

Preliminary Evaluation of OPC Voluntary Industry Initiative (VII) Initial Inspection Results

1. OPC Detection and Alarm

NEI VII criteria:

An open phase condition must be detected and alarmed in the control room unless it can be shown that the open phase condition does not prevent functioning of important-to-safety structures, systems and components.

Observations:

The proposed OPC detection and alarm design schemes appear technically adequate to detect, and alarm in the main control room in the event of an unbalanced voltage from an OPC.

Questions for the Industry:

None

2. OPC Protective Action

NEI VII criteria:

1. With no accident condition signal present, modifications will be required to provide automatic features to ensure safe shutdown is maintained.
2. With an accident condition signal present, the licensee must demonstrate:
 - 2.1. Automatic detection and actuation will transfer loads required to mitigate postulated accidents to an alternate source and ensure that safety functions are preserved, as required by the current licensing bases.
 - 2.2. Alternatively, a licensee may show that all design basis accident acceptance criteria are met with the open phase condition, given other plant design features. Accident assumptions must still include licensing provisions associated with single failures. Typically, licensing bases will not permit consideration of the of the open phase condition as the single failure since this failure is in a non-safety system.

Observations:

Three of the designs incorporated defense-in-depth features such as redundant channels and coincidence trip logic which will minimize spurious trip of the offsite power system. One licensee used a single channel detection and protection scheme to mitigate the effects of OPCs. In general, all four protection aspects of the design are capable of mitigating an OPC with and without an accident if no failures are assumed in the OPIS system.

The staff is interested in understanding how the OPIS designs consider potential failures, and how the VII criteria will be met during potential failures.

Questions for the Industry:

- a. What actions are being taken to mitigate the potential consequences resulting from a potential OPIS failure? How do these actions meet the OPC VII criteria?
- b. If there was a failure of the OPIS, how would the plant meet the provisions for single failure of the onsite power system to mitigate against DBAs? If so, describe how.

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3. UFSAR update

VII criteria:

The UFSAR must be updated to discuss the design features and analyses related to the effects of, and protection for, any open phase condition design vulnerability. This update would typically be to chapter 8.

Observations:

Three of the four licensees reviewed during the initial inspections were evaluating the need to update their UFSARs because the modification process had not been completed at the time of the inspections. One licensee updated their UFSAR with very limited details of the design features and analyses related to the effects of, and protection for, any OPC design vulnerability.

The staff is interested in understanding what technical content will be included in the UFSAR updates to be consistent with the VII.

Questions for the Industry:

What is NEI's expectations for updates to UFSAR with regard to the level of technical content detail and schedule for implementation? What is sufficient detail to reflect the licensing basis for protection against OPCs? Could you provide examples?

4. Surveillance and LCO Requirements in Plant TS

VII criteria:

Periodic tests, calibrations, setpoint verifications or inspections (as applicable) must be established for any new protective features. The surveillance requirements must be added to the plant Technical Specifications, if necessary to meet the provisions of 10 CFR 50.36. Further industry guidance will be provided for the development of Technical Specifications as the design features are identified.

Observations:

Three licensees were currently evaluating the need to: (a) update LCOs and Surveillance Requirements in plant Technical Specification; and (b) establish procedures for periodic inspections, tests, calibrations, and setpoint verifications. One licensee determined no changes are required to the TS, but established procedures for periodic inspections, tests, calibrations, and setpoint verifications.

It is unclear to the staff what tests, calibrations, setpoint verifications or inspections are likely to be established, and how licensees will update their Technical Specifications to be consistent with the VII.

Questions for the Industry:

What type of periodic tests, calibrations, setpoint verifications or inspections are anticipated to be established, consistent with the VII? What is NEI's expectations for having licensee's update their TSs in order to meet the VII criteria? Could you provide examples?

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References:

1. NEI VII to address the OPC (ADAMS Accession No. ML15075A454).
2. Functional criteria established in the November 25, 2014, NRC letter to NEI (ADAMS Accession No. ML15075A454)
3. NRC Inspection Reports:
 - i. 05000458/2018010 (ADAMS Accession No. ML18085B197);
 - ii. 05000528/2018010, 05000529/2018010, AND 05000530/2018010 (ADAMS Accession No. ML18103A157);
 - iii. 05000454/2018011; 05000455/2018011 (ADAMS Accession No. ML18138A136); and
 - iv. 05000335/2018002; 05000389/2018002 (ADAMS Accession No. ML18208A328).