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RIVERKEEPER

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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

VIA E-MAIL AND FIRST-CLASS MAIL

October 19, 2009

Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 205555-0001
Attn: Rulemakings and Adjudications Staff
Rulemaking.Comments@nrc.gov

Re: Comments on NRC's Proposed Enhancements to Emergency Preparedness Regulations

Dear Rulemakings and Adjudications Staff:

Riverkeeper, Inc. ("Riverkeeper") hereby respectfully submits the following comments in response to the Nuclear Regulatory Commission's ("NRC") Enhancements to Emergency Preparedness Regulations, Proposed Rule, 10 C.F.R. Parts 50 and 52, RIN 3150—AI10, NRC-2008-0122, 74 Fed. Reg. 23254 (May 18, 2009) (cited hereinafter as "EP Enhancements Proposed Rule"). Riverkeeper's comments offer feedback on the proposed rule as well as the various draft documents associated with the rulemaking, including:

- Interim Staff Guidance on Emergency Planning for Nuclear Power Plants, NSIR/DPR-ISG-01 (hereinafter "Interim Staff Guidance");
- NUREG-0654/FEMA-REP-1, Supplement 4, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Draft for Public Comment (May 18, 2009) (hereinafter "NUREG-0654/FEMA-REP-1, Supp. 4");
- NUREG/CR XXXX, "Criteria for Development of Evacuation Time Estimate Studies," Sandia National Laboratories (Predecisional Draft, April 23, 2009) (hereinafter "Draft ETE Report").

For the reasons set forth below, the proposed rule and related guidance documents fail to address numerous fundamental deficiencies with the current regulations, and should be revised as indicated.

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I. RIVERKEEPER'S INTEREST

Riverkeeper is a member-supported, not-for-profit organization dedicated to protecting the Hudson River and its tributaries.[1] Since its inception in 1966, Riverkeeper has used litigation, science, advocacy, and public education to raise and address concerns relating to the Indian Point nuclear power plant, located on the eastern bank of the Hudson River in Buchanan, NY. Riverkeeper is headquartered in Tarrytown, New York, approximately twenty-two (22) miles from the Indian Point facility, and has numerous members that reside within at least fifty (50) miles of the plant.[2]

Since the terrorist attacks of September 11, 2001, Riverkeeper has taken an active role in calling for improved security and emergency planning at Indian Point.[3] In 2003, New York Governor George Pataki commissioned a study of Indian Point's emergency plan by James Lee Witt & Associates ("Witt Report"),[4] which concluded that the plan would not adequately protect the public in the event of an actual emergency. In response, three of the four counties that make up Indian Point's Emergency Planning Zone ("EPZ") and the New York State Emergency Management Office ("NY SEMO") have refused to submit the Annual Certification Letter since 2003, citing serious doubts about its effectiveness. Despite Witt's findings and the utter lack of confidence in the plans by regional and state government officials, FEMA and NRC have subsequently approved the emergency plan every year since.

Riverkeeper remains convinced that the current emergency plan for Indian Point will not protect the public in an actual emergency and that comprehensive reform of the emergency planning regulations would be beneficial. Accordingly, Riverkeeper has a vested interest in the instant rulemaking proceeding, and we encourage careful consideration of the following comments.

II. THE INSTANT RULEMAKING FAILS TO ALTER THE PROCEDURAL NATURE OF CURRENT EMERGENCY PREPAREDNESS REGULATIONS

A general review of NRC's proposed regulatory changes reveals a failure to address a fundamental flaw with the current emergency preparedness regime. The existing set of sixteen emergency planning standards found in 10 C.F.R. § 50.47(b) is purely procedural, in that it does not set actual benchmarks for determining what constitutes a workable plan, sufficient to meet the "reasonable assurance" standard of §50.47(a)(1). In fact, there are no specific criteria in the regulations by which a "reasonable assurance" finding is made. This lack of any tangible regulatory framework is primarily responsible for the utter lack of public confidence in NRC's emergency planning oversight at many plants around the country, Indian Point not least among them. Residents living near Indian Point, and at other plants around the country, believe that these plans are a mere procedural formality, devoid of any connection to the daily realities of

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[1] *See generally,* Riverkeeper.org, Our Story, http://www.riverkeeper.org/ourstory_index.php (last visited Oct. 15, 2009).

[2] *See* Riverkeeper.org, Contact Us, http://www.riverkeeper.org/contact/ (last visited Oct. 15, 2009).

[3] *See, e.g., In re Entergy Corporation (Indian Point Nuclear Power Station, Units No. 2 and 3; Facility Operating Licenses DPR-26 and DPR-64)*, Section 2.206 Request for Emergency Shutdown of Indian Point Units 2 and 3 (November 8, 2001).

[4] James Lee Witt Associates, LLC, Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone (2003) (hereinafter "Witt Report").

heavy traffic, high population density, and poor communication between licensees and surrounding communities regarding how the plan will be successfully implemented, if it is ever needed. Public confidence is built on accountability and integrity; NRC is ultimately accountable to the public when the agency approves a licensee's emergency plan. Public confidence in the NRC is especially important when it comes to emergency planning, because the effectiveness of the emergency plan ultimately depends on how well the public adheres to it.

Accordingly, Riverkeeper strongly supports the establishment of performance-based standards to be used in evaluating a licensee's emergency plan on a yearly basis. Establishing binding performance-based standards to determine whether an emergency plan provides "reasonable assurance" is essential to enlisting the support of the public and concerned stakeholders in this process. There is no accountability without a system of benchmarks by which these plans are measured and actions taken by NRC if a plan is not up to par. While there may be some areas of NRC regulation that favor regulatory flexibility, emergency planning is not one of them. This is the one area of regulatory oversight that requires a clear, easily defined baseline that can be implemented by the industry and enforced by NRC. Its success is entirely dependent on cooperation from other federal agencies, state and local first responders, and the public.

Unfortunately, the instant rulemaking proceeding fails to address the procedural nature of emergency preparedness regulations, and in fact, only appears to make further procedural amendments to the existing regime. As discussed in more detail below in relation to specifically proposed security-related and non-security related revisions, NRC should implement performance standards to ensure a more effective regulatory scheme.

III. NRC'S CONSIDERATION OF SECURITY RELATED ISSUES

NRC proposes several amendments to existing regulations in an effort to address emergency preparedness actions for hostile events.[5] Regulatory inclusion of security-based events is a logical and long overdue first step in the process of overhauling NRC's emergency planning regulations. It is essential that all licensees of currently operating plants be required to address intentional acts of sabotage to demonstrate that the onsite and offsite plans will function cohesively to protect the public in the event of a terrorist attack. However, any regulatory revisions to reflect security related issues must be founded upon accurate notions of hostile threats and radiological consequences thereof. A review of the proposed security related regulatory revisions reveals that this is not always the case.

In light of this apparent deficiency, along with several others, Riverkeeper offers the following comments in relation to specific security related revisions to the existing regulatory scheme:

A. "Challenging" Licensee Drills and Exercises

NRC's Proposed Changes

NRC recognizes that current regulations addressing drills and exercises are general in nature and do not explicitly require licensees to include hostile action event scenarios, or allow the NRC to

[5] *See* EP Enhancements Proposed Rule at 23256-60.

require specific scenario content.[6] NRC explains that while nuclear plant licensees have developed and implemented hostile action based emergency drills since the terrorist attacks of September 11, 2001 pursuant to NRC directives and industry guidance, such measures are currently only voluntary.[7] NRC further acknowledges that drill scenarios have become predictable and that "responders may be preconditioned to accident sequences that are not likely to resemble the accidents they could realistically face."[8]

As a result of their these concerns, the NRC proposes to add, *inter alia*, the following language to existing regulations related to drills and exercises:

> i. Licensees shall use drill and exercise scenarios that provide reasonable assurance that anticipatory responses will not result from preconditioning of participants. Such scenarios for nuclear power plant licensees . . . must include a wide spectrum of radiological releases and events, including hostile action events. Exercise and drill scenarios as appropriate must emphasize coordination among onsite and offsite response organizations.
>
> j. The exercises conducted . . . by nuclear power plant licensees . . . must provide the opportunity for the ERO to demonstrate proficiency in the key skills necessary to implement the principal functional areas of emergency response . . . . [and] key skills specific to emergency response duties in the control room, TSC, OSC, EOF, and joint information center. Additionally, in each six calendar year exercise planning cycle, nuclear power plant licensees . . . shall vary the content of scenarios during exercises conducted . . . to provide opportunity for ERO to demonstrate proficiency in skills necessary to respond to the following scenario elements: Hostile action directed at the plant (at an exercise frequency of at least once every 8 years), no radiological release or an unplanned minimal radiological release that does not require public protective actions, an initial classification of or rapid escalation to a Site Area Emergency or General Emergency, implementation of strategies, procedures, and guidance developed under 50.54(hh), and integration of offsite resources with onsite response . . . .[9]

The latter provision prescribes "the minimum exercise scenario elements necessary for licensees to meet NRC expectations for challenging and varied scenario content in biennial exercises."[10]

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[6] *Id.* at 23259-60.
[7] *Id.*
[8] *Id.* at 23260.
[9] *Id.* at 23286.
[10] *Id.* at 23278.

In order to ensure that licensee exercise scenarios implement these new requirements, NRC further proposes to add a requirement that licensees submit full participation and onsite biennial exercise scenarios for prior NRC review and approval.[11]

Riverkeeper's Comments

While the NRC has properly identified the problematic deficiencies with current licensee drill and exercise programs, the proposed regulatory changes will not fully alleviate all relevant concerns.

i. NRC Must Provide More Specific Criteria For Determining The Appropriate Scope Of Hostile Event-Based Drills To Ensure That All Relevant Factors Are Considered

Regulatory inclusion of security-based drills is critical, however, the proposed changes are too general and vague to ensure that plant-specific hostile threat environments would be adequately reflected in future drills. More precise standards and benchmarks are, thus, necessary to ensure that drills would adequately address varying hostile threat environments and site specific concerns at particular plants.

To begin with, the frequency of hostile action event based drills, particularly full-participation exercises but also tabletop-drills, should be based on site-specific knowledge of the current threat environment at each plant. To the contrary, the NRC's proposed changes would only impose a general requirement that licensees' drills incorporate a hostile action event at least once every eight years.[12] However, this would be far too infrequent for plants operating under a higher risk of terrorist attack. In such circumstances, security-based drills should be conducted more often than the proposed regulatory change would require, such as on a biennial basis. For example, the current DHS "threat level" for New York City continues to be Orange, meaning there is a "High Risk of Terrorist Attack."[13] Thus, Indian Point, located a mere 24 miles from New York City, home to the nation's, if not the world's, largest financial center, should be required to conduct a full-participation security-based drill more frequently than once every eight years, and hopefully on a biennial basis at the very least. Given the fact that a successful terrorist attack on Indian Point (i.e., one resulting in a large radioactive release to the environment) would have grave impacts on New York City, it makes sense to require the plant to operate at a correspondingly high level of preparedness. Conversely, it may not be necessary for plants located in lightly populated areas to perform security based drills as often. Accordingly, NRC should provide for more specific standards in its proposed rulemaking to ensure that hostile action based drills are performed at a higher frequency at facilities where there is a higher level of risk of significant radioactive release.

Moreover, while the NRC now makes the vague requirement that licensees perform drills involving hostile action events, the regulation changes and associated guidance updates do not provide enough direction to ensure that varied, site-specific contingencies are considered in such

[11] *Id.* at 23277, 23285.
[12] *Id.* at 23286; Interim Staff Guidance at 27; NUREG-0654/FEMA-REP-1, Supp. 4, at 12.
[13] See NYS Office of Homeland Security website at http://www.security.state.ny.us/, last accessed October 14, 2009.

scenarios. As a result, future security-based drills may continue to be unrealistic in scope and execution.

For example, hostile action event scenarios should reflect a fast-breaking radiological release caused by an intentional attack on spent fuel storage facilities, i.e. pools and dry casks. This is imperative for several reasons. First, the likelihood for such a scenario is not insignificant given the vulnerabilities of such facilities, for example, those at Indian Point.[14] Second, the results of such an occurrence could potentially be catastrophic. For example, at Indian Point, an attack on the densely packed IP2 or IP3 spent fuel pools would result in contamination of a significant portion of the 10-mile emergency planning zone and the 50-mile ingestion pathway zone.[15] Federal government reports note that a radioactive release could begin in less than an hour. Accordingly, it is crucial that plants demonstrate that they can successfully respond to such a situation. Thirdly, inclusion of scenarios involving attacks on onsite spent fuel storage facilities is necessary to be consistent with the current status of permanent nuclear waste disposal in the United States.[16] Accordingly, consideration of an intentional attack on spent fuel is a fundamental part of a security based regulatory scheme, including licensee drill programs.

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[14] The spent fuel pools at Indian Point are not housed under containment, but rather in non-reinforced cinderblock industrial buildings which are admittedly penetrable by aircraft. The dry casks in the Indian Point ISFSI are stored on an outdoor concrete pad, lined up in rows that are easily visible from the air and the Hudson River. Moreover, numerous reports indicate that nuclear power plants remain likely targets of terrorist attacks. *See, e.g.,* Nat'l Comm'n on Terrorist Attacks Upon the U.S., *The 9/11 Commission Report* (2004); *Wide-Ranging New Terror Alerts*, CBS News.com (May 26, 2002), *available at*, http://cbsnews.com/stories/2002/05/24/attack/main510054.shtml (discussing heightened alert of the U.S.'s nuclear power plants as a result of information gained by the intelligence community); *FBI Warns of Nuke Plant Danger*, CBS News.com (May 1, 2003), *available at*, http://www.cbsnews.com/stories/2003/09/04/attack/main571556.shtml (discussing FBI warning to nuclear plant operators to remain vigilant about suspicious activity that could signal a potential terrorist attack); General Accounting Office, *Nuclear Regulatory Commission: Oversight of Security at Commercial Nuclear Power Plants Needs to be Strengthened*, GAO-03-752 (2003) (noting that U.S. nuclear power plants are possible terrorist targets, and criticizing the NRC's oversight of plant security); *FBI's 4th Warning*, CBS News.com (July 2, 2004) (discussing FBI warning of recent intelligence showing Al-Qaeda interest in attacking nuclear plants). A 2006 study by the National Academy of Sciences on security risks posed by the storage of spent fuel at nuclear plant sites, confirmed that attacks by civilian aircrafts remain a plausible threat. Nat'l Acad. of Sciences., *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report* (2006) (hereinafter "2006 NAS Study"). The study found that attacks on spent fuel pools are attractive targets since they are less protected structurally than reactor cores and typically contain much greater inventories of medium and long-lived radionuclides than reactor cores. *Id.*

[15] Indeed, the 2006 NAS Study concluded that storage pools are susceptible to fire and radiological release from intentional attacks. *See* 2006 NAS Study at 49, 57. The environmental impacts of a fire in a spent fuel pool may be severe, extending over a geographic area larger than a state's legal boundaries and continuing for decades. *See generally* Gordon R. Thompson, "Risk Related Impacts from Continued Operation of the Indian Point Nuclear Power Plants" (Institute for Resource and Security Studies) (November 28, 2007) (hereinafter "Thompson Report"); *see also* German Reactor Safety Org., *Protection of German Nuclear Power Plants Against the Background of the Terrorist Attacks in the U.S. on Sept. 11, 2001* (Nov. 27, 2002) (finding that large jetliners crashing into nuclear facilities under different scenarios could cause uncontrollable situations and the release of radiation).

[16] With Yucca Mountain politically dead and the NRC's "Waste Confidence Decision" wholly undermined, spent nuclear fuel is going to continue to remain onsite at nuclear power plants for the indefinite future. *See, e.g.,* Associated Press, "$13 Billion Later, Nuclear Waste Site At Dead End" (March 5, 2009), *available at* http://www.msnbc.msn.com/id/29534497/ (last visited Oct. 19, 2009) (quoting Energy Secretary Steven Chu as stating that Yucca Mountain is no longer an option for storing highly radioactive nuclear waste); *see also* Commissioner Svinicki's vote on SECY-09-0090: Final Update of the Commission's Waste Confidence Decision (Sept. 24, 2009), available at http://www.nrc.gov/reading-rm/doc-collections/commission/cvr/2009/2009-0090vtr-

Security-based drill scenarios should also be required to consider various possible occurrences that would result in conjunction with a hostile event. For example, hostile event based drills should encompass: significant self-evacuation, or "shadow evacuation," occurring beyond the 10-mile radius and as far away as 50 miles; simultaneous attacks resulting in a Loss of Offsite Power (LOOP); multi-pronged attacks (e.g., a drill at Indian Point would include an armed attack on the plant itself, coupled with an attack on the Tappan Zee Bridge that would render it impassable); and severely impaired critical infrastructure, such as a major traffic artery impeded due to an accident (for example, in the Fall of 2005, the Tappan Zee Bridge, a major artery between New York City, Westchester County, Rockland County, and New Jersey, was closed due to a tanker truck fire, causing delays of up to nine hours for commuters). The eventuality of such contingencies would have major implications for effective emergency response.

Unfortunately the NRC's proposed regulatory changes do not ensure that hostile event-based drills would take into account such critical, site specific factors. The proposed rule and associated guidance merely list vague "key skills" which ERO's must demonstrate in future drill scenarios. As described in the NRC's proposed Interim Staff Guidance based on the revised regulatory changes, such skills include: "[r]esponse to hostile action, including interface with LLEAs [local law enforcement agencies]," "[e]ngineering assessment, repair plan development, and physical repair of critical equipment damaged by hostile action after the active attack but before the site is secured by LLEAs," response to a scenario which begins with or rapidly escalates to a high emergency level, ability to respond to the loss of large areas of the plant, repair of damaged equipment, "use of alternative facilities to stage the ERO for rapid activation during a hostile action event," ability to provide medical care for injured or contaminated personnel, radiological release assessment and monitoring, consideration of wind direction and persistence, consideration of a wide spectrum of radiological releases, consideration of varying equipment failure mechanisms, and the like.[17] Clearly, based on these vague directives, there is no guarantee that future hostile action based drills would take into account the relevant factors that may come into play during a hostile event, such as those discussed above. This is true, notwithstanding the NRC's new proposed obligation to pre-approve drill scenarios, since such approval would be based upon the aforementioned vague standards.

NRC's proposed regulatory changes point to reliance on an NRC sanctioned industry guidance document entitled "Conducting a Hostile Action-Based Emergency Response Drill."[18] However, a review of this document reveals broad criteria which also do not ensure that licensees will consider all relevant concerns.[19] For example, this guide discusses a hostile action event scenario structure which states rather broadly that "[t]he drill begins with the commencement of

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kls.pdf (dissenting in part on update to Waste Confidence Decision due to uncertainties of the future of long-term nuclear waste disposal). As such, spent fuel will continue to be an ever-present concern from a security standpoint.

[17] *See* Interim Staff Guidance, at 28-30.

[18] Revision 1 to Nuclear Energy Institute 06-04, "Conducting a Hostile Action-Based Emergency Response Drill" (October 30, 2007), ADAMS Accession No. ML073100460 ("NEI 06-04 Rev. 1"). This document was endorsed by the NRC in "NRC Regulatory Issue Summary 2008-08, Endorsement of Revision 1 to Nuclear Energy Institute Guidance Document NEI 06-04, 'Conducing a Hostile Action-Based Emergency Response Drill,'" (March 18, 2008), ADAMS Accession No. ML080110116.

[19] *See* NEI 06-04 Rev. 1 at 2-1 to 2-4, Appendix A (listing similarly broad capabilities licensees must demonstrate); *see also id.* at 4-1 to 4-4.

the attack (consideration in the scenario should include possible diversions and other attacks)."[20] However this open directive fails to ensure that licensees would address the appropriate site specific factors, as discussed above. The document also explains that

> [t]he scenario events are expected to present the conditions necessary for, or leading to, significant damage to irradiated fuel. Additionally, the scenario events should create a sense of urgency in assessment and the need for restoration of equipment or systems that drive the need for mobilization of resources in a controlled manner. The threat *may* be presented to fuel either in the reactor core or the spent fuel pool. In addition there must be a potential for a radiological release.[21]

Once again, this language is too general in nature to guarantee that licensees will properly take into account various contingencies that may occur during a hostile event. The permissive language relating to whether a scenario could address an attack on a spent fuel pool is unacceptable, since, as explained above, this is a credible, potentially catastrophic situation which *must* be addressed in future security based drills and exercises. Moreover, this would not require consideration of scenarios involving onsite dry cask storage facilities.

This guidance further provides that "assessment of nearby infrastructure vulnerabilities to a hostile action . . . would be a logical and expected response by OROs [offsite response organizations]" and that "developers of the off-site components of a hostile action-based drill or exercise are encouraged to consider it as an ancillary objective for hostile action-based scenarios."[22] This is clearly not explicit enough to require the necessary consideration of pertinent infrastructure concerns.

The guidance set forth in the proposed NUREG-0654/FEMA-REP-1, Supp. 4, is also too general to ensure consideration of relevant contingencies. This draft report would merely suggest that "[e]xtent of play discussions should consider varying attack scenarios (i.e., insider threat or ground, waterborne, airborne, or a combination of attacks) every exercise cycle" and that hostile action based exercise "can coincide with either a release scenario or 'no release'" scenario" but that "consecutive 'no release' HAB [hostile action-based] scenarios should not occur."[23] This draft report further provides vague directives indicating that licensees should vary radiological releases and release conditions.[24] However, without more specificity, this guidance, like the others, would not necessarily cause licensees to take all relevant release scenarios associated with a hostile event into account in future drill schemes.

Without more precise benchmarks related to the scope of hostile actions, future security-based drills at nuclear power plants may continue to be completely ineffective. A pertinent example arises out of the 2004 biennial drill at Indian Point: the scenario involved a cargo plane being

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[20] *Id.* at 4-1.
[21] *Id.* at 4-2 (emphasis added).
[22] *Id.* at 2-4.
[23] NUREG-0654/FEMA-REP-1, Supp. 4, at 10-11.
[24] *Id.* at 10.

hijacked and flown into an open area behind IP3 near the fuel storage building and the transformer yard. Only one person was presumed killed, despite extensive building damage and a jet-fuel fire. This scenario did not involve impact with actual irradiated fuel, and accordingly, no radioactive release was included, despite the fact that a General Emergency was declared just before the drill was "concluded" when the allotted time for the exercise had run out. Notably, the exercise was halted before control of the plant had been established or the General Emergency resolved. This perfectly illustrates a hostile action-based drill which did not reflect realistic assumptions that would likely accompany an actual hostile act. Under the NRC's proposed regulatory changes, scenarios like this one would remain acceptable compliance with the law, and, theoretically, licensees would never be obligated to address the credible contingencies discussed above.

Accordingly, the NRC's "enhancement" to licensee drill and exercise schemes to include hostile event-based scenarios in the instant rulemaking is not sufficient to ensure that future drills would adequately address actual hostile threat events. The NRC must provide more specific criteria for determining the appropriate scope of hostile event-based drills to ensure that all relevant factors are considered.

ii. NRC Has Not Done Enough To Ensure Increased Realism And Unpredictability In Licensee Drill Programs

Regulatory inclusion of security-based drills is one element of NRC's overall proposed measures, as cited above, intended to reduce predictability and increase realism in licensee drill programs. Riverkeeper appreciates the NRC's recognition that a higher level of unpredictability and realism must be injected into both the safety-based and security-based drills in order to improve their usefulness. As a senior NY SEMO official commented to Riverkeeper in advance of a drill at Indian Point held in November 2006, "I've been doing these drills for twenty years. They're always the same." Indeed, such changes are absolutely necessary to ensure that drills and exercises are tools which accurately test and measure facilities' capabilities to handle real emergency situations. Without a realistic underlying premise, a drill would not provide any useful function. Additionally, public confidence in a plants emergency plan can only be achieved if NRC demonstrates its willingness to test for credible scenarios.

Unfortunately, NRC's proposed changes do not go far enough to achieve the intended goals here. NRC proposes to generally require that future drill scenarios be varied so as to not result in anticipatory responses, providing only that scenario variations should include hostile action events, scenarios with no or minimal radiological release, and scenarios with an elevated initial emergency level or rapid escalation thereto.[25] NRC's draft guidance documents would likewise provide only vague direction: the Interim Staff Guidance lists general "key skills" which ERO's must demonstrate in future drill scenarios, as discussed above[26]; NUREG-0654/FEMA-REP-1, Supp. 4 memorializes the proposed regulation changes and offers some additional general guidance, including that drill scenarios "include varied release effects and environmental and meteorological conditions between exercise scenarios within a cycle (e.g., momentary or puff vs. continuous release, ground vs. elevated release, shifting wind direction and speed), as applicable

[25] EP Enhancements Proposed Rule at 23286.
[26] See Interim Staff Guidance at 28-29.

to plant design and historical site characteristics" (though these elements are not actual requirements, but rather "areas of consideration"), and "incorporate expanded causative events," taking into account "site-specific hazards (e.g., adjacent chemical plants, hazardous material storage facilities, railways, etc.), applicable regional natural events (e.g., earthquakes, hurricanes), seasonable conditions and HAB scenarios."[27] A review of all the proposed changes and guidance reveals that NRC has not provided sufficiently specific criteria to ensure that future drill scenarios will properly consider relevant, site-specific realities that may realistically come into play when accidents or hostile events ensue.

To begin with, as discussed at length above, NRC fails to provide any standards related to the substantive scope of hostile scenarios. Rather NRC's proposed regulatory changes indicate that mere inclusion of a hostile event-based scenario into a licensee's drill scheme at least once every eight years, in conjunction with other elements, is evidence of acceptable unpredictability and realism. Such a vague standard, with scant guidance, would not oblige licensees to encompass a wide variety of realistic hostile event scenarios into their drill schemes. As discussed above, it is imperative that security-based drills be based on a variety of attack scenarios, not only focused on the reactors themselves (including attack on the spent fuel pools, an aircraft attack on other critical plant buildings and systems besides the containment domes, or a waterborne attack targeting the turbine buildings or intake structures), and utilize the most current knowledge about the types of attacks that might be carried out, types of weapons used, potential target sets, and the degree of damage expected from a successful attack. Without criteria in place to ensure that accurate hostile action based events are employed in future drills, the regulatory changes will not lead to a more realistic and variable drill scheme.

Furthermore, in order to be realistic, drills should take into account various factors, which would not necessarily be encompassed under the loose proposed regulatory requirements and associated guidance. Such factors include the following: stress on limited emergency resources and personnel (for example, multiple attacks on the region including local bridges, roads, and electrical transmission lines, or a regional electrical blackout); major transportation arteries which are impassable (due to acts of terrorism or gridlock) to people evacuating[28]; radioactive plume travel beyond the 10-mile radius, which threatens to expose citizens with higher-than-acceptable doses[29]; significant shadow evacuation beyond the 10-mile radius and as far away as

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[27] NUREG-0654/FEMA-REP-1, Supp. 4, at 10.

[28] In relation to the 2002 biennial drill at Indian Point, when asked how they would handle massive increases in traffic on the Tappan Zee Bridge during an evacuation, emergency officials at the Joint News Center responded that "additional toll-booth operators would be called in to handle the increased volume." Based on this response, it is evident that the involved official either did not take the issue of traffic during an emergency evacuation into account, or had an unacceptable method for handling it. Yet, this is a critical issue, especially for highly populated areas like the area around Indian Point. Indeed, numerous traffic accidents and inclement weather in the region over the past few years reveal how vulnerable the region's transportation infrastructure is to gridlock. Accordingly, such situations should be reflected in drills to ensure the plants are able to properly cope.

[29] Federal Government reports acknowledge that dangerous levels of radiation can drift well beyond the 10-mile EPZ, even beyond the 50-mile ingestion pathway (see discussion related to evacuation time estimates below). In light of this, drills should include "ingestion pathway" (i.e., the 50-mile radius around a nuclear power plant within which people could be at risk if they eat or drink contaminated food or water) exercises which require activities beyond the 10-mile radius emergency planning zone. Beyond proposed general guidance alluding to the fact that licensee's should consider varying radiological release conditions, such as varying meteorological condition or wind direction, the instant rulemaking provides no criteria that would oblige consideration of the foregoing. Indeed,

50 miles[30]; large numbers of injured and contaminated people requiring treatment and decontamination[31]; and travel of emergency officials to emergency joint news center, the hub for emergency notification operations, especially in the event of a fast breaking release scenario.[32] Without more specific criteria, licensees would continue to not be required to consider such factors. How can NRC hope to foster realistic scenarios when such critical issues are not made part of the equation?

NRC's proposed changes to enhance drill realism also falters in another respect. Under the existing regulatory scheme, safety-based drills are normally based on a gradually deteriorating safety situation that inevitably provides at least 8-12 hours for protective actions, such as evacuation, to be conducted. It has been quite problematic that accident scenarios used never seem to result in more rapid deterioration of plant conditions. NRC's new regulatory scheme does recognize this problem, and would require that licensees demonstrate ability to respond to scenarios that begin with, or escalate rapidly to (within 30 minutes), a Site Area Emergency or General Emergency.[33] However, the proposed guidance would only require that drills employ such a scenario as little as once every eight years.[34] Based on the realistic possibility that plant conditions could deteriorate quickly in an accident or hostile event, it would be wise to require drills reflecting that possibility on a more regular basis. Additionally, the new rule language and guidance leave the door open to licensees to only escalate to Site Area Emergency.[35] Not specifically requiring escalation to the highest emergency level reduces the efficacy of NRC's proposed change here.

Lastly, Riverkeeper fails to see the efficacy of mandating drill scenarios in which there is no radiological release/unplanned minimal radiological release that does not require public protective actions.[36] The importance of training and conducting exercises that consider a radiological release is paramount. This is the only way for licensees, NRC and the public to understand the consequences of release, no matter how low the perceived risk. Moreover, public confidence in an emergency plan can only be achieved if NRC demonstrates its willingness to test out worst-case scenarios. For example, at Indian Point, drills repeatedly have not included radiological releases, including the 2002 and 2004 biennial drills. Given the unique position of

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vague directives to perform "radiological assessment" are meaningless unless licensees are required to do so in the proper context. *See* Interim Staff Guidance at 28-29.

[30] Academic research and the experience at Three Mile Island demonstrate there will be significant shadow evacuation outside of the 10-mile zone. The Witt report recommends consideration of shadow evacuation. *See* Witt Report at x; *see also* discussion related to evacuation time estimates below.

[31] Medical personnel have expressed concerns about hospitals being overrun by citizens worried that they have been exposed to radiation and the ability to treat a large number of contaminated people. NRC's proposed guidance only identifies "ability to provide medical care for injured, contaminated *personnel*." Interim Staff Guidance at 29.

[32] Exercises should not begin with all the emergency personnel already at the joint news center. As noted by county emergency officials, one of the problems presented by a fast breaking release and associated traffic congestion is that a large number of county, state, and federal emergency officials will be unable to get to the joint news center in a timely manner.

[33] Interim Staff Guidance at 29.

[34] *See id.* at 27; NUREG-0654/FEMA-REP-1, Supp. 4, at 9.

[35] *See, e.g.,* NUREG-0654/FEMA-REP-1, Supp. 4, at 9 (indicating that classification would only need to start at or rapidly escalate to Site Area Emergency, and stating that reaching a General Emergency is not required).

[36] *See* EP Enhancements Proposed Rule at 23286; Interim Staff Guidance at 27-29; NUREG-0654/FEMA-REP-1, Supp. 4, at 10.

Indian Point in a highly populated region, the value of running drills with no release is very questionable.

It is, thus, more than evident, that the proposed revisions to the licensee drill regime would not fully achieve the NRC's intended goals of less predictability and more realism. NRC's proposed changes fail to alter the existing drill regime to a sufficient degree such that predictable and ineffectual scenarios would be avoided in the future. Requiring compliance with frequent drills which reflect an *accurate* range of hostile event scenarios and give due regard to site specific considerations, would result in a far superior drill model that would accomplish the NRC's objectives here. Only if such concrete obligations are imposed to ensure realistic scenarios are employed would drills be able to accurately demonstrate licensee emergency response capabilities.

iii. NRC Should Incorporate Performance Based Standards Into Drill Requirements

In addition to the need for more precise criteria to ensure that future licensee drills and exercises address the full range of potential concerns that may arise during an emergency situation, NRC must provide a concrete method for measuring the effectiveness of future drills. Performance based standards must be inserted into the new regulatory scheme to guarantee a mechanism by which the NRC, as well as licensees and the public, can make well-informed judgments as to the effectiveness of the drill, and the actual capabilities of licensees.

While NRC's proposed regulatory changes require that future drills and exercises demonstrate various broadly termed emergency response capabilities (such as appropriate staffing, communication, implementation of protective actions, mitigation, ability to deal with hostile events and rapidly escalating emergency levels, etc),[37] the new regulatory scheme would continue to provide a vague standard for evaluating such drills. That is, the regulations provide for "formal critiques" to identify any weakness and deficiencies experienced during drills.[38] Though NRC now proposes to amend this requirement to make clear its application to drills and exercises,[39] such a vague obligation does not provide for meaningful evaluation of licensees' performance of drills. Without a mechanism to do this, drills amount to mere procedural requirements and cease to be useful tools. The proposed Interim Staff Guidance also fails to provide any concrete standards, simply reiterating that "[w]here weaknesses in performance are observed, the critique of such performance and resolution of weaknesses using corrective action programs contribute to the strength of licensee emergency preparedness through incorporation of lessons learned and training of the ERO."[40]

Instead, NRC should impose concrete standards based on actual licensee performance. In particular, NRC should require specific, measurable levels of performance be achieved during tabletop and full participation exercises, both security-based and safety-based, backed up by a strict, enforceable Corrective Action Program that allows a limited time period (less than the current 120-day period) to remedy below-standard performance problems. If a plant

[37] See Interim Staff Guidance at 28-29.
[38] 10 C.F.R. Part 50, App. E, IV.F.2.g.
[39] EP Enhancements Proposed Rule at 23278, 23286.
[40] Interim Staff Guidance at 28.

owner/operator cannot come into compliance within the prescribed time period, the licensee must shut down until compliance is achieved. For example, one such performance requirement could be for senior ERO officials to demonstrate ability to staff offsite emergency operations centers and Joint Information Centers (JIC) in a timely manner (this is currently not tested during full participation drills because staff is already present at the JIC when the drill begins).

iv. NRC Has Failed To Improve Public Participation in Licensee Drill Performance

One additional glaring flaw with the NRC's proposed regulatory changes to licensee drill and exercise programs is the failure to improve public participation in relation to licensee drill performance. Current regulatory guidance which NRC continues to endorse indicates that "scenario-related information should be treated as security sensitive."[41] Common practice involves a single public meeting several days after the exercise where the public is "debriefed" on the results of the exercise. Moreover, typically only media, elected officials' representatives and a few members of the public are allowed to observe the exercise. There is no reason for such limited involvement from the public. Thus, the NRC should take steps to ensure adequate public participation is allowed, including, but not limited to eliciting input from the public both before and after the biennial drill, requiring increased public access to Joint Information Centers during the drill, and increasing public disclosure of the results and evaluations following the biennial drills, detailing problems encountered and required changes to the plan or its implementation that must be made within a prescribed time period.

Indeed, the Governor Pataki-commissioned Witt report called for such greater public involvement in emergency planning:

> Cities, special facilities, private employers, and selected citizen groups or neighborhoods should be encouraged to participate in exercises. Elected officials should participate in exercises to make sure that the decision-making element is well represented and that they receive needed training. We further recommend that interested stakeholders be allowed to observe these exercises.[42]

Public participation in this manner is important for establishing credibility in plants' emergency plans. For example, at Indian Point, Entergy (the Indian Point Licensee) continually maintains that security and EP at Indian Point have been significantly enhanced since 9/11. However, it is impossible for the public to make an independent judgment of this claim, due to "safeguards" restrictions imposed by NRC. The opportunity to provide input on, be involved with, and hear feedback on licensees' drills would help the public to make such independent evaluations related to the effectiveness of the drills, and in turn, a licensee's emergency plan.

The NRC's proposed new requirement that licensees obtain NRC approval of future drill scenarios would provide a prime opportunity for public input to be solicited, should this requirement becomes final. Upon submittal of scenarios to the NRC, those members of the public who possess appropriate interest (such as Riverkeeper in the case of Entergy's future

[41] NEI 06-04 Rev. 1 at 4-3.
[42] Witt Report at 240-41.

proposed drills in relation to Indian Point) should be given the opportunity to offer input regarding the efficacy of the licensee's proposed drill and whether or not such drills are consistent with NRC's regulatory intent, regulations, and guidance. Additionally, the NRC's existing requirement that "[a]ll training, including exercises, shall provide for formal critiques in order to identify weak or deficient areas that need correction, " and that any deficiencies identified be corrected,[43] could provide another formal opportunity for public involvement: NRC should explicitly require that all documentation produced as a result of this obligation should be accessible for public scrutiny and comment.

Claims that scenario information must be secretive are unfounded. The realm of possible hostile event scenarios include ones already contemplated by the public at large, such as those discussed herein (such as suicide attacks on spent fuel storage facilities, jet fuel fires, disruption of offsite infrastructure, etc). Accordingly, there is no reason to classify such information as sensitive. This only serves to prevent public scrutiny related to the effectiveness of hostile action-based drill scenarios and emergency response actions. At a minimum, there must be appropriate limits on the amount of secrecy applied.

B. On-Shift Multiple Responsibilities

NRC's Proposed Changes

NRC identifies its concern that in the context of a hostile action event, on-shift Emergency Response Organization ("ERO") personnel who are assigned to emergency plan implementation functions may have multiple responsibilities that would prevent timely performance of their assigned emergency plan tasks. To address this, NRC proposes to require licensees to produce a "detailed analysis demonstrating that on-shift personnel . . . are not assigned any responsibilities that would prevent timely performance of their assigned functions."[44] NRC states that,

> [l]icensees would first need to identify the spectrum of accidents defined in their licensing basis (i.e., design basis accidents (DBAs), as well as the DBT [design basis threat], as applicable), for which there must be emergency planning. The analysis would identify all tasks which must be complete for each DBA and the DBT, as applicable, and the responders responsible for the performance of those tasks.[45]

Riverkeeper's Comments

The effectiveness of this proposed regulatory change is dependent upon consideration of an accurate range of possible accidents and hostile threats at a nuclear power plant. However, the present DBT, adopted in January 2007, is not reflective of all potential terrorist threats to a nuclear power plant. While the actual DBT is not publicly available, published descriptions

[43] EP Enhancements Proposed Rule at 23286; see 10 C.F.R. Part 50 App. E § IV.F.2.g.
[44] EP Enhancements Proposed Rule at 23284.
[45] *Id.* at 23274; *see also* Draft Interim Staff Guidance at 13 (providing specific requirements for ensuring that on-shift staff can cope with site-specific DBAs and the DBT).

reveal that NRC requires a comparatively light defense for nuclear power plants and their spent fuel.[46] Thus, it would seem that the current DBT does not reflect the level of threat which licensees may be confronted with. For example, the NRC has explicitly stated that the DBT rule "does not require protection against a deliberate hit by a large aircraft."[47]

Accordingly, requiring licensees to only address accidents defined in their licensing basis will not be broad enough to require consideration of all relevant hostile threats. Emergency response tasks will undoubtedly vary depending on the type of threat contemplated. Clearly, more severe hostile threats will cause concomitantly more severe consequences resulting in more including those discussed in above. Failing to do so will render NRC's proposed regulatory changes here largely ineffective due to resulting inaccurate analyses of on-site personnel responsibilities.

C. Licensee Coordination with Offsite Response Organizations During Hostile Action Events

NRC's Proposed Changes

NRC recognizes that offsite response organizations ("OROs") are faced with unique challenges in the context of a hostile action event which were not contemplated at the time the current regulations were developed.[48] In particular, NRC expresses concern that current regulatory scheme does not ensure adequate coordination between licensees and OROs during a hostile action event. Accordingly, NRC is proposing to specifically require that "[n]uclear power plant licensees shall ensure that offsite response organization resources (e.g., local law enforcement, firefighting, medical assistance) are available to respond to an emergency including a hostile action event at the nuclear power plant site."[49] NRC explains that licensees would have to coordinate with OROs "to ensure that licensees and OROs are able to effectively implement pre-planned actions for any contingency."[50] Moreover, this requirement would be enforced through routine inspections and observation of emergency exercises.[51]

Riverkeeper's Comments

NRC's proposed measures to address the lack of appropriate coordination with OROs will not necessarily remedy the situation. Simply requiring that licensees establish ORO availability amounts to a mere procedural requirement which does not guarantee sufficient coordination in the event of an actual emergency resulting from a hostile event.

Indeed, NRC's Interim Staff Guidance document provides only vague standards licensees are suggested to meet, which are largely procedural in nature: "review ORO resources . . . to verify that alternate resources have been identified," "address the training of the alternate personnel," maintain "additional duty rosters of qualified personnel," address timeliness of activation of the

[46] *See* Thompson Report at 38-39 (citing NRC Press Release No. 07-012, Jan. 29, 2007).
[47] Thompson Report at 38-39.
[48] EP Enhancements Proposed Rule at 23258-59.
[49] *Id.* at 23284.
[50] *Id.* at 23274.
[51] *Id.*

alternate personnel, verify mutual aid and other agreements for alternate resources, verify updated arrangements for alternate resources, and "update license agreements with OROs."[52] Accordingly, NRC's proposed regulatory change would only appear to require that the ORO situation is in order on paper. Such ambiguity will not ensure appropriate coordination.

NRC's goal here would be much better served if more specific, enforceable, performance based standards were imposed. Such criteria should include the following:

- Demonstrated ability of offsite first responders and emergency medical personnel at trauma centers in the emergency planning zone to treat large number (to be determined) of injured or contaminated individuals.
- Demonstrated ability of local law enforcement agencies ("LLEAs") and fire departments to respond to specific types of terrorist attack, e.g. aircraft crash into the control room building, or large number of terrorists attempting to breach the fuel storage pool.
    - Require fire departments to be trained and equipped to fight jet fuel fires.
    - Require medical first responders to be trained and equipped to deal with burn and explosion injuries.
    - Require OROs to have access and be trained to use heavy equipment to clear debris following an attack, so that plant personnel can reestablish control of the facility.
- Demonstrated interoperability of onsite and offsite emergency response organizations, e.g., onsite security and plant operators with LLEA, fire departments, state and federal counterterrorism organizations. For example, in a terrorist attack, is there interoperability between plant security personnel, local police departments and the FBI Hostage Rescue Team, or the U.S. Coast Guard?
- Require LLEA to be periodically trained and tested for their familiarity with the plant's physical layout and security procedures.
- Clear, enforceable guidelines specifying the role of local and state law enforcement during different security based events (i.e., support security forces versus directing traffic and emergency response personnel, etc).

Articulating more specific guidelines in this manner would be a much more effective approach towards ensuring proper coordination between licensees and OROs during hostile based events. Moreover, making such standards enforceable benchmarks which licensees must meet would make the NRC's requirement for coordination a meaningful part of the "reasonable assurance" determination.

IV. NRC'S CONSIDERATION OF NON-SECURITY RELATED ISSUES

Riverkeeper offers the following comments on NRC's proposed revisions relating to non-security related issues:

[52] Interim Staff Guidance at 19-20; see also NUREG-0654/FEMA-REP-1, Supp. 4 at 6-7 (discussing the new regulatory requirements in a similarly vague manner).

A. Backup Means for Alert and Notification Systems

NRC's Proposed Changes

NRC acknowledges that current NRC regulations do not require backup power for emergency sirens systems or other backup alert and notification system ("ANS") alerting capabilities when the primary alerting means is unavailable.[53] NRC further recognizes that if a plant's primary ANS becomes unavailable and no backup exists, the public may not be promptly alerted of an emergency event and protective actions to be taken.[54] Accordingly, NRC's revisions to the emergency preparedness regulations aim to address the necessity of backup capabilities. After considering a few different alternatives, NRC decided to add the following language to address their concerns:

> The licensee shall identify and demonstrate that the appropriate governmental authorities have both the administrative and physical means for a backup method of public alerting and notification capable of being used in the event the primary method of alerting and notification is unavailable during an emergency to alert or notify all or portions of the plume exposure pathway EPZ population. The backup method shall have the capability to alert and notify the public within the plume exposure pathway EPZ, but does not need to meet the 15-minute design objective for the primary prompt public alert and notification system.[55]

NRC's proposed Interim Staff Guidance incorporates the foregoing general changes into applicable guidance documents. Pertinently, a revision to NUREG-0654, Appendix 3, "Means for Providing Prompt Alerting and Notification of Response Organizations and the Population," (hereinafter "NUREG-0654, App. 3") would add language requiring that licensees develop a backup ANS "capable of covering essentially 100% of the population within the entire plume exposure EPZ in the event the primary method is unavailable. The backup means of alert and notification shall be conducted within a reasonable time."[56] The proposed Interim Staff Guidance further states that "[t]opography, population density, existing ORO resources, and timing will be considered in judging the acceptability of backup alerting plans," and suggests that "[a]lthough circumstances may not allow this for all facilities, OROs and utility operators should attempt to establish a backup system that will reach the population in the plume exposure EPZ within 45 minutes."[57] NUREG-0654/FEMA-REP-1, Supp. 4, also discusses the proposed changes in a similar, general manner.[58] Beyond these general, vague revisions, NRC's rulemaking indicates that guidance would be provided to assist licensees in determining the acceptability of backup methods, implementing and maintaining backup methods, performing

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[53] EP Enhancements Proposed Rule at 23261.
[54] *Id.*
[55] *Id.* at 23284.
[56] Interim Staff Guidance at 46.
[57] *Id.* at 47.
[58] NUREG-0654/FEMA-REP-1, Supp. 4, at 12-17.

periodic demonstrations of backup methods, as well as to clarify design objectives and other criteria for ANS backup methods.[59]

Riverkeeper's Comments

i. NRC Must Require ANS Backup Power

Requiring a backup ANS at all operating plants is only a partial solution to an ongoing problem that is directly related to the pronounced lack of public confidence in emergency planning at many nuclear plants; it still does not address the fundamental problem of powering the ANS system if there is a loss of power to the electrical grid.

NRC specifically acknowledged this problem, and considered requiring backup power, but rejected this as an unacceptable approach since "it would address only one of several ANS failure modes (i.e., loss of AC power) for one alerting method (i.e., sirens)."[60] NRC's Interim Staff Guidance further explains that since having backup power for siren systems does not address other possible failure modes, requiring or relying on backup power for sirens is not equivalent to having an independent backup means for public alerting and notification. A proposed revision to NUREG-0654, App. 3 reflects this understanding and would state that while "[a]n independent backup means of public notification is required . . . . [b]ackup power for fixed sirens is not required unless mandated by other regulation or legislative act."[61]

However, the need for backup power is not undercut in any way by the fact that backup power would not address all ANS failure modes. Indeed, requiring a backup ANS, although very important in and of itself, is no substitute for firstly requiring backup power for primary alerting systems.

NRC recognizes that the "most common warning system used at U.S. nuclear power plants is based on sirens that are powered directly, or indirectly through batteries, by an AC power source."[62] It is, thus, imperative that the NRC ensure reliability of such systems in the reasonably foreseeable scenario of a loss of offsite power to the grid during a plant emergency. NRC should only require reliance on a secondary, fall back system after imposing requirements that increase dependability of a facility's primary ANS. This is made evident by the fact that NRC's proposed regulatory changes would not require that backup alerting systems meet the 15-minute standard for completing the initial alert and notification. Clearly, this would not guarantee the same capability as a functioning primary ANS.[63]

Furthermore, in the event of offsite power loss, relying only on a backup ANS may not prove to be a viable solution: various existing backup ANS methods, such as reverse callout systems, CAP alerts, and Internet notification via a Joint Information Center ("JIC") website, would not

[59] EP Enhancements Proposed Rule at 23275.
[60] *Id.* at 23262.
[61] Interim Staff Guidance at 47.
[62] EP Enhancements Proposed Rule at 23262.
[63] NRC admits that "the backup method would not be required to have the same capabilities as the primary alerting system in terms of timeliness." *See* Interim Staff Guidance at 49.

have a guaranteed backup power source either in the event power to the grid is interrupted during an emergency. Even if the alerting agency, e.g. the state emergency management JIC, has backup power to send out an e-mail alert or automated phone message, most residences and businesses do not. Their computers and most home telephones that rely on AC power will not work during a power loss. Theoretically, if such methods were employed, the only people that would be notified are those using cell phones or driving in their cars with the radio on, tuned to the particular station that has an agreement to automatically transmit a CAP alert if one is initiated. In such a scenario residents would be in virtually the same position they are in at present, i.e., they would have to be notified by local law enforcement via "route alerting." In other words, the public in the 10-mile EPZ would be dependent on police driving around, announcing an emergency over their vehicle loudspeakers. This clearly would not have the same level of effectiveness as a system that could be effectively run on backup power.

Based on the foregoing, it is essential that NRC recognize and address the problems faced by alert and notification systems during power loss situations. NRC should require every operating plant to install backup power to their primary ANS so that the loss of offsite power will not affect the licensee and the local government's ability to alert the public to an emergency at the plant. Failing to do so will detract rather than enhance the protection of the public. Moreover, imposing such a requirement would be consistent with national recognition that backup power for emergency notification systems is desirable.[64]

Such a system has finally been installed at Indian Point, following a protracted effort begun by Riverkeeper and taken up by former New York Senator Hillary Rodham Clinton, in the form of legislation that became part of the Energy Policy Act of 2005. Pursuant to the legislation, Entergy replaced the trouble-plagued siren system at Indian Point with new sirens that have battery backup power. Unfortunately, the backup ANS proposed by Entergy all depend on "third-party vendors" who are not required to provide backup power capability to their systems. At a minimum, the ANS requirements approved by Congress for Indian Point should be extended to all operating plants.

ii. NRC Should Impose Requirements To Ensure Backup Alert and Notification Systems Would Operate As Effectively As Primary Alert and Notification Systems

NRC's proposed regulatory changes should ensure that backup alert and notification systems employed by licensees be as timely and effective as the functioning primary system would have been. This is especially true if NRC ignores the urgent need to require installation of backup power to ensure operation of siren systems in the event of loss of offsite power.

Unfortunately, NRC's proposed regulatory changes already indicate that backup systems would not be required to posses the same alert and notification capability as primary systems: the NRC's new rule would not require that backup systems meet the 15-minute standard for

[64] NRC even cites to U.S. House of Representatives Committee on Appropriations Report 107 – 740, which directed FEMA to update its guidance on outdoor warning and mass notification systems to be operable in the absence of an AC power supply, as well as the Energy Policy Act of 2005 which directed the NRC to require backup power for the emergency notification system for nuclear power plants where there is a permanent population in excess of 15,000,000 within a 50-mile radius of the power plant. *See* EP Enhancements Proposed Rule at 23261.

completing the initial alert and notification which the primary system is required to meet. Guidance, as discussed above, suggests that that backup alert and notification should occur "within a reasonable time," and recommends no longer than 45 minutes.[65]

Given the importance and function of a backup system in the event a primary ANS is unavailable, Riverkeeper fails to see a justifiable reason why execution of a backup system should be held to a different standard. NRC rationalizes that "some backup methods would not be capable of meeting the timeframes that are part of the primary ANS design objectives."[66] If such is the case, than those backup methods should simply not be acceptable for use by licensees. NRC further reasons that the new regulation would not require a specific timeframe related to backup systems since the existing regulation acknowledges that the events which are more likely to warrant use of alert and notification capability are those where officials would have substantial amount of time in which to make judgments regarding activation of the warning system to alert and notify the public.[67] However, this utterly ignores those events which would require urgent action.[68] Just because such situations are not as likely, does not preclude them as possibilities, and, as such, backup systems should be equipped to deal with urgent scenarios as well.

NRC does not provide much further indication as to how effectively backup systems would have to operate. Instead, NRC largely refers to future guidance that would ostensibly provide the criteria for acceptability of backup alert and notification systems. This guidance alluded to in the instant rulemaking should, of course, be made available for public review and comment so that interested members of the public can determine whether backup methodologies sanctioned by NRC would be as effective as primary alert and notification systems.

iii. NRC Should Incorporate Performance Based Standards Into ANS Requirements

In order to measure the effectiveness of primary and back up alert and notification systems, NRC should implement enforceable standards against which licensee performance must be judged. Such standards should include, at a minimum: (1) demonstrated functionality of the ANS system, (2) requirement of backup battery power to the primary ANS, and (3) at least one backup method for alerting the public.

B. Evacuation Time Estimate Updating

NRC's Proposed Changes

NRC recognizes that current regulations do not require any review or revision of Evacuation Time Estimates ("ETEs") following an initial licensing of a plant and that, although some licensees do revise ETEs, "the use of ETEs in evacuation planning is inconsistent and . . . [does] not affect the development of public protective action strategies."[69]

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[65] Interim Staff Guidance at 46-47.
[66] EP Enhancements Proposed Rule at 23275.
[67] *Id.* at 23275.
[68] 10 C.F.R. Part 50, App. E. § IV.D.3.
[69] EP Enhancements Proposed Rule at 23264.

According, NRC proposes regulatory changes in an attempt to rectify these problems. In particular, 10 C.F.R. § 50.47 would be revised to provide that ETEs "must be updated on a periodic basis," and that any updates must be submitted "to the NRC for review and approval."[70] Revisions to Appendix E to Part 50, section IV provide further details on when an update would be required:

> Within 180 days of issuance of the decennial census data . . . licensees . . . shall develop an ETE and submit it to the NRC for review and approval. . . . During the years between decennial censuses, licensees shall estimate permanent resident population changes at least annually using U.S. Census Bureau data and/or State/local government population estimates. Licensees shall maintain these estimates so that they are available for NRC inspection during the period between censuses and shall submit these estimates to the NRC with any updated ETEs. If at any time during the decennial period, the population of either the EPZ or the most populous Emergency Response Planning Area ["ERPA"] increases or decreases by more than 10 percent from the population that formed the basis for the licensee's currently approved ETE, the ETE must be updated to reflect the impact of that population change. The updated ETE must be submitted to the NRC for review and approval under § 50.4 no later than 180 days after the licensee's determination that a population change of more than 10 percent has occurred.[71]

NRC would review ETE updates "to ensure they were consistent with NRC guidance on the development of ETEs," which is out for public comment with NRC's instant rulemaking, as previously cited above.[72]

Moreover, NRC adds that ETE updates "shall be used by licensees in the formulation of protective action recommendations and must be provided to State and local governmental authorities for use in developing protective action strategies."[73] NRC explains that licensees would be expected to "identify and analyze potential enhancements to improve evacuation times and document whether implementation was appropriate."[74]

Riverkeeper's Comments

i. NRC's Proposed Trigger For Requiring ETE Updates Is Flawed

Riverkeeper agrees that ETEs must be updated regularly, however, NRC's proposed trigger of a 10% change in population density of the EPZ or most populous ERPA may not be sufficient to

[70] *Id.* at 23282.
[71] *Id.* at 23283-84.
[72] *Id.* at 23273; *See* Draft ETE Report.
[73] EP Enhancements Proposed Rule at 23283.
[74] *Id.* at 23273.

always ensure timely updating. While variation of population density is an appropriate indicator for when an ETE update is needed, the proposed threshold would not necessarily capture population changes which may have a significant impact on ETEs.

Pertinently, of the nations commercial reactor sites, Indian Point, located just 24 miles north of New York City, (35 miles north of Times Square) tops the list as the nuclear power plant with the greatest population density within a 10-mile radius (at least 300,000) and 50-mile radius (approximately 20 million people).[75] With population ever increasing in such an already dense area, a 10% variation in only the 10-mile EPZ or most populous ERPA within the EPZ may not be sensitive enough trigger future ETE updates even though shifts in population would have an impact on evacuation estimates and associated planning.

Accordingly, NRC must require consideration of population density beyond just the EPZ and most populous ERPA. Doing so will ensure a more accurate trigger for future ETE updates for reactors like Indian Point which are located in very highly populated areas. This is especially so given substantial shadow evacuation that will occur beyond the EPZ (as discussed further below). While NRC admits that it considered requiring a review "of individual counties and States in addition to the whole EPZ," NRC decided that review of the EPZ and ERPA with the largest population "was considered to be a reasonable balance between the burden on licensees and applicants and the need to ensure that the ETE is accurate . . . ."[76] As such, it appears that NRC has failed to require consideration of relevant information for the purposes of administrative ease. However, the safety of populations surrounding nuclear power plants should trump concerns about the burden to licensees caused by mandating accurate assessments of changes in population.

Moreover, reliance upon a seemingly generic Highway Capacity Manual for the general conclusion that only increases 10% or more of vehicles on roadways would result in a decreased level of service due to traffic, and vice versa, seems highly questionable. Surely, effects on roadway service would vary depending on starting population densities (i.e., a 10% increase of vehicles in an area with millions of people would be more severe that the same increase in an area with only a couple thousand people). NRC's assessment of this highway manual forms the basis for their conclusion that population changes of less than 10 percent would not significantly impact the ETE. However, it appears far from clear that NRC's conclusions are well founded. Accordingly, NRC should perform a site-specific review of nuclear reactor sites to determine the appropriate percentage in population change particular licensees should consider. For example, at Indian Point, based on the existing high population density, a 5% change would be a more appropriate trigger.

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[75] *See, e.g.,* Witt Repot at 4, 81-82. The NRC has previously acknowledged that Indian Point has the "highest population within 10, 30 and 50 miles of any nuclear power plant in the U.S. At 50 miles, it population is more than double any other plant site." *See* U.S. Nuclear Regulatory Commission, Consolidated Edison Company of New York: Indian Point, Units 2 and 3, Memorandum and Order, January 8, 1981, at 6; *see also* Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3, Draft Report for Comment, Main Report (U.S. Nuclear Regulatory Commission December 2008) ("Indian Point Draft Supplemental EIS") at Table 2-1.

[76] EP Enhancements Proposed Rule at 23273.

In addition to requiring updates to ETEs based on changes to population density in accordance with the above comments, it would also be acceptable to require ETE updates based on other predetermined indicators such as traffic volume, or a preset time period. Indeed, Riverkeeper does not agree with NRC's determination that changes to infrastructure are not a suitable basis for an ETE update. Modifications to infrastructure that is critical for evacuation purposes should be an independent a basis triggering a licensee to update ETEs. NRC acknowledges that "changes in infrastructure, or addition of a large subdivision to the EPZ, could also impact the ETE," however, determined that "population is the more important factor," and, thus, only required updates based on population density changes.[77]

NRC rationalizes that infrastructure projects take years to plan, budget, and construct, whereas population changes occur over shorter periods of time, and so infrastructure changes are "an enveloped contributor."[78] NRC seems to imply that when ETE updates are performed pursuant to the prescribed changes to population density, they will encompass consideration of any infrastructure changes as well. However, it is improper to speculate or assume that population changes will occur in such a fashion as to guarantee timely consideration of any infrastructure modifications. As such, changes to infrastructure deserve independent consideration in relation to ETE updates. Furthermore, NRC's proposal would only allow consideration of changes to infrastructure once those changes were wholly complete. However, the implementation of long-term infrastructure projects, which NRC recognizes takes years, will undoubtedly have an affect upon evacuation times, and should, thus, be considered in an ETE update as well.[79] Moreover, NRC's proposed ETE update scheme consistently focuses on requiring "licensees to evaluate a population change impact on the ETE."[80] At a minimum, NRC should clarify that when an update is triggered, the update must be comprehensive, with due consideration for all appropriate factors, including planned/completed changes to infrastructure, and not just assess how the population change will affect the ETE. While the Draft ETE Report would ostensibly encompass such relevant factors, it would merely be guidance, and NRC should make its regulation changes more explicit to reflect their apparent intentions here.

Another flaw in NRC's proposed model for future ETE updates is the notable lack of an appropriate enforcement structure. NRC would merely require that licensees maintain population estimates and only submit them in the event an updated ETE is actually performed. NRC should be more proactive and require annual submittals by licensees to explain their population estimate reviews. NRC should review such submittals to ensure that licensee determinations that ETE updates are not warranted, are accurate. Having more oversight in this manner would only serve to ensure timely ETE updates.

Furthermore, to improve public participation, and foster a higher degree of public confidence in emergency preparedness regulations, NRC should explicitly require that all future ETE updates be fully disclosed for scrutiny by interested members of the public.

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[77] *Id.* at 23265; *see also* Draft ETE Report at 32 (stating that updates to ETEs are not required for planned activities such as construction or infrastructure projects).
[78] EP Enhancements Proposed Rule at 23265.
[79] For example, an ETE to assess how evacuation times would be affected during the replacement/rehabilitation of the Tappan Zee Bridge would be appropriate.
[80] EP Enhancements Proposed Rule at 23273.

ii. NRC's Proposed Guidance Document Establishing Criteria For Development Of Future Evacuation Time Estimate Studies Is Flawed

NRC's emergency preparedness rulemaking includes a proposed draft report, "Criteria for Development of Evacuation Time Estimate Studies," (hereinafter "Draft ETE Report") intended to be "a guidance template for the development of ETE studies."[81] Unfortunately, the draft report fails to address the following deficient threshold assumptions which form the basis for current ETE methodology:

a. Reliance on Keyhole Model of Evacuation

The Draft ETE Report continues to rely solely on the "keyhole model" of evacuation, that is, "[a]n evacuation of the 2 mile radius around a NPP and the downwind sectors forming a keyhole configuration."[82] However, use of this method is based upon an overly simplistic, outdated plume transport model which assumes that radiation moves in a predictable, straight-line direction (called a Gaussian plume model). Much authority indicates that such straight-line models are only appropriate for relatively flat, homogenous terrain and that where terrain is more complex, radiation dispersion will occur in a far more variable manner.[83] Many nuclear power plants are situated in areas with complex terrain. For example, Indian Point has nearby mountains and bluffs with higher elevations than the point of release from the plant would be, as well as an adjacent river located in a valley with steep sides.[84] Complex terrain features such as these have direct impacts on air flow from the site which affects how pollutants released from the plant will travel. Accordingly, assuming that radiation plumes will move in a straight-line direction, and consequent reliance upon keyhole evacuation, is not appropriate for such sites.

Without accurate assumptions about plume transport, ETEs will continue to be designed without appropriate regard for the portion of the population that will actually be affected by radiological release. In the event of an actual emergency, licensees would not have the appropriate tools to accurately assess the proper protective actions to take. Accordingly, it is imperative that NRC require licensees to develop ETEs based upon more realistic notions of plume transport.

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[81] Draft ETE Report at iii.

[82] *Id.* at 7-9, 28-30, 35.

[83] *See, e.g.,* Stephen F. LaVie, Senior Emergency Preparedness Specialist, United States Nuclear Regulatory Commission, Power Point Presentation: *What's in the Black Box Known as Emergency Dose Assessment?*, prepared for the 2009 National Radiological Emergency Planning Conference Dose Assessment Workshop, Part 2, Dispersion, ADAMS Accession No. ML091050257.

[84] See, e.g., Indian Point Draft Supplemental EIS at 2-2 ("The region surrounding the Indian Point site has undulating terrain with many peaks and valleys. Dunderberg Mountain lies on the western side of the Hudson River 1 mi . . . northwest of the site. North of Denderberg Mountain, high grounds reach an elevation of 800 feet . . . above the western bank of the Hudson River. To the east of the site lie the Spitzenberg and Blue Mountains. These peaks are about 600 ft . . . in height. There is also a weak, poorly defined series of ridges that run in a north-northeast direction east of IP2 and IP3. The Timp Mountains are west of the facility. These mountains rise to a maximum elevation of 846 ft . . . Elevations south of the site are 100 ft . . . or less and gradually slope toward the Village of Verplanck).

b. Reliance on Artificial 10-Mile Emergency Planning Zone

The Draft ETE Report continues to be based upon evacuation of the emergency planning zone ("EPZ"), defined as the "area with a radius of about 10 miles around a nuclear power plant."[85] However, ample authority suggests that radiation resulting from an accident or intentional attack at a nuclear power plant will go beyond 10 miles. For example:

- A Sandia National Laboratories report from 1982, "Calculation of Reactor Accident Consequences" (referred to as the "CRAC-2" report) indicated that a so-called "peak fatality zone" extends out to 17.5 miles and that a "peak injury zone" extends out to 50 miles;[86]
- A 1997 Brookhaven National Lab Report ("A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants") claims that a disaster from a spent fuel pool could make an area up to 2,790 square miles around the plant uninhabitable;[87]
- The Chernobyl accident demonstrates the reality that dangerously high levels of radiation can extend tens to hundreds of miles beyond the 10-mile radius and 50-mile ingestion pathway (i.e., the area within which people could be at risk if they eat or drink contaminated food or water);
- In the event of aircraft related attack resulting in radiological release, fire and smoke from burning jet fuel can carry radioactivity to higher altitudes and subsequently disperse radioactivity far beyond the 10-mile emergency zone;
- Federal legislation calling for the distribution of Potassium Tablets within a 20-mile radius of nuclear power plants suggests that the area of impact could be beyond the 10-mile EPZ;
- Recommendations made by the American Thyroid Association regarding distribution of Potassium Iodide also suggests that the area of impact could be beyond the 10-mile EPZ.

It is, thus, evident that ETEs artificially restrict the area contemplated for evacuation, resulting in unrealistic and ineffective estimates. NRC should require consideration of an expanded evacuation zone of at least 50-miles to reflect situations which are more likely to occur in the event of an actual radiological release.[88]

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[85] Draft ETE Report at vii.

[86] The CRAC-2 Report stated that "increasing the evacuation distance [from 10] to 25 miles could substantially reduce the peak consequences, but the feasibility of a timely evacuation from so large an area is highly questionable."

[87] The Chernobyl accident, which rendered about a thousand square miles uninhabitable (about 100 square miles permanently), released to the environment only a fraction of the radioactive material currently stored at Indian Point. Thus, it is entirely conceivable that a significant radiological release from Indian Point could render a large portion of the New York metropolitan area uninhabitable.

[88] In the instant rulemaking, NRC deletes certain completed one-time requirements including 10 C.F.R. § 50.54(s)(1) except that portion which discusses the size of the EPZ as a 10-mile radius would be retained. *See* EP Enhancements Proposed Rule at 23267. In light of the reasons set forth herein, NRC should reconsider this determination and delete the entire provision, and compel licensees to formulate more accurate assessments of the EPZ size.

This is especially important given the new reality in the U.S. that spent nuclear fuel will continue to be kept onsite at nuclear power plant facilities for the indefinite future.[89] Releases due to accidents or attacks on vulnerable spent fuel pools or casks, such as those at Indian Point, will be far-reaching,[90] and licensees should prepare ETEs considering that possibility.

c. Unrealistic Scenario Development

The Draft ETE Report would foster unrealistic ETE scenario development. While the report contains ten different scenarios with variables including season, day, time of day, and weather conditions, none of the scenarios appear to address evacuation during rush hour in the morning or evening. Rather, the scenarios only consider "daytime," when "major work places are at typical daytime levels," and "evening," when "permanent residents are generally at home." Given the extremely high volume of commuter traffic during rush hour (especially in highly populated areas like the vicinity surrounding Indian Point), it is virtually certain that an attempted evacuation during this time would take hours longer than one occurring midday.

The failure to specifically address this contingency calls into question the usefulness of this report. Unless licensees are required to consider a realistic range of possible evacuation scenarios, ETEs will not be relevant to the NRC and Department of Homeland Security process for approving plants' emergency plans under 10 C.F.R. § 50.47.

d. Improper Consideration of Shadow Evacuation

The Draft ETE Report would not provide for proper consideration of shadow evacuation. The report conservatively recommends that "[a] shadow evacuation of 20 percent of the permanent resident population, based on US census data, should be assumed to occur in areas outside of the evacuation area being assessed for all cases extending to 15 miles from the NPP."[91]

However, ETEs should acknowledge that significant shadow evacuation will occur well beyond the 10-mile EPZ radius and as far as 50 miles. Academic research as well as Three Mile Island and Hurricane Rita demonstrate that shadow evacuations will be considerable. Given the demographics of the New York Metropolitan region, it is reasonable to assume that hundreds of thousands of people will be on the road, self-evacuating and/or trying to reach loved ones. Accordingly, consideration of 20% shadow evacuation only as far out as 15 miles would clearly not be sufficient for an accurate ETE.

Furthermore, because the draft guidance document contemplates a staged evacuation (i.e., evacuation occurring in phases), the report incorrectly assumes that an orderly shadow evacuation will occur: "For a staged evacuation, when developing the 0-2 mile ETE, it should be assumed that 20 percent of the remaining EPZ permanent resident population evacuates as a shadow evacuation. When developing the 2-5 mile ETE, it should be assumed that this shadow

[89] *See supra* Note 16.
[90] *See supra* Note 15.
[91] Draft ETE Report at 15-16.

evacuation is complete or underway."[92] This is an unrealistic assumption for highly populated areas, such as the vicinity around Indian Point.

It is not clear from the Draft ETE Report how NRC decided its conservative recommendation relating to shadow evacuation was appropriate. Licensees should be required to consider a more accurate estimate of shadow evacuation, based on current, peer-reviewed studies of human behavior approved by both NRC and independent experts. If licensees follow the proposed suggestion, ETEs will continue to be ineffective tools for emergency planners.

Based on the foregoing, it is clear that the efficacy of NRC's proposal to require updated ETEs is severely undercut by the failure to sufficiently enhance ETE methodology such that future updates would accurately consider all relevant issues. The requirement to update ETEs becomes hollow unless licensees would be required to base their future studies on the realistic assumptions discussed above.

iii. ETEs Should Become A Performance-Based Standard

The current regulatory scheme governing ETEs, reinforced by the instant rulemaking, merely requires development of the ETE study, to be included as part of nuclear power plants' emergency plan, for use in the planning process to "help licensees recommend and offsite officials determine the most appropriate protective action."[93] As a seemingly procedural requirement, ETEs have limited effectiveness. Given the numerous deficiencies with ETE methodology, which render the estimates grossly inaccurate (as discussed above), it is hard to believe that ETEs would play any kind of actual role in any decision-making process, let alone in the NRC's "reasonable assurance" determination.

By imposing ETE standards of performance, these studies would become a meaningful component of emergency planning regulations. That is, NRC should require that licensee ETEs, using proper assumptions and methodology, demonstrate timely evacuation under varying relevant conditions. For example, a standard stating that "evacuation of 100% of the 2-mile EPZ must occur within four hours of evacuation order, during rush hour in inclement weather." Licensees should be obligated to make these kinds of demonstrations in order to receive emergency plan approval.

C. Emergency Declaration Timeliness

NRC's Proposed Changes

In response to inappropriately delayed emergency declarations, NRC proposes to add a criterion to the regulations to "ensure that licensees are aware that they are responsible for completing

[92] *Id.* at 16.
[93] EP Enhancements Proposed Rule at 23265.

emergency declarations in a timely manner in the event of a radiological emergency."[94] Specifically, licensees would be required to

> establish and maintain the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an emergency action level has been exceeded and shall promptly declare the emergency condition as soon as possible following a determination that an emergency action has been exceeded.[95]

Riverkeeper's Comments

NRC determined that imposing a "capability criterion" was preferable over imposing "an inflexible performance criterion."[96] This is simply an explicit example of NRC's unwillingness to hold licensees to measureable standards based on actual performance. Requiring a demonstration that the 15-minute threshold could theoretically be met is clearly not as valuable as requiring demonstration that the 15 minute threshold *would* be met. Accordingly, NRC should adopt this requirement as a performance criterion in order to have a more effective tool for measuring licensee performance.

V. CONCLUSION

Based on the foregoing, Riverkeeper submits that NRC's proposed revisions to the emergency preparedness regulations do not go far enough towards remedying the currently ineffective regulatory regime. Incorporation of the suggestions articulated herein will help to develop a more useful and credible regulatory structure. Indeed, NRC must undertake a much more comprehensive review which properly considers certain fundamental assumptions identified throughout the above comments. Importantly, NRC must implement measureable, performance-based standards in order to make the existing purely procedural scheme useful.

Thank you for your consideration.

Sincerely,

s/

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[94] *Id.* at 23263.
[95] *Id.* at 23284.
[96] *Id.* at 23263.

Rulemaking Comments

From: Deborah Brancato [DBrancato@riverkeeper.org]
Sent: Monday, October 19, 2009 11:49 PM
To: Rulemaking Comments
Subject: Comments of Riverkeeper, Inc. on NRC's Proposed Enhancements to Emergency Preparedness Regs, RIN 3150-AI10, NRC-2008-0122, 74 Fed. Reg. 23,254 (Oct. 19, 2009)
Attachments: 2009.10.19.Comments of Riverkeeper, Inc. on NRC's Proposed Enhancements to Emergency Preparedness Regs, RIN 3150—AI10, NRC-2008-0122, 74 Fed. Reg. 23,254.pdf

Dear Secretary and Rulemakings and Adjudication Staff,

Attached please find the comments of Riverkeeper, Inc. on the NRC's Proposed Enhancements to Emergency Preparedness Regulations, Proposed Rule, 10 C.F.R. Parts 50 and 52, RIN 3150—AI10, NRC-2008-0122, 74 Fed. Reg. 23,254 (May 18, 2009) and associated guidance documents.

A hard copy will follow by mail.

Thank you for your consideration.

Sincerely,

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