

From @QUCDN.QueensU.CA:F5100030@LAUVAX01.BITNET Mon Nov 5 17:00 EST 1990
Received: from qucdn by mips2.Phy.QueensU.CA (5.52/4.7)
id AA10876; Mon, 5 Nov 90 17:00:06 EST
Received: from QUCDN.QueensU.CA by QUCDN.QueensU.CA (IBM VM SMTP R1.2.2MX) with BSMT
Received: from LAUVAX01.BITNET (F5100030) by QUCDN.QueensU.CA (Mailer R2.07+QK)
with BSMT id 8200; Mon, 05 Nov 90 16:34:30 EST
Date: Mon, 5 Nov 90 16:32 EST
From: F5100030%LAUVAX01.BITNET@QUCDN.QueensU.CA
Subject: Progress Report - hope this one gets through!
To: hepburn@mips2.phy.queensu.ca
Message-Id: <0BBBB7BE12DF204871@LAUVAX01.BITNET>
X-Envelope-To: hepburn@mips2.phy.queensu.ca
X-Vms-To: IN%"hepburn@mips2.phy.queensu.ca"
X-Vms-Cc: F5100030
Comments: This node is also LAUVAX01 on BITNET
Status: R

SNO-STR-90-155

SUDBURY NEUTRINO OBSERVATORY

CONCRETE, SULFURCRETE AND SHIELDING RESEARCH

PROGRESS REPORT CON-11-90

E.D. Hallman, Laurentian University

November 5, 1990

Progress in our research area up to the SNO Meeting - Chalk River, has been documented in the technical report on concrete/sulfurcrete presented at the meeting. I list below, updates and highlights of work undertaken in September and October. Unfortunately, a report sent for distribution in October was not received.

1. BORON GLASS PRODUCTION & TESTS

We examined the radioactivity of the ingredients for a 1 tonne melt of 10 % boron glass. We found 1.8 ppm Th and 0.5 ppm U in the purified silica sand supply, and no detectable (< 50 ppb) uranium and thorium in the borax. The relatively high Th and U in the silica led us to obtain a supply of quartz from Timmins (previously examined for radioactivity) to substitute for the silica sand in the test melt. This quartz was rechecked and found to contain 25 ppb Th and 30 ppb, so that the predicted radioactivity of the glass is thus < 15 ppb Th and < 15 ppb U - satisfactory for this run. Supplies for the glass have now been delivered, and the melt is scheduled for November 12 at the Temiskaming Testing Lab. of the Ontario Ministry of Mines. The glass will be tested in low activity concrete and sulfurcrete blocks later in November.

2. SULFURCRETE BLOCK PRODUCTION

200 sulfurcrete blocks have been ordered from Sulfurcrete Products, Calgary, incorporating Haley dolomite aggregate. 50 of these will include 1 % boron, (as boron glass), for production and long-term stability test purposes. These blocks should be available in January 1991, for use in the underground lab.

3. BORON CONCRETE STABILITY/STRENGTH TESTS

We are continuing long term strength and aging tests on two batches of 1 % boron concrete, with 10 % boron glass additives. The samples with the more water-soluble glass (not the glass of choice for the 1 tonne melt), show some minor surface cracks after water immersion (at 40 deg. C) for 28 days. Tests are continuing. We plan a discussion with Larry Moriarty (Monenco) about the specifications for testing of the final material, and time/scale, testing personnel required. A high purity, special Portland cement which promises to have less alkali reaction potential, has been tested for radioactivity. Although radioactivity is not significantly below normal Portland cements, we will continue to investigate its use, in connection with long-term stability of the boron concretes.

4. GERMANIUM COUNTING FACILITY AT LAURENTIAN

During a recent visit here, Jagam helped to commission the three crystal Ge detector from the University of Guelph, in a basement lab at Laurentian. We have now counted standards and other previously measured materials, and obtained a reliable efficiency factor. Rock and backfill samples from the underground lab site, cement and sand samples from our concrete work, and other materials of interest will be counted here.

5. UNDERGROUND LOW-LEVEL GAMMA COUNTING LABORATORY AT CREIGHTON

With the support of INCO, through Ken Langille and Bob Coulter, we have identified an appropriate site - a 16 ft square lunch room on the 4600 ft level at Creighton - for a germanium counting facility. The site and proposed operation are in the midst of an approval process at INCO, and plans for a concrete block wall, door, minor ventilation changes, and some electrical work are in progress. We hope that final approval and construction orders will be completed in November, with installation of the facility in January 1991. The lab site is just out of the norite rock zone, and we have tested the granite wall material to check radioactivity levels. Measurements show the granite to have about 2 ppm U and 13 ppm Th - levels which, although above those for norite, should not pose a problem for the low background facility.