

**ANNUAL REPORT  
ON  
THE EFFECTIVENESS OF TRAINING  
AT OPERATING POWER REACTORS  
FOR  
CALENDAR YEAR 2017**

**OCTOBER 2018**

Enclosure

## EXECUTIVE SUMMARY

This report documents an annual review by the Nuclear Regulatory Commission (NRC or the Commission) of training effectiveness at operating power reactors. The review evaluates industry-wide personnel training in order to identify any negative trends important to safety.

The reviewers limited the scope of review to operating power reactors subject to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.120, “Training and Qualification of Nuclear Power Plant Personnel.” The review compiles data from the NRC Reactor Oversight Process (ROP), NRC observations of National Nuclear Accrediting Board (NNAB) meetings, the NRC Operating Experience Data Analysis Tool (ODAT), and reported events at operating power reactors.

The operating power reactor training programs continue to provide adequate protection of public health and safety. No other insights were developed during this evaluation.

## BACKGROUND AND REVIEW METHODOLOGY

The NRC requires in 10 CFR 50.120 that licensees provide qualified personnel to operate and maintain nuclear facilities in a safe manner in all modes of operation. In order to provide that protection, nuclear power plant personnel that perform work important to safety and security must maintain adequate knowledge, skills, and abilities through training and qualification. The NRC monitors implementation of those training and qualification requirements in the Reactor Oversight Process (ROP). For further information on the ROP see <https://www.nrc.gov/reactors/operating/oversight.html>. The Institute of Nuclear Power Operations (INPO) also monitors implementation of Systems Approach to Training (SAT) programs through training program accreditation reviews conducted for the National Nuclear Accrediting Board (NNAB). For the development of regulations related to training, and a history of the relationship between the NRC and NNAB, see the “History of the Training Rule” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16257A453) and “Operator Licensing History” (ADAMS Accession No. ML16084A726).

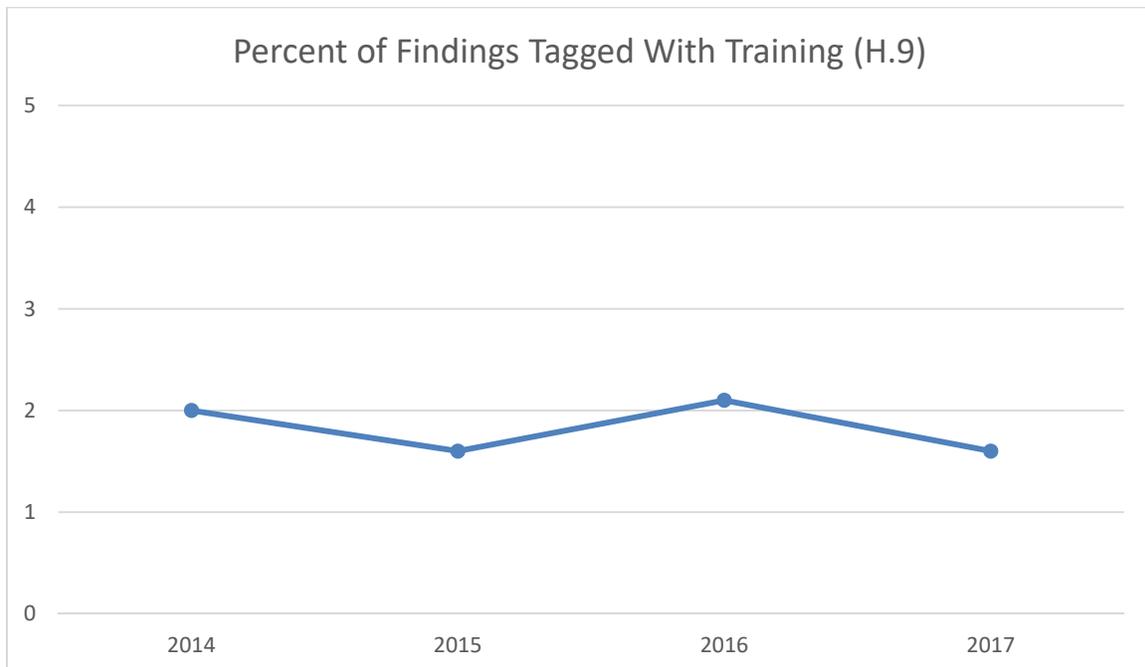
To generate this report, the reviewers evaluated data from the ROP, ODAT, reported events, and NRC observations of the NNAB. The ROP provides insights to the causes of performance deficiencies at operating nuclear power plants through cross-cutting aspect information, as defined in NRC Inspection Manual Chapter (IMC) 0310, “Aspects Within the Cross-Cutting Areas” (ADAMS Accession No. ML14337A018). Specifically, inspectors can associate findings with cross-cutting aspect H.9, “Training,” if the organization fails to provide training or fails to ensure knowledge transfer to maintain a knowledgeable, technically competent workforce and instill nuclear safety values. Also in the ROP, the NRC documents the causes and corrective actions, including training, in inspection reports in response to risk-significant performance issues at operating nuclear power plants in accordance with NRC IMC 0305, “Operating Reactor Assessment Program” (ADAMS Accession No. ML18059A337). The small number of risk-significant performance issues per year is insufficient to perform meaningful statistical analysis, but the significance of the issues warrant including qualitative insights. The ODAT tool evaluates industry operating experience. In particular, ODAT can trend failure causes, including training, from events reported at operating reactors. Licensee event reports (LERs) reported by operating power reactors in accordance with 10 CFR 50.73 were classified by human error types, including training, and then evaluated for trends. The reviewers also incorporated qualitative insights from NRC observers of the NNAB. For more information on NRC training

observation activities, see the “Memorandum of Agreement Between the Institute of Nuclear Power Operations and the U.S. Nuclear Regulatory Commission” (ADAMS Accession No. ML13129A093).

## SUMMARY OF REVIEW

### Reactor Oversight Process Insights

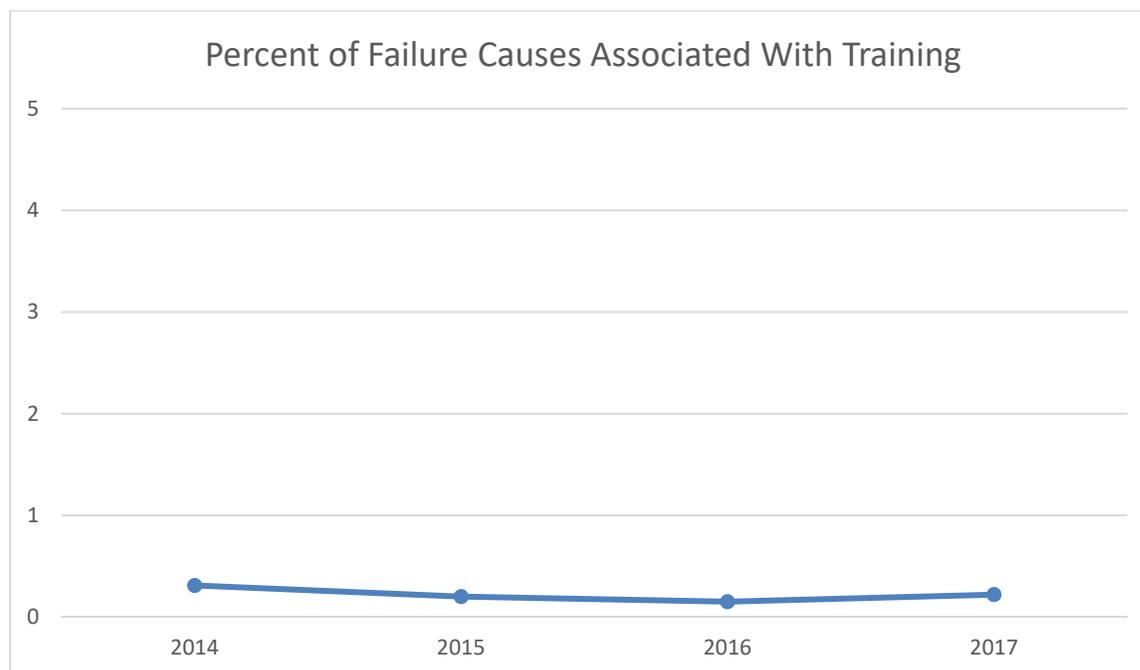
In 2017, inspectors associated cross-cutting aspect H.9, “Training,” with nine findings of very low safety significance (Green) out of 566 total findings, or 1.6 percent. Cross-cutting aspect H.9 is one of 20 baseline cross-cutting aspects, or 5 percent of available aspects. Therefore, training is underrepresented as a cause of performance deficiencies compared to the number of available aspects. A qualitative review of the nine findings associated with H.9 revealed no obvious common-cause issues. Inspectors identified no findings of greater-than-green significance in 2017 with a H.9 cross-cutting aspect. A historical review of H.9 occurrence reveals a stable trend (2.1 percent in 2016, 1.6 percent in 2015, and 2.0% in 2014).



In 2017, there were 11 total low to moderate significance (White) findings or performance indicators. Inspectors did not associate cross-cutting aspect H.9, “Training,” with any of these greater-than-green findings. However, inspectors document additional details for greater-than-green findings, including causal factors of the performance deficiency. Inspection reports for two of the 2017 findings indicate that training issues contributed to the greater-than-green performance deficiencies (ADAMS Accession Nos. ML18051A745 and ML18110A304). Only one of these findings was related to activities covered by 10 CFR 50.120 (ADAMS Accession Nos. ML18110A304). In this case, the inspectors determined that training was weak, but did not rise to the level of a causal factor. Therefore, there were no concerns about training related to greater-than green findings.

## Operating Experience Data Analysis Tool

In 2017, licensees associated a failure cause code of “Training” with 0.22 percent of reported events. The trend is stable, with an event cause code of “Training” reported 0.15 percent of events in 2016, 0.2 percent in 2015, and 0.31 percent in 2014. The percentages do not compare directly with the ROP cross-cutting aspect percentages due to the availability of significantly more cause codes in ODAT than cross-cutting aspects. The ODAT results validate that training as a cause of performance deficiencies or events is a stable trend with low magnitude.



## Licensee Event Reports

In 2017, licensees did not report any events that were classified with a training error. The trend has been stable with between three and zero events per year since 2014.

## NRC Monitoring of the Accreditation Process

In 2017, NRC staff observed the NNAB on seven occasions. The observers noted that the board was thorough in their questions and challenges. In addition, the observers noted that the board had sufficient information to make decisions and the diversity of board member expertise worked well.

## CONCLUSIONS

In 2017, the NRC documented instances of training weaknesses at operating power reactors that were of very low safety significance in the ROP. The industry trends in the ROP, ODAT, and LERs show that these issues represent a small percentage of identified performance deficiencies and the trends remain stable. NRC observers of the NNAB documented that the process remains thorough so that the accreditation process supports the integrity of the Systems Approach to Training required by 10 CFR Parts 50 and 55.

Therefore, the NRC concludes that operating power reactor training programs provide adequate protection of public health and safety. No other insights were developed during this evaluation.