Enclosure

**Regulatory Guide Periodic Review**

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| Regulatory Guide Number: | **1.145** |
| Title: | **Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants** |
| Office/division/branch: | **NRO/DSEA/RHMB** |
| Technical Lead: | **Brad Harvey** |
| Recommended Staff Action: | **Reviewed with issues identified for future consideration** |

**1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?**

RG 1.145 was first issued in August 1979. The document relies on dated atmospheric dispersion algorithms. Pacific Northwest National Laboratory (PNNL) developed PAVAN, a main-frame computer program, to implement the atmospheric dispersion algorithms in 1982 (Ref. 1). The NRC's standard review plan (Ref. 2) in Section 2.3.4, Short-term Dispersion Estimates for Accident Releases, states that the use of the PAVAN computer code is an acceptable approach for implementing the dispersion algorithms discussed in RG 1.145. Because PAVAN is a 30-year main-frame computer code, some in industry have had problems converting it to run in a PC environment.

PNNL recently developed a PC version of the code under contract with the NRC (PAVAN08). PAVAN08 also included revised dispersion algorithms described in RG 1.145. PAVAN08 provides significantly less conservative results as compared to PAVAN. PAVAN08 needs to be assessed further to determine if it provides non-conservative results. Consideration is being given to asking PNNL to do a comparison of PAVAN08 with Environmental Protection Agency's atmospheric dispersion code AEROMOD to evaluate whether the revised atmospheric dispersion algorithms in PAVAN08 are appropriate for their intended use.

References:


1. NUREG/CR-2858, "PAVAN: An Atmospheric Dispersion Program for Evaluating Design Basis Accidental Releases of Radioactive Materials from Nuclear Power Plants" (November 1982).

2. NUREG-0800 Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition.

**2. What is the impact on internal and external stakeholders of <u>not</u> updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?**

There are no large power reactor license applications anticipated in the near future (next 3 to 5 years). Thus, there is no immediate need for revising the guide at this time to address their licensing. For small modular reactors, four applications are anticipated in the next two years. Two will be design certifications, one a construction permit application, and one a combined operating license application. Due to the small size and design of the small modular reactors atmospheric dispersion is not expected to be a significant licensing issue and the existing version of PAVAN will continue to be a valid model.

**3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?**

An estimated 320 hours (0.2 FTE) and some tech assistance dollars are needed for PNNL to do a comparison of PAVAN08 with Environmental Protection Agency's atmospheric dispersion code AEROMOD, and assess whether the revised atmospheric dispersion algorithms in PAVAN08 are appropriate for their intended use. If it is determined that PAVAN08 is not an appropriate substitute for PAVAN, then additional work is necessary to map out an alternative approach.

**4. Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?**

Reviewed with issues identified for future consideration.

**5. Provide a conceptual plan and timeframe to address the issues identified during the review.**

Not applicable.

**NOTE: This review was conducted in March 2014 and reflects the staff's plans as of that date. These plans are tentative and subject to change.**