Responses to Questions
Senator Kirsten E. Gillibrand
Letter Received October 26, 2015

1. Despite the fact that Indian Point experienced four unplanned shutdowns this year, including a shutdown that was the result of a transformer fire, the mid-cycle assessment states that the NRC plans to conduct baseline inspections at Indian Point. What are the criteria for a baseline inspection versus other levels of inspection? And when making a decision on the level of inspections that a plant will be subject to, do you look at the violations in a cumulative way? Or do you only look at a specific period of time?

NRC regulatory oversight and associated actions at nuclear power plants are governed by a plant's position in the NRC's Reactor Oversight Process (ROP) Action Matrix. Use of the Action Matrix to guide NRC regulatory actions promotes consistency, predictability, and transparency in our oversight of license performance. The assessment of plant performance and subsequent position in the Action Matrix takes into consideration the results of NRC inspection findings, as well as plant-specific performance indicators.

All operating units receive the baseline inspection program, regardless of their performance or position in the Action Matrix. If a licensee's plant safety performance declines, the NRC conducts supplemental inspections in addition to the baseline inspections. Declining performance is determined by either performance indicators exceeding pre-determined thresholds, or when safety significant inspection findings are identified. As the number and/or safety significance of performance indicators or inspection findings increases, the NRC responds with increasing regulatory engagement by conducting supplemental inspections of increasing scope, consistent with the Action Matrix. Safety–significant inspection findings remain as inputs into the Action Matrix for at least four consecutive calendar quarters (or longer if the licensee takes more time to meet the objectives of the associated NRC supplemental inspection). Performance indicators are treated in a similar fashion.

A key performance indicator is "unplanned scrams" (a scram is a rapid reactor shutdown). Planned shutdowns for maintenance do not factor into this performance indicator. If the unit experiences more than three unplanned scrams over 7,000 critical hours (the reactor is critical when not in a shutdown status), the indicator will exceed the significance threshold and the unit would be subject to supplemental NRC inspection. While Indian Point Unit 3 experienced five unplanned scrams over the course of 2 years in 2014 and 2015, the unit did not experience more than three unplanned scrams over a 7,000 critical hour period and therefore, did not exceed the performance indicator threshold. Consequently, no supplemental inspection was warranted, per the Action Matrix. In addition, there were no safety–significant inspection findings identified at Indian Point that would warrant supplemental inspections, as discussed below.

2. Is there a number of incidents or violations within a certain period of time that the NRC would require a level of inspection above baseline inspection? Please provide details regarding the levels of inspection.

If an NRC power reactor licensee receives a single safety–significant inspection finding or reports a performance indicator that exceeds a pre-determined threshold, that unit will be subject to a supplemental inspection in addition to the baseline inspection. There are three distinct supplemental inspections that are implemented in response to declining licensee performance based on increasing safety significance of inspection findings or performance

indicators. Safety significance is color-coded as either green, white, yellow, or red in order of increasing significance. Conduct of these supplemental inspections is dictated by the NRC Action Matrix:

- If a unit receives a single white inspection finding or performance indicator, the NRC will conduct a 40-hour supplemental inspection to assess the licensee's root cause evaluation, extent-of-condition evaluation, and corrective actions.

- If a licensee's performance further declines, as indicated by multiple greater-than-green findings or performance indicators, the NRC will conduct an additional supplemental inspection (typically 200 hours) to review the licensee's root cause evaluation, extent-of-condition evaluation, and corrective actions. As part of this inspection, the NRC conducts an independent extent-of-condition evaluation.

- Should a licensee's performance decline further (e.g., multiple yellow inputs, or a red inspection finding or performance indicator), the NRC would conduct a supplemental inspection that is nominally 3,000 hours of effort, and would require the licensee to undergo an independent safety culture assessment.

A complete explanation of the NRC's process for assessing licensee performance and determining the appropriate regulatory response is contained in Inspection Manual Chapter 0305, "Operating Reactor Assessment Program."

3. Could you explain why given multiple incidents involving transformers at Indian Point over the past 8 years, the Commission believes that the current monitoring regime for transformers is sufficient?

The incidents at Indian Point referred to in this question have all involved main power transformers. Each incident is discussed below. A general discussion of the role of main power transformers and the NRC's role in monitoring their performance is provided first as background.

Main power transformers, while necessary for transferring electricity generated by the nuclear power plant's main generator to the grid, are not necessary for shutting down the reactor and maintaining the reactor in a safe shutdown condition. As such, they are not considered nuclear "safety-related" components and are not subject to the requirements of Appendix B, *Quality Assurance Criteria for the Nuclear Power Plants and Fuel Reprocessing Plants*, of 10 CFR Part 50*, Domestic Licensing of Production and Utilization Facilities*. However, since a failure of the main transformer can result in a reactor scram, they are subject to the requirements of 10 CFR 50.65, *Requirements for monitoring the effectiveness of maintenance at nuclear power plants* (also known as "The Maintenance Rule").

NRC inspectors use the baseline inspection program to monitor the licensee's maintenance practices for main transformers under 10 CFR 50.65. Inspectors verify that a licensee is complying with work instructions, and they evaluate the licensee's maintenance practices and activities to ensure compliance with industry maintenance standards. When failures occur on components that are included in the licensee's 10 CFR 50.65 program, the licensee is required to track them, and once the number of failures exceeds the criterion for the system, the licensee is required to evaluate any necessary corrective actions to its maintenance practices for that

system. NRC inspectors can also evaluate these corrective actions during problem identification and resolution inspections.

The NRC tracks unplanned reactor scrams as a performance indicator under the ROP. All reactor scrams and associated licensee causal evaluations are reviewed by NRC inspectors to determine if a licensee performance deficiency contributed to the cause of the reactor scram. Those deficiencies that are identified as meeting the criteria for an inspection finding are documented in an NRC inspection report. In addition, reactor scrams are counted as performance indicators in the NRC's ROP. If a plant exceeds three scrams in 7000 critical hours, it will receive additional NRC oversight to verify that appropriate action is being taken to identify the causes of the scrams and it is implementing effective corrective actions.

From 2003-2010, there was an average of about 2.5 reactor scrams per year industry-wide resulting from main transformer problems. The NRC noted a degrading trend in this area in 2008 and 2009, when a total of nine main transformer issues resulted in reactor scrams. The NRC issued Information Notice 2009-10, *Transformer Failures, Recent Operating Experience*, detailing some of these events (including the 2007 transformer failure at Indian Point Unit 3), and noting industry practices such as online automated oil analysis and monitoring, which could detect some degrading conditions internal to the transformer prior to a catastrophic failure. Industry-initiated improvements to maintenance practices, which include those outlined in the Information Notice, have resulted in more reliable transformer performance over the past five years – an average of about 1.4 reactor scrams per year industry-wide from main transformer problems.

Over the period examined from 2003-2015, the two units at Indian Point experienced three main transformer failures resulting in reactor scrams. The NRC reviewed each failure under the baseline reactor inspection program. The April 6, 2007, main transformer failure at Indian Point Unit 3 is documented in NRC Inspection Report 05000286/2007-003. The failure was caused by degradation of a high voltage bushing that resulted in an electrical fault as one phase of the high voltage output arced to the steel frame of the transformer. The inspection report notes an inspection finding of very low safety significance related to the failure. The November 7, 2010, main transformer failure was reviewed in NRC Inspection Report 05000247/2011-005. That failure was the result of a manufacturing design deficiency that led to the failure of a high voltage bushing. The most recent failure, on May 9, 2015, resulted in a Special Inspection, a type of NRC reactive inspection that is chartered to follow up on an event with possible safety significance. In this case, the significance was not from the failure of the transformer itself (which was the result of a fault on a high voltage winding internal to the transformer), but from water intrusion into safety-related electrical switchgear rooms as a result of the deluge system activation and the firefighting water that was used to extinguish the fire from the burning transformer. The results of this inspection are documented in NRC Special Inspection Report 05000286/2015-010. During the 3rd quarter of 2015, the NRC performed a review of the maintenance effectiveness associated with the May 9, 2015, main transformer failure at Indian Point Unit 3, and did not identify any findings. NRC inspectors will also evaluate licensee corrective actions for main transformer issues since 2007 in Indian Point's upcoming problem identification and resolution inspection, which is scheduled for early 2016.

Based on the actions discussed above, the Commission has determined that the current monitoring regime for transformers is sufficient.

4. a) What is the NRC's role, if any, in being part of a nuclear plant's decision to close? b) Is the NRC notified of plans? c) Does the NRC have any input? d) Please provide information on any involvement in these decisions on any level.

a) The NRC does not have a role in a Licensee's decision to close a nuclear power plant permanently; this is solely the licensee's decision.

b) Yes. Once a licensee has determined the date on which it will permanently cease operations of the plant, the licensee must submit to the NRC a certification of permanent cessation of operations and the date on which operations will cease. These submissions are required by NRC regulations under 10 C.F.R. 50.82(a)(1)(i) and 50.4(b)(8).

c) No, the NRC does not have any input into the licensee's decision to close the plant. It should be noted that each operating power reactor license issued by the NRC has an expiration date. If a licensee takes no action to renew its plant's license, the plant would have to permanently shut down upon expiration of the operating authority under the license.

d) The NRC does not have any involvement in a nuclear power reactor licensee's decision to permanently shut down. However, once a power reactor licensee has made the determination to permanently shut down, the NRC will actively engage the licensee in decommissioning planning, public meetings, and establishment of schedules and milestones. The NRC will recommend that a licensee involved in decommissioning planning form a community committee to obtain local citizen views regarding the decommissioning process and spent fuel storage issues. It has been the NRC's observation that those licensees who actively engage the community maintain better relations with the local citizens. For most decommissioning sites, the State and local governments are also involved in an advisory capacity, often as part of a community engagement panel or other organization aimed at fostering communication and information exchange between the licensee and the public.

In addition, the NRC has conveyed to industry stakeholders that a key to efficient and effective decommissioning is early planning. The NRC encourages early communications and frequent pre-submittal meetings between the NRC staff and the licensee to provide a common understanding of the expected schedule and milestones for decommissioning-related licensing actions. The NRC staff will also review the adequacy of the licensee's decommissioning trust fund to ensure that the funding is available to complete radiological decommissioning of the site safely and within the time allotted by NRC regulations.

5. Does the NRC have access to and monitor financial information that is publicly available, or otherwise private data, that would indicate the overall financial health of aging nuclear plants?

The NRC maintains decommissioning funding and related information requirements throughout the life of a reactor facility, and regularly reviews the status of licensees' decommissioning trust funds. These detailed reviews provide NRC reasonable assurance that licensees maintain adequate funds to safely decommission their facilities. Under current NRC regulations, power reactor licensees have no ongoing financial qualification requirements after satisfying initial financial qualifications required at the time of licensing. The NRC staff, however, does maintain

awareness of the financial health of all licensees by screening trade papers, industry newsletters, U.S. Securities and Exchange Commission filings, and other public sources of information for any indications that they may not have sufficient financial resources to operate their plants safely, and to determine whether to issue Requests for Additional Information (RAIs) to licensees. Through the issuance of RAIs, NRC may request that a currently operating power reactor licensee provide information regarding its financial arrangements and status of funds. The NRC staff's analysis of the licensee's response may be used, as appropriate, in the planning of inspection activities and subsequent enforcement.

To date, the NRC has found no direct link between safe plant operations and licensee financial qualifications or conditions. The Commission has determined that any such nexus is indirect. As such, the NRC's primary tool for evaluating and ensuring safe operations at nuclear power reactors is its inspection, licensing, and enforcement programs. Specifically, the NRC conducts detailed technical licensing reviews, maintains a comprehensive ROP for both plant construction and the operational phase, deploys full-time resident inspectors at all power reactor facilities, maintains an operating experience program, and implements a nuclear vendor quality assurance inspection program. Should a licensee's actions result in safety or security performance issues at a nuclear power plant, the NRC uses its ROP to assess the significance of those issues to determine the appropriate regulatory response.