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STATE OF ILLINOIS
Pollution Control Board

BEFORE THE POLLUTION CONTROL BOARD
OF THE STATE OF ILLINOIS

IN THE MATTER OF:)	
)	
REVISIONS TO RADIUM WATER)	
QUALITY STANDARDS: PROPOSED)	R04-21
NEW 35 ILL. ADMIN. CODE 302.307)	Rulemaking - Water
AND AMENDMENTS TO 35 ILL. ADMIN.)	
CODE 302.207 AND 302.525)	

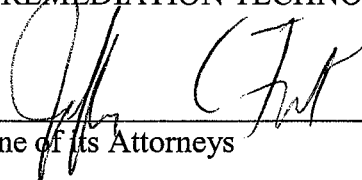
NOTICE OF FILING

To: See Attached Service List

Please take notice that on January 4, 2005, we filed with the Office of the Clerk of the Illinois Pollution Control Board an original and ten copies of the attached ***OPPOSITION TO MOTION TO SUBMIT COMMENTS FILED BY THE CITY OF JOLIET ON DECEMBER 22, 2004***, a copy of which is served upon you.

Respectfully submitted,

WATER REMEDIATION TECHNOLOGY, LLC

By: 
One of its Attorneys

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THIS FILING IS BEING SUBMITTED ON RECYCLED PAPER

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***OPPOSITION TO MOTION TO SUBMIT COMMENTS FILED BY THE
CITY OF JOLIET ON DECEMBER 22, 2004***

Water Remediation Technology LLC ("WRT") through its attorneys, hereby objects to the Motion filed on December 22, 2004, by the City of Joliet to file "additional public comment."

The rhetoric used by the City and its consultant is grossly inappropriate and should be struck from the record in this proceeding. The City of Joliet is attempting, at this late date, to insert facts without an affidavit that were the subject of testimony at the August and October hearings, and included in pre-filed testimony each time. The City had the opportunity to present the witness who now professes to be complaining. For the following reasons, the Motion should be denied and the proffered public comment stricken from the record.

In support of this Objection, WRT states as follows:

1. The Board's procedural rules require that a Motion that relies on evidence that is not of record must be supported by affidavit or certification. 35 IAC 101.504. That was not done here. Moreover, the "facts" asserted in the Motion and in the "Exhibit" are so rife with misstatements that the lack of sworn testimony is not surprising. On the other hand, if the Board

chooses to consider this late public comment, then WRT requests that the Board also consider the response of Mr. Ted Adams. (Attachment 1 hereto; hereafter "Adams Letter")

2. The "Exhibit" on which Joliet relies is a letter from a Mr. Eli Port. In it, he challenges one point made in the December 8 Public Comment submitted by Mr. Ted Adams: Adams calculation of the radioactive potency of an HMO particle. (Hereafter Adams December Comment). Port also makes factual assertions relating to the North East Ohio Regional Sewage District ("NEORSD") POTW and the Kiski Valley POTW. These are issues as to which Mr. Adams has provided pre-filed testimony in August, and been subject to examination at various times over 3 days of hearings, by Board members, Board assistants, the Agency counsel and even Joliet's lawyer. The assertions made by Mr. Port relating to these three issues are misleading and incomplete.

3. With respect to the NEORSD situation, it is not clear where he had obtained his information. His claim, that "the activity ... was at least several thousand curies," is not only without any documented support, it is incorrect for several reasons.

a) The NEORSD assessed how much radiation had been disposed of into the sewer system over the 20 year period at issue. The total mass found was less than 0.5 Curies. (See Adams October pre-filed testimony, Ex 14, p 4 and Attachment F). This documentation comes from the report done for NEORSD as part of its clean-up efforts.

b) The NRC and agreement states prohibit the release into a sewer of more than 1 curie per year. (10 CFR 20.2003). There is no evidence that the licensee released any more than what it was authorized to do by the regulations, a fact brought out by the hearings and Adams Letter, p. 9.

c) The quotations from Mr. Lenhard of NEORS in the Adams December Comment, p. 4, clearly indicate that a "tiny fraction of an ounce, a gram or two" was the cause of contamination of 174,000 cubic yards of ash and of the millions in clean-up costs incurred by NEORS. (See Adams Letter, p 9.)

4. With respect to the Kiski Valley, PA situation, there is one citation given, but Mr. Port's use of it is grossly misleading.

a) The action taken by the NRC is a jurisdictional step. The Kiski Valley POTW is still subject to PADEP requirements, which will "only" cost about \$1 million. (See Exhibit 4, p. 4; August hearing transcript at 13; Adams Letter, pp. 8-9).

b) According to the PADEP, they would NOT allow the Kiski Valley POTW to land apply this sludge, as asserted by Mr. Adams' August testimony and recently confirmed. (See Adams January Letter, p. 9.)

c) The uranium released to the Kiski sewer system was from an NRC licensed fuel fabrication/research facility/laundry, not "from the processing of nuclear fuel". There is a big difference. (Id).

5. Mr. Adams is directly involved in working with the Kiski Valley and the NEORS POTWs on the problems they have encountered in receiving radioactive solids. He has seen first hand the substantial costs and damage caused by levels of radiation [approximately 0.58 Ci in Kiski Valley and 0.5 in NEORS released over decades] that could easily appear in Illinois' POTWs [Joliet produces 0.3 Ci per year] The NRC amended its rules to prohibit discrete radioactive particles from being flushed down the sewer. (See generally, Exhibit 4,

Attachment B). IEMA has the same rule in place [32 IAC 340.1030(a)] which WRT has specifically recommended to the Board for adoption here.

6. Mr. Port appears to not appreciate the non-homogeneous nature of these discrete particles, such as those that can be formed by the HMO process. The Kiski sludge levels vary from 2.6 to 923 pCi/g illustrating the non-homogeneous nature of radioactive solids. They are not evenly distributed as Mr. Port would calculate at his desk. And he has given no such qualifications showing any familiarity with these issues. The superficial nature of his comments on these two situations, and the mistakes made in his reports submitted in November suggests he is lacking in applicable knowledge and may not have read the exhibits or transcripts of this proceeding.

7. The other topic area Mr. Port addresses is the calculation done in Attachment 2 to Mr. Adams December Comment. In that comment, Mr. Adams presents his assumptions and calculations in painstaking detail to document the conclusion that an individual exposed to a discrete radioactive particle could be exposed to a years' worth of allowable radiation. He provides sufficient detail that the reader could follow the assumptions made and decide if they agreed with them or not. The rhetoric of Mr. Port is inappropriate. Nevertheless, Mr. Adams response to these assertions is attached and the Board is invited to consider them. But consider these facts:

a) In his December Comment, Mr. Adams does the calculations, presents the alternative ways of looking at conservative risk factors, and reports a calculated dose based on those assumptions. Obviously, if one changes those assumptions, the resulting calculation can be changed. But to call that "grossly misleading" and "gross errors and misstatements" is ridiculous.

b) Some of the assertions Port makes are patently not correct. He claims that 18.3 pCi/g is the "actual maximum concentration in Joliet sludge" when the record in this proceeding shows that another Joliet treatment plant had a value of 47.2 pCi/g. These are the **only** two samples Joliet claims to have ever taken of its sludge! With only two samples [one of which is higher] how can any scientist say that 18 pCi/g is "the actual maximum?" Moreover, the IEPA/IEMA document included as Exhibit 11 in this proceeding estimated sludge concentrations of 94.5 and 98.4 pCi/g for the two Joliet plants! And one would expect that once treatment of the groundwater supply begins, [if the water treatment plant filtrate is flushed down the sewer as suggested by Port] that the levels in the sludge would only increase as the radium is taken out of the water supply. Port ignores all of these factors in his letter.

c) There also appears to be a unit error in his skin and ingestion dose calculations, as noted by Mr. Adams January Letter, p. 6.

d) Mr. Adams has had first hand experience with the effects of these discrete particulates. He was aware and disclosed the recent "assumption" that NRC would allow in calculating dose. But he questions whether this new assumption - which is based on testing using pig's skin - will stand further evaluations particularly as applied to risk to children.. (See Adams Letter, p. 4). Moreover, in this context, where there remains a choice as to what standards to set for new drinking water treatment facilities, why would an agency encourage the spreading of this carcinogen, when it is technically feasible to remove it and there is no evidence that such technology is economically unreasonable! ALARA [As Low As Reasonably Achievable] would require no less. (Id. pp 4-5).

8. For all of his rhetoric, Port never defends the mistakes exposed by Mr. Adams' simple and understated critique of Mr. Port's reports. (See, Adams December Comments, Page 2, and Attachment 2). Mr. Adams identified several questions that go to the assumptions and basis used by Mr. Port in documents submitted by Joliet on November 22 and ostensibly prepared by him. It appears that a review of these comments show that the Port documents submitted in November by Joliet confuse the eastside and westside plants, have different calculations of the amount of waste disposed, and lack references. Perhaps most embarrassing to Mr. Port are the comments on Page 8 of Attachment 2 of Adams December Comments. On this page, Mr. Adams identifies statements that were made by Mr. Port that are not true. Mr. Adams documents his statements with references -- Mr. Port has not responded. And the "expert" Mr. Port, stated that Ra228 was an alpha emitter; that is not true -- it is a beta emitter. (Id., p.8.) Port has also not responded to this point.

9. Having gone to the effort and expense of preparing a late comment, allegedly to protect the City of Joliet from "material prejudice", it is startling what Joliet and Port DO NOT dispute. Given these admissions, the proposed comment is not going to solve any "prejudice" to the City:

a) Mr. Port is endorsing the use of some IEMA rules. WRT agrees that IEMA has appropriate jurisdiction here and has filed permit applications before IEMA. (See Exhibit 17). In its December 8 Public Comment, WRT has also urged the Board to include the IEMA prohibition on releasing discrete radioactive particles down the sewer, as provided in 32 IAC 340.1030(a). [The Sierra Club also stated its proposed water quality standard is premised on "the assumption that the radium is present in a soluble form" and urges the IEPA and the IPCB "to take measures to ensure that highly

radioactive particulates are not released to Illinois waterways." Post-Hearing Comment of Sierra Club and Environmental Law and Policy Center, at II.C, p. 9. The IEMA comment even cites the same rule, but on another sub-paragraph.] But Joliet appears to want something different - to reserve the right to choose HMO technology and discharge radioactive particles into its own sewer system, and without IEMA oversight.

b) Mr. Port does not contradict Mr. Adams' calculation which shows that, with an influent to Joliet's plants of 5 pCi/l, Joliet would barely meet the existing MOA level of 0.1 pCi/g for applying radium contaminated sludge to crop lands. Clearly, radioactive particles cannot be backwashed into the Joliet POTWs and still meet this limitation. (Adams December Comment, Attachment 6.)

c) Port does not explain where the missing 0.2 Ci per year of radium have gone in Joliet. (See Adams December Comment, Attachment 3). Is it in the facilities and pipes? Is it going into the waters? Is there more going onto the croplands than what is represented by the sludge testing? This is a substantial amount of radiation to be unaccounted for; something that neither the NRC nor IEMA would allow their licensees to do.

d) Port also does not contradict the conclusion of Adams' Attachment 5 that the Joliet Westside plant is exceeding the sludge application rate agreed upon by IEMA and IEPA.

e) Port does not explain what happened to the testing data on the West Side plant that Mr. Duffield testified at the October 22 hearing had been done. Mr. Duffield claimed that report showed conditions in that plant were below the levels projected by the

generalized ISCORS model presented in August by Mr. Adams. (October 21 hearing, transcript at 393). But there was no such report submitted by the City of Joliet in their November 22, 2004, filing, a fact noted by Mr. Adams. (Adams December Comment, p. 2). But Mr. Port is apparently not concerned about that and even at this very late date, we still don't have that report that Mr. Duffield promised. (October 22 transcript at 408).

f) The submission by Mr. Port relies on dilution to solve the exposure issue relating to radium particles. He admits that the HMO particles are caught on a filter. He does not dispute that these particles may range from 10,000 pCi/g or up to 70,000 pCi/g. But he would have these "disposed of into the sanitary system through which it flows with other wastes to the wastewater treatment plant." (Port letter p 2). These discrete particles are at levels that could not even be disposed of in a low level radioactive waste facility. (See, Ex 5, p. 7, figure 3, and August transcript at 35).

g) Mr. Port does not challenge the existing Memorandum of Agreement ("MOA") limitation of 0.1 pCi/g in sludge applied to crop lands, nor does he challenge the 5 pCi/g cleanup standard adopted by U.S. EPA and Illinois for West Chicago. While it may be that IEMA licensees may discharge 60 pCi/L into a POTW, that does not mean that the POTW can spread whatever level of radiation it chooses onto crop land, as documented by a simple calculation. (E.g. Adams December Comments, Attachment 6). A 5 pCi/L level in the incoming level to a POTW, with a 50 percent removal rate in the treatment plant, the sludge will barely qualify under the 0.1 pCi/g limitation contained in the existing MOA. (Id).

10. Mr. Port endorses some of IEMA's regulations, while ignoring the prohibition on disposal of radioactive particles. The levels of radium removed from drinking water in cities like Joliet are not trivial. They are substantial and should be subject to the same safety procedures that other similar sources of radioactivity are. For example, IEMA rules require that any licensee possessing more than 100 uCi of radium is a "major possessor" (32 IAC 426.40), and that a licensee must post signs for employees warning of radiation hazards where there is more than 1 uCi of radioactive material. (Id. 340.920). At the levels recorded for Joliet that amount of radiation will accumulate **at each well** in less than two days! (Adams Letter, p 6). We think these standards are relevant, and perhaps Mr. Port does too.

11. There is no "material prejudice" to Joliet here. Joliet participated in all 3 days of hearings attended by Mr. Adams, and had ample opportunity to examine him. This late motion appears as much designed to counter the reality of radioactive solids having significant health implications, whether in a POTW or in croplands. Joliet promised to provide data on testing Mr. Port had done at its west side plant. That report is still missing.

12. One fact should be clear from the instant Motion - the decision on what to do with the residue from the drinking water treatment is a crucial issue. (See August transcript at 10). The type of treatment facilities that can safely meet the drinking water standard is relevant to this proceeding; we believe the Board should take that issue into account if it chooses to proceed on this record.

13. WRT and Mr. Adams have participated in these rulemaking proceedings. Mr. Port has not been made available at any of the hearings, though he was under contract with Joliet and had submitted a draft report before the October hearings were held. We are concerned that Joliet is attempting to avoid any examination of Mr. Port, by the Board, by the Agency, by the

Sierra Club, by the public, or by WRT. If Joliet is different from other communities, it can always initiate its own proceeding. Or it can ask for another hearing, at which time Mr. Port's "opinions" can be examined. But seeking to file a late comment, claiming "material prejudice" in these circumstances, is not appropriate.

WHEREFORE, WRT requests that the Board deny the Motion to File Additional Public Comment to Prevent Material Prejudice from Grossly Misleading [sic] Submission in this Proceeding, filed by the City of Joliet dated December 22, 2004.

Respectfully submitted,

WATER REMEDIATION TECHNOLOGY, LLC

By: 
One of its Attorneys

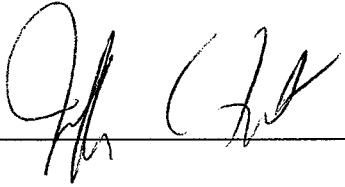
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THIS FILING IS BEING SUBMITTED ON RECYCLED PAPER

CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that he/she has served upon the individuals named on the attached Notice of Filing true and correct copies of ***OPPOSITION TO MOTION FILED BY THE CITY OF JOLIET ON DECEMBER 22, 2004***, by First Class Mail, postage prepaid, on January 4, 2005.



SERVICE LIST

R04-21

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Dennis L. Duffield City of Joliet Department of Public Works and Utilities 921 East Washington Street Joliet, IL 60431	Abdul Khalique Metropolitan Water Reclamation District of Greater Chicago 6001 West Pershing Road Cicero, IL 60804

Exhibit 1

T. G. ADAMS and ASSOCIATES, INC.

11 West Main Street
Springville, NY 14141
(716) 592-3431 FAX (716) 592-3439

January 4, 2005

**Ms. Amy Antonioli
Hearing Officer
Illinois Pollution Control Board
100 West Randolph
Suite 11-500
Chicago, IL 60601**

**R04-21
Rulemaking - Water**

Dear Ms. Antonioli:

Over the last several months, I have attended three days of hearings; reviewed hundreds if not thousands of pages of material and testimony, provided sworn testimony and have undergone examination by the IPCB, IEPA and other interested parties. During this time, I have openly and honestly expressed my concerns regarding the IEPA proposed rule change. The areas that I have covered to facilitate an understanding of my concerns were based on my real hands-on experience or involvement with contaminated POTWs and the associated regulatory, financial and liability burdens that were associated with these unfortunate, yet preventable events.

To assist the IPCB, IEPA and the public to gain a better understanding of the potential impacts of the proposed rule change, I tried to provide a "Big Picture" view. I provided this "Big Picture" because, in my opinion, to fully understand the potential impacts related to the revisions to the existing water quality standard (the back-end of the treatment process) one needs to examine the release of the radioactive particulate material from the water treatment to the POTW and to the resultant sludge or effluent (the front-end of the process). The bottom line is to evaluate the whole process and focus on impacts due to the high activity radium particulates released to the sewer. It is the insoluble particulates that are the major concern here, not the type of water treatment process, the type of the radionuclide, or the type of POTW. To me the answer is a simple one, if one prohibits the discharge of insoluble radioactive (including radium) particulates down the sewer, then one doesn't have to worry about the impacts to the POTW worker, or what concentration is in the sludge and how much can be spread on a landfill, or what are the impacts to the child playing in the field. Thus, my testimony addressed topics such as:

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- Detailed background and history of the POTWs that were contaminated because of radioactive particulates being allowed to be discharged down the sanitary sewers
- Efforts that were undertaken by the GAO, AMSA, and ISCORS to provide first time information regarding the amounts of radioactive (including NORM) particulate material coming into the POTWs and potential impacts on POTW workers and on the public which resides on contaminated sludge augmented soil. I also presented that neither of these agencies examined the specific impacts to a unique situation, the release of concentrated radioactive particulates down the sanitary sewers
- NRC and agreement states (including Illinois) efforts to address the POTW contamination issues by promulgating a "no insoluble material down the sewers" requirement in their respective radiation protection standards and the universally accepted and NRC and agreement state requirement for maintaining all radiation exposures As Low As Reasonably Achievable (ALARA)
- Potential impacts of the radioactive radium material on the aquatic biota using a DOE standard and the Biota Dose methodology. I also presented data from a reputable Florida organization for several Florida lake ecosystems which demonstrated that it is possible to exceed the DOE protective standard for aquatic organisms (i.e. mussels)
- Recommendations and concerns from the US EPA regarding how to handle water treatment residuals/sludge (i.e. don't apply radium treatment residuals to the soil as an augmentation agent unless the treatment residuals provide a clear benefit.
- Comparison and related discrepancies between IEPA and Joliet POTW data/calculations regarding Radium activities in the sludge. There is a significant difference of .2 Ci that needs to be addressed
- Comparison of the Joliet pre-HMO particulates (i.e. pre-radium particulates) being released down the sewer and into the sludge
- Comparison of the Joliet radium sludge concentrations and the IEMA limit of 0.1 pCi/g and identification that little to no sampling (until most recently) of the radium concentrations in the POTW sludge and in the Illinois fields where contaminated sludge has been placed

Therefore, I strongly encourage the IEPA, IEMA and responsible water treatment and POTW facilities to work together to examine the "Big Picture" and do what is right, take

the appropriate action to prohibit the discharge of radioactive radium particles down the sewer.

Response to Mr. Port's letter (Mr. Harsch's filing dated December 22, 2004)

Since part of my testimony and public comments (December 7, 2004) have been challenged by the City of Joliet and their consultant citing words such as "misleading", "misapplication", "unintelligible and scientifically unsupported", "gross exaggeration" to name a few, I am compelled to provide responses to the motion filed by Mr. Harsh dated December 22, 2004.

First of all, as part of my involvement with the proposed IEPA rule change and the related hearings, I have provided my testimony in both documented and verbal form. The IPCB, IEPA, members of the public and other interested parties were provided ample opportunity to examine me directly. Second of all, I don't have an agenda to "serve the interests of my client" at the expense of "serving the interests of the public or of the POTW workers". On the contrary, my experience working with AMSA, ISCORS, and several POTWs and working side by side with their workers, interfacing and negotiating with representatives of the NRC an agreement state (Ohio) and a soon to be agreement state (Pennsylvania), as well as my experience in cleaning up contaminated sites and receiving unrestricted release from the NRC or agreement state and my close working relationship with the concerned public, has allowed me to see the broad picture from several client, regulatory, worker, and public perspectives.

Simply put, I have been there, done that, got the T-shirt and continue to wear it. At no time were my efforts intended to be misleading, gross exaggerations or anything to the like. If there is/was a perceived opinion that my testimony or public comment was such, then perhaps further explanation is required on my part or perhaps my intended communication point(s) were not fully understood by the receiving party. Certainly, I did not repeat all of my prior testimony when I prepared the comments that Mr Port has apparently reviewed.

General

Comment

On the first page of Mr. Port's letter to Mr. Duffield dated December 22, 2004, Mr. Port states "The Adams letter ranges over a wide variety of issues in addressing five subjects containing analyses that are unintelligible and scientifically unsupported. In this letter, I address the first subject in the Adams letter, *Potency of Radium Particles and Behavior in POTWs*".

Response

With that statement, I conclude that Mr. Port has chosen this topic (only one of the five subjects) because he has concerns over this topic and has chosen to not address my comments in the other four subjects.

Calculation of Dose to Skin and Ingestion from Discrete Radium Particles

Pages 1 through 3 of Mr. Port's Letter

Comment

On these pages Mr. Port attempts to criticize my presentation of potential skin and ingestion doses to a child playing in a field augmented with high activity particulate radium contaminated sludge. I believe five points address and/or answer his comments.

Response

First, I did include both standards, a rather detailed history, and both calculations. The purpose was to show the IPCB, IEPA and others that for over 40 years the issue of hot particles and their potential impact to the skin has been debated. Regulations were established by the NRC and had been in effect for several years that required licensees to determine the skin dose based on an area of 1cm². Only recently (2002), was a revision to that requirement implemented by the NRC which now allows the dose to be averaged over a 10 cm² area.

In this situation, where the Board is adopting a prospective regulation, I believe that the Board needs to understand the scientific uncertainty relating to this issue. Significant information has been reviewed by national and international radiation agencies and individual researchers regarding the appropriate area to use and what dose to the skin actually causes an impact (fatal and non-fatal skin cancers, erythema [reddening or tinting of skin], epidermal necrosis [cell killing], acute ulceration [break in the skin which forms a scab], and dermal thinning [slight depressions in the skin]). Most of the research has been based on the use of pig's skin as well as some in-vivo animal studies and in-vitro cell transformation studies to correlate dose to impact. Whether pig's skin is a suitable substitute for a child's skin, has yet to be demonstrated.

There continues to be a debate as to whether these "hot particles", sometimes known as "discrete radioactive particles" and in my calculation, represented by HMO particles, should have an enhanced carcinogenicity factor. In my opinion the answer isn't yet final. More research will be conducted and the discussions will likely to continue. In the meantime, why do we want to expose individuals of the public (especially children) to radioactive particles when we have the ability to prevent it?

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January 4, 2005

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This goes against the basic radiation protection principle of ALARA, which is to maintain radiation exposures as low as reasonably achievable (economic and social factors being taken into account). Furthermore, our fundamental radiation protection framework, the foundation which we use to establish our standards, protection guides, levels and limits, is based on the premise that any dose received as a result of exposure involves some incremental risk.

The second issue raised by Mr Port I also believe is not a fair characterization of my calculations and presentation. I did not compare the results of my skin dose calculations to a whole body dose. I clearly stated that the dose was to "that area in a 6-hr period" If I had intended to correlate the potential skin dose to the whole body a tissue weighting factor (Wt) would have been used.

In regard to this comment, there was no intent to "mislead by using an obsolete standard". I believe I clearly presented both standards and attempted to educate the audience on such.

Third, there seems to be some misunderstanding by Mr. Port regarding my presentation and assumptions pertaining to the 3 gram of radium particulates. It was not my intent nor do I believe I communicated that a 3 gram bolus of HMO/radium particles of a concentration of 70,000 pCi/g would pass through the sewage treatment plant. The POTW process concentrates radioactive particulates into the sludge or ash as a matter of its operation and objective (to remove solids out of water). As part of that process, I have experienced in my working with POTWs, re-concentration of radioactive particulates in the resultant sludge/ash/grit. Thus, the radioactive material in the sludge/ ash or grit is not homogenous, but made up of discrete high activity particles. The actual distribution of the particles depends on the POTW treatment and handling process. I have seen instances with several particles aggregated together which when analyzed, contained hundreds to thousands of pCi of activity. I have even experienced an aggregate of particles in a golf ball size clay-like mass. All of these materials have gone through the rigorous POTW treatment and handling process and some have survived even through incineration.

Based on these experiences, I used a 3 gram aggregate of high radium particulate activity for the potential skin dose (and a 2 gram aggregate for the potential ingestion dose) to show what could be the potential dose to a child under these circumstances and documented assumptions. I understand that other individuals may have differences of opinions regarding my experience and assumptions and I am respectful of those opinions whether I agree with them or not. I do not perceive them to be by their nature misleading or mis-applications or gross exaggerations.

Fourth, I do not agree with Mr. Port's use of the 18.3 pCi/g radium concentration in his skin dose or ingestion dose calculations for the following reasons:

- 1) This concentration is not the "actual maximum concentration in Joliet sludge". In Mr. Port's earlier testimony, Exhibit 4 of Mr. Harsch's filing dated November 24, 2004, he presents as part of his RESRAD Dose modeling a maximum radium concentration from the Joliet Westside Plant of 47.2 pCi/g. The 18.3 pCi/g is reported for the Eastside Plant. This is in comparison to the IEPA radium sludge concentrations for Joliet's Eastside and Westside Plants of approximately 94.5 and 98.4 pCi/g, respectively. There is a significant difference here that needs to be addressed.
- 2) The 18.3 p Ci/g value represents pre-HMO treatment and release conditions. It does not reflect sludge concentrations with radium particulates contained within, as I believe based on my experience will be the case.
- 3) I believe there is a "unit "error in his skin and ingestion dose calculations. I believe the units for the skin dose conversion factor is rem/hr/uCi/cm^2 rather than rem/hr/uCi/g or rem/hr/uCi/g/cm . In his calculation for ingestion, I believe the unit for activity should be $1.83 \times 10^{-5} \text{ uCi/g}$ rather than $1.83 \times 10^{-5} \text{ pCi/g}$.

Fifth, I disagree with the suggestion that the risk posed by radioactive materials represented by the Joliet situation is not substantial.. According to IEPA, Joliet pumps 16 MGD of drinking water. At an average of 13.3 pCi/l, this is 804.448 micro Curies/day [16 MGD x 3.785 liters per gallon x 13.3 pCi/l]. A "major possessor" of radium is one who is licensed to use, possess or store 100 micro Curies of radium. 32 IAC 326.40. A typical 1000 gpm well processing 13.3 pCi/l water would accumulate 72.49 micro Curies per day. Thus, in less than a day and a half, each such well would be a "major possessor".

And by comparison to the quantity of radiation that caused the problems in Ohio and Pennsylvania, the quantity is "major". IEPA calculates the quantity of radiation in Joliet to be about 0.3 Ci per year. For NEORSD, about 0.5 Ci had to be remediated from 20 years of sewer discharge and Kiski Valley now has 0.58 Ci to remeidate, resulting, from at least 20 years of discharge. Turning the naturally occurring radium into "hot" discrete radioactive particles, or "techically enhanced" NORM, could create future problems for Illinois' POTWs, the state, and the affected citizens.

In summary, my analysis clearly showed it was based on a "hot" or discrete radioactive particle, not on the diluted or overall blended average in sludge. These are the kinds of particles that represent the greatest risk. These are the kinds of particles I have seen in my experience, causing substantial damage to POTWs. And these are the kinds of

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particles that the NRC, and the POTWs with whom I have worked, have banned from being sent down the sewers into a POTW.

Feedback from NEORS and KISKI POTW Representatives

Page 4 of Mr. Port's Letter
Pertaining to KISKI

Comment

Mr. Port states on this page that "he (Adams) fails to mention that the incident he described resulted from the processing of nuclear fuel. He omits the fact that on June 22, 2004, prior to the date of his letter, the Nuclear Regulatory Commission determined that the ash described by Mr. Adams could be released for unrestricted use (SECY-04-0/02)"

Response

I am very aware of the NRC decision and the status of the KISKI situation since I was involved in with this site just after the discovery and notification by the Pennsylvania environmental authorities of the uranium contaminated ash in the lagoon in 1994. For almost 10 years I have been directly involved in characterization, remediation planning, and interface and negotiations with the NRC, PADEP, KISKI and the party responsible for releasing the uranium to the KISKI sewers. Early in the project after adequate characterization data was available, I proposed and personally sought, through the application of the RESRAD dose assessment methodology, to have the site accepted by the NRC for unrestricted release (i.e. meet the 25 mRem/yr NRC criteria). The NRC at that time did not agree with that assessment and proceeded to perform additional evaluations and 3-D modeling of the site. After a number of years of discussions, meetings, and additional evaluation, the NRC finally made its decision to allow the ash to be released for unrestricted use on June 22, 2004.

However, please note that while the NRC may consider this material to be released for unrestricted use, the final decision rests with the PADEP. My discussions with the PADEP KISKI Project Representative identified that this decision is at least 6 months away. Both the radiological and waste management sections of PADEP must be fully satisfied with the proposed remediation and ultimate disposal at a local PADEP permitted landfill. There will also be a public comment and public hearing on the proposed remediation/disposal plan.

The total volume of contaminated ash at Kiski is 12,000 cubic yards. The uranium concentration of the ash ranges from 2.6 to 923 pCi/g, with an average total uranium

concentration of 78.7 pCi/g. It has taken over 10 years to address the impact of the release of 0.58 Ci of insoluble uranium particulates down the Kiski sewer.

The PADEP Representative also confirmed my understanding that this material would not be permitted to be applied to farm fields as a soil augmentation agent and would have to be disposed of in a landfill. . If the remediation/disposal plan was accepted by PADEP, the material would be removed from the lagoon under radiological controls and sampling/monitoring of the material and workers would be required.

It should be noted that the uranium that was released to the KISKI sewer was from the controlled discharge of uranium from a NRC licensed fuel fabrication facility and related laundry. It was not a "release of material from the processing of nuclear fuel" as stated by Mr Port. There is a big difference.

Finally, the discharge was halted, over 10 years ago, as soon as it was discovered. Kiski Valley has adopted a pre-treatment ordinance to prohibit any further discharge.

Pertaining to NEORS

Comment

Mr. Port states "Mr. Adams goes on to discuss the release, in Ohio, of one to two grams of cobalt 60 (Co-60). He fails to disclose that the specific activity of Co-60 is 1100 curies per gram and that the activity of cobalt released in Ohio was at least several thousands curies."

Response

In making this statement, I am afraid that Mr. Port didn't understand or read the whole presentation. First of all, like KISKI, I have been involved and am still involved in the aftermath of the Co-60 contamination of the 174,000 cubic yards of sludge/ash/grit at the NEORS Easterly and Southerly Plants. Again, I was involved in the characterization, remediation and attempted release of certain parts of the sites for unrestricted use. Once again, the NRC did not accept the assessment. In 1999, Ohio become an Agreement State and the Ohio Department of Health, Bureau of Radiation became the regulatory agency. The status to date is that the NEORS will be applying for an Ohio Radioactive Materials License sometime in January 2005. A radiological control plan and related procedures will be implemented and full-time radiological coverage will be provided.

Mr. Port's conclusion that the "activity of cobalt 60 released in Ohio was at least several thousands of curies is incorrect for the following reasons:

- 1) In my filed public testimony dated October 8, 2004, Section III page 4, I clearly stated that the aggregate radioactivity disposed of into the sewer system over a 20 year period was less than 0.5 Curies (i.e. .455 Curies) and in Exhibit F, I included an excerpt (Page 3-15) from the "Site Remediation Plan for the Northeast Ohio Regional Sewer District Southerly Wastewater Treatment Plant Cuyahoga Heights, Ohio" September 1996, rev. 0, B. Koh and Associates, Inc. On this, page there is documented the total amount of Co-60 contained in the ash at the NEORSD sites. Thus, the total Co-60 activity for the sites when all is added up is approximately 0.5 curies, not "thousands of curies."
- 2) The release of "thousands of curies" over a 20 years period is not permitted by the NRC. Even the pre- 1991 version of 10CFR 20.2003 allowed only an average concentration of $6.0 \text{ E-}7 \text{ uCi/ml}$ of radium to be released to the sewer in one month and limited the radium activity released to the sewers in a year to 1 curie. Even over a period of 20 years, the most radium that the NRC would permit would be a total of 20 curies not "thousands of curies". From my review of the licensee's discharge records and discussions with the NRC, the licensee's releases were always maintained within the NRC authorized limits. I am sure that both parties (both the regulator and the licensee) would be adamant about defending their position against anyone who suggested that 'thousands of curies were released' into the sewers.
- 3) In my objective to provide the most accurate and direct information, I documented Mr. Lenhart's comments verbatim. Even at the risk of comments by others, I did so as to preserve the integrity of my testimony and to make certain not to mislead or misapply the words of others. He did state as I quoted him in my December 7, 2004 public comment letter. But it is here that I believe Mr. Port incorrectly interpreted Mr. Lenhart's communication point. The point is that it was a very small amount of Co-60 (0.5 Ci) that resulted in the costly aftermath (> \$2 million) that is still going on at NEORSD and Mr. Lenhart tried to provide the reader a unit that could be understood (i.e. "a tiny fraction of an ounce, only a gram or two") to compare how such a small quantity could cause such a tremendous financial impact. I don't know if Mr. Lenhart is aware of what the specific activity of Co-60 is and its relation to his reference to a gram or two. What I do know is that he is certainly aware that a small quantity of radioactive particulates released into a POTW can result in a costly cleanup and continuous attention until the material has decayed to acceptable levels and/or the site is accepted for unrestricted use by the state of Ohio. Since Co-60 has a half life of 5.3 years, allowing storage for decay is a viable alternative.

Again, as soon as the discharge was discovered, it was halted, by the POTW and the discharge pipe sealed. While the relatively short half-life of Co-60 allows NEORSD to allow the original incident to take its course, with the Ra-226 half life being 1600 years, a cautionary approach is required to avoid the same perils that have damaged other POTWs.

In summary, I want to thank the IPCB for taking the time to consider my comments. I hope I was able to provide additional information that will help those readers to understand the "Big Picture". In all honesty, I can't understand way anyone would allow the release of radioactive particulates down the sewer in light of the experience of other POTWs, especially when they can be concentrated and captured and disposed of in a more environmentally safe manner. The NRC and the agreement states did the right thing and prohibited further releases of these kinds of particles. As I stated in earlier in this response, it really doesn't matter, whether the material is licensed or not, what matters is the material is made up of a high activity radioactive particles. Neither the IEPA, nor the POTWs really know the true magnitude of the adverse environmental, social and financial impacts are going to be due to the release of such particulates. They need to do their homework and work together to solve the "Big Picture" radium issue in Illinois.

Respectfully submitted


Theodore Adams