ANS STANDARDS TO SUPPORT DOE NPH DESIGN

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The American Nuclear Society (ANS) has been developing Voluntary Consensus Standards (VCSs) for more than 55 years to meet the 1995 National Technology Transfer and Advancement Act objectives saving the Federal Government millions of dollars of standards development costs annually. The ANS Standards Committee has 8 consensus committees, one of which is the Environmental & Siting Consensus Committee (ESCC), which is responsible for preparation and maintenance of standards addressing all aspects of nuclear power plant and non-reactor nuclear facility siting, environmental assessment, environmental management, environmental monitoring, and categorization and evaluation of natural phenomena hazards (NPHs) at public and private sector nuclear facilities.

ESCC develops and maintains many multi-media environmental and siting standards to assist the private and public sectors in nuclear facility licensing, design, construction, and decommissioning. Within its purview, it develops and maintains several risk-informed performance based NPH standards to support Department of Energy (DOE) standards and handbooks. These include the NPH Handbook (DOE-HDBK-1220-2017), and DOE-STD-1020-2012. ESCC standards include risk informed performance based NPH determinations to ensure design adequacy with respect to site-specific earthquakes, extreme straight-line winds, hurricanes, tornadoes, tornado atmospheric pressure changes, 13 types of flood initiators, tsunamis, seiches, storm surges, extreme precipitation, and volcanic ashfall.

ANS-2.3 is a national standard for Estimating Tornado, Hurricane and Extreme Straight-Line Wind Characteristics at Nuclear Facility Sites, which assists in the determination of design criteria for extreme winds. ANS-2.8, Determination of External Flood Hazards for Nuclear Facilities, just completed after 9 years of work, addresses the many flood hazard initiators.

In addition, there are 8 earthquake and volcanic ashfall standards which include:

- ANS-2.2 - Earthquake Instrumentation Criteria for Nuclear Power Plants.
- ANS-2.10 - Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation.
- ANS-2.23 - Nuclear Plant Response to an Earthquake.
- ANS-2.26 - Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design.
- ANS-2.27 - Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments.
- ANS-2.29 - Probabilistic Seismic Hazard Analysis.
- ANS-2.30 - Assessing Capability for Surface Faulting at Nuclear Facilities.
- ANS-2.34 – Probabilistic Volcanic Hazard Analysis.

These 10 national standards address every NPH hazard that affect existing nuclear facilities and can be used for the design of major modifications and new facilities. A brief status on each of these important standards will be presented along with current technical studies that are designed to develop a greater understanding of the state-of-the science for each NPH.