Gadolinium Doped Water Cherenkov Detector for use as Neutron Detector\textsuperscript{1} PATRICK DAVIS, BRIAN WOLTMAN, DONGMING MEI, YONGCHEN SUN, KEENAN THOMAS, OLEG PEREVOZCHIKOV, University of South Dakota, UNIVERSITY OF SOUTH DAKOTA RESEARCH TEAM\textsuperscript{2} — Background characterization is imperative to the success of rare event physics research such as neutrinoless double-beta decay and dark matter searches. There are a number of different ways to measure backgrounds from muon-induced processes and other forms of high energy events. In our current research, we are constructing a research and development project for the feasibility of a Gadolinium doped water Cherenkov detector as a neutron detector. We are constructing a 46 liter acrylic housing for the Gd-doped water consisting of two acrylic cone sections connected to a middle acrylic cylinder to increase volume while still using 5 inch photo multiplier tubes (PMTs) on either end. I will present the challenges of a Gd-doped water detector and the reasons why our design should be much more successful than past metal housed detectors. I will also discuss our current progress and future goals of our detector including its use in characterizing the background in the future underground laboratory in the Sanford Lab, soon to be DUSEL.

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