



Nuclear Energy Information Service

Illinois' Nuclear Power Watchdog since 1981

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COMMENTS OF NEIS ON
Hazardous Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal
Combustion Residuals From Electric Utilities Docket
Attention Docket ID No., **EPA-HQ-RCRA-2009-0640**
September 16, 2010

Nuclear Energy Information Service (NEIS) is a Chicago-based safe-energy and anti-nuclear environmental organization, with over 800 supporters in Illinois and over 27 other states. We submit the following comments regarding the above mentioned EPA Docket dealing with the regulation of coal combustible residuals (CCRs).

Over the years, much has been made of the chemically toxic nature of CCRs. However, little has been said, and less done about the radiation content of CCRs. More often than not, at the state level, CCRs have actually been exempted from regulation on their radiation content. NEIS believes this “if we don’t address it, it is therefore not a hazard” mentality is a threat to public health and safety; and a legalized assault on the well-being of workers and residents of communities living near coal-fired power stations and CCR deposits.

We are here to recommend that the EPA regulate CCRs for radiation content; and use the same radiation standards applied to exposures from nuclear power stations.

Background: It has long been known that CCRs contain numerous radioisotopes. Uranium-238, thorium-232 and uranium-235 for example, are naturally occurring with the coal being burned, and represent the predominant radionuclides. On average they are present in concentrations of 1.3 ppm for uranium and 3.2 ppm for thorium. Others are decay products and these, and the decay daughters of the decay products. The combustion of the coal acts to increase the concentration of these radioisotopes as the volume of material decreases. Some estimates place the increase in radioactive concentration of CCRs as being between 10 to 100 times that of that found in the original coal [1,4].

The literature presents a mixed and somewhat dated picture as to the hazard represented by the presence of these radioactive isotopes in CCRs. Early literature (1, 7, and their sources) has made the point that coal combustion results in exposure to the public that is much greater than that from the allowable emissions from properly functioning nuclear power plants, which are far more heavily regulated:

...it should also be noted that during normal operation, the effective dose equivalent from coal plants is 100 times that from nuclear plants.[4]

Others claim the exposure levels are low, or not a health risk [2, 4].

Some literature has demonstrated several other unwanted detrimental health and safety/security effects:

- It has been pointed out that the cumulative quantity of uranium-235 – a material with weapons potential -- present in CCRs is sufficiently large to present a national security risk, in that the processes to reclaim it from CCR materials is well known, and easier to use than reprocessing irradiated reactor fuel:

Finally, radioactive elements released in coal ash and exhaust produced by coal combustion contain fissionable fuels and much larger quantities of fertile materials that can be bred into fuels by absorption of neutrons, including those generated in the air by bombardment of oxygen, nitrogen, and other nuclei with cosmic rays; such fissionable and fertile materials can be recovered from coal ash using known technologies. These nuclear materials have growing value to private concerns and governments that may want to market them for fueling nuclear power plants. However, they are also available to those interested in accumulating material for nuclear weapons.... [1]

Of far greater potential are the much larger quantities of thorium-232 and uranium-238 from coal combustion that can be used to breed fissionable isotopes. Chemical separation and purification of uranium-233 from thorium and plutonium-239 from uranium require far less effort than enrichment of isotopes. Only small fractions of these fertile elements in coal combustion residue are needed for clandestine breeding of fissionable fuels and weapons material by those nations that have nuclear reactor technology and the inclination to carry out this difficult task....[1]

Thus CCRs worldwide represent an easily accessed source of weapons-grade material available to any nation that burns substantial amounts of coal, independent of other complicated nuclear enrichment processes;

- A study from the Netherlands warns of increased worker exposure from radionuclides, specifically lead-210, in the coal plant boilers:

Dutch power companies recently have become aware of a hazard due to the presence of radioactive ²¹⁰Pb in their boilers. In an investigation conducted by KEMA in the Netherlands it was discovered that ²¹⁰Pb isotope accumulates within fire-side deposit layers that form on membrane waterwall tubes.[3]

Regardless, of one's opinion or assessment of these studies and reports, two important facts remain in weighing their value, and argue for EPA's regulatory decision being based on the Precautionary Principle:

- Most if not all of the easily accessible literature on the subject is severely dated, and often repeated as "new" information long after publication date [4]; and
- A great deal of the available literature draws their conclusions prior to the release of the National Academy of Sciences BEIR-VII Report of 2005, which states in no uncertain terms the following:

"The scientific research base shows that there is no threshold of exposure below which low levels of ionizing radiation can be demonstrated to be harmless or beneficial... The health risks—particularly the development of solid cancers in organs—rise proportionally with exposure... As the overall lifetime exposure increases, so does the risk," states NAS committee chair Robert R. Monson of the Harvard School of Public Health in Boston, MA. [6]

What the BEIR-VII indicates is that whatever amount of exposure coming from CCRs will add to the radiation exposure of the workers at coal plants specifically, and the general public. As such CCRs do represent a demonstrable health hazard, and should be regulated to the same extent we regulate commercial nuclear power plants.

SOURCES:

1. "Coal Combustion: Nuclear Resource or Danger?", Alex Gabbard, ORNL Review, Summer/Fall 1993, Vol. 26, Nos. 3 and 4.
2. Radioactivity in Coal and Fly Ash, by Kjell Johansen, Ph.D., Appendix B, We Energies, Coal Combustion Products Utilization Handbook; 2000.
3. Hazardous accumulation of radioactive lead on the water wall tubes in coal fired boilers, W.M.M. Huijbregts*, M.P. de Jong*, and C.W.M. Timmermans**, *Anti Corrosion Methods and Materials* Volume 47, No 5, (2000), pp. 274-279
4. Mara Hvistendahl, Coal Ash Is More Radioactive than Nuclear Waste, December 13, 2007. (Note: largely parrots the 1993 ORNL article by Alex Gabbard).
5. "Radioactive trace elements – coal burning," Wikipedia
6. Press Release for the "Biological Effects of Ionizing Radiation," BEIR-VII Report, National Academy of Sciences, June 29, 2005.
7. 1978 paper for *Science*, J. P. McBride, Oak Ridge National Laboratory