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In the Matter of:	Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 and 3)
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**Exhibit CLE00012b  
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Section 2:

*Mitigation. Both evacuation and shelter-in-place have strengths and limitations as mitigation for radioactive release. If not well developed, both can cause adverse psycho-social impact. Can their effectiveness be improved while reducing adverse effects? And are additional mitigations important to require in a permit?*

Introduction

The principle role for mitigation is to circumvent an anticipated significant adverse impact. In the first section of this report, we discovered that key mitigations underpinning emergency response can fail. The promise of reduced impact may not be fulfilled. And the mitigative steps may themselves cause significant adverse impacts. Because mitigation is a primary rationalization for permit approval, the topic deserves a hard look.

Protective Options for Radiation Exposure

As well articulated by the Witt report,<sup>xlviii</sup> during a radiological emergency, beyond "saving lives," the response must be focused on "dose saving." Dose saving actions need to occur in the early phases of an accident if they are to reduce radiation exposure to vulnerable populations.

There are five protective measures listed in EPA Guidelines<sup>xlix</sup> and cited by Witt<sup>l</sup> that can be taken alone or in combination toward the end of dose saving. Evacuation is the first protective approach. Sheltering-in-place is the second strategy. The third is ingestion of Potassium Iodide pills aimed at blocking the thyroid from taking up radioactive iodine. The fourth is washing radiation off and discarding contaminated clothing. The above four steps relate primarily to the ten miles "plume" EPZ on the assumption that radiation will go no further. In the outer 50-mile "ingestion" EPZ, a fifth measure involves efforts to avoid bio-accumulation of radioactive hazards over time through consumption of contaminated food and water. Of these five, only two are serious protective mitigations, as Witt summarizes<sup>li</sup>:

*When responding to a radiological emergency, there are two basic forms of protective actions that emergency managers can instruct the public to take--evacuation and sheltering. Evacuation is typically the preferred method of protection, as it removes the public from the dangerous area altogether. Sheltering only minimizes the exposure of the public to the airborne hazard. Sheltering is, however, quick to implement relative to evacuation and can provide protection for short time periods.*

Evacuation Trigger---Two Guidances

The trigger for the first protective action, evacuation, was set by EPA at potential exposure to radiation beyond 1 rem.<sup>lii</sup> The guidance for evacuation was calculated as the point where risk avoided exceeds the risk from evacuating. For a successful evacuation to occur, the population must clear the affected area before receiving a 1 rem dose.<sup>liii</sup>

However, Sing Sing will not be evacuating, at least initially. Westchester's Emergency Plan makes it clear, in the section on Emergency Classification level for general emergency, that "*correctional facilities in the EPZ are sheltered.*"<sup>lv</sup> Accordingly, Sing Sing inmates will be sheltered-in-place and may never be evacuated before their exposures exceed the federal guideline. Furthermore, while the 1 rem is the maximum exposure for evacuation of the general public, the federal guidelines allow exposure of up to 5 rem for "selective" populations.<sup>lv</sup> And, under extreme hazards, immobile populations hard to evacuate can be allowed to receive up to 5 rem for the general population and 10 rem for "selective" populations.<sup>lvi</sup> The implication for this analysis is clear; Sing Sing inmates are in a "selective" category that will be allowed to have five to ten times the exposure tolerated for the general public.

The ethics and morality of this differential treatment have not gone unnoticed. For example, as far back as 1981, the issue was raised by Charles Bates, Westchester Commissioner of Social Services, who wrote to County Executive Al DelBello commenting on the County's draft emergency plan:<sup>lvii</sup>

*The inmates at Sing Sing are not to be evacuated because of the problems with security. This goes well beyond the border of insanity. Does this reflect the degree of respect for human life upon which this plan is founded?*

Had the term been in common use then, Commissioner Bates might have called the situation an environmental injustice.

### Summary

In this section, I begin by reviewing lessons from the Katrina case that are applicable to the issue of mitigations of an Indian Point emergency, the prospects of mitigation are next evaluated by prisoners from Sing Sing. Then a detailed examination is given of each protective strategy and, finally additional mitigative steps are recommended.

#### I. Lessons of Katrina for Sing Sing

In the first section, the Katrina disaster was discussed with regard to impacts to prisoners. Documentation was given showing the failure of both forms of protective mitigation. Both shelter-in-place and evacuation not only proved to be inadequate as protection, but the failure of both strategies was associated with significant impact, vastly complicating the consequences of the primary disaster itself.

Of course, the Louisiana disaster differs substantially from a potential New York emergency at Indian Point. Prisoners in Katrina were literally treading water in their cells. And they suffered privation, exposure to contaminants, discrimination and abuse. The acute physical threat to their lives was primarily during the disaster, itself. Psychological and social threats persisted or came later.

Sing Sing prisoners would be spared flooded cells. But they face an invisible threat, possibly unmeasured or even undetected, that could be deadly in both the short and long terms. There might be no adequate defense against exposure. And while fear of drowning is existential, the dread associated with exposure to radioactivity has its own, well documented, psychological weight.<sup>lviii</sup> The palliative effect of Potassium Iodide pills, if in fact made available, would remove some risk and quiet some degree of concern. But other risks and concerns will not be removed. And because known and involuntary exposure to radioactivity bears long term and continuing physical and psychological scars beyond any initial trauma, it is my judgment that a severe emergency at Indian Point might be even more damaging than the destructive impacts found after Katrina. Not only are prisoners (and others) left with post traumatic stress but, additionally, the actual impacts of sheltering, evacuation and relocation. Drowning is a short term threat; victims of the nuclear event will have to live with chronic fears of long term latent disease. The potential for privation, discrimination, conflict and abuse also remains for Sing Sing prisoners, depending on the actual course of events.

Various other implications are clear from the ACLU report. Several come to mind in the context of this review.

- First, in chaos of disaster, mitigations designed for normal conditions routinely fail.
- Second, Emergency Response Plans on paper are different than response to an actual emergency.
- Third, any failures in planning and training become starkly apparent.
- Fourth, racial hostility and other stereotypes and historic enmity surface under the strain of the disaster.
- Fifth, the general stigma associated with prisoners is also likely to surface, placing prisoners on the bottom rung in terms of assistance and inviting either too little attention, i.e., blatant disregard, or too much attention, i.e., abuse.
- Sixth, reflecting these factors and others, evacuation is problematic as a mitigation.
- Seventh, reflecting these factors, and others, shelter-in-place is problematic as a mitigation.
- Finally, even seemingly well designed plans can fail miserably when put into practice, with the result that people are put at risk in ways that were not anticipated by those who assumed that plans would work like clockwork.<sup>lix</sup>

Other implications for Sing Sing and Indian Point can be garnered from the Katrina experience.

- It is not clear that the conditions of mutual support among prisoners found at OPP would be as likely in the tense environment in Sing Sing in the wake of an invisible disaster. If there were to be a shortage of KI, intense competition would emerge with repercussions for winners and losers.

- Assuming that they were informed of the threat, the conditions are created for prisoners to become unruly out of concern for family on the outside and in their desire to escape. Even if order is maintained, the psychological pressure will be extraordinary.
- Given invitation to public to shelter at Sing Sing, it is likely some guards will bring their families. Yet, unless there is reason to believe that sheltering at Indian Point is protective, then this action may backfire.
- What if an evacuation of Sing Sing prisoners was eventually ordered? Assuming that bus drivers (and buses) in fact exist to evacuate Sing Sing prisoners and that that opportunity is afforded, there is the question of whether the same drivers and buses have been simultaneously allocated to move others, at which point either someone gets left behind and/or someone goes second (or third or...). During Katrina, a logistical problem with the evacuation of prisoners from Orleans Parish Prison was that bus drivers were fatigued and were ordered to rest, leaving thousands of prisoners stranded in the meantime.<sup>lx</sup>
- One real possibility in the case of a nuclear disaster is that the decision to send bus drivers into the contaminated region (whether from outside the region or on a return trip from a prior run) will depend in no small part on the degree and type of hazard encountered. Similar factors may influence the willingness of drivers to reenter or enter the contamination zone.
- Even should transit be provided for Sing Sing, one cannot somehow disconnect an evacuation of Sing Sing prisoners from the overall chaos that would ensue regarding everyone else evacuating. In the case of Katrina, from the staging area on a highway overpass where 3000 prisoners were kept awaiting transit, civilians interfered out of anger that prisoners were being evacuated and they were not.<sup>lxi</sup> Similar situations might occur should transit afforded prisoners encounter people otherwise stranded in the zone of contamination from an in-progress nuclear disaster.
- If Katrina is representative, frustration over events during shelter-in-place and the inability to communicate with loved ones might lead to frustration and efforts to escape.
- In New Orleans, once prisoners were taken out of the flooded area, they were safe of the environmental peril, even if institutional perils remained. In the midst of an Indian Point event, prisoners may neither be safe from radioactive releases while in the prison nor during evacuation, were it to occur. They might continue to be environmentally imperiled after reaching their destination and subsequent points of assembly, refuge and reinstitutionalization. Moreover, once potentially exposed, prisoners are likely to believe that they have been imperiled, correctly or incorrectly. It is not clear how this might change their perceptions, expectations and behavior.

## 2. An inmate perspective on protective mitigation

Inmates at Sing Sing are lay experts in a position to evaluate the likely success of protective mitigation during an emergency at Indian Point. On April 15, 2010, I attended a Masters program class inside Sing Sing prison.<sup>lxiii</sup> The hour and a half class dealt with Indian Point and Environmental Justice. During a presentation by a staff member of Clearwater, Manna Jo Greene, inmates' questions and reactions were observed. Afterwards, I conducted a 25 minute focused discussion with the twelve students in attendance about potential risks from Indian Point.

There was much to learn and observe from the entire experience, beginning with just how hard it was to gain entry to the grounds, both in preparation for the visit and upon actual arrival. With delays, what was to be a three hour class was reduced to half that. And, my efforts to carry out follow up visits were unsuccessful.

Once with the class, the instructor went around the room so that class members could introduce themselves. Most took the opportunity to comment on what they knew about Indian Point. To my surprise, there was a high level of awareness even before the presentation, as evidenced by these comments.

*I heard a program on BAI on Indian Point.*

*I have been in Sing Sing for 8 years and you can't help think about Indian Point because it is right in your face. They do not discuss it because they do not know the level of fear that comes if you believe and think what the consequences are. I live with something that won't go away.*

*I knew it was here and I was concerned. I started paying attention to ecology after Chernobyl. Indian Point is a sign of the situation. They are not thinking about the possibilities very seriously that right next to us there is a waste disposal site or the ecology as a whole.*

*If anything happens, it affects Westchester residents. My daughters take field trips in school to Indian Point. I have family in the area and am concerned.*

*I want to find out how it affects the community and the water. We drink it.*

*I am interested in Indian Point. They say they have no evacuation plan. I read an article on the China Syndrome. It described a whistleblower and the infractions he suffered.*

*I am interested in environment and behavioral science.*

Others sought to establish their connection to the other theme of the class, Environmental Justice. A class member who described himself as a former drug dealer and robber with a 20-40 year sentence commented,

*I am looking to do good for the community. I oppose environmental injustice.*

Another added:

*I am interested in social justice.... I listen to WBAI.*

With the introductions over, I asked if they were previously concerned with any environmental issues in order to see if Indian Point was an exception or followed a rule. Several indicated a broader environmental interest:

*Water, it affects me and others too because we are drinking the water.*

*The sewage plant smells. It is a constant smell. It happens especially when the wind is coming this way and the humidity keeps it close in like a cloud.*

*The Hudson River. Long ago I used to fish there. It got so contaminated, it got so bad. Now they are trying to revive it. But they are not at that point yet. The problem is compounded when there is disposal. We do not realize it. I am from Central America. The water was clean. I looked at this and by and by I saw the difference. I think about it.*

*The recycling laws exist but they still throw everything together in the dumpster. I thought things would be separated.*

*I came from a community where they were not too environmentally friendly. We threw garbage around. When I grew up, no one talked about being environmentally friendly.*

Two inmates commented on the indoor safety of the prison, itself.

*There is asbestos and lead paint. Or dust in the cat walks. There are decades of waste.*

*The structure, the way it is built, [is a problem]. I myself walked down the tunnels and the paint is peeling. And there is no ventilation in the rooms.*

One of these comments singled out the environmental experience of visiting the medical clinic, which the first speaker and a second inmate hardly characterized as providing rapid care.

*We are used to having to wait to go to medical. There we are put in a cage and there is no ventilation. There is a mess in the hall and odors. You do not know what you are smelling.*

*The medical here is so subpar. They give you a couple of Tylenol. It takes two weeks to get to see the doctor. They are not into proper care.*

The presentation by Clearwater's Manna Jo Greene subsequently covered a range of topics regarding *Indian Point* and introduced the notion of Environmental Justice. Class members listened intently. But they became agitated and interrupted when she mentioned the importance of taking Potassium Iodide to protect the thyroid. Many commented at one time:

*Where is the supply?*

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As we moved into the post-presentation discussion, the first inmate to speak commented that prisoners are not informed:

*They keep us naïve. They told us nothing about Indian Point or its possible effects during our orientation. If we know something, it is on our own initiative.*

Another doubted the emergency notification system.

*There is no security orientation. One year ago they restored the alarms at Indian Point. They have drills and some succeed and some don't. But we are kept totally blind.*

Ignorance reduced worry. However, the problem with keeping inmates so ill informed, this inmate suggested, was that prisoners were needed to be cooperative should an incident occur.

*If we were oriented to this, it might raise fear. But anyone not aware would not know if they should cooperate or not. To ignore it could be a detriment to us or them.*

In the event of an accident at Indian Point, another inmate predicted

*They will secure us in place.*

The emphasis here was on "secure" rather than "shelter." This led to another student to offer an analysis for the prospects for "shelter-in-place" that was not sanguine.

*There is no place in this facility that is safe. They are not going to have Potassium Iodine for prisoners plus staff. If they shelter, we are screwed. The medical crew will disappear and outside communities will get the Potassium Iodine.*

There was good reason to expect triage, noted by another student.

*There was no swine flu (serum) for us last year. They will decide who to treat first.*

The class was fascinated by Manna Jo's description of how Sing Sing had become central to the issue of Environmental Justice regarding Indian Point's application. One student cited the prisoner's loss of rights, as witnessed during Katrina.

*It is a fact that we are in prison. We are in prison! We have no rights! They will lock us down. The upper security will go home. Katrina speaks to this. Why did the judge cite Sing Sing? It was not for humanitarian reasons. There had to be reasoning. We don't have the same rights if we have no standing, prisoners as free voices to speak out about the plant and any danger. Prisoners are not usually at the center of concern.*

At this point, Manna Jo was bluntly asked

*Why are prisoners being utilized in this [hearing on Indian Point]?*

Her response, that "This is the closest secured facility to Indian Point and the judges had the image of what could happen from Katrina," prompted a prisoner to ask

*How would we be evacuated?*

In responding, Manna Jo noted that people in the community have a choice about their protective response. That, even if ordered to shelter, "people on the outside can leave." The comment prompted class members to discuss how they lacked this same freedom. When one drew an analogy between their situation and the historical use of minorities as test subjects, classmates responded "We still are!" One class member was prompted to elaborate.

*There has to be an overt concern. This is no different than testing subjects. If they leave us by Indian Point, they are inherently calling us dead. Here is one certainty. They will not shelter us to death. Then they have issues of legal concern?*

Discussion next returned to evacuation and its feasibility. Two comments dismissed the ability to get prisoners out of Sing Sing.

*I would conclude that there is no evacuation plan for Sing Sing. The way that the prison is structured into blocks and different areas, it is almost impossible to get everyone out in an orderly fashion.*

*It will not work. When they do transfers, they put us in a belly chain and shakles. The belly chain requires numerous staff and it is time consuming. By that time the radioactive cloud would be over Sing Sing....If you put 25 individuals into a bus you would need eighty busses. It would take days to process this and the manpower to put people on the bus.*

The second commenter continued on to anticipate difficulties after prisoners were evacuated.

*And where are you going to take 1700 prisoners? To tents? What is the plan? What does it entail? How long will it take? Where will they put us?*

A string of comments indicated that prisoners doubted that they would be allowed to leave in any case.

*Be rational...This is a maximum security prison. The protocol is to not leave the walls. If an atomic bomb were going off, the warden would say we would get killed here or if we got out we would be killed. Forget the evacuation. It is totally against protocol.*

*I want to clarify that they would shut down this place. This is a maximum security prison. This is not some local house in Ossining. The main issue is safety and security. In a code blue, everyone is locked in their cell. That is what "secure" means.*

*There are different plans used for residents in Ossining and for the prisoners in Sing Sing.*

*You have to talk about the immediate world.*

And sheltering in place was hardly seen as protective during a radioactive event.

*There is no way to block the ventilation.*

*The ventilation! If you walk into A and B block there are no windows. They are sixty years old. The cranks are inoperable.*

In short, whether "secured/sheltered" in place or evacuated, no prisoners were optimistic about the outcome. The session ended with a return to the theme that prisoners should be informed; that inmates need to know about such eventualities so that if something did occur, they would understand what was happening and know to cooperate with staff to create the greatest level of protection for the inmate population.

This brief opportunity to hear directly from inmates in Sing Sing underscored the potential for impacts from a disastrous event at Indian Point to parallel those at OPP in New Orleans after Katrina. There are many factors at play in Sing Sing. It is a total institution, not accustomed to informing prisoners about issues that are beyond their volition. Its inmate population is considered to be highly dangerous and unlikely to be loosed from the prison unless they can be controlled adequately. The facility is environmentally ill-suited to be protective of inhabitants during a radioactive event. Evacuation options, if they exist, are problematic.

Given the superficial treatment of the FSEIS, there is no basis for contradicting inmate predictions. Moreover, the plausibility of the concerns is established by the Katrina experience. It is hard to believe that events could go as wrong as they did there. But there is little foundation in the case of Sing Sing and Indian Point to believe that they could not.

### 3. Is "shelter-in-place" a viable mitigation for the Sing Sing inmate population?

As a mitigation to the hazards associated with re-permitting Indian Point, "shelter in place" involves a basic conundrum. Prospective victims remain in a potentially hazardous area. Their shelter is untested and may or may not be protective. Given that the protection is uncertain, of what value is "shelter-in-place"? Should it count as a mitigation for potential harm to Sing Sing inmates resulting from an Indian Point emergency? It is currently clear that inmates will be secured, but it would be inaccurate to predict that they will be sheltered.

Emergency response documents do little to dissolve such doubts. The radiological guidance from the Westchester Health Department<sup>lxiii</sup> implies that shelter-in-place is a second choice to evacuation as a protective method (see Appendix 2). The guidance suggests that there are

situations where quick shelter is the best choice, such as during a "puff" release, because there may be no time to safely evacuate; also evacuation may be blocked by congestion, weather may be bad, multiple disasters may be at play and some people cannot easily be moved. Under hazardous conditions, significantly higher exposures to radioactivity may be tolerated with sheltering than the normal guidance would accept. In such situations, shelter is listed as the best option, even if the case is not made that it is a good option.

This inherent ambivalence is carried into NRC language, which gives a very qualified endorsement of "shelter-in-place" as a protective strategy.

*Depending on the type of structure, sheltering can significantly reduce a person's dose compared to remaining outside.*<sup>lxiv</sup>

This statement reflects considerable ambiguity. "*Depending on the type of structure*" implies that some shelters may not significantly reduce a person's dose. No guidance is offered for the characteristics of a structure capable of being protective during a nuclear accident. How close to a designed fallout shelter does a shelter need to be to be protective? No evaluation is made of Sing Sing prison against such a guidance. And the phrase "*compared to remaining outside*" begs key questions. Might a *reduced* dose nevertheless be harmful? And is sheltering as protective as evacuation?

Some further insight into this ambiguity comes from EPA, cited by Westchester County.<sup>lxv</sup> The federal guidance on sheltering-in-place also comes with many caveats. EPA does not recommend sheltering when expected dose exceeds 10 rem. And EPA acknowledges that outside air penetrates inside a structure, the speed depending on the type of accident, occupant behavior and the structure's attributes. Occupants can maximize protection by shutting doors and windows, shutting down ventilation systems and sealing any openings with towels, plastic or tape. However, not all will be able to do so. The agency additionally suggests the effectiveness of shelter offered by different kinds of structures.

Construction/Location	Dose Reduction
Wood-frame house (first floor)	10%
Wood-frame house (basement)	40%
Masonry house	40%
Office or industrial building	80% or better

Table 3: Dose Reduction by Shelter Type.<sup>lxvi</sup>

It is clear that, even under the best circumstances, there will be 20% received dose with shelter-in-place and 90% in the worst case. Some key questions come to mind. How much reduction is needed to make sheltering a truly protective strategy? And, again, how does Sing Sing shape up?

Here, the devil is in the details. The Witt report found the Indian Point emergency plan to be deficient in its discussion of shelter-in-place.<sup>lxvii</sup>

*...these plans do not appear to address the effect of weather patterns on the effectiveness of sheltering. Sheltering effectiveness against absorbed dose is very sensitive to weather conditions such as rain. Sheltering times can be limited when the outside temperature is either very hot or cold because the cooling and heating systems should be shut down. Also, with certain kinds of radiological releases and in structures with some common construction materials, sheltering is not really effective in reducing dosages. Long duration releases, especially where large amounts of radioactive material are released over a long period of time are not good candidates for sheltering. Sheltering has other implications as well, such as the need to consider placing KI and respiration filters in homes and offices, and to consider the expansion of delayed public transportation and of personal and vehicle decontamination capabilities.*

These issues also pertain to Sing Sing but are not resolved by the FSEIS.

#### Implications for Sheltering at Sing Sing from the Hospital Guidance

It is instructive to look at shelter-in-place guidelines for other institutions where not all occupants may be able to evacuate. The Westchester Radiological Emergency plan contains an attached guide on shelter-in-place for hospitals. After the anticipated instructions for sealing openings and shutting down all air intake systems, the guidance offers an instructive qualification.

*To be done to the extent that indoor air can be maintained within a safe range that does not jeopardize the safety of all occupants.*

Acknowledged here is the reality that, in order to stop entry of radioactively contaminated air, intake has to be eliminated. Yet, air exchange is a necessity. The more exchange, the more exposure. The guidance goes on to list items that need to be readily at hand. These are useful for Sing Sing as well. The list includes non-perishable food, bottled water, first aid supplies, battery-operated radios, flashlights, batteries, duct tape, plastic sheeting and plastic garbage bags. Those sheltered are to gather in a windowless room or hallway, discontinue use of tap water and ration food. And they need to have on hand everything required for decontamination.<sup>lxviii</sup>

#### Summary

Much as they failed to provide a serious EJ analysis, Entergy has offered no study of Sing Sing's effectiveness as protective shelter. As a result, significant questions regarding the protectiveness of Sing Sing were not answered. Some questions involve the behavior of the physical plant.

- How difficult is it to "close up" Sing Sing and shut down the HVAC system?
- Is the basic structure of the prison air tight?
- For how long will the physical plant keep radionuclide out under varied conditions of dispersal, weather and facility permeability?

- And, assuming ventilation is cut off, how habitable will the prison remain and for how long?

### Psycho-Social Impacts

Other unanswered questions pertain to the psycho-social character of the disaster situation.

- What long term psycho-social impacts will occur?
- Since radiation is invisible, might not "victims" deny it when it is present but accept it when it is not? It would be easy to perceive dangers not present and to ignore other dangers that are.
- Given that inmates may be forced to remain behind against their will, how calm will prisoners be when they realize they are not being evacuated in the midst of a radiologic event?
- In face of unknown and invisible threats, prisoners are literally and mentally locked in a cell, helpless to chart their own fate. What are the consequences of this disempowerment?
- What are the social and psychological impacts of sheltering? How long will inmates be required to remain sheltered? Will not a sense of claustrophobia and fear affect prisoners' and officers' emotional state and judgment over time, particularly if there is uncertainty, certain exposure or degradation of conditions?
- How much will conditions inside the prison degrade over time? As seen at OPP during Katrina, loss of power in a prison is a source of danger to all. If conditions outside involve extreme cold or heat, the failure to run air conditioning or heat might result in extreme discomfort or even harm. Likewise, will potable water be available? Might fallout contaminate the water source? And, perhaps most significantly, how long can Sing Sing occupants last with closed windows and no make-up air?
- Corrections officers may have difficulty reaching the prison for their shift and face the quandary of whether to report for duty or assist their families. If officers already on duty are kept for additional shifts, what are the consequences of fatigue?
- Is there sufficient training of staff? Given that there is no planning for Sing Sing in the eventuality of an Indian Point disaster, one cannot assume that staff is trained to address the issues that may arise from this kind of event and from prolonged shelter in place. At OPP during Katrina, for example, staff did not know how to start the backup generators not directly destroyed by flooding. The resulting power failures were due to ignorance, not flooding. During an Indian Point disaster, might not parallel failures occur at Sing Sing?
- Pressures on prisoners and officers alike may lead to tension, violence and mistreatment, as was demonstrated during the Katrina disaster. Beyond facing physical health danger from the environment, will prisoners also face physical health danger from both guards and peers?

- Prisoners understand that they are outcasts, placed at the bottom of social priorities. Will prisoners' needs be ignored even when urgent help is needed?

### Psycho-Social Issues Regarding Potassium Iodide (KI)

Sing Sing is reported by Witt<sup>lxix</sup> to store enough PI for inmates and members of the public who shelter at the prison. PI is not supposed to be taken unless thyroid exposures are projected to reach 25 rem. Tension will arise if inmates are denied PI during an emergency because it was unclear that the exposure justified it. Such a situation requires that Sing Sing officials have a means of determining dose in order to determine when PI should be administered and that the inmate community trust this source. Furthermore, should Sing Sing prove to have inadequate supply of PI or the pills go to sheltered visitors instead of prisoners (a scenario that the Katrina experience makes plausible), then inmate anger would be a near certainty. As a further complication, Witt cites adverse reactions to ingestion of Potassium Iodide including anaphylactic shock. In the midst of a radiologic emergency, Sing Sing would need to have the capacity to treat such reactions. No data has been presented in the application to confirm this capacity.

### Shadow Evacuations

It is interesting to note Witt's discussion of "shadow evacuations,"<sup>lxx</sup> those undertaken voluntarily (not by directive) by those perceiving a threat and determining their own best course of action despite government pronouncement. The concept derives from this author's work, which formed the basis for the concept of "risk perception shadow,"<sup>lxxi</sup> the phenomenon that explains that people perceive risk differently than it is bounded by risk models. The risk perception shadow for an emergency at Indian Point is likely to exceed the area actually considered by Entergy and NRC to be at risk. As Witt summarizes, shadow evacuations can be expected for half the population of the 10 mile EPZ outside the actual dispersal plume (and, therefore, expected by officials to shelter rather than depart), another 25% from a ring just outside the plume EPZ and yet another 10% from the approximate 50 mile radius, which contained 4.5 million people at the time Witt did their study. That represents a lot of cars on the road, much more traffic than area roads can begin to accommodate.

Witt's concern was that shadow evacuations would clog roads and block required evacuations. My interest here is a bit different. If people are likely to seek evacuation even when not deemed officially warranted, then it is reasonable to expect Sing Sing inmates to expect the same, particularly when they may be sheltered under conditions that demand a general evacuation. Much as tensions rose with the flood waters in OPP during Katrina, it would be naive to expect inmates (and officers and staff) to sit calmly when their lives may be at risk from an invisible threat. Whether discipline is kept or not, an immense burden of stress will be experienced by all in the situation, intensified by the pre-decision to shelter-in-place. By the time removal from the hazard would become an option for this EJ population, their exposures may be significantly

higher than that tolerated for the general population. And they cannot be expected to be pleased about this or accept this as fair.

### Summary

In sum, these questions raise the potential for repeating mistakes seen during the Katrina disaster. There is a real potential for environmental injustice or disproportionate harm associated with a shelter in place policy. There will be an understandable reluctance to evacuate Sing Sing. As Katrina demonstrates, the decision to evacuate may be long in coming. Just as OPP prisoners were left treading water, Sing Sing prisoners may find themselves stuck in a radiologically unsafe environment. The problems of guard shortages, deprivation, competition with civilians for prison food and water supply and power outages may be parallel. And the likelihood of temper, panic and violence will rise with guards and prisoners, alike. As a core EJ issue reflecting their lack of control in the situation, prisoners will not, themselves, make critical decisions regarding their safety. But they will hardly be indifferent to the decisions that are made.

Several diverse sources shed additional light on the difficulties of relying upon a "shelter-in-place" strategy for Sing Sing.

### The Witt Report

A brief evaluation of Sing Sing's capacity to deal with an emergency event at IP was included in James L. Witt's 2003 comprehensive examination of emergency preparedness around Indian Point.<sup>lxxiii</sup> As Witt reports, once informed of the emergency by the state, Sing Sing would go into lock down. By thus securing prisoners, the prison would free up manpower to assist outside the prison with tasks including traffic control and community security. The Witt report addresses both capacity for shelter-in-place and evacuation.

Based on the information provided to Witt,<sup>lxxiii</sup> Sing Sing's capacity for shelter-in-place is so robust as to allow 100,000 meals to be produced per day and for an unspecified but presumably substantial number of community residents to shelter. The actual extent of this capacity in terms of numbers and duration is not mentioned. As support for its ample capacity, Witt reports that, during a winter ice storm, IP provided food for the surrounding community. Potassium iodide was reported to be stored on site with sufficient supply for visitors. Witt reports Indian Point's confidence that employees would remain on the job and report for duty even if off-duty "*provided roads are passable.*" No targeted staff training was reported to have occurred. Radiation monitors were not present. Witt did not report the capacity of Sing Sing to operate over an extended period with no ventilation and make up air.

### The ETS experience at Sing Sing as a Test of Habitability During Shelter-in-Place

Some indication of what might await inmates sheltered in place at Sing Sing for any significant amount of time under closed ventilation conditions was foreshadowed in a lawsuit involving smoking policy at the prison. Plaintiffs, prisoners in Sing Sing, claimed that they were exposed

to environmental tobacco smoke when other inmates smoked in their cells. The District Court in 1996 summarized the issues.<sup>lxxiv</sup>

*Plaintiffs' allegations, if believed, overwhelmingly describe a prison environment permeated with smoke resulting from, inter alia, under-enforcement of inadequate smoking rules, overcrowding of inmates and poor ventilation.*

Although Sing Sing had a prison policy mirroring state law disallowing smoking in public places, under Policy and Procedure 104, inmate cells have the status of private residences and can, therefore, smoke. Plaintiffs alleged that ETS in cells and public spaces

*... combined with poor ventilation, creates serious long-term health risks" such as the symptoms they reported of sinus problems, headaches, dizziness, asthma, hepatitis, nausea, shortness of breath, chest pains, and tuberculosis as a result of exposure to ETS.*<sup>lxxv</sup>

In upholding lower court rulings, the District Court found that it to be "cruel and inhumane punishment" for plaintiffs to be exposed to ETS in their cells. This case established claims of poor ventilation. Not only ETS, but any noxious and potentially dangerous air resulting from or introduced during closed conditions during "shelter-in-place" would easily spread through the prison without prisoners' ability to protect themselves.

#### The April 2011 Fire Event As a Test of Ability to Handle Shelter-in-Place

Another test of indoor air conditions and prison emergency response occurred on April 18, 2011. An early morning fire at Sing Sing forced the evacuation of more than 700 inmates, most reportedly able to return to their beds within a few hours. The fire had an electrical origin and began in a basement area.<sup>lxxvi</sup> Some sixty inmates subsequently wrote letters to a local attorney alleging a flawed handling of emergency response and challenging media reports of no harm to inmates or staff. Many of the failures they reported have more than a superficial similarity to prisoner outcomes of Katrina and might generalize to an emergency at Indian Point. The letters, as described by an attorney, document alleged events apparently not reported in the press, including these observations:<sup>lxxvii</sup>

1. Prisoners were trapped in cells during the smoky fire in darkness for on the order of three hours, one inmate claiming five hours.
2. One prisoner reported awakening coughing, eyes burning and chest constricted.
3. Various health symptoms materialized among prisoners, including headache, asthma and other breathing problems, chest pain and a seizure. One reported that all were blowing "black stuff" out of their noses.

4. Three hundred prisoners were eventually moved to the gym and left there in the dark with no security. Fighting resulted in a number of injuries to prisoners, including stabbings. One prisoner reports that he banged on doors to escape but was ignored by guards.
5. Many were unable to see nurses for their injuries and conditions; a triage station was not set up until 8 hours after the fire started. While nurses reportedly denied injury claims by inmates; they confirmed claims of injury by prison staff.
6. Prisoners reported that fire alarms did not work and that no evacuation plan was in evidence. Guards reportedly had no clue what to do.
7. Prisoners, by one account, yelled and begged for guards to come to their aid but to no avail. One reported officers as "hostile, combative and abusive." One officer was quoted as saying (it is not certain to whom) "I don't care what you do, just run." Another was quoted as saying, with reference to the prisoners, "I'm not going in there, let them all die."
8. During the event, guards apparently did not know how to open windows to vent the smoke.
9. During the event, with the power out, cells had to be opened manually.

While further information on the event remains sketchy, the fire event offers a further picture of how well emergency response within the prison responds to the need to protect prisoners from harm. Evacuation was long delayed. Sing Sing prisoners were subjected to noxious and harmful conditions for an extended time despite their requests for help.

#### Conclusions Regarding Shelter-in-Place

As noted above, within the ten mile EMZ, outside of evacuating those in most direct danger, others are likely to be sheltered-in-place. It is likely that Sing Sing prisoners will be sheltered for at least some period during an emergency at Indian Point, and possibly for an extensive period of time. However, as a mitigation for exposure risks, "shelter-in-place" falls short. Neither Entergy nor NRC has presented evidence required to conclude that this strategy will be protective of Sing Sing inmates. Moreover, those inmates, an EJ population, will neither have personal volition in what may be a life-threatening situation, nor will they be afforded the opportunity to be immediately evacuated. Furthermore, as demonstrated during the Katrina disaster and supported by the ETS and fire examples, there are ample reasons to see sheltering in Sing Sing during a protracted closed air event as having significant secondary impacts. If these cases are at all representative, Sing Sing may in fact lack the ability to manage an Indian Point emergency. Finally, the Witt report suggests that Sing Sing will be likely to shelter and feed community members during an emergency. Without judging the prudence of shelter at Sing Sing for community members, one of the key lessons of Katrina was that non-prisoners receive

preferential treatment over inmates, competing for potentially scarce supplies of food, water, medicines, medical care or other necessities.

Given the plan to shelter-in-place, inmates will potentially remain longest in an environment perceived as and potentially contaminated. They are totally dependent on others to move them and to decide the timing, destination and route. If relocated, they face uncertainty about being the new inmate "in town" for good reason, as demonstrated in the aftermath of Katrina. And they will have the added burden of environmental stigma. After Chernobyl, for example, Russians feared evacuees for fear that they were a source of harmful irradiation.<sup>lxxviii</sup> After Katrina demonstrated the effects of racism and other factors that made relocating prisoners difficult for them, adding such stigma into the mix promises to create even more challenging possibilities.

#### 4. Is evacuation a viable mitigation for the Sing Sing inmate population?

##### Introduction

Assuming that potential victims can be safely removed from harm's way, evacuation is the preferential protective strategy. However, even seemingly well designed evacuation plans can fail miserably when put into practice, with the result that people are put at risk in ways that were not anticipated by those who assumed that plans would work like clockwork. A review of evacuation outcomes during major U.S. disasters reveals such errors in planning assumptions as<sup>lxxix</sup>

- a failure of coordination between adjacent communities
- over demand on limited road systems resulting in congestion
- too much demand on limited services such as bus companies
- evacuating too early or too late when hindsight is the only way to tell the correct timing
- lack of coordination with evacuation points and
- limited capacity of evacuation areas to absorb sudden large populations

##### Evacuation Impacts Associated with Indian Point

Research done for this project reveals that there are apparently no plans for an evacuation of Sing Sing inmates as the result of an Indian Point emergency. The absence of an evacuation plan places a particularly heavy burden on "shelter-in-place." At the same time, there is some indication of when and how an evacuation effort might materialize. Should sheltering not prove viable or a combination of wind direction and severity of radioactive release demand it, a decision to evacuate Sing Sing might be reached, even if not planned for. In the 2003 Witt report, an evacuation of Sing Sing is discussed.<sup>lxxx</sup> Witt was informed that decisions about evacuation would depend on health risk as well as the risk of moving inmates. The decision would be made by the State Emergency Management Office. Destination would be decided at that point, determined by computer search to determine where there was appropriate cell availability as well as an appropriate match to each inmate's profile. Witt was told by Sing Sing that evacuation would occur under state police escort in two tiers using 54 secure and 10 conventional vehicles. An additional 170 secure coaches were to be provided by New Jersey. Both New York and New Jersey would cooperate.

The potential for a successful evacuation from Sing Sing in light of an Indian Point emergency rests both on factors external and internal to the prison and prison system.

#### Success of a Sing Sing evacuation would depend on the success of a larger evacuation

Witt makes clear that the evacuation of Sing Sing inmates would depend on the overall success of the larger evacuation effort. Some of his more general conclusions about an overall evacuation have clear implications for Sing Sing.<sup>lxxxi</sup> Taking note of the failure of state and local officials to certify evacuation plans, Witt concluded that the aftermath of a disaster at Indian Point would be a regional tangle reflecting congested roadways lacking the capacity to handle the scale of an evacuation demanded, the predicted flight of first responders, a lack of public preparation and failed communications and hazards assessment. That is hardly a reassuring assessment.

The Witt report calls into question just how easy it would be to evacuate prisoners from Sing Sing. Even the softest estimates of congestion during an Indian Point event would make movement across the Hudson river a challenge. Presumably, buses would not travel north to the Bear Mountain Bridge, as this would necessitate driving right past the reactor complex. And presumably escapees would not be directed east, as prevailing winds would carry any releases down over the heart of New York City. That leaves taking the Tappan Zee Bridge, itself not far south of the troubled reactor(s), which would be one of the few key arteries allowing the suburban and urban populations east of the river a way west.<sup>lxxxii</sup>

But the most significant challenges to an evacuation program for Indian Point involve the sheer numbers of people who would seek escape by roadways that have congestive nodes and are incapable of handling anything close to the volumes of traffic involved, particularly in instances

where drivers are panicked. There are corollary issues of what kinds of contagious behavior and rumor may influence people attempting evacuation, once out of the area, where will people go to seek shelter that can accommodate needs and will such evacuation destinations be accessible? Will people even know which direction to go and if the place they go to is safe?

The latter point is hardly an idle concern. During the chaos of the recent Fukushima nuclear disaster in Japan, people evacuated directly into the plume of radioactivity released by the failing plants and errantly remained in contaminated areas believing that they were safe.<sup>lxxxiii</sup> The faulty response occurred despite collection of accurate plume dispersal information, which was, however, never shared with the public. The potential for such error is just one of the uncertainties encountered in real time events that may contradict plans and anticipated conditions. Evacuation protocols anticipated in advance, even if verified or modified by actual accident data, may not be protective. In the Fukushima case, they were actually harmful.

Then there are the impacts of the evacuation action itself. For average citizens, evacuation, by its very nature, involves many secondary impacts, from traffic accidents that hold up traffic further, separation of families and extreme stress. And there is no clarity that vehicles will be sufficiently protective, raising the possibility of concern over exposure during evacuation. Abandoned properties are vulnerable to vandalism, vital activities may not occur and social systems may fail. Then there are the impacts at the evacuation destination(s) and the long term impacts of the event socially and psychologically. Evacuation is a costly strategy, indeed.

Were such situations to materialize with the overall evacuation, it would have clear implications for the fate of Sing Sing prisoners. If roads are clogged by those fleeing the New York Metropolitan Region, including shadow evacuees, then any evacuation effort for inmates will be mired in this background morass. A decision to abandon shelter-in-place in favor of evacuation might be delayed, aborted or socially triaged because of panicked congestion or other problems with a more general evacuation effort. And of course, carrying out a safe inmate evacuation would be much more problematic given such conditions. Could a strained reduced force of first responders provide police escort for evacuation and primary and secondary backup for Sing Sing? In the midst of delayed or failed evacuation under emergency conditions, the chances for aid or evacuation of Sing Sing inmates diminish. And planning error, poor communications and inadequate hazard evaluation might put Sing Sing prisoners at risk while evacuating (or sheltering, for that matter).

Although significant questions exist with regard to evacuation of populations from the impacted region, per se, the issues surrounding evacuation of Sing Sing prisoners are significantly more complex, uncertain and doubtful.