



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 2 1 1988

Dr. Stratis Vomvoris
NAGRA
Parkstrasse 23
Baden, Switzerland

Dear Stratis:

Thank you for kindly setting up my visit to the Grimsel Rock Laboratory on June 27 and the NAGRA offices on June 28. The trip to the laboratory gave me a good perspective on the migration experiment.

During the Grimsel visit, I had a discussion with Hans-Peter von Allmeu concerning the effect of the mining of the tunnels and drifts on the hydraulic properties of the rock. I remarked that NRC had prepared a draft Technical Position on the disturbed zone and that I would be glad to send it to him. The most notable finding in the Position is that the largest effect on the properties of the rock close to the excavation is likely to be the redistribution of stress around the opening rather than the physical effect of mining or blasting. The Position suggests that the effects of stress distribution would extend up to about three to five diameters from an opening, based on linear elastic theory. A rough corroboration of the effect of stress distribution is noted in some of the work in the Stripa mine, which indicates that permeability near a 3 meter wide drift was increased up to about 11 meters from the opening. I enclose for your interest a draft that was sent out for public comment. Please note, however, that this Position was never actually released, and our plans to release it are uncertain.

In my meeting with Dr. Zuidema on June 28, I mentioned that I thought that it would be possible to measure the effects of matrix diffusion on the migration experiment if a high-molecular weight tracer were used in conjunction with ordinary diffusive tracers, since the diffusion coefficient of the former would be smaller. He indicated that they were reluctant to use high molecular weight tracers because of the possible lingering effects for future experiments. I suggested that the use of colloidal size silica microspheres would have a minimal effect on the rock. I enclose a paper by Cathles, et.al., in which brine and silica tracers were used to determine that matrix diffusion was an important phenomenon in their particular experiment.

Thank you for your written comments on the INTRAVAL proposal. I am working on a new draft right now, and it should be out shortly. There is still some computer programming to do on the transport model, but I foresee no great obstacles except lack of time. I am preparing to try the current models on a Cray XMP-24, which should give us orders of magnitude more computing power.

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Dr. Stratis Vomvoris

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Once again, thank you and NAGRA for your great hospitality. I look forward to seeing you in Tucson in November.

Sincerely,

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Richard Codell, Senior Systems Analyst
Division of High-Level Waste Management
Office of Nuclear Materials
Safety and Safeguards

Enclosures: Draft GTP on Disturbed Zone
Paper by Cathles

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