U.S. Nuclear Regulatory Commission Staff Response to SRM-SECY-16-0073
Detailed Description of Force-on-Force Inspection Program Options

Although the U.S. Nuclear Regulatory Commission (NRC) conducts security baseline inspections, including force-on-force (FOF) exercises, for all licensees for which a design-basis threat (DBT) applies (i.e., operating nuclear power reactors and Category I fuel cycle facilities), the focus of this enclosure is on security baseline inspections at nuclear power reactors.

Background

The fundamental building blocks that form the framework for the reactor oversight process (ROP) for nuclear power reactors are the seven cornerstones: initiating events; mitigating systems; barrier integrity; emergency preparedness; occupational radiation safety; public radiation safety; and security. This ROP framework is based on the principle that the NRC's mission of assuring public health and safety and promoting common defense and security is met when the agency has reasonable assurance that licensees are meeting the objectives of the six cornerstones of safety and the security cornerstone.

The security baseline inspection program is designed to gather information to determine whether a licensee is meeting the objective of the security cornerstone. Specifically, the objective of the security cornerstone is to provide assurance that a power reactor licensee's security system and material control and accounting program meet the applicable general performance objectives and requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 73, "Physical Protection of Plants and Materials," and 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material."

Overall, the security baseline inspection program emphasizes achieving a balanced review of a cross section of licensee activities important to the security of the facility, with inspection resources assigned to each area based on its relative importance to meeting the objectives of the security cornerstone. The security baseline inspection program provides the minimum examination of the facilities, licensee activities, and licensee programs and procedures to determine whether licensees are meeting applicable regulatory requirements. The inspection program incorporates several baseline inspections and a performance-based FOF inspection to assess the licensee's ability to implement its strategy for protecting against the DBT. As discussed in Inspection Manual Chapter (IMC) 2201[1], the inspection frequency and sample size for each inspectable area are based on risk information and security insights, and are designed to identify problems before a licensee's performance deteriorates to unacceptable levels.

The security baseline inspection program's inspectable area periodicity, and annualized estimated resources for nuclear power reactors are shown in Table 1 below.

[1] IMC 2201, "Security Inspection Program for Operating Commercial Nuclear Power Reactors" (Official Use Only-Security Related Information) (OUO-SRI) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13234A497).

Physical Security Baseline Inspection Procedures (IP) and Estimated Resources[2]
(Table 1)

Inspection Procedure No.	Title	Frequency	Annualized Estimated Resources[3]
71130.01	Access Authorization	Triennial	8
71130.02	Access Control	Annual	27
71130.03	Contingency Response - Force-on-Force Testing	Triennial	131
71130.04	Equipment Performance, Testing and Maintenance	Biennial	18
71130.05	Protective Strategy Evaluation	Triennial	30
71130.06	Protection of Safeguards Information	Triennial	2
71130.07	Security Training	Biennial	14
71130.08	Fitness-For-Duty Program	Triennial	8
71130.11	Material Control and Accounting	Triennial	4
71130.14	Review of Power Reactor Target Sets	Triennial	3

Under the Protective Strategy Evaluation and Performance Evaluation Program (IP 71130.05) portion of the security baseline inspection program, the NRC conducts an inspection of the licensee's protective strategy and an assessment of the fundamental components of the licensee's performance evaluation program, which includes training and self-assessment through required, periodic drills and exercises. The intent of this IP is not to assess the outcome of an FOF exercise but, rather, to evaluate the licensee's implementation of processes and procedures to achieve its intended training objectives, consistent with Section VI, paragraph C.3, of Appendix B to 10 CFR Part 73. The Contingency Response – Force-on-Force Testing (IP 71130.03) portion of the security baseline inspection program is the only performance-based assessment of licensees' protective strategies and how licensees integrate and implement the components of their security programs to protect against the DBT.

The staff has implemented several changes to the FOF inspection program over the past four triennial inspection cycles (each inspection cycle is 3 years in duration). During the first triennial inspection cycle (2004-2007), each FOF inspection consisted of three FOF exercises. Since that first cycle, the program has matured and been updated through the ROP self-assessment processes and based on input from stakeholders. In 2014, the staff revised the FOF inspection program to reduce the number of FOF exercises from three to two, expand the formal FOF exercise critique process, and implement compliance-based inspection of licensee-conducted annual FOF exercises during the region-led Protective Strategy Evaluation and Performance Evaluation Program evaluation. Since 2014, the staff has implemented several additional

[2] Id.
[3] Direct inspection effort (hours), based on conducting the nominal range of inspection requirements within the inspectable area.

changes to the program, primarily in response to the lessons-learned review described in SECY-14-0088,[4] which have resulted in a reduction to the average number of direct inspection effort (DIE) hours for the FOF inspection by approximately 17 percent to 360[5] DIE hours per inspection. Based on its assessment of the security baseline inspection program, the staff has found that the program, including FOF, is effective. The staff has, however, identified potential efficiencies and improvements.

The staff engaged with stakeholders during public and closed meetings throughout the assessment process. A summary of the stakeholder interactions in response to Staff Requirements Memorandum (SRM) for SECY-16-0073[6] is included in ADAMS under accession number ML17223A335[7]. Resource savings noted in the discussion below are based on estimated reductions in on-site inspection time. Due to the modest nature of the estimated resource savings, this was not a critical factor in the staff's final recommendation. The staff requested industry representatives and the Nuclear Energy Institute (NEI) to provide quantitative resource impacts of the proposed options; these stakeholders did not provide the information, so the staff assessment of resource implications is based on the staff's experience and observations during the conduct of FOF exercises throughout the previous inspection cycles.

Force-on-Force Inspection Procedure Options

In SRM-SECY-16-0073, the Commission directed the NRC staff to conduct an assessment of the security baseline inspection program, including the FOF program. In response to the Commission's direction, the NRC staff developed three options for potential revisions to the FOF inspection program.

The staff has assessed that the security baseline inspection program effectively evaluates licensees' security programs and meets the agency's goals of ensuring safety and security through objective risk-informed inspections; however, the staff has identified opportunities to improve the efficiency of the inspection program. The staff's proposal to implement changes to the FOF inspection program is based on maintaining the other security baseline inspections during the triennial inspection period to maintain an appropriate level of regulatory stability and oversight in order to readily identify any potential degradation in licensees' security programs.

As part of the security baseline inspection procedure assessment, the staff completed a review of the governing IMC and associated IPs. The staff established a working group composed of regional and headquarters security inspectors. The working group identified and recommended correction of redundant inspection sample items and IP inefficiencies. The detailed list of recommendations, provided in the working group summary,[8] are being pursued by the staff and could be implemented regardless of which option the Commission approves.

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[4] SECY-14-0088, "Proposed Options to Address Lessons-Learned Review of the U.S. Nuclear Regulatory Commission's Force-on-Force Inspection Program in Response to Staff Requirements Memorandum – COMGEA/COMWCO-14-0001" dated August 20, 2017(ADAMS Accession No. ML14139A231).
[5] The previous IP allocation for FOF was 435 hours of DIE. The current IP allocation for FOF is 393 hours of DIE; however, recently implemented efficiencies have not yet been incorporated into the IP allocation.
[6] SRM-SECY-16-0073, "Options and Recommendations for the Force-on-Force Inspection Program in Response to SRM-SECY-14-0088," dated October 5, 2016 (ADAMS Accession No. ML16126A140).
[7] "Security Baseline Inspection Program Assessment Stakeholder Interactions in Response to SRM-SECY-16-0073" (ADAMS Accession No. ML17223A335).
[8] Security Baseline Inspection Procedure Review Team Recommendations dated August 21, 2017 (ADAMS Accession No. ML17191A402) (OUO-SRI).

During the assessment process, the staff identified some proposed enhancements/efficiencies which, in addition to the staff recommendations noted in the previous paragraph, apply to all options and can be pursued and incorporated into the FOF inspection process to minimize NRC on-site time:

1. Add an extra week between the planning and exercise portions of the FOF inspection to permit licensees and staff more time to prepare documentation for the exercises.
2. Embed the Composite Adversary Force (CAF) director with NRC staff during the planning week activities to streamline the scenario development process.
3. The CAF Team could arrive on-site 1 week earlier to allow training for the exercise week during normal work hours and minimize after-hours/weekend sessions.

The discussion of the FOF significance determination process (SDP) for each option below is based on the current FOF SDP. The staff has a separate, ongoing initiative to review and update the security baseline inspection program SDPs. The working group recommendations have been provided to the SDP task force and the staff is moving forward with revisions to the IPs and the associated SDPs using the current change management process. The staff would seek Commission approval or provide notification to the Commission (as appropriate per the Commission's direction in SRM-COMSECY-16-0022[9]) of any new or revised SDPs or IPs.

FOF Option 1 – Implement process improvements and maintain the current program of two NRC-conducted FOF exercises at each nuclear power reactor facility on a triennial basis

This option represents the current FOF inspection program, with the implementation of the process improvements discussed above. This option consists of an A-week, during which the NRC would plan two FOF exercises, and a B-week, during which the NRC would evaluate licensee performance during the conduct of the two NRC-planned exercises. The inspection program would continue under the currently established framework using IP 71130.03, and the current FOF SDP, pending any revisions based on the SDP task force. The current FOF SDP uses the two NRC-planned exercise results as inputs to assess overall licensee performance during FOF inspections.

The advantages of this option are that it provides the most program stability while implementing the IP review team recommendations, pursuing revisions to the FOF SDP, and monitoring licensee performance during a period of resource reductions for both the NRC and industry.

The disadvantages of this option are that it provides the smallest resource savings for both the NRC and industry and it does not take advantage of the opportunity to gain additional insights from assessing one FOF exercise from a different perspective.

As noted in Table 2, this option is estimated to result in a reduction in 16 hours per inspection of on-site time through the CAF team efficiencies and streamlined procedures. This option is estimated to result in minimal resource savings for licensees because it would preserve the current two-exercise process and licensee staffing requirements for the exercises would remain unchanged.

[9] SRM-COMSECY-16-0022, "Proposed Criteria for Reactor Oversight Process Changes Requiring Commission Approval and Notification" dated May 12, 2017 (ADAMS Accession No. ML17132A359).

FOF Option 2 – Revise the FOF inspection program to include one NRC-conducted FOF exercise, followed by a defense-in-depth exercise if the licensee's performance on the first FOF exercise is rated effective or a second NRC-conducted FOF exercise if it is not

This option is a modification of the current inspection program and incorporates aspects of NEI's defense-in-depth proposal outlined in attachment 3 in the January 26, 2017, letter.[10] This option would maintain both the A- and B-weeks; however, the NRC inspection team would include a placeholder in the plan for the second exercise from which a defense-in-depth exercise would begin. During B-week, if the initial NRC-planned FOF exercise outcome was marginal, indeterminate, or ineffective, the team would conduct a second NRC-conducted FOF exercise.

If the licensee's initial exercise outcome was effective, the NRC would evaluate a defense-in-depth exercise instead of the second full-scope FOF exercise. The defense-in-depth exercise would consist of a CAF team complement, which would begin testing the licensee's defenses at or within the protected area boundary at a pre-determined location. This would allow the NRC to reduce the scope of the exercise and focus the evaluation on the internal layers of the licensee's protective strategy. Since the adversary would be starting at this internal starting point, a loss of a target set would not necessarily result in a regulatory finding. The NRC would assess licensee performance via the current FOF SDP when the licensee's performance was other than effective during the initial FOF exercise. A new SDP and a new or revised IP would need to be developed for inspection and assessment of defense-in-depth exercises.

The potential advantages of this option are that it would provide an opportunity for the NRC to perform a specific evaluation of a licensee's internal protective strategy and may promote integrated use of strategies, tactics, and physical components. Also, for licensees that have an effective first FOF exercise, there may be greater resource savings for both the NRC and the licensee than those estimated under option 1.

There are also disadvantages to this option. First, there is a risk of unintended consequences if a licensee has an otherwise effective external protective strategy and makes unnecessary changes to its internal strategy to perform well in the defense-in-depth exercise. By focusing on the internal strategy in the second exercise, the NRC may unintentionally encourage licensees with an effective external strategy to divert resources from maintaining that effective strategy to make unnecessary changes to their internal strategy solely for the purpose of performing well in the defense-in-depth exercise. Furthermore, this option would require resources to plan, coordinate, and carry out a second NRC-conducted FOF exercise even though it would not be needed if the first exercise is effective. Although NEI initially proposed a defense-in-depth exercise, NEI stated in a July 17, 2017, letter that it did not prefer this option.[11]

The staff estimates that this option would reduce on-site time by approximately 28 to 36 hours per inspection, due to the reduced time required to conduct the defense-in-depth exercise when compared to a complete NRC-planned FOF exercise for a licensee that is evaluated as effective on the first exercise and subsequently completes a defense-in-depth inspection. If a licensee is required to conduct two NRC-planned exercises, the staff estimates a 12-hour reduction in time on-site. This option would also result in resource savings for licensees due to the reduced

[10] NEI letter to B. Holian, "Industry Recommendations Related to Memorandum, 'Staff Requirements – SECY-16-0073 – Options and Recommendations for the Force-on-Force Inspection Program in Response to SRM-SECY-14-0088,'" dated January 26, 2017 (ADAMS Accession No. ML17046A218).
[11] NEI letter to Marissa Bailey dated July 17, 2017, "Updated Industry Input on Options Being Considered for Force-on-Force Exercise Inspections" (ADAMS Accession No. ML17198B306).

number of exercise controllers for the limited scope exercise and due to the reduced time needed to conduct the defense-in-depth exercise.

FOF Option 3 – Revise the FOF inspection program to include one NRC-conducted FOF exercise and an enhanced NRC inspection of a licensee-conducted annual FOF exercise

Option 3 would maintain one NRC-conducted FOF exercises and would include an enhanced NRC inspection and evaluation of a licensee-planned and conducted FOF exercise. Licensees currently conduct annual exercises for each security shift as part of the performance evaluation program required by 10 CFR Part 73 Appendix B. The NRC's current inspection procedure for these licensee-conducted annual exercise focuses on an evaluation of the licensee's implementation of the training and qualification elements of its performance evaluation program, not the effectiveness of its protective strategy. Under this option, the NRC would plan and inspect one exercise and would conduct an enhanced inspection of a regularly scheduled licensee-conducted annual FOF exercise. Key differences between the NRC-conducted exercise and the licensee-conducted exercise include that the licensee would develop the exercise scenario, and the adversary force would be composed of licensee personnel. In addition to evaluating the performance of the licensee security force, the enhanced NRC inspection of the licensee-conducted exercise would review and evaluate the performance of the adversary force and the development and implementation of the exercise scenario.

This option considers the maturity and robustness of the current security baseline inspection program, and is an effort to reduce burden where possible and create efficiencies by leveraging the current regulatory oversight structure, while maintaining the NRC's ability to effectively evaluate licensee performance and preserve the integrity of the NRC's regulatory oversight.

Under this option, licensees would still be required to enter deficiencies into the corrective action program upon identification through the critique process and the current FOF IP. This option would require development of a new or revised IP and associated SDP to evaluate the licensee-conducted exercise. The new or revised IP would use performance-based criteria consistent with the current FOF IP.

The staff identified several advantages of this option. This option would provide staff with a different and additional perspective through which to observe and evaluate the licensee's implementation of its protective strategy. Conducting an enhanced evaluation of a licensee-conducted FOF exercise would allow the NRC to better assess licensees' understanding of the tactics, techniques, and procedures that might be used by real world adversaries. Improved licensee performance in the development and conduct of their annual exercises could facilitate licensees' self-assessment and identification of security issues to the benefit of their overall security programs. This option would provide the staff with data that would inform a thorough consideration of potential future program changes, such as NEI's proposal to "ultimately [allow] licensees to prepare and conduct FOF exercises as a replacement for the NRC-conducted FOF exercises."[12]

Specifically, the staff would be able to assess whether licensee-conducted FOF exercises can mitigate conflicts of interest and realistically represent the DBT sufficient to meet the requirements of Section 170D of the Atomic Energy Act of 1954, as amended. Additionally, in SRM-SECY-16-0073 the Commission directed that, prior to any staff assessment of an industry proposal that the NRC observe and evaluate licensee-conducted FOF exercises rather than the

[12] Id.

NRC conducting FOF exercises, the Office of General Counsel complete a legal analysis on this matter. That legal analysis was provided to the staff and the Commission in February 2017, and is non-publicly available because it contains Official Use Only – Attorney/Client Privileged Information. Finally, the staff has determined that this option will provide the largest reduction in DIE hours and would also provide some resource savings by only performing one NRC-conducted FOF exercise, which would shorten both the FOF planning and exercise weeks. As noted in its letter of July 17, 2017, the industry prefers this option.

However, the staff identified some disadvantages for this option. This process initially could increase complexities with the scheduling process due to the need to avoid conflicts among multiple NRC inspections and licensee operations. The continued use of the Reactor Programs System to coordinate inspection planning would mitigate this issue. Although this option would result in the largest, albeit moderate, resource reduction for both the NRC and licensees, travel expenditures, both time and cost, associated with a new or enhanced inspection could counteract some of the estimated on-site resource savings.

The staff estimates that this option would reduce on-site time by approximately 56 hours per inspection due to the reduced time required to plan and develop one FOF exercise during A-week, and the elimination of one exercise day in B-week. The estimated reduction in hours includes the NRC on-site time associated with inspecting the licensee annual exercise. Additional savings would be realized due to a reduction of the Multiple Integrated Laser Engagement System gear support through the elimination of one exercise, which would offset the increased travel costs noted above. This option is estimated to result in resource savings for licensees through the elimination of one FOF exercise and the associated staffing requirements. Further, consistent with the discussion in SECY-03-0208, the use of a licensee adversary force is subject to perceptions of conflict of interest; however, the staff expects that any potential conflict would be mitigated by the NRC's independent evaluation of the licensee-conducted exercise.[13]

Option 3 would increase the efficiency of the FOF inspection program and allow the staff to evaluate the licensee's ability to implement its protective strategy while reducing staff resources, without compromising the NRC's regulatory oversight responsibility.

The following table (Table 2) provides an overview of the estimated change to the on-site DIE for each of the three options when compared to the current FOF inspection DIE allocation. The table only reflects an evaluation of on-site DIE for the NRC staff.

[13] SECY-03-0208, "Adversary for Force-on-Force Exercises at NRC-Licensed Facilities", dated December 3, 2003 (ADAMS Accession No. ML051020052)

Contingency Response - FOF Testing (IP 71130.03) DIE
Comparison based on proposed options (Table 2)

Option	Estimated number of on-site DIE hours	Total estimated DIE hours (on-site plus in-office)	Estimated change from current program
Current FOF Inspection	320	360*	0
Option 1	304	344	-16
Option 2	284 to 292 (effective) 308 (other than effective)	324 to 332 (effective) 348 (other than effective)	-36 to -28 (effective) -12 (other than effective)
Option 3	264	304	-56

*Note, the current IP allocation is 393 hours of DIE; however, the staff has already implemented some efficiencies

Next Steps

Upon receipt of the SRM from the Commission, the staff will begin developing the new or revised IPs and SDPs, as appropriate. The staff estimates that it will require approximately 12 months to develop an inspection program based on Option 3 for the Commission's consideration per the direction in SRM-COMSECY-16-0022, and approximately 18 months for an inspection program based on Option 2. The staff would work with industry to identify the lead plants for implementing options 2 or 3, should either of these options be approved by the Commission.