POSTGRADUATE RESEARCH PROGRAM
U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY
AIR POLLUTION PREVENTION and CONTROL DIVISION
Research Triangle Park, North Carolina, U.S.A.

Research Chemical/Environmental Engineer/Biologist/Toxicologist
Project # NRMRL/APPCD-2003-03

EPA's National Risk Management Research Laboratory (NRMRL) is seeking a Research Chemical/Environmental Engineer, Biologist, or Toxicologist with experience in the operation of laboratory and pilot-scale experimental combustion systems for the generation and characterization of fine particle matter (PM). Additionally, it would be beneficial if the candidate had knowledge and/or experience with in-vitro and in-vivo exposure techniques and animal models to examine health effects resulting from fine PM exposures.

The ideal candidate will have knowledge of and experience with pollutant formation within fossil fuel combustion systems, especially organic and inorganic transformation and particle formation processes. The applicant should have knowledge and experience with the operation of laboratory-scale experimental combustion systems and particle sampling and instrumentation with a record of published research. Hands-on experience with a variety aerosol instrumentation including electrical mobility, time-of-flight, light scattering, and inertial impaction techniques, as well as GC/MS, XRF, XRD, ICP/AED, ICP/MS, AA, and SEM/EDX analyses would be beneficial. Knowledge and experience of how toxicants induce inflammation and tissue injury in both in-vitro cell culture systems and following in-vivo exposure in experimental animals is strongly desired. The candidate will conduct theoretical and applied research examining fine particle formation, characterization, and control from combustion processes as well as subsequent health effect outcomes as part of a comprehensive program at the EPA's combustion research facility in Research Triangle Park, NC. Applicants should be scheduled to soon receive, or have recently received (past five years) a doctorate degree.

Background

NRMRL's Air Pollution Prevention and Control Division (APPCD) located in Research Triangle Park, NC is currently seeking to place a postdoctoral researcher in a program that is examining the formation of fine particles within fossil fuel combustion processes. This program seeks to understand high temperature organic and inorganic ash transformation processes in order to characterize combustion particle emissions from a variety of sources as well as gain an understanding of properties that influence adverse health effects associated with exposure. The research involves applied experiments using a variety of laboratory, pilot-scale, and full-scale combustion systems and includes the development and operation of indirect and direct animal exposure facilities to test hypothesis of PM health effects using different animal models. This research integrates state-of-the-art combustion sampling and advanced organic and inorganic analysis techniques with in-vitro and in-vivo health effect analyses through collaborative efforts with EPA's National Health and Environmental Effects Research Laboratory (NHEERL). The researcher would act to build EPA's in-house capability while at the same time expanding his/her own range of expertise. The results of this program will be transferred to the public and private sectors by publications in the peer reviewed literature and conference presentations. The

researcher will be jointly assigned to the NRMRL/APPCD's Air Pollution Technology Branch and NHEERL's Experimental Toxicology Division, Immunotoxicology Branch, co-located in Research Triangle Park, North Carolina.

- The researcher will work somewhat independently, yet in cooperation with a team of chemists, chemical engineers, toxicologists, environmental engineers, and technicians to investigate the combustion-related formation mechanisms of fine particles. The ability to collaborate with senior level EPA engineers and scientists as well as more junior staff is essential to the success of the project.

- The researcher will be responsible for proposing potential mechanisms for organic and inorganic pollutant transformation and fine particle formation, sampling methods development, developing research plans to investigate these, and designing apparatus and instrumentation to conduct these plans, if necessary. Additional considerations include the ability of the researcher to assist shop staff in construction, operate the experimental system, and conduct chemical and physical analyses of the sampled products. Physical and chemical analyses will include but not be limited to real-time size classified particle analyses by electrical mobility, time-of-flight, light scattering, and inertial impaction techniques, as well as GC/MS, XRF, XRD, ICP/AED, ICP/MS, SEM/EDX analyses of collected samples.

- The researcher will, as part of a team, perform animal (rodent) and in-vitro exposures to the emission atmospheres described above and assess health effects by monitoring inflammation and tissue damage, and the production and genetic expression of cytokines, growth factors and receptors. In addition, animal models of susceptibility including allergic asthma and influenza virus infection will be utilized to determine if pollutant exposure affects the incidence or severity of respiratory disease.

- The researcher will be strongly encouraged to publish the results of his/her work in peer review journals and present data at national and international conferences.

Applicants should have received a doctoral degree in chemical engineering, environmental engineering, biology, toxicology, or a closely related field within five years of the desired starting date, or completion of all requirements for the degree should be expected prior to the starting date. The program is open to all qualified individuals without regard to race, sex, religion, color, age, physical or mental disability, national origin, or status as a Vietnam era or disabled veteran.

The participants will be selected based on academic records, recommendations, research interests, compatibility of background and interests with research programs and projects at NRMRL/APPCD, and the availability of funds, staff, programs, and equipment.

The appointment is for one year and may be renewed for up to two additional years upon recommendation of NRMRL/APPCD and subject to availability of funds. The appointment is full time at NRMRL/APPCD.

The participant will receive a stipend, determined by experience of between $4,300 and $4,700 per month. Limited inbound travel and moving expenses may be reimbursed according to established policies. The participant must show proof of health and medical insurance. This can be obtained through ORISE.

Applications are accepted and processed on a continuing basis. The Postdoctoral Research Program for NRMRL is administered by the Oak Ridge Institute for Science and Education. ***Please reference Project # NRMRL/APPCD-2003-03 when calling or writing for information.*** For additional information and application materials contact: Postdoctoral Research Program/NRMRL, Attn: Betty Bowling, Science and Engineering Education - MS 36, Oak Ridge Institute for Science and Education, P.O. Box 117, Oak Ridge, Tennessee 37831-0117, Phone: (865) 576-8503 FAX: (865) 241-5219 e-mail: bowlingb@orau.gov.