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nuclear question

researcher.
ges is by John Savard, a graduate student in Physics

ibutions from interested students on any aspect of the

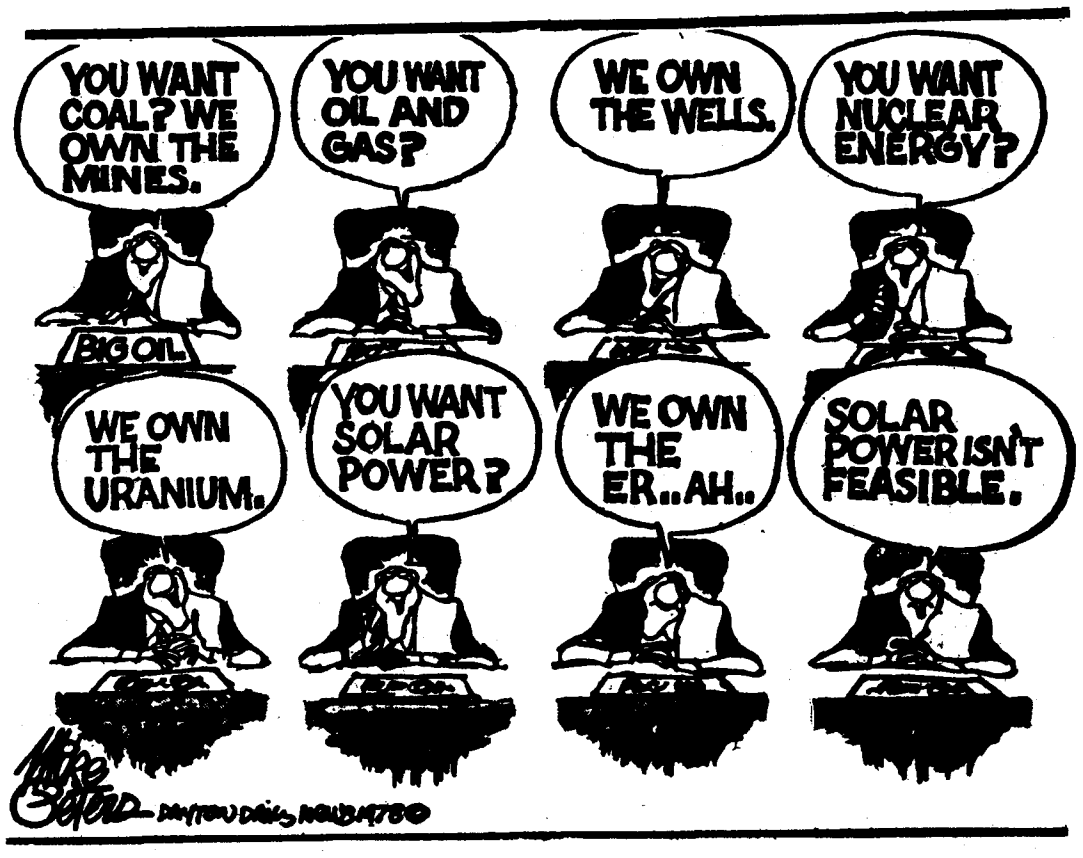
reply ...

Vermont Yankee nuclear plant in rnon suspended the granting of nstruction licenses for nukes from until September 1976, when the issued a report on the en-onmental impact of reprocessing and ste management parts of the fuel le for light-water reactors. The court ng agreed with the New England alition on Nuclear Pollution and intained that those aspects of the fuel le had been inadequately covered in nsing hearings.

The NRC report (called "The hop Report," after one of its editors) se the salt-bed disposal method as most feasible. High-level wastes are ady being stored in heavy barrels in ndoned salt mines in West Ger-ny, but indefinite storage by this ns may not work. Dr. Hannes n, a Nobel laureate in physics d in "The Nuclear Fuel Cycle," has , "There is no doubt that the salt mines could be considered safe for any normal waste products. But because of the very large quantities of extremely poisonous substances, it is required that the repository should be absolutely free of leakage for a period of hundred of thousands of years. No responsible geologist can guarantee this, simply because the problem is one of which we have no experience."

The General Accounting Office summed up the desperate waste problem quite succinctly in its report to Congress, September 9, 1977:

To safeguard present and future generations, locations must be found to isolate these wastes and their harmful environmental effects. A program must be developed for present and future waste disposal operations that will not create unwarranted public risk. Otherwise, nuclear power cannot continue to be a practical source of energy.



On the other hand...

by John Savard

Nuclear power is not safe. It kills, ures, and incapacitates.

Unfortunately, so does every other d of power. And the other kinds of wer kill, injure, and incapacitate ch more often, per unit of energy duced.

This is the message of the book e health hazards of NOT going lear," by Petr Beckmann, author of History of Pi." And he makes that e very effectively.

For a given amount of energy, 90 es as many coal miners as uranium ers will die of industrial accidents, 18 times (or more) the number of nium miners who die of excess cers is the number of coal miners o die of Black Lung for the same ount of energy. Incidentally, these res are based on light-water reac-, with no reprocessing.

On January 6, 1973, an oil fire ted in Bayonne, New Jersey, On uary 3, 1976, an oil storage complex South Brooklyn caught fire and oded. In either case, had the wind blowing in the right direction, sands of people would have died. look at the fuss being made about ee Mile Island ... where the evacua- of pregnant mothers from the area found, in hindsight, to be un-ssary.

One early chapter attempts to ain why a nuclear power plant ot explode like an A-bomb. Not "is likely to," but "cannot." The dent that can happen is a loss of ant accident. If the flow of water to reactor core is halted completely, the backup cooling system also then the fission products inside the rods would continue to generate until the metal casing of the fuel also melted, producing a mass of active molten metal that would melting the bottom of the pressure l around the core. Note that it takes fuel to cause a meltdown, as the ium can be easily prevented from ucing that much heat ... because the i I reactor, featured in "We Almost Detroit" did not have enough spent t the time (October 1966) to cause a down under any circumstances.

The molten, radioactive metal d (unless some dimwit had located bway tunnel under the nuclear r plant) cool off quite harmlessly t couldn't explode) several yards underground (no, it wouldn't get to the Earth's core, let alone the Indian Ocean) ... but it would release gaseous radioactive substances that could endanger the public.

Next, we need a wind blowing towards a population center ... and a temperature inversion. Since it takes time for the molten metal to melt its way out of the containment building, some time is available to evacuate. Finally, it becomes possible that excess deaths from cancer, in years to come, will be caused by the accident.

With oil and natural gas tanks, there is no question of having both a cooling and a backup system failure, followed by possible casualties in years to come, which would, however, normally average to less than one casualty.

One match — and whoosh! An explosion that would immediately kill dozens ... and smoke that could, possibly, cause excess deaths from emphysema, asthma, and so on, again given the right weather conditions.

How about radioactive waste? The radium and thorium isotopes in coal expose the public to at least 180 times as much radiation as the routine emissions of an atomic power plant of equal capacity: but these have already been seen to be absurdly low. Coal ash also contains both radioactive and conventional poisons, and is bulky compared to radioactive waste.

If reprocessing does not proceed, Dr. Beckmann admits that such waste would be a problem: the useful plutonium is the primary long-live component of such waste, and if it is removed, what is left is almost all of half-lives shorter than a few decades, and of very little bulk. It is the lack of bulk — the concentration of the hazard — that is the safety advantage of nuclear power.

Mine tailings are a more serious hazard: while it can be dealt with reasonably with existing technology (according to the recent APS report on nuclear fuel cycles), since it was (until recently) ignored by the public and the anti-nuclear movement, it had been treated with a blase attitude similar to that towards non-nuclear hazards.

Poisons such as arsenic, selenium and vanadium in coal offer a greater hazard than the radioactivity in coal: and these poisons have an infinite, not merely a long, "half-life."

Also, naturally occuring uranium in the ground has leaked into water supplies and caused excess cancers: by burning it up inside reactors, and burying what is left in carefully selected, rather than naturally and randomly selected, sites, public health is enhanced in the long run.

Terrorism and sabotage? There are far easier ways of killing large number of people than by building your own A-bomb: but for obvious reasons, Dr. Beckmann chooses not to prove his point by naming them. There have, however, been magazine articles occasionally on the subject — so it is no secret what they are. One argument made recently is that, while germs and gas are universally rejected, A-bombs are "legitimate," having been used, and are therefore more attractive to terrorists having PR concerns. I should think that the indiscriminate killing of thousands is sufficiently odious that the means used in doing so will scarcely add or detract.

Price-Anderson? The first $120 million of damage due to a nuclear accident is insured with private insurance companies: the next $560, by the Federal Government in the U.S., but the utilities pay premiums to this fund ... which is a profit-maker, not a subsidy. And there is no no-fault insurance for other forms of disaster at all. Yes, the U.S. government invested $1 billion in reactor safety ... but it spends $1 billion every year on Black Lung victims.

Then, what is wrong with nuclear power?

For one thing, it would save the lives of coal miners by putting them out of work. But, if we had more abundant energy, and if we didn't need to force people to mine coal, perhaps we could afford better social services and other jobs for them.

For another, it distracts people from the real issue of conservation. Since nuclear power is safe and abundant, people will avoid making the painful adjustment to using less energy, at least in the form of electricity. Why shouldn't they avoid it? For one thing, eventually human energy production will generate enough heat to change the planet's climate. So, we had better adjust now to using less energy than delay things until we've had time to prepare for the adjustment. For another, energy use contributes to economic prosperity. This will enable people to avoid coming face to face with the moral issue of poverty: the redistribution of wealth. It will also mean that there will be less delay in giving the poor what they need, and without bloodshed.

What about solar power? After auto accidents, accidental falls are the number two cause of deaths not due to disease. Climbing up on the roof to fiddle with a solar power collector, for a few kilowatts of power, not thousands of megawatts, and having to maintain your own energy storage system ... covering a few square miles of desert with white paint to compensate for nuclear-produced heat is cheaper and safer.

Dr. Beckmann ends his book with a hypothesis to account for the anti-nuclear movement. Even in the late sixties, he says, environmentalists tended to be left-wingers, college-educated, and affluent. (This is not guilt by association — guilt isn't involved — but an observable statistical preponderance.)

Self-interest, not recognized consciously by those involved, is invoked. What self-interest could oppose the cheapest, cleanest, safest method of power generation yet developed?

If it weren't for the free enterprise system and modern technology ... people without college educations wouldn't be going to Florida, or even London, Paris, and Rome. The beaches, airplanes, ocean liners, and even the roads would once more belong exclusively to cultured individuals. Mass affluence, the lifeblood of which is energy, is destroying affluence as the sign of a favored social stratum.

My primary source for this article, which I must confess to having plagiarized in spots, is Dr. Beckmann's book. Not everything in it, however, comes from there: besides some use of other sources, I expressed my own opinions when I explained what is wrong with nuclear power. Dr. Beckmann's book is well worth reading in its entirety. Fairness, however, does compel me to mention two errors in it: plutonium is more toxic than radium, not the other way around, since plutonium concentrates at the surface of bones; and his proof that a reactor cannot become an A-bomb also proved, for a moment, that it couldn't be a reactor either ... due to unavoidable oversimplifications.