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EMANATION AND PERMEABILITY STUDIES AT THE ELLIOT LAKE LABORATORY

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SNO-SLR-92-018

The following are data obtained during the months of February and March, 1992.

²²²Rn EMANATION STUDIES

Material	Emanation Rate	
	atoms kg ⁻¹ h ⁻¹	atoms m ⁻² h ⁻¹
Norite	5.03 ± 0.79	248 ± 39*
Shotcrete	52.04 ± 5.35	1968 ± 202*
Boron composite	5.71 ± 0.85	216 ± 32*
Miradri	—	111 ± 2.9
Polyurethane	—	?

+ Only rough estimates (atoms m⁻²h⁻¹) because surface area has not been calculated accurately. Samples still in emanation chambers.

* There have been difficulties in the measurement of this sample because of what seems to be considerable outgasing. It will take another 2-3 weeks, before attempting for the third time.

NOTE: The above values require further verification because calibration factors have to be rechecked, and because changes have been introduced in the emanation chambers and emanation systems.

PERMEABILITY STUDIES

Material	PERMEABILITY k, cm ² s ⁻¹	"STOPPING POWER" R	REMARKS
MIRADRAIN ²	2.28 x 10 ⁻⁸	0.146	1 layer
MIRADRI ¹	1.08 x 10 ⁻⁷	0.057	composite
MIRADRAIN ³	5.41 x 10 ⁻⁸	0.170	2 layers
MIRADRI + MIRADRAIN ⁴	1.20 x 10 ⁻⁷	0.059	1 layer Miradrain + Miradri composite

- 1) Miradri made-up of tar compound sandwiched by polyethylene sheet and paper backing
- 2) Plastic backing material
- 3) "whole" material without Miradri
- 4) "whole" composite

*R is the ratio of the ²²²Rn concentrations measured in the sensitive volume of the detectors for the material under investigation relative to the reference material, i.e. GF filter material. Because k is proportional to the thickness and solubility of the material, it is difficult to compare the properties of materials as ²²²Rn barriers unless all the materials investigated have the same, say, thickness. For this reason, and particularly for Miradri, the R values are given. This topic will be discussed shortly.

Note The increase of k with the increasing thickness of the material is more apparent than real. This is so because $k \propto \delta$ (thickness) and often an additional increase in δ does not bring about any significant improvement in R. (See SNO-STR-91-069)

ULTRAHIGH WATER PURIFICATION SYSTEM

A ultrahigh water purification system has been built which is now operational. Some preliminary tests are now being conducted to ensure that the system produces water of the desired purity. The system has been designed to carry out ²²²Rn emanation studies of different materials in water.