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Industrial Radioactive Wastes

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Summary:

R.C.S.I. investigations show that the public has unrestricted access to the junction of Buttermilk Creek into Cattaraugus Creek. Radioactive materials are discharged into Buttermilk Creek by an industrial plant in West Valley, N. Y. under supervision of the Division of Compliance of AEC. Amounts of discharge were entirely within AEC rules according to a recent report by the Division. The rules, however, were made assuming no public access to Buttermilk Creek, and are now being changed (see Bulletin #5 for the changes).

The AEC has the task of promoting and policing the safe industrial use of radioactive materials. This is different from the task of protecting the general environment from radioactive pollution. We interpret the Buttermilk Creek incident as indication that the conservationist task should not be added to the present responsibilities of the AEC. Local control of radioactive pollution is discussed in Bulletin #5.

1. Background.

Spent nuclear fuel is reprocessed for further use in nuclear reactors by Nuclear Fuel Services, Inc. (NFS). This private industrial venture is pioneering an essential service for the projected growth of the electric power industry. The NFS plant occupies a 190 acre tract in the middle of a 3000 acre state-owned preserve, the Western Nuclear Service Center, in West Valley, New York. The safety of operation is policed primarily by the Division of Compliance of the Atomic Energy Commission (AEC).

An RCSI report on the NFS plant (Reference 1) concluded that more radioactive pollution was released into streams than was permitted by law. Our data were promptly and expertly investigated by Mr. Ryan and Mr. Nilsen of the Division of Compliance of the AEC, and an official report of the investigation was entered in the record (Reference 2). The official ruling is that the NFS plant was complying with AEC regulations then in force and that radioactive materials were discharged in a legal and proper manner.

This AEC ruling is important. It means that the discharge of radioactive wastes at West Valley is not a local problem, but rather an example of an official policy that allows an increase in radioactive contamination of surface waters in all of the United States.

## 2. The AEC ruling.

The AEC ruling bears on three separate points: a) the facts of the case, b) the responsibility for the release of pollutants, and c) the enforcement of law.

a) There is no dispute with the corrected high reading of Sr-90 in the RCSI sample of the creek (4010 pCi/l). According to the AEC ruling, this sample was taken from the creek just when the plant was releasing radioactive wastes.

b) According to the AEC ruling, radioactive waste was released from the NFS plant exactly as prescribed by the AEC. We conclude that the Division of Compliance of the AEC authorized the amount of radioactive materials released into Buttermilk Creek. The owners and operators of the NFS plant can not be blamed in this matter, since they followed the instructions of the supervising agency.

c) This AEC ruling interpreted federal anti-pollution laws in a way which the RCSI challenged. We explain the controversy, and we note that a more recent AEC ruling agrees with us (see RCSI Industrial Radioactive Waste Bulletin #5).

The law (References 3, 4 and 5) prescribes limits for the concentration of radioactive pollutants, and is meant for water discharged from the grounds of an industrial plant into the environment (that is, into unrestricted areas). Here is how the law is applied in practice. The NFS plant discharges water from lagoons holding radioactive wastes (this water contains "low level radioactive wastes"). This discharge goes out of a pipe into Frank's Creek on plant grounds. Frank's Creek flows under the plant fence and empties into Buttermilk Creek on the grounds of the State preserve. The boundary of the preserve follows Buttermilk Creek, which empties into Cattaraugus Creek in a narrow corner of State-owned land. The AEC ruling is concerned only with the radioactivity measured where Cattaraugus Creek leaves State lands. The other waters are declared "restricted", with the following addition, which we quote (Reference 2):

"It should be noted that concentrations in excess of the 10 CFR Part 20 limits may be authorized for release into an unrestricted area if accessibility and dilution factors of the stream are such, that it is unlikely that individuals will be exposed to annual average concentrations in excess of drinking water levels."

This shows that the ruling is based solely on toxicity to people. See discussion, below, for further comment.

## 3. Investigation of Cattaraugus and Buttermilk Creeks.

RCSI members made several visits to West Valley and photographed the area near Cattaraugus and Buttermilk Creek. The grounds of the NFS plant are surrounded by a chain link fence, with Frank's Creek flowing out under the fence. The boundaries of the State preserve (Western Nuclear Service Center) are marked by barbed wire: a three strand fence on one side and a five strand fence on the other. These fence lines run along the two shores of Buttermilk Creek and stop short of the creek mouth without connecting with each other. The barbed wire fence is posted by W. R. Grace and Co. against trespassing, with no warning of

radioactive hazard. In March creek water flooded under the fence. On April 19, RCSI members rode a canoe down Cattaraugus Creek past the mouth of the Buttermilk and took photographs. They met nothing along the route to warn or hinder them against wading in Buttermilk Creek water. RCSI members also followed both shores of Cattaraugus Creek on foot starting from bridges on public roads, and reached the junction of Buttermilk and Cattaraugus Creeks without crossing a fence or trespassing on posted territory. This stretch of the Cattaraugus is used as a white water canoe trail by members of the Adirondack Mountain Club.

We conclude that Cattaraugus Creek is an unrestricted public waterway, and that the discharge of Buttermilk Creek water rather than Cattaraugus Creek must be kept clean as prescribed by Federal and State law.

#### 4. Discussion.

The use of nuclear fuel can be either a major opportunity to clean up our environment, or a major threat. The opportunity comes from the fact that radioactive wastes are much easier to detect and are already subject to more control than any other industrial wastes. The threat comes from existing gaps in the control of pollution, and from the pending enormous increase in industrial use of fissionable materials. We want to put the control of radioactive wastes in perspective by distinguishing four levels of danger, from personal to global.

##### a) Local exposures and damage to individuals.

The Federal Radiation Council (FRC) designs standards for protecting people from too much exposure to radioactive materials. The official limits for the discharge of radioactive wastes come from FRC standards, are based on expert scientific judgement, and are conservatively set to produce "no effect" in the exposed people, as long as exposure is not occupational (the limits are revised from time to time, as the FRC makes use of more recent knowledge). For strontium-90, for example, "no effect" means odds better than 200,000:1 that even the highest permitted concentration will not cause leukemia in the exposed person within a year. Odds against any other kind of damage are much better in this case. If a water reservoir should become accidentally contaminated with Strontium-90 to the level of 300 pCi/l, a family may use the water as before with reasonable confidence that it will suffer no damage from the strontium whatever, and this includes cancer, congenital damage to newborn, and genetic damage to that family for a generation. This even includes estimates of damage from eating fish caught in the reservoir, (Reference 6).

Keeping environmental pollution with radioactive wastes down to this level of individual safety is a police function of the AEC. We suggest that the AEC should not be asked to accomplish more than this, since its primary responsibility is the development and promotion of uses of atomic power.

##### b) Polluted environment and damage to public health.

The standards for safe exposure of individuals are not meant to be used for whole populations, because the notion of "no effect" simply does not apply to the effects of radiation on large numbers of people. Instead, the FRC recommends that we look at any increase in exposure to radioactive materials as damaging to the population, and allow such exposures only when the benefits to the community justify the social costs (an example of a cost-benefit computation of

radiation exposure is given in Reference 10). Industrial managers are our community's experts in cost-benefit thinking, and they normally compute the social cost of pollution in terms of damage to public health. In the case of radioactive pollution of water, however, the damage to public health is not a workable measure of social cost. The RCSI reached this conclusion from our experience with other forms of water pollution. New York State traded economic benefits against public health risks in the past, and turned Lake Erie and the Hudson River into state-size sewers. The resulting social cost was great, but it never showed up in public health statistics.

The RCSI suggests a re-thinking of benefits as well as costs. At present, nuclear fuel competes as an industrial source of electric power with coal and oil on the basis of dollar cost per kilowatt hour. In such a restricted competition, pollution control is likely to become the first victim of cost-cutting. We suggest that pollution control should not be thought of as a part of costs of power generation, but that it should rather be promoted as a marketable service of the power industry. A cleaner environment is a commodity the public will pay for, and we hope that management will undertake to sell as much of this commodity as can be secured at a reasonable cost. We expect the costs to go down with advances in the infant technology of processing radioactive wastes.

c) Regional pollution and damage to nature.

Where pollution spreads to wide areas of land and water we have to become concerned with the problem of conservation. Mankind is only one member of a natural community, and damage to that community turns soon enough into damage to us. Industry releases growing amounts of materials that harm all life. Many of these accumulate in the environment from year to year, and our environment is becoming progressively less wholesome. The accumulating pollution includes long-lived radioactive isotopes like tritium, poisonous metals like lead and mercury, and persistent synthetic poisons like DDT. This trend is a threat to wildlife, crops and human well-being (Reference 7).

We suggest that control of radioactive pollution in the neighborhood of atomic industries can not be efficiently separated from the control of all forms of industrial pollution in the region. We see the need for regional control of all pollution by an agency with a primary responsibility for conservation and a strong competence in ecology. (We note that ecological standards of pollution control are necessarily more stringent than public health standards, since the human species is seldom the weak link in the chain of life. Quite the contrary, the greatest threat to our continued survival comes from the fact that our species is entirely too tough to be so fertile.)

A significant proposal for this kind of regional control of radioactive pollution was recently made by the New York State Department of Health, and is discussed in the RCSI Bulletin #5 of this series.

(d) Global radioactive pollution.

The damages caused by global radioactive fallout were described in previous RCSI bulletins in connection with the controversy about fallout shelters (Reference 8). Since the signing of the test-ban treaty the U.S. Government has been committed to a policy of banning world-wide radioactive fallout. More recently, President Johnson spelled out both the practical advantages of halting tests of atomic weapons, and our moral obligation not to burden mankind with unnecessary exposure to radiation.

Radioactive wastes from peaceful uses of nuclear fuels are in many ways the same as fallout from bomb tests. Long-lived radioisotopes (Krypton - 85, tritium) spread all over the globe from the point of release. If such releases are not controlled, the ban on radioactive fallout will become meaningless. However, the present U.S. controls are concerned only with industrial health hazards due to local pollution, and are quite irrelevant to the problem of global radioactive pollution. For example, the legally permitted levels of tritium in water are 1000 times greater than the highest levels due to fallout before the test ban (Reference 9); those due to strontium-90 are 60 times greater.

The RCSI sees a need for an official U.S. commitment to new standards, which would limit the increase of industrial radioactive fallout on a world-wide scale. We see this as a necessary part of the present U.S. policy of banning world-wide radioactive fallout from weapons tests.

#### References

- (1) RCSI Industrial Radioactive Waste Bulletin #3, February 28, 1968.
- (2) Nuclear Fuel Services Inc., West Valley, New York "A report of the investigation by the Division of Compliance of the Atomic Energy Commission concerning alleged excessive discharges of Strontium 90 contained in liquid effluent".
- (3) Federal Register Rules and Regulations Title 10 Part 20 "Standards for protection against radiation" (usually abbreviated to IOCFR 20). Par. 20.106, "Concentrations in effluents to unrestricted areas".
- (4) New York State Sanitary Code Title 10 Chap. I, Par. 16.7.
- (5) "Radiation Control in New York State" pamphlet, State of New York, Executive Department, 1963.
- (6) Federal Radiation Council Staff Report No. 7, May 1965 (Strontium-89, Strontium-90 and Cesium-137).
- (7) B. Commoner "Science and Survival" New York: The Viking Press, 1966.
- (8) R. C. Lewontin "Biological effects of radiation", R.C.R.I. Report 1:2, February 1964.
- (9) K. Anderson, "Tritium in New York State Waters", Bulletin, Bureau of Radiological Health Services, New York State Dept. of Health, 1966.
- (10) A. Brodsky, 1965, Amer. Jour. Publ. Health, 55 No. 12, pp. 1971-1992.