

POLICY ISSUE NOTATION VOTE

June 22, 2004

SECY-04-0102

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations

SUBJECT: RESULTS OF THE STAFF'S EVALUATION OF POTENTIAL DOSES TO
THE PUBLIC FROM MATERIAL AT THE KISKI VALLEY WATER
POLLUTION CONTROL AUTHORITY SITE IN LEECHBURG,
PENNSYLVANIA

PURPOSE:

To obtain Commission approval to take no further decommissioning action at the Kiski Valley Water Pollution Control Authority (KVVWPCA) site.

BACKGROUND:

KVVWPCA operates a waste water treatment plant in Leechburg, Pennsylvania, about 40 kilometers (25 miles) northeast of Pittsburgh on the flood plain of the Kiskiminetas River. From 1976 to 1993, KVVWPCA treated sewage sludge by incineration. KVVWPCA disposed of the resulting sewage sludge ash by mixing it with water to form a liquid slurry and pumping this material into an onsite lagoon. Discharges to the lagoon ceased in 1993 and plans for closure were developed in 1994.

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In the course of site closure, the Pennsylvania Department of Environmental Resources notified the U.S. Nuclear Regulatory Commission (NRC) that elevated uranium concentrations had been found in an ash sample. Subsequent analyses revealed that subsurface uranium contamination was present at concentrations of up to 34 becquerels per gram (Bq/g) [923 picocuries per gram (pCi/g)] total uranium, and that the material was enriched to approximately 4 percent uranium-235. Further characterization revealed that the volume of the contaminated ash is approximately 9000 cubic meters (320,000 cubic feet) and that the total uranium inventory is approximately 32-41 gigabecquerels (0.85-1.1 Ci), resulting in an average total uranium concentration of approximately 3.0 Bq/g (80 pCi/g). The contaminated ash is highly heterogeneous and the highest levels of contamination are found over a relatively small area, at a depth of 2 to 3 meters (m) [7 to 10 feet (ft)]. Nuclides other than uranium are also present, but at much lower concentrations. The contamination is believed to have resulted from the re-concentration of uranium-contaminated effluents released from the sanitary sewers and laundry drains of the Babcock & Wilcox (B&W) Apollo facility. There is no evidence suggesting that the discharges from the B&W Apollo facility exceeded permissible levels in effect during operation.

NRC and the Pennsylvania Department of Environmental Protection (PADEP) have held numerous interactions on the decommissioning of the KVVWPCA site. During a February 12, 2003, meeting between NRC and PADEP, NRC staff took the position that it is KVVWPCA's responsibility to identify an appropriate option for decommissioning the site in accordance with NRC regulations. If KVVWPCA's preferred option were to leave the material in place, it would need to perform a dose analysis to demonstrate that this option meets the dose criteria of the License Termination Rule (LTR), 10 CFR Part 20, Subpart E.

Conversely, in an April 23, 2003, letter to KVVWPCA, PADEP stated that it believes that "...the chemical constituents of the ash, the construction of the lagoon, the threat of groundwater contamination, the location of the lagoon within the 100 year flood plain of the Kiskiminetas River, and other factors, make closure in place undesirable...because closure in place is neither an appropriate nor lawful option under Pennsylvania law." PADEP classified the material in the ash lagoon as "low level radioactive waste" and stated that "...permanent placement of this ash in the Authority's lagoon would constitute unlawful shallow land burial of low level radioactive waste...(and that) portions of the waste with concentrations of uranium and other radioactive materials exceeding 30 picocuries per gram...(would be placed) under license on order of the Department, pursuant to the Department's authority under the Low Level Waste Act, the Solid Waste Management Act...and the Radiation Protection Act...such waste would, therefore, be prohibited from disposal in a municipal waste landfill under Section 273.201(1)."

Differences in the approaches between the two agencies prompted Senator Rick Santorum (Pennsylvania) to send a letter, dated May 15, 2003, to NRC, requesting that NRC and PADEP develop a single consistent recommendation for treatment of the contaminated ash at KVVWPCA. Through a series of PADEP/NRC coordination telephone conferences and monthly coordination reports to PADEP, NRC staff developed its plan to conduct an independent dose assessment for the KVVWPCA site.

By letter dated November 7, 2003, NRC staff informed KVVWPCA and PADEP that it would be conducting its own dose assessment, and that KVVWPCA should not submit its decommissioning plan (DP) until the NRC staff completed its assessment and determined whether submittal of a DP is necessary. The letter also noted that PADEP has taken the

position that under Pennsylvania's Solid Waste Management Act, the ash in the lagoon should be removed and properly disposed of per the Commonwealth's jurisdiction over the material as solid waste. Therefore, the NRC staff's dose assessment would also include potential dose to workers in an excavation scenario.

Contrary to the directions in the staff's November 7, 2003, letter, KVWPCA submitted a DP on April 8, 2004. KVWPCA indicated, that based on its dose analyses, no further remediation activities were necessary to meet the LTR criteria for unrestricted use.

DISCUSSION:

NRC staff conducted dose assessments for a range of potential scenarios consistent with the realistic scenarios approach discussed in SECY-03-0069 "Results of the Licence Termination Rule Analysis," May 2, 2003. These scenarios include a removal scenario, in which the contaminated ash is excavated and removed to an offsite disposal facility, and an onsite no-action scenario, in which the lagoon is abandoned in place with no remedial actions performed. The onsite scenarios included a reasonably foreseeable future land use case and a pair of less likely cases used as assessment tools to bound the uncertainty associated with future land use. In all of the scenarios, doses from the groundwater pathway are expected to be significantly limited by the relatively non-leachable form of uranium in the ash as determined by leaching tests.

A likely disposition of the contaminated ash is that it will be removed, and that the site will continue to be used as a waste water treatment plant. The critical group in the removal scenario is the workers who excavate the contaminated ash and are exposed through inhalation of resuspended fine contaminated ash particles and direct irradiation. In addition, to address the possibility that the ash may be removed to a RCRA-permitted landfill, potential impacts of more aggressive leachate chemistry (low or high pH conditions) on uranium mobility were considered and the range of doses to a hypothetical individual residing near the landfill was qualitatively evaluated.

The total effective dose equivalent to workers who excavate and remove the ash is expected to be approximately 0.15 mSv (15 mrem). As any removal operation would take considerably less than one year, this total effective dose equivalent constitutes the total annual dose in the year of removal. Doses to ash removal workers are dominated by the inhalation of uranium-234 and uranium-238 with a small additional dose from external exposure. Doses to the ash removal workers are limited by the relatively low average concentration of these isotopes, the limited exposure time during excavation of the ash, and the limited respirability of the ash particles.

The potential annual dose to residents near a landfill disposal site was not quantitatively evaluated, but is expected to be bounded by the results of the onsite agricultural and intrusion cases discussed below. Therefore, the dose is expected to remain well below 0.25 mSv (25 mrem). Protection of a future resident would arise from both the relatively non-leachable form of uranium in the ash as determined by leaching tests and the engineered and institutional features for groundwater protection that are required for both municipal and hazardous waste landfills. Although disposal of the ash under alkaline, carbonate-rich conditions may result in higher uranium mobility than predicted in the analysis of the onsite scenarios, these facilities are designed with engineered and institutional features to limit contamination of groundwater.

Three cases of the onsite no-action scenario, in which the ash is assumed to be left in place without any remedial action, were also evaluated. These include a recreational use case, in which the property is converted into a riverside park; an agricultural use case; and an intrusion case, in which it is assumed that a volume of ash is excavated for the construction of a basement and the excavated ash is spread on the land surface. These cases, while less likely, were evaluated because they are useful assessment tools. As they comprise a range of future land use and include all exposure pathways, they can be used to bound other scenarios and, therefore, provide an evaluation of the uncertainty associated with future land use.

In the event that the contaminated ash remains onsite with no remedial action taken, the assumption of a recreational exposure case results in a peak mean annual total effective dose equivalent of approximately 0.01 mSv (1 mrem) over the next few centuries, eventually rising to approximately 0.02 mSv (2 mrem) at 1000 years. This result is approximately an order of magnitude lower than either the agricultural case or the intrusion case because no crop intake is assumed in the recreational case.

The results of analysis of the agricultural case indicate that the peak mean annual total effective dose equivalent within the 1000-year compliance period is predicted to be less than 0.2 mSv (20 mrem) and to occur at 1000 years after the present time. Results of the analysis of the intrusion case indicate that the peak mean annual total effective dose equivalent within the 1000-year compliance period is also expected to be less than 0.2 mSv (20 mrem) and to occur at 1000 years after the present time.

In the agricultural and intrusion case, it was assumed that a member of the critical group would site their well or cultivated field at a random location within the 4000 m² (1 acre) site. In the unrealistic case that a farmer were to occupy the site and place a home in the most contaminated 200 m² (0.05 acre) area on the site, the peak mean annual total effective dose equivalent would be expected to be slightly above the dose constraint, but well below the public dose limit and thus this scenario is not given further consideration in the staff's evaluation. The staff's detailed dose assessment is attached.

As the site meets NRC criteria for unrestricted release under the scenarios considered, the staff's position is that no further action is necessary regarding decommissioning of the KVVWPCA site. In accordance with Part 51 and the National Environmental Policy Act, the staff will prepare an Environmental Assessment (EA) and Federal Register Notice detailing the environmental impacts associated with each of the scenarios. The EA also would evaluate the impact of transporting the material from KVVWPCA to a disposal site. The EA would be published for a 30-day comment period. Pending comment resolution, the staff would send a letter to KVVWPCA, PADEP, and Senator Santorum detailing the NRC staff's dose assessment and conclusion that the site meets the LTR requirements for both the onsite and removal scenarios, and that therefore, NRC intends to take no further action regarding the site.

CONCLUSION:

The NRC staff's dose assessment indicates that under the likely removal scenario, the dose to the workers who excavate the ash is expected to be approximately 0.15 mSv (15 mrem), and the dose to the individuals residing near the landfill is expected to be well below 0.25 mSv/yr (25 mrem/yr). For the onsite scenario, three cases were evaluated. The patron of a park, in the recreational use case, is expected to receive a dose of approximately 0.02 mSv/yr

(2 mrem/yr). The dose to the less likely resident farmer in both the agricultural case and the intrusion case is expected to be less than 0.20 mSv/yr (20 mrem/yr). Regardless of whether the ash is left in place or excavated pursuant to Pennsylvania State law, the NRC staff concludes that the KVVWPCA site is acceptable for unrestricted use, and no further remedial action under NRC authority is required. In addition, the on site scenarios analyzed in the DP submitted by KVVWPCA are consistent with, and bounded by, the NRC staff's analyses.

RECOMMENDATION:

The Commission approved the staff's proposed action to prepare and publish an EA and FRN regarding the KVVWPCA site. Pending resolution of comments on the EA, the staff would send letters to KVVWPCA, PADEP, and Senator Santorum explaining that the KVVWPCA site meets the LTR requirements for both onsite and removal scenarios and that the NRC; therefore, intends to take no further action.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objections.

/RA Martin Virgilio Acting For/

Luis A. Reyes
Executive Director
for Operations

Attachment:
Dose Assessment Related to Kiski
Valley Water Pollution Control Authority
Incinerator Ash Lagoon

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*See Previous Concurrence

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