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May 18, 2010

Hon. Edward Buhrmaster
NYS Dept. of Environmental Conservation
Office of Hearings & Mediation Services
625 Broadway, First Floor
Albany, NY 12233-1550

Re: Chemung County Landfill permit modification, Application No. 8-0728-00004/00013; RFPLC responses to NEWSNY sound study, cuttings waste report

Dear Judge Buhrmaster:

Enclosed please find the above-referenced responses to submissions made at the April 28 issues conference in this matter. In addition, I am responding briefly to a submission received today via email from NEWSNY regarding the cuttings waste issue.

Today's letter from Ms. Hennesy to Your Honor indicates that cuttings wastes are being received at the landfill from drill sites that may or may not be developing the Marcellus shale formation and therefore any radiological contaminants in the waste can be expected to be mixed with cuttings wastes from sites where little or no radiological contamination of the waste would be expected. However, the April CoPhysics report provided by NEWSNY is able to identify drill sites by the formation being developed. More importantly, the CoPhysics report does not indicate whether wastes from a Marcellus shale drill site originate form the vertical or horizontal leg of the borehole. It is only wastes that originate from horizontal drilling in the Marcellus shale that raise an issue regarding the propriety of disposal in an MSW landfill, since these but not wastes from the vertical leg can be expected to be relatively highly radioactive. Thus, were the Department to accept without further inquiry the CoPhysics report as reflecting the concentration of radioactivity in cuttings wastes, NEWSNY could accept cuttings wastes later originating from the production stage of horizontal drilling that are substantially more concentrated in radioactivity than reported in the CoPhysics report. As the Department found last year in its Draft Supplemental GEIS on the proposal to allow horizontal drilling in the Marcellus formation in New York, cuttings waste can be about 25 times more radioactive than background.

In light of this finding, it is improbable that the few samples from a Marcellus shale drill site for which radiological concentrations are reported by CoPhysics actually reflect the worst case circumstance, where a drill site is generating cuttings waste for an extended period that originate entirely from the horizontal leg of a borehole drilled into the Marcellus formation. Three responses to the CoPhysics report that make this point are enclosed, from Dr. Resnikoff, Dr.

Anthony Ingraffea of Cornell University, and Dr. Conrad B. Volz of the University of Pittsburgh,[1] all of whom find the report to be seriously deficient for the purpose for which it is offered, to demonstrate that cuttings waste accepted at the landfill will pose little or no safety or health risk.

The threshold legal question for the proposed issue is whether cuttings wastes from the horizontal leg are "processed and concentrated" in their radioactivity. Part 380-1.2(e). If they are, such wastes may not be disposed in a Part 360 MSW landfill. Part 360-1.1(a). Unfortunately, the terms "processed and concentrated" are not defined in Part 380, and there are no judicial or administrative case decisions interpreting the meaing of the words. As Dr. Ingraffea shows, there are several processes applied to the waste slurry brought up at a Marcellus shale drill site to ready the waste for disposal, principally designed to separate and reuse drilling fluids, and to further separate unusable waste water from the solid phase of the waste, which may still contain up to 20% liquids, which have leached radioactivity from the shale formation and have become much more concentrated in radioactivity than when the fluids were injected into the wellbore. The concentration of radioactivity in the solid phase (the cuttings waste) is a clear hazard to health, as demonstrated by Dr. Volz.

In the absence of any other guidance, Your Honor should look to the context for the provision in Part 380 on the regulation of NORM. There are seven categories of materials that are made subject to, or made exempt from regulation under Part 380. Part 380-1.2(a) through (g). The clear purpose of these provisions is to subject to regulation low level radioactive materials that could expose workers or the public to substantial health and safety threats, compared to NORM that is no more radioactive than background. Thus, uranium mill tailings or other radioactive waste from the extraction of uranium that falls below thresholds for regulation by the Nuclear Regulatory Commission (NRC) are regulated under Part 380. Part 380-1.2(b).[2] Also, presumably because adequate protections would ordinarily be expected to be in place, Part 380 does "not apply to the protection of radiation workers, and the limits in this Part do not apply to doses *due to background radiation*, to exposure of patients to radiation for the purpose of medical diagnosis or therapy, or to voluntary participation in medical research programs." Part 380-1.2(c) (emphases added). Other provisions appear to contemplate the same circumstance, where radioactive materials are already regulated by other authorities. *See* Part 380-1.2(d), (f), and (g).

Thus, the single provision governing NORM, (Part 380-1.2(e)), should be understood to exempt NORM from regulation under Part 380 where the NORM waste at issue exceeds concentrations slightly above background. This is precisely the rule, for example, that governs disposal of radioactive waste in a hazardous waste landfill.[3] The U.S. Department of Energy (DOE) and NRC have adopted similar rules for release of contaminated materials and once

1 Dr. Volz's letter will not be ready until May 19, when it will be emailed to the Service List and sent by regular mail, owing to unexpected scheduling conflicts.

2 NRC jurisdiction over radiation is governed by the Atomic Energy Act of 1954, which limits NRC jurisdiction to "source material," "special nuclear materials," and "byproduct material," all of which are generated by the extraction or enrichment of uranium ores for nuclear fuel, or management of the materials is "in the interest of the common defense and security." 42 U.S.C. §§ 2014, 2071. *Cf.* Bryan R. Reynolds, *Who's Going to Regulate NORM?*, 22 N. Ky. L. Rev. 5, 10-11 (1995).

3 *See* CWM Chemical Svcs., Part 373 Renewal Permit (2005), Attach. C (Waste Analysis Plan), p. C-2 ("Trace levels" of radioactivity "*slightly above background* may not be land disposed without NYSDEC approval," and land disposal of "higher levels" is prohibited) (emphases added). *Cf. Also id.*, p. C-72 ("Radioactivity Screening is performed to screen wastes for radioactivity above background levels."). The relevant excerpts from this permit are attached hereto.

contaminated sites.[4]

Our response to NEWSNY's sound study emphasizes that the "snap shot" measurements on which the study is based cannot substitute for "a valid extrapolation to a one-hour time interval," under worst-case conditions, which is required under Part 360-1.14(p). For example, once the elevation of the working face exceeds the eight-foot berm around the east side of Cell IV-B, the attenuation of noise effects emanating from the location NEWSNY measured sound will be removed. The study therefore cannot avoid modeling the real-world conditions that will occur during operations. The failure to take such conditions into account, discussed at length on our response, renders the report insufficient to resolve the noise issue.

Finally, I would like to comment on NEWSNY's effort at the issues conference to discredit Dr. Resnikoff, primarily by reference to *Finestone v. Florida Power & Light Company*, 2006 U.S. Dist. LEXIS 7743 (S.D. Fla. 2006), where an expert report by Dr. Resnikoff addressing the concentration of radioactivity in waste sludge from a nuclear power plant that was disposed on land was found inadmissible. However, the basis for that decision is not relevant here. First, the court in *Finestone* found that Dr. Resnikoff was "qualified to testify" about the effect of radiation concentrations in waste on human exposure. 2006 U.S. Dist. LEXIS 7743, at *42 and *59. Second, the issue for which Dr. Resnikoff was excluded from testifying involved "the wrong dose exposure computer calculation . . . using RESRAD rather than RESRAD Offsite." *Id.* At *40. The results of the calculation offered in *Finestone* were contradicted by "actual data retrieved from the site and surrounding environment," as reported by NRC. *Id.*, at *42.

Here, no actual site specific data have been analyzed by a government agency, and the CoPhysics report lacks sufficient information to determine how the data was retrieved. Moreover, for the few drilling sites labeled "Marcellus" in the report's table of analytical results, the results are contradicted by comments of the New York State Department of Health (NYSDOH) stating that the "production brine" generated from Marcellus shale gas drilling is characterized by substantially higher radioactivity than production brine generated from drilling in other formations, where it has been used to deice roadways, such that Marcellus shale production brine should not be used for this purpose. See Issues Conf. Ex. 11. In addition, NYSDOH found that "NORM may concentrate in . . . sediment in settling ponds" utilized in the management of Marcellus shale drilling wastes. *Id*. NYSDOH concluded, "Until more data are available, gas drilling in the Marcellus should include sampling of drill tailings, frac flowback water and production brine." *Id*. However, here, NEWNY has not provided any such information.[5]

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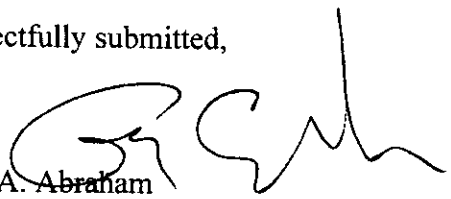
4 "To protect recycle workers, the general public, and the environment, DOE has established requirements (DOE Order 5400.5, Radiation Protection of the Public) for surveying materials for radioactivity and for allowable residual radioactivity levels for unrestricted release of such materials. These requirements allow unrestricted release of materials with radioactivity slightly above background radioactivity levels." 66 Fed.Reg. 36562 (July 12, 2001).Under NRC's regulations, 10 CFR Part 20 Subpart E, the License Termination Rule, "A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE [total effective dose equivalent] to an average member of the critical group that does not exceed 25 millirem (0.25 milliSievert) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA)." 10 CFR § 20.1402. As Dr. Resnikoff's and Dr. Volz's responses show, Marcellus shale cuttings waste would exceed this dose limit by multiples.

5 As noted earlier, some samples reported by CoPhysics are labeled "Marcellus," but this is not sufficient to determine whether the samples resulted from gas drilling in the Marcellus, or whether the samples came from the early development phase of a Marcellus gas drilling site, where wastes are generated from the vertical segment of the bore, predominantly from strata other than the Marcellus.

Finally, DEC Staff's position appears to be that it does not matter how radioactive cuttings wastes may be because it is not processed. Relatively high levels of NORM in the waste should therefore cause no concern. In light of the ongoing effort by the Department to determine whether, and under what conditions, Marcellus shale natural gas development should be allowed in New York—and effort that can be expected to fully analyze the implications of managing waste from such sites—this position seems premature, and as noted here, is based on woefully insufficient information about the Pennsylvania wastes being accepted at the Chemung County Landfill.

RFPLC's concerns about exposure to the radioactivity of this waste are not novel. These concerns were raised when Marcellus shale development was beginning in Pennsylvania,[6] and in public comments to the Department on last year's SDGEIS. It is our contention that suffic ient information has not been provided by NEWSNY to resolve the issue of the safety of disposing large volumes of this waste which, if it truly poses health and safety risks, should be regulated under Part 380.

Respectfully submitted,



Gary A. Abraham

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cc: Service List w/encs.

6 *See e.g.*, Abraham Lustgarten, "Natural Gas Drilling Produces Radioactive Wastewater," *Scientific American*, November 9, 2009, enclosed.