

Presentation to
Pennsylvania Senate
Environmental Resources and Energy Committee

Public Hearing on
Radiation Levels at Landfills

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Introduction and Overview

My name is Diane D'Arrigo and I am the radioactive waste project director at the Nuclear Information and Resource Service (NIRS), a national nonprofit organization concerned with radiation and nuclear waste. My degree is in chemistry and environmental studies and I have worked in academia, industry and the public interest. I have been at NIRS for the past 20 years focusing mainly on the commercial nuclear power waste issue, working to prevent the deregulation and dispersal of nuclear materials, working for their isolation from the biosphere.

This hearing was triggered by legitimate and growing concerns that nuclear materials have gotten into, are leaking out of, and could continue to be disposed of in Pennsylvania landfills and other Municipal Solid Waste facilities (MSW) and sewage facilities. I appreciate the chance to share my perspective in the context of growing national and international efforts to stop regulating significant portions of the nuclear power and weapons waste streams.

Main Points

- 1) Ionizing radiation is of concern, even at so-called “legal” levels. Tritium (radioactive hydrogen), which is showing up in high levels at some landfills, is of also of concern and could come from nuclear fuel chain industries sources.**
- 2) Pennsylvania’s law requiring licensed control over human-made nuclear waste is not being fully enforced. Nuclear materials appear to be getting into and leaking out of places never designed or intended to isolate them. Residents’ concerns are not being meaningfully addressed. Since Pennsylvania is the nation’s largest importer of solid waste, you stand to receive this nuclear waste amongst imported trash.**
- 3) Investigate, learn from and correct the problems that led to radioactive contamination at sites such as Kiski Valley, Apollo and Parks Township and the Pottstown landfill, and the high levels at landfills across the state.**
- 4) Large amounts of licensed radioactive waste could be systematically “deregulated,” cleared, released from regulatory control or treated as if not radioactive, via many ongoing legal and illegal methods, on the state, national and international levels. Radioactive material could get into the state MSW facilities from imported solid waste and, if the state law is not enforced, from in-state generators.**
- 5) Recommendations**
Enforce the state law requiring specific nuclear regulatory control over radioactive wastes generated by licensed or government activities.
Investigate more closely apparent failures-to-enforce the law by holding additional hearings on local experiences and with local experts. This is to assess safety at those sites as well as to prevent violations in the future.

1) Ionizing radiation is of concern, even at so-called “legal” levels. Tritium (radioactive hydrogen), which is showing up in high levels at landfills, is of also of concern and could come from nuclear fuel chain industries sources. If it is really coming from illegally dumped consumer goods, this is a warning to stop unnecessary use of radioactive materials to make unregulated items. It should also serve as a caution that greater vigilance is needed to prevent release of currently-regulated, much larger sources of radioactive materials, like at nuclear power, weapons and fuel chain facilities.

Ionizing radiation is of concern at some of the state MSW sites and at nuclear sites both, because there are no “safe” levels or thresholds. It is of concern because leakage of some mobile radioactivity today could be an indicator of more and different types of leakage in the future. Dilution to “legal” levels will not solve the problem or protect the public, the resources and the businesses in the Commonwealth. More information is needed on the possible presence of radioactive materials that are generated from nuclear power, weapons and other nuclear fuel chain industries in MSW facilities.

There is no safe level for exposure to ionizing radiation. Even very low exposures can increase the risk of developing cancer, reduced immunity, birth defects, heart disease and other negative health effects. Some scientists believe that low, repeated exposures could be more harmful than single high dose exposures. So the most prudent approach is one of precaution, to prevent unnecessary exposures and minimize unavoidable exposures.

This “no safe dose” concept has been understood since the beginning of the atomic age and has been reconfirmed by the US National Academy of Sciences in its **2006 Report on the Biological Effects of Ionizing Radiation (BEIR) VII, “Health Risks From Exposure to Low Levels of Ionizing Radiation”**¹ and by the European Committee on Radiation Risk (ECRR) in its **2003 Recommendations of the ECRR: The Health Effects of Ionising Radiation Exposure at Low Doses and Low Dose Rates for Radiation Protection Purposes: Regulators’ Edition**².

I am submitting a page entitled **No Safe Dose** which is a compilation of historical quotes on and references to the scientific consensus that there is no threshold for radiation damage to humans. The ECRR report raises concerns that the risk levels used by some radiation advisory bodies underestimate the dangers from low dose exposures and recommend changes that will better protect the population.

Recent studies being carried out with US tax dollars by the US Department of Energy are revealing new, unimagined effects on cells from bombardment with very low levels of ionizing radiation. For example, scientists are observing that cells don’t have to be directly hit by ionizing radiation to be impacted. Such mechanisms for damage are not included in the bio-kinetic models used to predict radiation risk from various amounts of various types of radiation.

Other weaknesses in the system include a failure to take into consideration that radiation effects are multiple, additive, cumulative and synergistic. That means there is no accounting for the fact that there are routine repeated exposures and they can occur along with exposures to other dangerous pollutants. The combined effects can be worse than each alone added together.

Dilution does not solve the real problem—it simply spreads the contamination around to more potential recipients.

Tritium health effects information and articles on investigations at nuclear reactors in Illinois are being provided. Tritium can cause cancer and other health effects. Our bodies are largely composed of hydrogen, carbon and oxygen. When tritium is inhaled, ingested or absorbed, some flushes through, but some can replace (non-radioactive) hydrogen in our tissues and our DNA (genetic material). It emits beta particles that can destroy bonds causing genetic mutations and cancer.

To put the tritium levels into some perspective, tritium occurs in nature in the range of 3 to 24 picocuries per liter. The EPA maximum contamination level for drinking water is 20,000 picocuries per liter, a thousand times naturally occurring. Legal radiation levels are NOT safe levels. There are many possible sources for tritium from illegally dumped consumer goods to nuclear power and weapons wastes and possibly sludges.

Tritium leakage impacts could be very significant health wise and legally. In Illinois, the discovery by citizens and the state government that tritium has been leaking from nuclear power reactors has led to a state lawsuit against the utility and a class action suit by community residents. Among the concerns is contamination of groundwater even at levels below the EPA's maximum contamination level. At the request of the state's US Senator, the federal Agency for Toxic Substances and Disease Registry (ATSDR) has begun an investigation and the nuclear power industry is carrying out its own self-imposed assessment of the growing problem.

2) Pennsylvania's law requiring licensed control over human-made nuclear waste is not being fully enforced. Nuclear materials appear to be getting into and leaking out of places never designed or intended to isolate them.

Pennsylvania's guidance and regulations for monitoring at all MSW facilities in the state are not capable of preventing large amounts of radioactivity from getting into these facilities, especially if it gets deregulated. **Since Pennsylvania is the nation's largest importer of solid waste, you stand to receive this nuclear waste amidst the regular trash from other states might begin to deregulation.** My recommendation is that the state work to prevent deregulation by taking steps to prevent it coming to your MSW sites.

3) Investigate, learn from and correct the problems that led to radioactive contamination at sites such as Kiski Valley, Apollo and Parks Township and the Pottstown landfill.

Since my perspective is not local and my time is limited, I cannot provide you with the necessary specifics you need from sites in this Commonwealth such as Kiski Valley, Parks Township, Apollo, Pottstown and numerous other locations. However, for you to responsibly protect your constituents as well as those of your colleagues at those and similar sites, I strongly encourage you to review carefully the written testimony and references provided and convene additional hearings to understand what has been and is happening at those sites, some of which appears to violate the state law. Precedents are being set for other contaminated areas and solid waste facilities. This is especially important as Pennsylvania is in the process of becoming an Agreement State with the US Nuclear Regulatory Commission and will be responsible for nuclear licensing in the Commonwealth.

4) Large amounts of licensed radioactive waste could be systematically “deregulated,” cleared, released from regulatory control or treated as if not radioactive, via many ongoing legal and illegal methods, on the state, national and international levels. Radioactive material could get into the state MSW facilities from imported solid waste and, if the state law is not enforced, from in-state generators.

(It could also get into recycling and consumer goods like baby toys and cars or roads and buildings.) It is precisely because of this threat of nuclear deregulation that Pennsylvania was one of over a dozen states in the late 1980s-early 1990s that adopted a state law requiring licensed nuclear waste to be kept in a facility specifically licensed for radioactive material. That law passed in response to the Below Regulatory Concern or BRC policies of the US Nuclear Regulatory Commission. The US Environmental Protection Agency estimated that a quarter of the volume of so-called “low level” radioactive waste in the country could have been deregulated by implementing those policies. The BRC policies were revoked by Congress in 1992, but numerous agencies including the US Nuclear Regulatory Commission, the Department of Energy, the Environmental Protection Agency, the Department of Defense and the Department of Transportation are working to revive them by different names. International nuclear entities are also working to legitimize exempting and excluding nuclear waste from regulatory controls. This is largely being done without or against the will of affected public.

Deregulation of Nuclear Wastes

Over the past 20 years, I have observed international, national, state, and community efforts both to deregulate to prevent deregulation of nuclear wastes. The potentially-impacted steel and solid waste industries and workers (both union and nonunion) have

worked with the public, local, state governments and entities within federal government agencies to prevent nuclear power and weapons wastes from being deregulated.

The reality is that there are persistent efforts underway to deregulate, clear, release and disperse licensed, human-generated radioactive wastes into the environment, everyday commerce and into solid and hazardous waste streams and facilities. Strong opposition to this effort continues and in general, the public, workers, impacted industries, communities and some states have prevented across the board deregulation of nuclear wastes thus far.

The Commonwealth of Pennsylvania is in an interesting and pivotal place in this extremely important struggle. The struggle is important because ionizing radiation can be harmful at every level. Some natural sources cannot be avoided but unnecessary additional exposures can be prevented if there is a goal to do so. The presence of various levels of naturally occurring radioactivity should be used to justify letting go of radioactive materials that now under lock and key.

As trends to deregulate nuclear waste proceed on the national, international and state levels, despite clear public opposition, PA is slated to receive increasing amounts of nuclear waste as it is deregulated becoming part of the solid waste stream that goes to landfills, incinerators, recyclers and any other MSW facilities.

EPA

The US EPA³ is still considering whether and how to proceed with its Advanced Notice of Proposed Rulemaking that could allow nuclear wastes to go to RCRA C or D hazardous and/or solid waste facilities. Public opposition is strong but EPA is seriously considering proceeding.

NRC

In June 2005, the US Nuclear Regulatory Commission (NRC) postponed (for probably about 2 years) its “Control of Disposition of Solid Materials” rulemaking⁴ that would have streamlined the deregulation and release of radioactive waste to unlicensed destinations. Had the NRC staff’s preferred option⁵ in the rulemaking been accepted, nuclear contaminated solid materials would have been generically okayed for dumping in regular trash landfills and for use to make roadbeds. Contaminated tools and equipment could have been used or sold for reuse without warning or notification.

The NRC will, however, continue to release nuclear waste under its current case-by-case exemption procedures, which do not require public notice, comment or intervention. For example, NRC staff quietly approved (under US NRC regulation 10 CFR 20.2002) sending the decommissioning waste from the closed Haddam Neck (Connecticut)⁶ and Yankee Rowe (Massachusetts) nuclear reactors to unlicensed dumps in Grand View, Idaho (US Ecology) and Andrews, Texas (Waste Control Specialists or WCS) respectively. Opposition and concern from the public and state officials forced cancellation or postponement of those shipments⁷.

DOE

In 2000, the Department of Energy adopted a policy prohibiting radioactive or potentially radioactive metals from going into commercial recycling. Those contaminated metals may go to MSW facilities if accepted, as can other deregulated DOE radioactively contaminated wastes. The DOE's environmental impact process appears to be in limbo, and there are indicators⁸ DOE intends to reverse its ban on radioactive metal going into commercial recycling.

DOT and NRC

In 2004, the Department of Transportation and the Nuclear Regulatory Commission adopted transportation regulations that increase the amounts of radioactivity that is exempt from placarding and manifesting for the majority of radionuclides. This could make it easier for radioactive material to slip into unlicensed facilities without notice. NIRS, the Sierra Club and several other groups are challenging that deregulation in the transport rule. It was adopted to "harmonize" with international recommendations that were established without public input or notification and which were already in "harmony" before the changes.

Because federal efforts were underway to deregulate nuclear waste in the early and mid 1980s states adopted laws requiring continued regulatory control in their jurisdictions. Now, as federal and international agencies move to repeat that threat, states must enforce the laws they passed.

5) Recommendations

Enforce the state law requiring specific nuclear regulatory control over radioactive wastes generated by licensed or government activities.

Investigate more closely apparent failures-to-enforce or outright violations of the law by the Department of Environmental Protection, by holding additional hearings on local experiences and with local experts. This is to assess the safety at those sites as well as to prevent future violations, especially as more nuclear materials could enter the state through the imported solid waste stream.

¹ <http://newton.nap.edu/catalog/11340.html#description>; **HEALTH RISKS FROM EXPOSURE TO LOW LEVELS OF IONIZING RADIATION** BEIR VII PHASE 2, Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, Board on Radiation Effects Research, Division on Earth and Life Studies, NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMIES, THE NATIONAL ACADEMIES PRESS, Washington, D.C. 2006. The BEIR VII report continues to support the Linear No Threshold Theory of dose response. It actually indicates a small increase in the projected risk from exposure to ionizing radiation. Page 500 of pre-publication advance copy indicates 11.42 cancers per 1000 [up from 5.7 in EPA FGR 13 based on BEIR V].

² <http://www.euradcom.org/2003/ecrr2003.htm>

³ U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA); Advanced Notice of Proposed Rulemaking (ANPR) OAR-2003-0095; "Approaches to an Integrated Framework for Management and Disposal of

Low-Activity Radioactive Waste” 40 CFR Chapter 1 [FRL-7585-6] RIN 2060-AL71; 65120 Federal Register/Vol. 68, No. 222 / Tues, November 18, 2003 / Proposed Rules

⁴ US NRC RULEMAKING ISSUE NOTATION VOTE March 31, 2005 SECY-05-0054 FOR: The Commissioners FROM: Luis A. Reyes, EDO SUBJECT: PROPOSED RULE: RADIOLOGICAL CRITERIA FOR CONTROLLING THE DISPOSITION OF SOLID MATERIALS (RIN 3150-AH18)

⁵ US NRC [7590-01-P] 10 CFR Part 20 RIN 3150-AH18 Proposed rule Radiological Criteria for Controlling the Disposition of Solid Materials: NRC Staff Preferred Option: Section III pp 13-15, Section VI pp 73-83.

⁶ US NRC letter April 19, 2005 to Mr. Wayne Norton, President Connecticut Yankee Atomic Power Company, East Hampton, CT 06424-3099 FROM: Daniel M. Gillen, NRC Deputy Director Decommissioning Directorate Division of Waste Management and Environmental Protection Office of Nuclear Material Safety and Safeguards; Docket No. 50-213 SUBJECT: APPROVAL OF DISPOSAL PROCEDURES IN ACCORDANCE WITH 10 CFR 20.2002 (TAC NO. L60567)

⁷ American Ecology Corporation (Boise, Idaho) Letter to Brian Monson, Hazardous Waste Program Manager,, Waste Mgmt and Remediation Division, Idaho Dept of Environmental Quality, 2 May 2005 from Stephen Romano , American Ecology President and CEO, 1 p.

⁸ Summary of Paducah, KY cleanup contract.