Neutron Generator Enterprise (NGE)

Essential to every system in the U.S. Nuclear Deterrent

Neutron tube manufacturing

All nuclear weapons in the U.S. Nuclear Deterrent (ND) stockpile require neutrons to function. Neutron generators (NGs) provide neutrons at a required rate to precise timing requirements, contributing essential energy to the nuclear reaction. Being a limited life component, they must be periodically replaced.

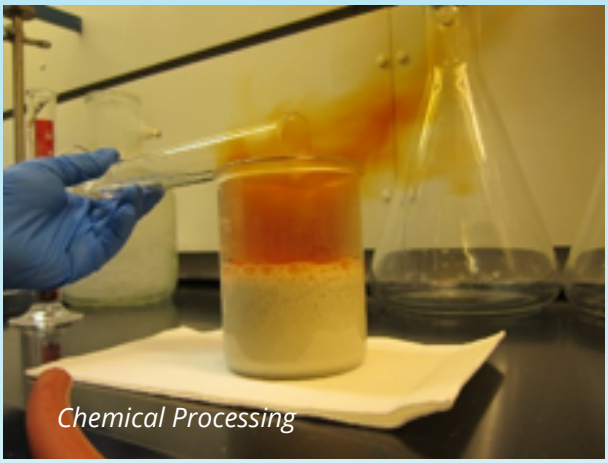
Sandia National Laboratories (Sandia) NGE is responsible for the entire NG lifecycle — both design agency and production agency responsibilities — from scientific understanding through design and development, qualification, production, surveillance, dismantlement, and disposal. The NGE is an integrated supply chain system with a dedicated infrastructure for ensuring NGs meet technical performance, cost, and schedule requirements — this includes attaining "mark quality" certification that products meet all applicable design requirements, drawings, specifications, and known design intent.

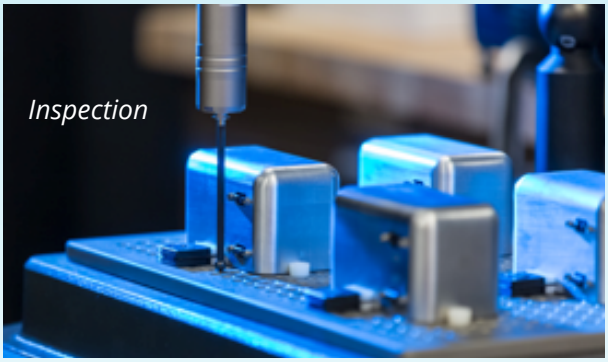
The NGE produces two primary types of NGs: one-shot ferroelectric NGs (FENGs) and multi-shot electronic NGs (ELNGs). To design, qualify, and build these, the NGE must maintain extensive knowledge in various disciplines, as well as the infrastructure to support activities and facilities. As part of Sandia's Component Science, Engineering & Production Center (CSEP), the NGE is responsible for elements of the research, design, qualification, production, and surveillance of over 20 products including NGs, neutron monitors, and switch tubes. The CSEP is responsible for approximately 100 products across three product technologies — NGs, power sources, and explosives components.

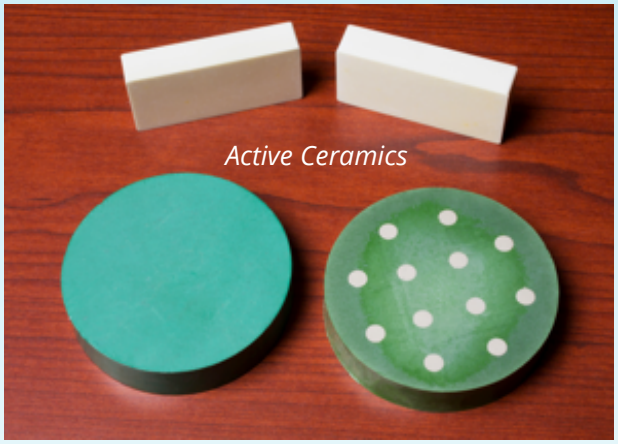
The NGE comprises two groups — Product Design and Technology and Product Delivery Value Streams. Using Lean Six Sigma quality principles and project management best practices, the Product Design and Technology Group contributes expertise in product design and engineering, lifecycle engineering, and applied science and technology maturation. The Product Delivery Value Streams Group contributes expertise in manufacturing science, product documentation, and product delivery execution.

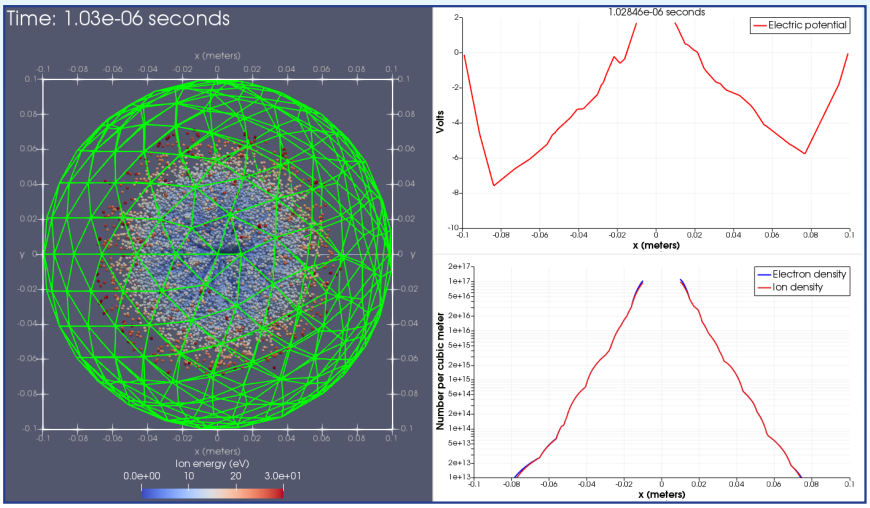
Neutron tube manufacturing

Neutron Generator Enterprise









Numerical simulation of expanding ion-electron plasma

Points of contact:

Muhammad A. El
Sr. Manager, Product Delivery Value Streams
mael@sandia.gov

Dolores M. Sanchez
Sr. Manager, Advanced Programs
dsanch@sandia.gov

External Dec. 2018

Sandia National Laboratories

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA-0003525. SAND 2018-13711 O

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration