RESUME

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EDUCATION

B.S.	General Sciences, Oregon State University, Corvallis, Oregon	1961
M.S.	Meteorology, Oregon State University	1962
	Graduate Study, Atmospheric Sciences, University of Washington, and Joint Center for Graduate Study, Richland, Washington	1968-1976

EXPERIENCE

Mr. Ramsdell has been a member of the Battelle staff since 1967. He has worked as an individual contributor, as a member of intra- and interdisciplinary research teams, and as a project leader for intra- and interdisciplinary research teams. His areas of expertise include: research planning and organization, dispersion modeling, and applied atmospheric boundary layer description. He has reviewed manuscripts for the editors of: *Science*, *Journal of Climate and Applied Meteorology*, *Atmospheric Environment*, *Health Physics*, *Nuclear Technology*, *Solar Energy*, and the *Journal of Energy*, and he has been on review teams for the U.S. Department of Energy, the U.S. Nuclear Regulatory Commission, the U.S. Environmental Protection Agency, and the National Research Council. In addition, he has made presentations to National Academy of Sciences Review Panels, to the U.S. Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards, and has appeared as a witness in hearings before the U.S. Nuclear Regulatory Commission's Atomic Safety and Licensing Board.

- Review of Applications for Construction and Operation of New Nuclear Power Plants. Mr. Ramsdell is the assistant project manager for several U.S. Nuclear Regulatory Commission projects related to the review of applications for new nuclear power plants. These projects include work to develop the infrastructure to support application reviews by NRC and PNNL staff, readiness assessment reviews of progress in preparation of applications, and review of the applications. In addition, Mr. Ramsdell has contributed technically in each of these areas. He has helped prepare review guidance, he has lead readiness assessment teams, and he is a subject matter expert for review of the meteorological and accident assessment portions of the applications. Mr. Ramsdell also assists in the review of Emergency Plans submitted as part of the applications.

- Program Plan for Environmental Review of Nuclear Reactor New Deployment. At NRC's request, in late 2005 and early 2006 a team of senior PNNL staff, under Mr. Ramsdell's direction, prepared a program plan for PNNL's environmental review of applications for new power reactors. The program plan addressed the scheduling, staffing, and resources needed to conduct simultaneous environmental reviews for as many 12 new nuclear power plants in the 2007 through

2009 time frame. The plan addressed infrastructure and preapplication measures to support the reviews. Finally, the plan addressed risks to schedules and actions to ameliorate those risks. This program plan formed the basis for a 5-year Basic Ordering Agreement with NRC that has a value of about $10 million per year.

- Review of Early Site Permit Applications. Mr. Ramsdell is the manager of projects assisting the U.S. Nuclear Regulatory Commission in reviewing applications and preparing environmental impact statements for Early Site Permits (ESP) for new nuclear power plants. Three ESP applications were submitted in the fall of 2003. Draft EISs were completed in late 2004 and early 2005, and Final EISs were published in 2006. Mr. Ramsdell presented oral and written testimony before the NRC Atomic Safety and Licensing Board for the hearings have been completed on the three applications, and the three early site permits have been issued. Review of a fourth ESP application started in August 2006 and the EIS was published in August 2008.

- Environmental Impact Statements for Nuclear Power Plant License Renewal. Mr. Ramsdell is the manager of a project that is assisting NRC staff in preparation of site specific supplements to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, NUREG-1437. These supplements contain site-specific reviews of environmental issues related to renewal of nuclear power plant operating licenses for which generic conclusions could not be reached in NUREG-1437. In addition, the supplements address issues that were not considered previously, or for which there is new information.

- Tornado Climatology. In April 2005, Mr. Ramsdell completed an update of the 1986 climatology of tornadoes in the contiguous United States that was prepared for the U.S. Nuclear Regulatory Commission. The climatology, which covers more than 46,000 tornado segments observed between 1950 and August 2003, estimates tornado strike probabilities for 1°, 2°, and 4° latitude and longitude boxes. Design wind speeds with probabilities of being exceeded of 10^{-5}, 10^{-6}, and 10^{-7} per year are also estimated for these boxes. Design wind speeds are also estimated for three regions of the country at the three probability levels. This climatology was updated again in December 2006 to evaluate the implications of a change in the relationship between tornado damage and maximum wind speed proposed by the National Weather Service.

- Dispersion Modeling. Mr. Ramsdell is a lead scientist in development of applied atmospheric dispersion models at Battelle. He specializes in development of models for atypical applications. He has developed and validated models for dispersion under low wind speed conditions and for dispersion in the vicinity of buildings. He developed a set of models to evaluate potential consequences of a release of material associated with a potential collapse of the shelter covering the Chernobyl Unit 4 reactor. He developed and validated the dispersion model used Hanford Environmental Dose Reconstruction (HEDR) Project which examined the consequences of the release of ^{131}I from the Hanford Site, and he developed the atmospheric dispersion and dose calculation models that are part of the U.S. Nuclear Regulatory Commission's Radiological Assessment System for Consequence AnaLysis (RASCAL).

  Each of these models represented an advance in the state of the art of applied dispersion modeling. The models of dispersion in low wind speed conditions and in the vicinity of buildings are being considered by the U.S. Nuclear Commission for use as standard models for regulatory purposes. The Chernobyl model included multiple plumes with variation of particle sizes and densities as a function of distance within a Gaussian model framework, The RATCHET code, developed for the Centers for Disease Control and Prevention as part of the HEDR Project, explicitly treats uncertainty in the input data to produce a range of

estimates of concentration in the environment that are consistent with the available data and has become the standard dispersion model for use in Dose Reconstruction Studies for DOE sites. RASCAL is used by the U.S. Nuclear Regulatory Commission and others to estimate source terms, atmospheric dispersion, and doses during emergencies at nuclear power plants. Version 3.0.5 of RASCAL includes a model for UF_6 releases at fuel cycle facilities. This new model combines a dense-gas dispersion model with a thermodynamic model of the reaction of UF_6 and water. Version 3.0.5 of RASCAL also includes calculations that provide intermediate phase dose estimates for comparison with EPA's protective action guides. He is currently leading project to update RASCAL and to update the NRC's PAVAN code, which was last updated in the 1980s.

Mr. Ramsdell also assisted in upgrading the atmospheric dispersion models in the GENII code; upgrading the atmospheric dispersion models used assessing nuclear power plant control room habitability; and development of a Monte Carlo model to estimate release rates from environmental monitoring data.

- Generic Environmental Impact Statements for Decommissioning Nuclear Power Plants. Mr. Ramsdell was part of a PNNL team that reviewed the environmental impacts of decommissioning nuclear power reactors. Based on the results review, the team prepared an update to NRC's *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*, NUREG-0586.

- Environmental Impacts of Extending Reactor Fuel Burnup Above 60 GWd/MTU. Mr. Ramsdell led a study to evaluate the environmental impacts of increasing the burnup of reactor fuel (increasing the energy extracted from the fuel). This study included evaluation of changes in the radionuclide inventory in the fuel and releases of radionuclides to the gaps in fuel rods as burnup increases, changes in impacts associated with the front-end of the nuclear fuel cycle and normal reactor operations, changes in potential impacts of postulated reactor accidents, changes in impacts of transportation of spent nuclear fuel, and the economic effects of increasing fuel burnup.

- Environmental Review Plans. Mr. Ramsdell managed a project to review and update the U.S. Nuclear Regulatory Commission's *Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants*. These environmental standard review plans (ESRPs) had not been updated since they were written in the late 1970s. The updated document *Standard Review Plans for Environmental Reviews for Nuclear Power Plants*, NUREG-1555 was published for public comment in October 1997. The final document was published in March 2000. A supplement to the ESRPs, dealing specifically with environmental reviews associated with nuclear power plant license renewal, was also published in March 2000.

  As part of this project PNNL assisted the NRC staff in preparation of a supplement to its *Final Environmental Statement Related to the Operation of the Watts Bar Nuclear Plant, Units 1 and 2*. Another portion of the project involved assisting the NRC staff in identification of the measures necessary to ensure that activities in and around nuclear power plants comply with and further the purposes of the Endangered Species Act.

- Emergency Response Planning. Mr. Ramsdell has been an NRC observer for nuclear power plant emergency exercises and a member of emergency response facility appraisal teams. He has been involved in several studies related to emergency response planning. He led a team that reviewed criteria used by NRC to evaluate dispersion models for emergency response applications. The review covered the areas of: non-buoyant releases from

buildings and building vents, elevated release diffusion rates, and identification of fumigation conditions and fumigation climatology.

- Extreme Wind Analyses. Mr. Ramsdell was lead scientist in the development of techniques for estimating extreme winds for use by the NRC in probabilistic risk assessments. This work has led to new techniques for adjusting extreme winds to a standard measurement height and computation of tornado strike probabilities. Published products include a tornado climatology for a contiguous United States and a report that describes a procedure for estimating extreme winds using readily available wind data.

- Environmental Impact Statements. Mr. Ramsdell has contributed to both the preparation of environmental impact statements for Battelle's industrial customers and the review of early (1970"s) environmental reports submitted to the Nuclear Regulatory Commission. In 1974 he wrote a detailed review of the instrumentation for meteorological monitoring programs at nuclear power plant sites. Mr. Ramsdell is involved in the continuing evaluation of the environmental impacts of the development of the Department of Energy's Hanford Area.

PROFESSIONAL AFFILIATIONS

American Meteorological Society
Health Physics Society

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