Contribution ID: **619** Type: **Poster**

3P81 - Analysis of Cygnus Electrical Signals

Wednesday 26 June 2019 13:30 (1h 30m)

MSTS product number: DOE/NV/03624-0386
The United States initiated the Subcritical Experiment (SCE) program to support stockpile stewardship mission shortly after the 1992 moratorium on underground nuclear testing was established. Many SCE's are conducted at the Nevada National Security Site (NNSS) in Nevada. Cygnus is a high energy radiation generating device (RGD) located and operated at the NNSS and is a primary diagnostic for the SCE program.
The Cygnus Dual Beam Radiographic Facility consists of two identical radiographic sources, Cygnus 1 and Cygnus 2. From creation of the high power V-I drive to energy transport and X-ray conversion at the rod-pinch diode, the Cygnus machines utilize the following components: oil-filled Marx generator, water-filled pulse-forming line (PFL), water-filled coaxial transmission line (CTL), three-cell vacuum induction voltage adder (IVA), and rod-pinch diode. The diode pulse has the following electrical specifications: 2.25 MV, 60 kA, 60 ns. Each source has the following X-ray specifications: 1-mm diameter, 4 rad at 1 m, and 50 ns radiation pulse.
SCE's are both single-event and high-value, therefore a high level of performance in reliability and reproducibility are key issues of Cygnus. Prior to executing such a SCE, there are a formidable number of shots (e.g. each of the two Cygnus RGD's charging and discharging properly into the rod-pinch diode load) that must be executed to determine reliability and reproducibility of the Cygnus RGD's. For every shot on Cygnus, voltages and currents along the machine are recorded and analyzed. In this paper we summarize attributes of the voltage and current waveforms at different locations using distribution plots. These distribution plots are used to quantify the reliability and reproducibility for Cygnus.
• This work was done by Mission Support and Test Services LLC, under Contract No. DE-NA0003624 with the U.S. Department of Energy.

Authors: Mr TRUONG, Hoai-Tam (Tam) (Mission Support and Test Services, LLC); Mr HOGGE, Keith (Mission Support and Test Services, LLC); Mr MISCH, Michael (Mission Support and Test Services, LLC); Dr SMITH, John (Los Alamos National Laboratory); Mr GARCIA, Michael (Sandia National Laboratories); Mr ORMOND, Eugene (Sandia National Laboratories); Mr PARRALES, Martin (Sandia National Laboratories)

Presenter: Mr TRUONG, Hoai-Tam (Tam) (Mission Support and Test Services, LLC)

Session Classification: Poster - Industrial/Commercial/Medical Applications and Plasma and Pulse Power Diagnostics

Track Classification: 9.3 Pulsed Power Diagnostics