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Letters

Must Acid Raindrops Keep Falling on My Head?

This is a brief discussion sparked by David Strangway (*Geoscience Canada*, March 1980) and Jimmy Carter. What is nuclear waste, and why is its disposal of such vital concern to us all that Dr. Strangway should address it in his recent article? The question is generally ducked, probably because of a variety of vested interests in the *status quo*. Quite simply, most nuclear waste is spent fuel that has ceased to be of economic value in present-day plants. However, the bulk of the potential power still remains with the spent fuel – an astounding 99%! Therefore, nuclear power waste is the problem that we should be addressing – that is, unless this generation wishes to join the profligate ranks of those early oil producers, who flared trillions of cubic feet of natural gas in the days when there was no market for it.

Surely the accent of conservation should be placed upon our waste disposal sites. They must be safe as we can possibly make them, but they must also be repositories like Fort Knox. Every ounce of our present nuclear "waste" must be stored, accounted for, and accessible to future users.

The recent decision by the U.S. government to switch from oil to coal for a large part of electricity production in the highly industrialized American north is fraught with acid rain problems on an enormous scale. That this can happen in a country that has held up costly and potentially highly beneficial hydro-electric dam developments because a small fish may have to relocate boggles the mind. (Although I respect the sentiments of those who advocate this, as a geologist who has seen the record of countless extinctions in the geological past, one more is not, to me, a *cause celebre*, particularly when relocation of plucky survivors is entirely feasible.) Life may be full of compromises, but this recent decision, with ramifications far beyond the death of a great number of additional lakes, surely points up the urgency of many of the programmes suggested by Dr. Strangway.

We do not accept the carnage that occurs daily on our roads, we are constantly attempting to reduce it. We have opted to live with it because owning a car is convenient

Likewise, the larger and larger jet aircraft that now and then crash, with tragic loss of life, are still one of the safest forms of travel per passenger mile – which after all is what really matters. So-called nuclear power plants, despite the dangers so vehemently and rightly pointed out by today's Anti-Nukes, are also potentially very clean sources of energy. I obviously do not agree with the nuclear power abolitionists, because a pragmatic approach to life cannot see a return to the pioneer farm, idyllic though it might sound to city-dwellers. We must be very, very careful in the exploitation of nuclear energy, but no other equally clean energy source appears to be available in politically reasonable time. It will be a sad commentary on our democratic system if it goes down the tube because of an inability to develop the innovative technology to control the dangers of one of our best hopes for an energy revival. Thus again, everything that Dr. Strangway says becomes more urgent in the light of recent political decisions.

For nuclear energy waste to be curtailed, new types of reactors will be necessary. In the meantime, storage and reclamation should be the focus of today's efforts. Fortunately, the storage bays at present nuclear power plants are adequate for several decades, but back-up sites will be needed as the desirable proliferation of plants proceeds. Most of the techniques for testing and monitoring proposed by Dr. Strangway could be applied to many of our existing and abandoned mine sites. Natural resources, to be useful, must always meet certain rigid quality standards, and local economic mineral deposits are almost always destined to exhaustion. Surely it would be much more feasible economically of both time and money and also equally safe, after monitoring, to select some of these sites as storage areas for nuclear wastes?

To cite only one example: Marmoraton Mines, located half way between Toronto and Ottawa, for years exploited a small (as iron mines go) but high-grade orebody. The mine is now closed and unlikely to re-open. Testing might well indicate that this old mine could serve as a very satisfactory interim waste storage site. Environmental sealing of the area would have to follow. That this might be entirely feasible is demonstrated for us by a "natural experiment" that took

place near the railstop of Brent, a few kilometres north of Algonquin Park. A large meteorite crashed to Earth there in Middle Ordovician times, about 450 million years ago. Preserved in the impact crater, some 3 km wide, are about 250 m of sediments that include abundant layers and veins of highly soluble gypsum in the lower beds. Associated rock facies clearly indicate that the gypsum dates back to the Ordovician time of accumulation of the post-impact, crater filling. *Therefore, the preservation of abundant gypsum to the present day indicates that deep circulation of ground waters has been negligible in the Brent Crater for a long enough time to satisfy even the most cautious of nuclear storage opponents.* (I do not use the term "opponent" in any derogatory sense. Scientific progress would be much slower without the active confrontation of Doubting Thomases and technical speculators.) I take the Brent Crater to be an excellent geological test of many of the criteria required for a nuclear waste disposal site: it is useful not only because of its hydrological integrity, but also because it serves as a random sample of our Canadian shield environment (Lozej and Beales, 1975).

Numerous equally good or better sites can doubtless be found. If they too do not leak for another 450 million years, surely by then man will have the technology to handle any problems that develop? That is, if he is still around.

Perhaps, then, a better way to meet the storage problem is to look at places like Marmoraton and other shortly to be abandoned mines before adding to our energy costs by searching in virgin areas. If we move fast enough on these investigations, we might even save the last few of our lakes before acid rain gets 'em!

Reference

Lozej, G.P. and Beales, F.W., 1975, The Unmetamorphosed Sedimentary Fill of the Brent Meteorite Crater, Southeastern Ontario. Canadian Jour. Earth Sciences, v. 12, p. 606-628

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