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Summary of Radon Emanation Measurements on the Mine Box at 6800 feet

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A stainless steel box (approx. 18 inches by 18 inches by 2 inch) was attached to the Urylon coating of the control room area at the 6800 foot level (SNO detector site). A leak check of the box showed that there was extensive series of channels and holes that formed (as far as 2 feet away from the box) when the Urylon hardened.

The whole area was coated with Mineguard epoxy and this effectively sealed all the leaks. The box was left sealed for more than two weeks and then an extraction of the radon in the box was done by flushing the box with the boil-off nitrogen gas from a liquid nitrogen dewar. A specially built radon extraction board contains a liquid nitrogen cooled stainless steel trap which effectively traps all radon which enters. A second extraction (Trap 2) is done almost immediately after the first extraction to measure the background level in the box, radon board and nitrogen gas.

The stainless steel traps (traps 1 and 2) containing the radon are sent to Queen's University to transfer the radon into ZnS scintillation cells and then counted.

June

The extractions on the box on the Urylon wall were performed on June 3 and received at Queen's June 7.

Trap 1 had 103 psi (absolute) of gas in it. Presumably most of this is volatile vapors given off from the Urylon. The radon was counted from Trap 1 and a limit of $<26 \text{ Rn m}^{-2}\text{h}^{-1}$ from the Urylon was obtained.

Trap 2 was found to have 25 psi (abs) of gas in it. The radon was counted from Trap 2 and was found to contain much more radon than in Trap 1. If all the radon was from the Urylon, it would be equivalent to $329 \pm 10 \text{ Rn m}^{-2}\text{h}^{-1}$ from the Urylon.

July

The extractions on the box on the Urylon wall were performed on July 8 and received at Queen's July 12.

Trap 1 had 117 psi (absolute) of gas in it. The radon was counted and a limit of $<20 \text{ Rn m}^{-2}\text{h}^{-1}$ from the Urylon was obtained.

Trap 2 had 20 psi (abs) of gas in it. The radon was counted and was again found to have much more radon than in Trap 1. If all the radon was from the Urylon, it would be equivalent to $183 \pm 8 \text{ Rn m}^{-2}\text{h}^{-1}$ from the Urylon.

Summary

Both the June and July runs are similar: slow courier delivery, starting pressures found in both traps, background level of radon in Trap 1 and a very high radon level in Trap 2. The limits quoted on radon from Urylon as determined from Trap 1 are encouraging. The cause of the high radon level in Trap 2 is under continuing investigation.

The efficiency for flushing radon out of the box and trapping onto a stainless steel trap has to be measured. At present it is assumed in our calculations to be near 100%.