Contract No:

This document was prepared in conjunction with work accomplished under Contract No. DE-AC09-08SR22470 with the U.S. Department of Energy (DOE) Office of Environmental Management (EM).

Disclaimer:

This request is to release LiDAR data files acquired by SRNL R&D Engineering and H-Area Operations and Engineering while performing scans of the interior of the H-Canyon Exhaust tunnel. LiDAR data includes 3-dimensional (3D) point cloud data sets and panoramic digital images of the interior tunnel wall surfaces. Presently two deployments have been completed, the first in November 2019, Fig. 1, and the second in June of 2020. This request is for the release of the data collected during those two deployments. Detailed information on the deployment and data collected can be found in SRS document C-ESR-H-00072, "November 2019 Initial Deployment of LiDAR". It is planned to perform ongoing scans at approximately 6-month intervals, the purpose of the deployments is to evaluate the usefulness of the data collected to enable quantitative measurements such as tunnel dimensions and rate of surface erosion and as a precursor to a potential deployment of a LiDAR system on the tunnel inspection crawler.

A custom procured LiDAR on a pole inspection system is being used to scan the H-Canyon Exhaust Tunnel at a single location in the tunnel. The LiDAR which is mounted on a 25' pole was lowered by crane through a 6" pitot tube into the tunnel where it successfully completed scans at three different heights. The LiDAR system used collects both 3D point cloud data and panoramic digital images, Fig. 1. These images can be combined in the LiDAR software to visually enhance the results and facilitate identification and selection of points and areas for measurements. Measurements made from the LiDAR acquired point cloud data were verified to be within defined tolerance by comparing them to known artifact dimensions located in the tunnel. The deployments resulted in a scan of nearly 200' of the tunnel interior, from the data post processing, it was determined that the rough surface walls could only be scanned with little to no shadowing effect for total distance of 19'. Shadowing occurs when the line of sight laser measurement to each surface point becomes impossible due to obstructions, in this case the walls themselves having jagged and rough surfaces. All locations evaluated were within the measurement accuracy of the Leica BLK360 LiDAR, however as distance increases from the scanner to the wall, shadowing increases and point cloud density decreases causing baseline measurements to become more relative versus absolute. This was expected with this technology.

Fig. 2- Crane lowering LiDAR pole into tunnel (left), 3D point cloud data (top right), digital image with measurements (bottom right)

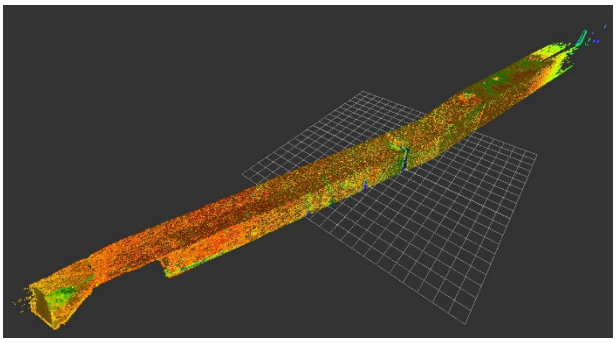

Fig. 1 - LiDAR system 3D point cloud acquisition of approximately 190' of tunnel.