

Sandia National Laboratories

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Mysore S. Nataraja
Waste Management Engineering Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, MD 20910

Dear Dr. Nataraja:

Enclosed please find a trip report based on my attendance at a symposium on "Shaft Drilling Research and Innovative Shaft Drilling Activities" held in Las Vegas, Nevada during May 16-18, 1984. Due to other commitments, I was only able to attend the proceedings on May 18. A tour of the Nevada Test Site was conducted on May 19 as part of the symposium. I also participated in this tour.

If you have any questions or comments on the enclosed material, please call me at FTS 844-6268.

Sincerely,

Krishan Wahi

Krishan Wahi
Waste Management Systems
Division 6431 -

KW:6431:vr

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Trip Report (Las Vegas, Nevada)

A symposium was held on May 16-18, 1984 in Las Vegas, Nevada on "Shaft Drilling Research and Innovative Shaft Drilling Activities." The NRC had authorized SNLA to send a representative to this conference. Since K. Wahi has been closely associated with certain aspects of the Exploratory Shaft in various media, SNLA thought it appropriate to send him. However, due to other commitments he was able to attend only one of the three days (i.e., May 18) of scheduled presentations and the tour of the Nevada Test Site (NTS).

There were four presentations on Friday (May 18), each one concerned primarily with "blind drilling" of shafts. The first paper was given by Paul Richardson of Santa Fe Shaft Drilling Company under the "Foreign Field Operations" session. The title of the paper was "Australia's Largest Blind-Drilled Shaft." The shaft was 14 ft. in diameter and was drilled to a depth of 2,460 ft. It represents the largest hole ever blind-drilled in hard rock. Layers of metagabbros, schists, and gneisses were penetrated which had compressive strengths up to 50,000 psi. Air-assisted reverse circulation was utilized during the drilling operation. One main conclusion by the author was that large shaft drilling is a proven technology. More details may be found in a copy of the paper attached with this report. Stephen Absher of Santa Fe Shaft Drilling Company presented a two-part paper on "Circulation for Large Hole Drilling." The first part discussed merits and demerits of different circulation systems. It was stated that for deep holes larger than 30" diameter, direct circulation systems are not adequate and that indirect (reverse) circulation systems must be used. Several indirect circulation techniques are being used at NTS. The second part presented details of one specific indirect technique; namely, reverse air assisted circulation. Next, Ken Ortigo of Reynolds Electrical and Engineering Co. described the drilling operations at the WIPP Site. Prior to the shaft construction, seventy small diameter exploratory holes were drilled at the site. Two shafts that are 300 ft. apart were blind-drilled. The exploratory shaft had a diameter of 142" and was partially lined. Some problems were encountered in setting the seal at the bottom of the liner. The second shaft (ventilation) had a 72" diameter and was not lined. This shaft is now being enlarged by blasting. Les Arnold from U.S. Army Corps of Engineers gave a talk on "Radioactive Waste Project Construction" for the WIPP Site. In addition to some details on the shaft construction, he also described the excavation activities at depth. Drifts and experimental rooms at an approximate depth of 2150 ft. are being excavated to carry out in situ experiments in the near future. He also alluded to another ventilation shaft that was excavated by "raise drilling". A pilot hole was drilled to the

desired depth after which the shaft was drilled from bottom up by pulling up on the drill assembly. All the above talks are highly relevant to the proposed shaft construction methods for exploratory shafts at the various repository sites for site characterization purposes.

A tour of the NTS was conducted on Saturday (May 19) with the primary purpose of showing various drilling equipment used for blind drilling. Several drill bits ranging from 7 ft. to 12 ft. in diameter were shown and described. Other equipment such as dual wall drill pipes, bit weights, Kellys, bit cutters, and fishing tools (for retrieving lost bits) were also available for inspection. A drill-rig setup was visited, but the rig was not operating on that day. The non-drilling related parts of the tour included visits to a man-made crater due to an underground thermonuclear explosion, remnants of aluminum, concrete, and brick structures subjected to blasts and shocks, and experimental bridge spans damaged by nearby detonations.