A20 (Ex. NRC000063). Estimates of low likelihood derive from confidence in technological safeguards, ignoring what Charles Perrow called “normal accidents” (1981 a and b, 1984). Three Mile Island because of the poor ergonomics of the control boards that prevented true monitoring of the plant; Chernobyl caused not by a malfunction of the reactor under normal operating conditions but by an ill-fated decision to test how well the reactor handled when pushed outside of normal operating conditions; Bhopal by operator error and neglect; the

⁶ Edelstein, Michael R. “Privacy and Secrecy: Public Reserve as a Frame for Examining the BP Gulf Oil Disaster” in S. Maret (Ed.) “Government Secrecy.” Research in Social Problems and Public Policy: Volume 19. Evergreen Publishers, 2011. Note this article won the Evergreen Journal Submission Award.

Texas City Hydrofluoric Acid Spill by virtue of an accident on a crane involved in periodic plant maintenance and not routine operations. The Japanese deployed the most advanced equipment for pinpointing where people had to be evacuated and where they might shelter safely. However, the equipment was ineptly used with the result that there are numerous examples of unnecessary public exposures due to errant information. CLE000050 at 18. The point is that while one must strive for “foolproof” technological systems, one must plan for these systems to be fooled. The NRC staff reliance on predictions of no risk embodies this fallacy as well.

N. One of the lessons of the regulation of toxic chemicals has been that the historic focus on cancers obscured many other physical and non-physical impacts. The presence of such impacts as respiratory injury, endocrine disruption and psycho-social impact do not detract from cancer as a concern, but they demand that our approach to chemical exposures be much broader. In the same vein, NRC Staff act as if the only risk of concern is from death due to radioactive exposure, the same low (no?) probability high consequence risk we have been discussing. However, the risk of non-lethal physical and psycho-social impacts from an emergency at Indian Point and of death from secondary causes is considerably greater than that of death from radioactive exposure. As established by my testimony, even if risks from radiological exposure were not to prove objectively significant, they could still hold high subjective significance to the individuals at risk. Such perceptions will underlie the behavior of all of those in the situation and can contribute to numerous other significant and disproportionate adverse impacts that will be incurred by Sing Sing inmates during an Indian Point emergency, including all of the impacts discussed in my report due to shelter-in place and possibly from evacuation as well. My testimony below regarding the Fukushima nuclear disaster underlines that fatalities can be experienced even where risks from radiation exposure are objectively insignificant. Instead of decrying the irrational nature of the human mind, the NRC Staff should recognize reality by assessing these impacts.

In conclusion, the requirement that Environmental Justice must be considered in a site specific review reflects an important reality, that adverse impacts occur within the context created by the actual facts on the ground and not the assumptions contained in a generic emergency handbook. My testimony illustrates the importance of an in depth contextual look for potential impact. In contrast, Entergy and NRC Staff take a superficial and dismissive position based on the subterfuge that there is a generic absence of risk and, therefore, no requirement to examine site scale impacts. A number of explanations have been offered above that render this reasoning irrational. It is instructive, accordingly, that both Entergy and NRC Staff ignore the fundamental reality of the Board's ruling that this issue warrants adjudication. A deeper examination is required by ASALB of how Sing Sing's inmate population would be impacted by an emergency

at Indian Point. The response briefs are unresponsive to this ruling. Neither respondent has offered any indication of taking the hard look at EJ demanded and neither has refuted the fact that my testimony provides just such a hard look.

III. Entergy and NRC Staff fail to show that Shelter in Place is a sufficiently protective mitigation

1. Considerable discussion of shelter in place and evacuation occurs in the Entergy and NRC Staff filings despite the respondent's insistence that, absent any risk, no impacts are feasible.
2. In discussing shelter in place, Entergy corroborates my testimony on two key points: shelter is the intended emergency strategy for Sing Sing and "special" populations such as prisoners are allowed twice the radiation dose as the general population. Entergy Testimony at A64 (Ex. ENT000258).
3. Entergy attempts to justify sheltering Sing Sing prisoners on the grounds that residents of other institutions will also be forced to shelter in place (pp58-9). Entergy Testimony at A72 (Ex. ENT000258). Entergy's argument establishes an important point. Residents of other "special" institutions, and not just Sing Sing, are also in danger of suffering disproportionate impacts should an emergency occur at Indian Point. These other special institutions, such as Sing Sing, should be fully assessed in the FSEIS and any feasible mitigatory steps identified.
4. Placing Sing Sing in the same category as these other institutions hardly negates the Environmental Justice impact to Sing Sing inmates. Some disproportionate adverse impacts might even be shared with other "special" facilities.
5. At the same time as some impacts are shared with other special institutions, unique features of Sing Sing must also be considered. Entergy fails to distinguish the fact that other "special" institutions in question are not maximum-security prisons and their populations and circumstances are quite different. For example, impacts of a radiological emergency to special populations exposed to a radiation dose in excess of that allowed the general public might vary with the age of the recipient. In comparing a facility for the elderly to the Sing Sing population, perhaps a full assessment would conclude that the aggregate differences in the age of the populations would differentiate risk because elders are less likely to live out the latency period for potential resulting cancers. A second example involves differences between special institutions with regard to accessibility. Relatives might be able to pick up and evacuate a family member from some institutions

ordered to shelter, but, absent a jailbreak, not from Sing Sing. Overall, Entergy fails to refute my testimony that potential adverse impacts are unique for prison populations and particularly for Sing Sing. That Sing Sing prisoners, an EJ population, would have disproportionately more and different significant adverse impact is not refuted.

6. The respondents' assessment of the protectiveness of shelter is generic and rhetorical. They offer no assessment of building types or site-specific effect, nor do they fall back on a substantive literature. They rely merely on prior and accepted practice. Thus, Entergy's attack that my analysis of the inferiority of shelter as a protective mitigation lacks support is interesting, because it is their own position that actually wants support. *See* Entergy Testimony at A80 (Ex. ENT000258). NRC Staff bore the responsibility to show proof that shelter in place is protective and that it mitigated significant adverse and disproportionate impacts on Sing Sing prisoners. Yet, Entergy has offered no analysis whatsoever or NRC Staff demonstrating the protective attributes of Sing Sing prison, its HVAC systems and its organizational control systems under emergency. By extension, since the respondents have placed all special institutions into consideration, their failure to offer a site-specific assessment of these institutions showing that they offer a protective level of shelter means that all populations confined to institutions of this classification may be at disproportionate risk. Moreover, regardless of race and income, inmates of such "special" facilities share a lack of efficacy and choice that establishes them as -Environmental Justice populations. The euphemism "special" here is illustrative, in fact, of how easily these populations can be dropped into a regulatory wastebasket. In this instance, special actually refers to the fact that these populations are placed at the bottom of the implicit triage list established by the mitigatory regime for an Indian Point emergency. As expendables, their marginalization is assured.
7. Unlike Entergy, which shared no authority for its contentions about Shelter in Place, NRC Staff cite a 2001 Institute for Chemical Studies ("ICS") report on shelter effectiveness as the authority behind their reliance on this protective strategy. Staff Testimony at A34, A35 (Ex. NRC000063). On close inspection, however, the ICS report is hardly a strong endorsement of Shelter in Place. In fact, it largely undermines the respondents' position that it is a protective mitigation.
8. The ICS report makes clear that Evacuation is preferable over Shelter, if feasible. Shelter is to be used if evacuation is problematic, health hazard is low, or if unprotected people would be exposed to a fast moving leak or a toxic vapor cloud. However, although shelter initially offers more protection than being outdoors,

Over time, small cracks in buildings will allow contaminated air to enter the indoor atmosphere. Some exposure will occur.... (ICS (NRC000071) pp. 2-3)

In short, as a choice of last resort, Shelter offers some degree of protection, at least initially, and particularly where the hazard is of low risk. Otherwise, its sole virtue is that it is the only available option when Evacuation is infeasible or inadvisable. Being the only option, however, is different than being a fully protective option! The best option may, in fact, not be protective against the adverse impacts of concern even if, by default, it is the only option during an emergency.

The respondents appear to be confused about the role of Shelter in Place in these proceedings. The primary question here is not about how to make the best of the limited options available during a disaster. Rather, it is about whether there are real protective mitigations available for potential threats. The absence of protective mitigation for identified potentially significant (in this case disproportionate) adverse impact confounds issuance of the license. Thus, a decision to license the reactors turns on this issue of whether there are genuine mitigations for the inevitable impacts of an Indian Point disaster. Unfortunately here, the NRC Staff has sought to avoid any meaningful discussion of EJ impacts by the simple method of denying that there are any. And neither party offers evidence that Shelter in Place will be protective for Sing Sing inmates and other Environmental Justice populations. The ICS report cited by NRC Staff certainly is not a source of such reassurance.

9. The report goes on (ICS (NRC000071) p 3) to add further qualifications:

The amount of protection from sheltering in place varies mainly with the air tightness of the building and the length of time the building is exposed to a hazardous plume. Modern, energy efficient and weatherized homes provide the most effective air movement barrier. But even the most weather-tight home will allow contaminated air to enter slowly. Infiltration of contaminated air into a building can be further reduced by sealing windows, doors and vents with plastic sheeting and duct tape.

Citing Oak Ridge National laboratory, the report notes that additional steps include advanced caulking of points of infiltration and placing the buildings under positive pressure to prevent infiltration. The key point, later reiterated (on p.42) is that

Clearly, the type of structure to be used in a shelter in place action has a large impact on how effective sheltering in place will be in protecting the public.

Given this admonition, one would expect that Entergy and the NRC staff would have undertaken such an analysis of Sing Sing before concluding that Shelter in Place there would be effective protection. Regarding infiltration, neither respondent offers data on how airtight the prison buildings are. Nor do they speak to plans to seal windows, doors and vents at the prison with plastic and duct tape. It is not clear why NRC Staff bothered citing this report---admitting knowledge thereby of its contents---if such information has not been provided. The ICS report confirms my argument that site-specific information is necessary before an assessment of the protectiveness of Shelter in Place can be made. It also confirms many of the concerns about protection that I raised.

10. ICS further supports my testimony when it cites several scientific studies carried out at national laboratories. In the first study, reduction of protection over time was found in "safe rooms." The level of protection varied dramatically according to building features and preparations, but nevertheless the level of protection eroded over time (ICS (NRC000071) p6). I have taken the liberty to display the results in Table 1. Results are very revealing, showing a considerable range of protectiveness and a reduction of protection over time on the rough order of 4/5ths per hour.

Duration	Upper level of exposure	Lower level of Exposure
Ten minutes	1/39	1/101
One Hour	1/7	1/17

Table 1: Modeled Chemical Exposure inside a "Safe Room" over time

Oak Ridge National Lab data cited by ICS (NRC000071 p. 6)

Of course, there is the question of how similar the "safe room" is to Sing Sing, how similarly the chemicals used in the experiment will behave to radiation released from an Indian Point emergency and other factors of external validity. Moreover, only two time

intervals are considered and exposure is only taken to one hour. Yet, the ICS report establishes that the benefit of even a "safe room" is diminished after only that one hour! By extrapolation, the benefit of Shelter would largely disappear in a few hours. It is evident from Fukushima Daiichi and Chernobyl that the time duration of radioactive releases may be extensive, on the order of ten days. In short, the study cited by ICS implies that Shelter in Place is not protective at the duration of radioactive exposure found for actual nuclear power plant disasters.

The second study discussed (ICS (NRC000071) p. 7) involved infiltration into a wood frame cottage by several toxic chemical warfare gasses. The study showed that, particularly for tighter conditions and for one of the chemicals tested, infiltration into the building was significantly reduced because the infiltrating agent was deposited out on the entry points to the building. The citation in the report of the study neglects to note, however, whether the amounts of this agent entering the shelter would still be lethal or harmful when inhaled. A reduction of dose means little if the dose is still sufficient to do harm. That rather obvious and fundamental point seems to have been overlooked. Then there is the fact that the second agent did not show the same reduction in dose. Of course, this study, in a wood frame cottage, lacks external validity and may not be generalizable to Sing Sing prison. There is again the question of whether radiation would behave similarly to that of the toxic chemical gas agents used, and if so, which one would it most resemble. In short, the cited study has limited relevance to considerations of Sing Sing as Shelter absent a detailed comparison to Sing Sing not offered by the respondents.

11. Several case studies of several pages length were offered by the ICS report (NRC000071 pp. 44). These were a Chemical Plant Explosion in West Helena, Arkansas on May 8, 1997, the Chemical Plant Release at Nitro, WV on December 5, 1995, an Overturned Tank Truck in Marin County, California on July 14, 1999 and a Runaway Chemical Reaction and Vapor Release in Paso Robles, California on November 12, 1991. Another twenty instances of chemical release were briefly discussed with only minimum detail.
12. Overall, these cases had minimal applicability to a nuclear emergency affecting Sing Sing with the exception of the Paso Robles incident. The incident included sheltering in place of over 800 inmates held in the minimum to maximum-security youth detention facility. The facility was ordered to shelter in place a day and one half after the incident started and for less than one day, a fraction of the time that might be demanded in a nuclear disaster. Nevertheless, it is instructive to read what the ICS reports about this experience (2001, pp. 18-19).

The detention facility housed approximately 800 "youth" inmates (13 to 26 years in age), with 150 of those being maximum security inmates on 23 and a half hour

a day “lock down”. These inmates were housed in approximately 80 wards with a centralized feeding and education/ recreation facilities on a large compound. Each ward housed 10-15 inmates.

Several logistical problems were noted in the decision to shelter-in-place at the detention facility. Since the facility was located wholly within the boundaries of an evacuation zone, workers that would normally report in the morning for normal shift changes were unable to do so. This problem was further compounded by the fact that several of the on-duty (night shift) personnel were already working a third shift and had not planned on being at the facility beyond normal shift change. Staffing for the overnight shift is reduced when compared to day shift and concerns regarding control of the inmates were raised particularly if the incident continued longer than the anticipated 12-hour window of risk that had been established.

Once it became apparent that meals would be required due to the duration of the incident, logistical problems occurred in terms of how to get the inmates to the centralized feeding facility or get meals to them in their wards without creating an exposure hazard. Also, if the incident ran longer than anticipated at the outset, concern over how to restock the centralized feeding facility was raised.

The limited supplies on hand for expedient sheltering modifications, such as duct tape and sealing film, were quickly exhausted with no means for replenishment.

The case study does indicate that inmates remained calm in part because excellent communications was maintained during the incident.

As to the issue of whether evacuation might have been considered, the report makes some interesting observations (ICS, (NRC000071 pp. 20-21):

The California Youth Authority activated its internal emergency operations center for the duration of the incident. Existing plans were in place for both shelter-in-place and evacuation. However, the liaison from the Authority was unaware that an evacuation plan existed.

The primary reason the evacuation plan was in place for the detention facility was the proximity of a nuclear power station to the facility. The evacuation plans included transportation, security and reception center issues that had been resolved in planning, but had never been tested other than a tabletop exercise.

While the detention facility management staff was very confident that the facility could have been safely and effectively evacuated in a reasonable period of time without incident, other staff members were not as confident on that point.

- 13.** Under "Lessons Learned" ICS (NRC000071 p 44) makes a broad endorsement of shelter-in-place and then qualifies the endorsement dramatically.

Examination of news reports, federal databases, incident reports and other data clearly indicates that sheltering in place, either alone or in conjunction with evacuation, is used effectively by emergency managers across the United States. The available data, however, generally lack sufficient detail to draw clear conclusions about effectiveness. To clearly demonstrate effectiveness, one would need to know whether a toxic gas cloud of sufficient concentration to be harmful entered a populated area.

It would also be important to know whether the population received warning in a timely manner, whether residents were clear on steps to take to shelter effectively, and whether residents implemented sheltering techniques prior to arrival of the toxic plume. Only in a few cases can it be determined that a cloud of toxic gas entered an area in sufficient concentrations to be harmful. And in even fewer cases are details of shelter in place education and implementation available.

It is instructive to explicitly contrast these two ICS sentences from the same paragraph above:

"(...) sheltering in place... is used effectively by emergency managers across the United States."

And, the next sentence,

" The available data, however, generally lack sufficient detail to draw clear conclusions about effectiveness." "

In short, the practice of Shelter in Place is so ingrained that it can be considered effective even when there is no detailed evidence to support this conclusion. The reality, exposed by the ICS report, is that the field of Emergency Management has perpetuated a myth about the protectiveness of Shelter in Place. But when one tries to pin down the evidence that it is a bona fide mitigation, there is virtually none. Neither NRC Staff nor Entergy--- or for that matter ICS---offer any supporting evidence. Yet, the force of prior practice and belief perpetuate an untested practice. In stark contrast, my own work over nearly forty years on the psycho social impacts of exposure to hazards offers countless examples of failed mitigation, including instances where shelter in place fails as a protective strategy. Take just one example from the ICS report, the hydrofluoric acid spill in Texas City, Texas, where I interviewed a sample of nearby residents after the incident. The gas quickly drove people from their homes and they were forced to run away down the street from the enveloping cloud. The incident is often referred to as America's Bhopal but with the difference that the chemical exposure was fortunately not fatal in Texas City.

14. Neither the application nor the impact statement make the case for Shelter in Place as protective mitigation for Sing Sing prisoners during a nuclear emergency at Indian Point. And, although asserted in the rebuttal documents, the case is certainly not made there either. In short, Shelter in Place is only presumed to be sufficient protection but there is no evidence to justify this presumption. The ICS report is the sole authority offered to justify shelter in place. This document, in fact, casts doubt on the approach. The report's qualified endorsement of shelter in place, undermined by the report's content, is clearly a matter of damning by faint praise. Just to review the specifics:

- In the chemical release cases cited by ICS, shelter in place is justified only by default (where evacuation is not possible) or as an alternative to remaining outdoors during an incident.
- The protectiveness of sheltering is affected by key variables identified by the report. The empirical basis for these variables derives from measurements taken during two controlled experiments. But these variables are not examined by NRC staff or Entergy as a basis for their endorsement of sheltering and no field measurements are offered as evidence.
- No information is provided about prison environments by ICS and the one case study involving a prison does not make for a strong endorsement of sheltering.

- ICS gives only scant information about the chemicals involved in the cases and no information for the experiments cited. Clearly, however, the behavior of the chemical is a variable. Neither ICS, nor Entergy and NRC Staff, offer information about the forms that radioactive release might take during an emergency and how radiation and radioactive particles behave in matters pertinent to the success of shelter in place.
- The ICS report offers only a meager bibliography. The lack of a literature confirms my contention that shelter is assumed to work; it is a belief shared by those in the field that has not been tested or questioned. It is a matter of faith.

It would appear that Entergy and NRC staff, in citing the ICS document as proof of their endorsement of shelter in place, either did not read the document or assumed that no one else would. As a social scientist, I am shocked that Entergy and NRC Staff (and the larger field of Emergency Response) would impose on the public a strategy for emergency response that has not been proven to be protective. In the context of impact mitigation, rather than emergency response, the failure to demonstrate that shelter is protective has serious implications for the ability to consider it as a mitigation for potential harm associated with the operation of Indian Point.

My report and testimony establishes a potential for disproportionate adverse impacts for Sing Sing inmates that is not reliably mitigated by Shelter in Place. As presented, Shelter in Place represents a rhetorical rather than substantive protection. While Sing Sing prisoners will nevertheless be sheltered in the event of a nuclear emergency at Indian Point, NRC Staff, supported by Entergy, have failed to provide any meaningful assessment of the effectiveness of the policy they would implement. And, as demonstrated above, even the evidence they cite casts doubt on their approach. In my view, this conduct constitutes an intolerable failure of fiduciary responsibility.

IV. Evacuation is Unlikely and would be Perilous for Sing Sing Inmates

1. The Respondents question my conclusion that there are no plans to evacuate Sing Sing inmates. Although respondents claim to have located a plan to evacuate the prison, they have not reviewed the plan or made it available through discovery. This plan therefore cannot form the basis of any of the conclusions drawn in the FSEIS.

2. NRC Staff rest their entire reassurance about evacuation from Sing Sing upon a vague account of a phone conversation with a NYSDOC official. Staff Testimony at A36 (Ex. NRC000063). They obtusely report that Theodore Fisch of the Office of Emergency Management is "aware of the Department of Corrections plans to provide protection of the safety of the prison population" and that "[c] corrections officials are confident they will be able to relocate prisoners from Sing Sing should the need arise." *Id.*

Their response brief makes further assertions about NYSDOC's "detailed emergency plan" and "well trained staff" and their ability to evacuate prisoners if conditions deemed it "appropriate." Such statements, absent detail, lack foundation. No detailed NYSDOC emergency plan for Sing Sing has been made public, nor did the corrections official say the plan was detailed. Lacking any hard facts, the NRC Staff statement on evacuation of Sing Sing amounts to little more than a statement of faith.

3. Meanwhile, Entergy takes the position that because an evacuation could be undertaken, there is no basis for concern that the prison population would suffer disproportionate impact. Entergy Testimony at A73 (Ex. ENT000258). This argument is riddled with contradictions. First, just because an Evacuation Plan may exist does not mean that there would be no adverse impacts should an emergency occur at Indian Point and an evacuation ordered for Sing Sing. Second, as noted above, I need to assess the alleged plan to anticipate resulting impacts from its implementation. NRC Staff and Entergy should act to make this plan part of the record so that it can be subjected to review. And, third, even if it is a great plan, it is unlikely that it would be carried out during an emergency with no impact whatsoever to Sing Sing inmates. Finally, the plan remains to shelter inmates in place until such time that NYSDOC determines that an evacuation should occur.
4. The NRC Staff response offers some clarification about when, in an unfolding emergency, there would be an evaluation of evacuation of Sing Sing prisoners. (A36)

(...) during a severe accident, after the plume has passed or release has ended, shelter-in-place would be accompanied by plans to evacuate or relocate out of the impacted area if conditions require such action. If such plant conditions are projected to impact Sing Sing or other such special facilities, then the facility emergency plan would recommend the evacuation of these populations.

In other words, discussions of evacuation would not begin until the release event was over. We know from the Fukushima and Chernobyl accidents that this can translate to

Sheltering in Place for ten or more days. Greenpeace: Lessons From Fukushima at 7 (CLE000050).

5. The facts presented in my testimony stand: the Sing Sing population will be initially sheltered, even in the face of a general evacuation. Unlike all other populations in the ten mile zone, special or not, Sing Sing inmates uniquely require action by NYSDOC following procedures that, to the extent they exist, are not public and therefore cannot be evaluated. In short, the ingredients for disproportionate impact are in fact confirmed.
6. Entergy's mention of "well trained staff" is another vague and meaningless statement. There is no description of which staff is being talked about. Some clarification is given with the comment that NYSDOC is required to train "all new health care staff . . . in all aspects of the emergency and disaster preparation plan." Entergy Testimony at A68 (Ex. ENT000258). As my testimony details, all staff need such training, not just health care staff.
7. In my testimony, I cite a letter written in the 1980s that decries the intent to shelter Sing Sing prisoners in place during a nuclear emergency at Indian Point. Entergy objects to this "old letter" being cited. (Entergy Testimony at 81 (Ex. ENT000258). Yet, the age of the letter is contemporary to adoption of the plan to shelter inmates, a plan that is still in effect. This letter therefore shows that the issue of disproportionate impact on Sing-Sing prisoners was a concern even before NRC had a policy on Environmental Justice. Now that the policy is in place, old concerns need to be addressed, not ignored.
8. Nothing in the Respondent's replies overturns the acknowledged fact that Shelter in Place is the planned response for such special populations as Sing Sing. This fact is neither contradicted by Entergy's vague statements about evacuation nor NRC Staff's reference to an apparently secret NYSDOC plan for evacuation. Such generalities not only fail to refute thirty-year-old misgivings about a policy of Shelter in Place, but they underscore the rhetorical rather than substantive nature of protective mitigation for Sing Sing inmates.
9. A further exercise in vaguery is NRC Staff's reference to NRC's enforcement capability to step in if the emergency plan is inadequate. Staff Testimony at A30 (Ex. NRC000063). It is not clear if the reference is to Westchester County's public emergency plan or NYCDOC's secret plan. As with the prior statements on evacuation that told us to trust NYSDOC's secret plan, here we are asked to trust NRC to act if others fail. Nowhere is there delineated the policy guiding when NRC would override the actions of a different authority directing evacuation or what it would then do differently.
10. NRC Staff also attempt to refute the potential for disproportionately high adverse impact on the Sing Sing population based on a vague statement about the Emergency Management Office's commitment to ensure protection of the public. The good wishes of

emergency planners are not disputed here. But we must push for something more solid, such as how this commitment will be achieved given the pitfalls set forth in my report and testimony. There needs to be a full delineation of the anticipated impacts of evacuating Sing Sing prisoners during a nuclear emergency.

11. Vague vacuous assurances aside, it is hard to escape the conclusion of my report, that there will be a disproportionately higher adverse impact for Sing Sing prisoners than for others in the general or special populations. This is certainly true for psycho-social impacts, as I have discussed at length in my report. Moreover, it is recognized that there will be higher tolerated dose received for this population. The SFEIS should address both short and long term consequences for individuals receiving this dose.
12. Above, I mentioned the call to blind faith. Overall responses to my testimony explain whom this faith is to be in. The Respondent's rhetoric devolves into a mantra "trust Entergy, trust NRC, trust NYSDOC." The situation reminds one of the presumptive security offered before Katrina, Fukushima Daichi and other parallel disasters. All such events are, in effect, failures of such trust, where fiduciary responsibility of agencies falls short in no small part because rhetorical rather than substantive mitigations were offered. The late environmental sociologist Bill Freudenberg referred to such failures as "recreancy."⁷
13. Contradictory arguments also appear in the matter of allowed dose. NRC Staff complains about Clearwater's contention that prisoners would get a higher dose of radiation than the public. Staff Testimony at A39 (Ex. NRC000063). Yet, contradicting themselves, they also admit "*it is possible that specific populations such as those incarcerated at Sing Sing could receive radiation doses higher than other populations that are immediately able to self-evacuate, [but] any doses received would be within the EPA dose guidelines.*" *Id.* This is an admission that disproportionate impact could occur and that the FSEIS conclusions about no differential impacts are incorrect.
14. NRC Staff contend without firm foundation that instant dose (the dose received at any one point in time) is not significant. *Id.* Rather, they weight projected dose over time. This reliance on cumulative dose is then interpreted in a very interesting manner. If the initial dose can be discounted, then evacuation can be considered at leisure. To support their argument, NRC Staff cite evacuation in Fukushima, where school children were evacuated first and then school buses were sent back for adults left behind. Apparently

⁷ Freudenburg, William. 2000. "The 'Risk Society' Reconsidered: Recreancy, the Division of Labor, and Risks to the Social Fabric." In Maurie Cohen, ed., *Risk in the Modern Age: Social Theory, Science and Environmental Decision-Making*, pp. 107–122. New York: St. Martin's.

Sing Sing is viewed as an analogous circumstance, with prisoners left behind initially to be picked up later. That inmates would accordingly receive a higher initial dose is rendered moot in NRC Staff logic because their eventual evacuation would spare them long-term dose. This argument has many problems. Most obviously, if receiving this dose were acceptable, there will be no reason to evacuate the general population at half the projected dose. Certainly, at Chernobyl, some thirty responders received high enough short term doses to cause rapid death. At the same time, thousands have died from long latency diseases. However, the fact that their deaths occurred considerably later does not tell us that the dose that caused death was short term or cumulative. In reality, both short term and cumulative dose over time are health threats alone and in combination.

- 15.** When their comments stray from the Sing Sing context, NRC Staff do not fare much better, as when they discuss evacuation of people without cars. Staff Testimony at A40 (Ex. NRC000063). These individuals, many meeting EJ characteristics, will be ordered to go to bus stops for pick up. Apparently EJ populations lacking cars will stand outside unsheltered contentedly waiting for the next bus. The absurdity of this recommendation is clear in light of the entire logic previously offered by Respondents for the importance of Shelter in Place. It is a perfect Rod Serling script. Just imagine the terror of people knowingly exposed to an invisible hazard while they wait outdoors unprotected. And just imagine the decorum issues for those waiting in line. Surely there are more protective mitigations for people needing bus transport, but they are not offered here. Instead, NRC Staff has offered another beautiful example of disproportionate adverse significant impact to EJ populations. People lacking their own transport will stand outside waiting for a bus.
- 16.** Evidence from the Katrina disaster served as a basis for my analysis of worst-case prison dynamics under disaster, showing the failure of both shelter in place and evacuation. Both Entergy and NRC staff sought to question the applicability of this case.
- 17.** Entergy cites an NRC review of the Katrina disaster, concluding that NRC emergency planning already addresses the lessons of Katrina. Entergy Testimony at A82 (Ex. ENT000258). On their part, NRC staff argues that the Katrina disaster is not equivalent to a nuclear plant emergency, which would be unique, that the size of impact area around Indian Point would be small as compared to Katrina, that the impact of radiation would be different than Katrina's failed levees and that evacuation was successful at Katrina. Staff Testimony at A38 (NRC000063). The abject rejection of learning from Katrina is unfortunate because the Respondents are profoundly wrong. A postmortem of every major disaster can be mined for important learning. Obviously a flood is different than a nuclear disaster, just as the chemical disasters cited in the ICS report cited by NRC Staff differ from nuclear disaster. The trick is to identify what components of a disaster may be generalizable, as I did in my report and testimony. The global dismissal of the Katrina comparison by the Respondents fails to refute the level of careful comparison that I made. Thus, there is a difference between saying that Katrina and an Indian Point

emergency are similar accidents in terms of the hazards involved and saying that some dynamics found in the effort to cope with the in-progress Katrina disaster are instructive to what might happen were there a disaster at Indian Point. In this instance, Katrina represents the best source of information about the impacts to an incarcerated population during both a Shelter and Evacuation phase of response. Respondents miss the learning opportunity completely, offering a glimpse into why the NRC SFEIS also missed the point.

V. Fukushima

1. Entergy contends that the events at Fukushima do not contradict NRC use of probabilistic weighted consequences of a nuclear accident and no adjustments are required based on the lessons of the disaster for NRC protective planning. Entergy Testimony at A83 (Ex. ENT000258). It is instructive that the Respondents attempt to play down the importance of the Fukushima accident. It spoils the "zero" probability argument.
2. In fact, as shown in my report and testimony, Fukushima is highly relevant for reasons that are somehow missed by the NRC in its own review of the disaster (USNRC, July 12, 2011). In contrast, an excellent report from Greenpeace (2012) cogently discusses emergency response-related issues. Drawing from this document, I can reinforce my earlier statements on this subject.
3. The Fukushima disaster illustrates that mitigations embedded in emergency response plans may fail for institutionalized populations in the midst of a nuclear disaster despite highly rated levels of anticipatory planning. Thus, reports of the Fukushima aftermath indicated delayed evacuation that left elderly patients in freezing conditions, failure to find transport for evacuation, abandonment of patients by fleeing staff, relocation of hospital patients to an evacuation center with no medical facilities and other gaffs that resulted in a considerable number of deaths, largely among those unable to care for themselves. Greenpeace: Lessons From Fukushima at 7, 19 (Ex. CLE000050). Greenpeace's account was elaborated in the report of a private foundation investigating the disaster, as summarized in the Wall Street Journal. Yuka Hayashi, *Panel Says Crisis Showed Facilities' Terrorism Risks*, Wall Street Journal (Feb. 29, 2012) (Ex. CLE000053). The account is worth quoting at length:

Evacuating patients from hospitals posed major challenges for medical personnel and government officials, including the difficulty of finding transportation and providing care after power supplies and phone lines were cut off. A number of deaths apparently were caused by the delays in evacuation, the committee concluded. Delays were particularly acute at one hospital in Okuma Township located just three miles from the plant. Of its 435 patients at the time of the

accident, including 337 in its psychiatric ward, a total of 50 had died by the end of March, including 25 who died during the transit for evacuation or at emergency shelters. The problems were attributed to trouble locating vehicles to evacuate the patients, who prompted the hospital president to drive around the area and beg every emergency and military personnel he encountered to send help to his hospital.

In short, rather than the disciplined response built into the apparently thorough emergency plan for the Fukushima Daichi plant, when confronted with the complex of disasters that manifested there, chaos reigned and helpless people were victimized.

4. Fukushima also underscores my point that one must think beyond direct nuclear fatalities in calculating the risk of accidents at Indian Point. After the Fukushima nuclear disaster, on the order of 600 fatalities were given death certificates indicating cause of death as "*nuclear disaster-related*" which allowed survivors to get benefits. What the nuanced wording indicated was that death was *indirectly* caused by the nuclear disaster, reflecting such conditions as fatigue, stress or aggravation of chronic. Greenpeace: Lessons from Fukushima at 19 (Ex. CLE000050); The Yomiuri Shimburn, *573 Deaths 'Related to Nuclear Crisis'* (Feb. 5, 2012) (Ex. CLE000055). The "zero risk" assumption, heavily in dispute, must counter the fact that death and injury may be caused other than by radionuclides.
5. As I noted in my report, the emergency response around Fukushima was fraught with error despite sophisticated hazard models. As a result, people were sheltered who should have been evacuated and some evacuees were sent into highly contaminated areas. The ten-day confinement required after Fukushima was comparable to that necessitated by the Chernobyl disaster. It resulted in food and fuel shortages. Specialized workers critical to disaster response were also in short supply, including drivers, nurses, doctors, social workers and fireman required to support confined populations. In reviewing the Fukushima disaster, Greenpeace concurred with my own evaluation when it concluded that Shelter in Place "*simply does not work in practice*". Greenpeace: Lessons From Fukushima at 7, 20-12 (Ex. CLE000050).

In summary, there are many vital lessons of the Fukushima disaster. If, in fact, NRC did not learn from Fukushima, their blindness to the issues raised is a matter of deep concern.

VI. Dismissing my Qualifications

No response document would be complete without an effort to demean the contending expert's qualifications. Entergy, having failed to dismiss the substance of my testimony on the limits of

Shelter in Place at Sing Sing as a response to a nuclear emergency, turns to dismissing my qualifications:

[Edelstein's] resume does not identify any expertise in emergency planning, health physics, nuclear reactor safety, or severe accident phenomena.

Entergy Testimony at A80 (Ex. ENT000258). The comment suggests no understanding of what is required to produce the EJ section of the FSEIS. As my vita indicates, I hold a Ph.D. in Social Psychology and my practice has been in the area of Environmental Psychology. I have studied psycho-social impacts of human-caused environmental disaster since the late 1970s. My work has been foundational, as indicated by citation of my work in the literature, and my book, *Contaminated Communities: Coping with Residential Toxic Exposure*, Second Edition, has been labeled as the classic in the field. My work has occurred in a broad diversity of circumstances:

- high level nuclear waste repository siting
- accidents at Three Mile Island, Chernobyl and Mayak
- the Exxon Valdez accident
- energy development including gas extraction and tar sands production
- oil refinery accidents and a range of chemical contamination events and industrial disasters (including the Texas City, Texas industrial accident listed as a case in the CIS document on shelter in place)
- cultural opposition to intrusive energy projects
- geologic and anthropocentric radon gas exposure
- proposed or operating waste disposal facilities
- residential and environmental contamination by chemicals
- ecosystem destruction, including the Aral Sea disaster and the drawdown of the Santa Cruz Oasis
- environmental hazard mitigation and cleanup
- communication of environmental hazards and their avoidance
- emergency response outcomes

The focus of work across these situations has been to describe and develop theory for psycho-social impacts experienced by people victimized by these events. The issue of home as shelter is central to a good bit of my work. Over the course of my career, I have addressed virtually every

aspect of psycho-social impact, including instances where shelter-in-place and evacuation failed as protective strategies. And I have often addressed issues of Environmental Justice and differential impact, moving beyond the superficial use of demographics used for classification to actually trying to understand the psycho-social dynamics that constitute the injustice. In short, I am very well qualified to provide this testimony.

One of the vital aspects of my approach to understanding the actual community dynamics and impacts in a given situation has been the ability to contextualize impact. If one can identify the sources and consequences of stress related to the disaster, including both physical exposures but also all of the attendant psycho-social dynamics, one can create a direct connection between cause and effect that avoids the tangle created by the classic legal test of psychological impact, the PANE vs. NRC litigation. There, the use of the word "risk" created an abstract relationship between the community and the threat. In my work, I seek to make concrete relationships that avoid this question. I have appended several pages from my book *Contaminated Communities* that address just this question (see Appendix 1).

Although I am not an emergency response planner, in the narrow sense, I have considerable expertise relating to the impacts of emergency response outcomes, having studied this issue in many contexts over the past thirty plus years, including matters of cleanup, evacuation, shelter in place and emergency communication. And, although certainly not a health physicist, I have co-authored several books and publications and organized national conferences on the topic of radon gas, collaborating with a physicist when I had to address aspects of the hazard outside my expertise. As a social scientist, my work abuts the more technical areas of emergency planning, health physics and disaster response closely. My report is a social science study drawing upon my own training and expertise without pretension to these other fields. In sum, assessment of potential environmental justice impacts from a nuclear emergency, including the protectiveness of Shelter in Place, is well within my expertise. It would hardly be the expertise of someone in health physics, reactor safety or emergency planning.

This digression into my own qualifications raises the matter of the qualifications of Respondents' experts to discuss Environmental Justice impacts for Sing Sing. I do not mean to question my colleagues expertise broadly, but rather to assess whether there is something about their backgrounds that helps to account for the failure of NRC Staff and Entergy to address Environmental Justice implications of license renewal for Indian Point, specifically in this case for inmates of Sing Sing.

For Entergy

Donald Cleary, a consulting economist who, until a decade ago was a member of the NRC staff for nearly thirty years. Mr. Cleary worked inside NRC on socioeconomic impact assessment of nuclear reactors. He helped author many NRC policies and documents. The thrust of his very impressive resume has little overlap with the questions at hand.

Jerry Riggs, an expert for Entergy, is a Geographer skilled in GIS but with no parallel expertise that would allow him to rebut my work. His involvement with EJ analysis is as a GIS analyst. I assume he is an excellent GIS professional, however, since it is uncontested that Sing Sing is an EJ community, his input here is moot.

Michael Slobbodian, a health physicist, works in reactor safety and emergency planning for Entergy. He came to the nuclear industry after spending six years at NRC. Without demeaning his expertise in general, beyond dose assessment, he has little basis for questioning my work on social issues presented.

For NRC

Jerry Rikhoff is a Regional Planner who does environmental impact assessment work, including EJ analysis, for NRC. He came to the agency from a decade working for firms such as Halliburton and Brown and Root. Rikhoff has obviously contributed to the generic approach for reactor EJ assessments that is questioned by my report and testimony.

Patricia Mulligan is Senior Advisor for Emergency Preparedness and Response, United States Nuclear Regulatory Commission. A pharmacist, she is an expert on Potassium Iodide. Before joining the NRC, she was employed in the nuclear power industry working on health physics and emergency preparedness issues.

What is striking about this collection of experts is their extraordinary experience determining how impact statements, emergency response and environmental justice are addressed by the NRC. They are extremely wedded to the status quo ways of thinking and practicing within NRC that my testimony calls into question. A second striking factor in the group is their lack of experience with the issues involved in discussing EJ impacts for Sing Sing inmates. They are not accustomed to working at the local scale and despite NRC guidance to the contrary, they tend to focus on macro level computer analysis that say little about the peculiarities of the EJ communities. Finally, illustrated is an amazing revolving door between the NRC and the nuclear industry. In this matter, the problem with this exchange is less the issue of regulatory capture by industry interests than the potential for creating ingrown thinking in the industry as a whole. Everybody talks the same language, knows the same people, and has similar history and common practice. . It is instructive that issues of industry/government revolving doors were raised in the Greenpeace report (2012, Ex. CLE00050) as a foundation for the Fukushima disaster. In particular, Gundersen (2012) warns that the common culture of the industry and regulator creates an "echo chamber." The potential for critical and alternative viewpoints necessary to deconstructing commonly held myths is easily shut off in this environment. It creates a potential for what Irving Janis, in his classic analysis of the Bay of Pigs fiasco, called "group think" (1977).

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