UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SECRETARY

July 21, 2004

COMMISSION VOTING RECORD

DECISION ITEM: SECY-04-0102

TITLE: 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

The Commission (with all Commissioners agreeing) approved the subject paper as recorded in the Staff Requirements Memorandum (SRM) of July 21, 2004.

This Record contains a summary of voting on this matter together with the individual vote sheets, views and comments of the Commission.

Annette L. Vietti-Cook
Secretary of the Commission

Attachments:
1. Voting Summary
2. Commissioner Vote Sheets

cc: Chairman Diaz
Commissioner McGaffigan
Commissioner Merrifield
OGC
OIP
EDO
PDR

SECY NOTE: THIS VOTING RECORD WILL BE RELEASED TO THE PUBLIC AFTER THE STAKEHOLDERS HAVE BEEN INFORMED ABOUT NRC'S COURSE OF ACTION, AS DESCRIBED IN THE SRM

VOTING SUMMARY - SECY-04-0102

RECORDED VOTES

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIP	COMMENTS	DATE
CHRM. DIAZ	X				X	7/12/04
COMR. McGAFFIGAN	X				X	7/13/04
COMR. MERRIFIELD	X				X	6/29/04

COMMENT RESOLUTION

In their vote sheets, all Commissioners approved the staff's recommendation and provided comments. Subsequently, the comments of the Commission were incorporated into the guidance to staff as reflected in the SRM issued on July 21, 2004.

SECY NOTE: THIS VOTING RECORD WILL BE RELEASED TO THE PUBLIC AFTER THE STAKEHOLDERS HAVE BEEN INFORMED ABOUT NRC'S COURSE OF ACTION, AS DESCRIBED IN THE SRM

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: CHAIRMAN DIAZ

SUBJECT: **SECY-04-0102 - 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**

Approved √/W Disapproved _____ Abstain _____

Not Participating _____

COMMENTS: Support Commissioner Merrifield's comments

SIGNATURE

7.12.04

DATE

Entered on "STARS" Yes √ No ___

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER MCGAFFIGAN

SUBJECT: **SECY-04-0102 - 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**

Approved X Disapproved _____ Abstain _____

Not Participating _____

COMMENTS:

See attached comments and edits.

Edward McGaffigan Jr.
SIGNATURE

July 13, 2004
DATE

Entered on "STARS" Yes X No ___

Commissioner McGaffigan's Comments on SECY-04-0102

I approve the staff's plan to take no further decommissioning actions at the Kiski Valley Water Pollution Control Authority site. I agree with Commissioner Merrifield that the staff should inform the stakeholders of the NRC's intended course of action soon after issuance of the SRM for this paper. This is a complex and sensitive issue and the staff should develop a comprehensive communications strategy which outlines how all of the stakeholders will be informed of this decision. I have also identified several minor editorial comments which are attached.

OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
DOSE ASSESSMENT
RELATED TO
KISKI VALLEY WATER POLLUTION CONTROL AUTHORITY
INCINERATOR ASH LAGOON

In summary, two series of extractions were conducted according to the protocols described in Amonette *et al.* (1994) to test the leachability of uranium from the ash under different chemical conditions. In the first test a sequence of four batch extractions with acetic acid (pH 2.9) was used to extract the readily available uranium and a high pH (8.3) oxidizing sodium bicarbonate solution was then used to extract the slowly available uranium (SAU). The low fraction of readily available uranium (*i.e.*, 3%) was in agreement with the results from the previous RAU test (ESSAP, 1996). The results of the SAU test indicated that a limited fraction of the uranium (*i.e.*, 21%) would be expected to become environmentally available over an extended period of time. The second series of tests used a synthetic infiltrate (deionized water pre-equilibrated for 18 hours with a low activity ash sample) as the extractant for a sequence of four extractions and used the alkaline SAU extractant on the solid sample left after the water extraction. The results of the water leach test indicated that under expected conditions at the site, the uranium in the ash is expected to be relatively unavailable to environmental transport.

No point

The extractions conducted at pH 8.3 were conducted with an extractant containing 0.1 M sodium bicarbonate which is expected to lower the calculated distribution coefficient significantly as compared to distribution coefficients calculated from the results of extractions performed without added carbonate species.

2 Dose Assessment

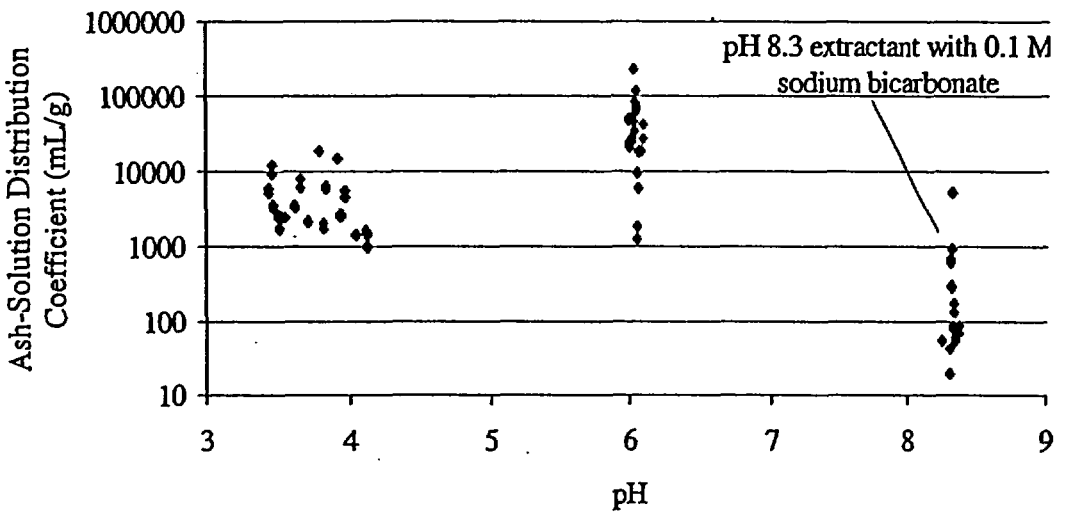


Figure 2: Relationship between leachability-based distribution coefficient and pH for KVWPCA ash (calculated using the final ratio method from results in ESSAP, 2004).

In order to capture an adequate range of future scenarios, dose assessments were performed for both an onsite no action scenario and an ash removal scenario. The onsite scenario was based on an unrestricted release (*i.e.*, no credit was taken for institutional measures such as land use restrictions or groundwater monitoring). No remedial action (*e.g.*, capping, partial removal of ash to an off-site location) is presumed to be performed in the onsite scenario. The onsite scenario includes a recreational use case, in which the property is converted into a

The distribution coefficient of uranium in the unsaturated layer was represented with a triangular distribution. The minimum value was chosen to represent uranium mobility in a clay layer with a relatively high fraction of sand, but without an interconnected high conductivity pathway through the unsaturated zone. Three K_d values for "clayey sand" (i.e., 58 to 78% sand, 6 to 8% silt, and 19 to 36% clay) from the data compilation of Thibault *et al.* (1990) were averaged to yield a K_d of 680 mL/g (data originally from Neiheisel, 1983). This value is believed to be a conservative lower bound because the unsaturated layer at the KVWPCA is primarily clay whereas the samples of "clayey sand" for which the K_d values were measured were primarily sand. A distribution coefficient of 1600 mL/g was used as the upper end of the distribution to represent uranium adsorption in clay (Sheppard and Thibault, 1990). No independent information was available to develop a central tendency of the distribution, which was estimated as the mean of the upper and lower bounds (*i.e.*, 1140 mL/g).

2.1.4 Selection of Input Parameters

The sensitivity of the predicted dose to the input parameters was tested using the probabilistic features of RESRAD 6.2 with the RESRAD default parameter distributions. Initial sensitivity analyses indicated that the dose was sensitive to the distribution coefficient of uranium isotopes in the contaminated zone. To reduce the uncertainty in this parameter, leaching tests were used to determine the partitioning of uranium in the ash (Section 2.1.3). A range of distribution coefficients for uranium in the unsaturated zone was determined from literature values based on site-specific soil type information.

After ranges were determined for the distribution coefficient of uranium in the contaminated and unsaturated zones, an additional sensitivity analysis was conducted with the new parameter distributions for the uranium distribution coefficients and with default RESRAD distributions for the remaining parameters. The results of the second sensitivity analysis indicated that the dose was most sensitive to the erosion rate of the cover layer, the erosion rate of the contaminated zone, and the thickness of the unsaturated zone. Because no site-specific information was available for the erosion rate of the cover layer or the contaminated zone, the recommended RESRAD probabilistic distributions were used to represent these parameters (Yu *et al.*, 1993). The thickness of the unsaturated zone was conservatively chosen at the lower end of the range of unsaturated zone thicknesses recorded in well boring logs from the site (IT Corp., 2002). Because of the importance of the plant and milk ingestion pathways to the predicted dose and the lack of site-specific information about plant and milk transfer factors, distributions were used to represent the plant and milk transfer factors (Yu *et al.*, 1993).

Because the dose was relatively insensitive to other parameters, the recommended values in NUREG/CR-5512 Volume 3 (Beyeler *et al.*, 1999) or the mean values of distributions recommended in NUREG/CR-5512 Volume 3 were used. In cases in which no parameter recommendation was available in NUREG/CR-5512 Volume 3, the mean of the RESRAD probabilistic distribution (Yu *et al.*, 1993) was used. In the few cases in which recommended values were not available in either of these sources, the RESRAD default values were used. The input parameter values and the bases for parameter selection are summarized in the Appendix.

2.1.5 Model Results

The assumption of a recreational exposure scenario results in an peak mean annual total effective dose equivalent of approximately 0.011 mSv (1.1 mrem) over the next few centuries,

Assessments, Whiteshell Nuclear Research Establishment, Atomic Energy of Canada Limited. Pinawa, Manitoba, Canada.

USGS (2004). US Geological Survey Real-Time Data Website (http://waterdata.usgs.gov/pa/nwis/dv/?site_no=03048500&PARAmeter_cd=00060,00065). Last accessed 27 February 2004

Williams, R. A. (1977). Letter from Robert A. Williams, Babcock and Wilcox, to Donald Brewer, KV Water Pollution Control Authority, confirming the connection of BWNMD liquid waste streams to the KVWPCA (ADAMS ML993360198)

Yu, C., and others (1993). Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil, Argonne National Laboratory, Argonne, Illinois.

Yu., C., and others (2001/2002). User's Manual for RESRAD Version 6 (ANL/EAD-4) Environmental Assessment Division, Argonne National Laboratory, Argonne, IL, July 2001. Version 6.21 (September 2002) available for download at web.ead.anl.gov/resrad/home2/resrad.cfm.

5 Appendix: Input Parameters

The selection of input parameters is discussed in Section 2.1.4 ~~3.1.5~~

Onsite Scenario Cases

	Agricultural case Recreational case[i]		Intrusion case		Intrusion into Hotspot	
	Surface	**Buried**	**Surface**	**Buried**	**Surface**	**Buried**
Total U (pCi/g)	25	Distribution [ii]	Distribution [ii]	92.9	275	92.9
Co-60 [iii] (pCi/g)	0.129	Distribution [ii]	Distribution [ii]	0.478	1.42	0.478
Area (m^2)	4000	4000	700	4000	700	4000
Thickness of Contaminated layer (m)	1	2	0.9	2	0.9	2
Cover layer (m)	0	1	0	1	0	1
Mass loading for foliar deposition (g/m^3)	0.0001	0.0001	0.0001	0.0	0.0001	0.0
Pathways						
External gamma	On	On	On	Off	On	Off

Inhalation	On	On	On	Off	On	Off
Plant ingestion	On (Off)	On (Off)	On	On	On	On
Meat ingestion	On (Off)	On (Off)	Off	On	Off	On
Milk ingestion	On (Off)	On (Off)	Off	On	Off	On
Aquatic foods	Off	Off	Off	Off	Off	Off
Drinking water	On (Off)	On (Off)	Off	On	Off	On
Soil ingestion	On	On	Off	On	Off	On
Radon	Off	Off	Off	Off	Off	Off

(i) Values for the recreational scenario, where different, are given in parentheses

(ii) See Section ~~3.1.2~~ 2.1.2

(iii) Co-60 concentrations are set as a function of Total U. See Section ~~3~~ 2.1.2

Subsurface Parameters

Zone	Thickness (m)	Bulk Density (g/cm³)	Total porosity	Effective porosity [g]	Field capacity [h]	Hydraulic conductivity [f] (m/yr)	B parameter [f]
Cover	1 [a]	1.48 [c]	0.44 [e]	0.20 (silt)	0.24	65 (silt)	3.8 (silt)
Contaminated	2 [a]						
Unsaturated	3.5 [b]	1.64 [d]	0.38 [f] (sandy clay)	0.06 (clay)	0.32	47 (sandy clay)	6.09 (sandy clay)
Saturated	not used	1.51 [d]	0.43 [f] (sand)	0.32 (sand)	0.11	10,850 (sand)	not used

[a] See section ~~3.1.2~~ 2.1.2

[b] Groundwater investigation (Chester, 1992)

[c] Upper end of range of densities for sewage sludge ash (REA, 1980)

[d] Calculated from total porosity based on assumed particle density of 2.65 g/cm³

[e] Calculated from bulk density based on assumed particle density of 2.65 g/cm³

[f] Recommended value or mean of the recommended distribution (NUREG/CR – 5512 Volume 3) for the soil type (IT Corp., 2002)

[g] Mean of recommended distribution (Yu *et al.*, 1993) for the soil type (IT Corp., 2002)

[h] Calculated from the effective porosity as demonstrated in Yu *et al.*, 1993

Distribution Coefficients

Correlation coefficients of 0.99 were used to correlate distribution coefficients for uranium isotopes in the same layer

	Ash	Unsaturated	Saturated[iv]
U (cm^3/g)	Triangular distribution[i]	Triangular distribution[i]	35
Ac-227 (cm^3/g)	1740[ii]	2400[iii]	450
Co-60 (cm^3/g)	1000[ii]	550[iii]	60
Pa-231 (cm^3/g)	2040[ii]	2700[iii]	550
Pb-210 (cm^3/g)	2400[ii]	550[iii]	270
Ra-226 (cm^3/g)	3550[ii]	9100[iii]	500
Th-230 (cm^3/g)	5890[ii]	5800[iii]	3200

(i) See section ~~3.1.3~~ 2.1.3

(ii) Mean of distribution recommended in NUREG/CR-5512 Volume 3

(iii) Recommended value for clay (Sheppard and Thibault, 1990)

(iv) Recommended value for sand (Sheppard and Thibault, 1990)

Onsite Scenario

Parameter	Input	Reference
Contaminated zone area (m^2)	4000	IT Corp., 2002
Length parallel to aquifer flow (m)	100	IT Corp., 2002
Cover depth erosion rate (m/yr)	distribution	Yu *et al.*, 1993
Contaminated zone erosion rate (m/yr)	distribution	Yu *et al.*, 1993
Average annual wind speed (m/s)	1.45	Mean of distribution (Yu *et al.*, 1993)
Evapotranspiration coefficient	0.625	Mean of distribution (Yu *et al.*, 1993)
Precipitation (m/yr)	0.96	30 year average for Pittsburgh (National Climatic Data Center)
Irrigation (m/yr)	0.5	Mean of irrigation rates for humid states (NUREG/CR-5512 V. 3)
Irrigation mode	overhead	Default
Runoff coefficient	0.45	Mean of distribution (Yu *et al.*, 1993)
Watershed area for nearby stream or pond (m^2)	74,320	IT Corp., 2002
Inhalation rate (m^3/yr)	12,260	Median of distribution (NUREG/CR 5512 v.3)
Mass loading for inhalation (g/m^3)	1.45E-5	NUREG/CR 5512 v. 3
Exposure duration (y)	30	Default
Shielding factor, inhalation	0.4	Default
Shielding factor, external gamma	0.27	Weighted average of indoor and outdoor shielding factors (NUREG/CR 5512 v.3) based on mean indoor and outdoor exposure times (NUREG/CR 5512 v.3)
Fraction of time spent indoors	0.66	Mean of distribution (NUREG/CR 5512 v.3)
Fraction of time spent outdoors (on site)	0.11	Mean of distribution (NUREG/CR 5512 v.3)
Hydraulic gradient	0.01	IT Corp., 2002
Water table drop rate (m/yr)	0.0	Aquifer in communication with the river (see Section ~~2.3~~ 1.2)
Well pump intake depth (m below water table)	not used	Not used in mass balance model
Model: Nondispersion (ND) or Mass-Balance (MB)	MB	More conservative than ND
Well pumping rate (m^3/yr)	214	Three times the mean annual per capita water consumption rate for PA (NUREG/CR 5512 v. 3)

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER MERRIFIELD

SUBJECT: **SECY-04-0102 - 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**

Approved ✓ Disapproved _____ Abstain _____

Not Participating _____

COMMENTS:

See attached comments.

SIGNATURE

6/29/04

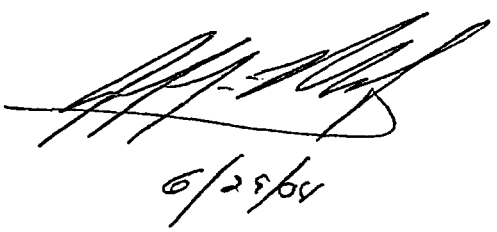
DATE

Entered on "STARS" Yes ___ No ___

Comments from Commissioner Merrifield on SECY-04-0102:

I approve, as clarified below, the staff's plan of action as described in SECY-04-0102 concerning the Kiski Valley Water Pollution Control Authority site in Leechburg, Pennsylvania.

I have no objection to the staff's overall plan concerning the issuance of an environmental assessment (EA) and a *Federal Register Notice* (FRN) for the site. The staff further states that "pending resolution of comments on the EA" letters would be sent to the site owner (KVWPAC), the state representatives (PADEP), and Senator Rick Santorum concerning the NRC plan of action. No schedule for the letters or EA was provided in the paper. Because this issue has been in contention for a number of years and there have been numerous public meetings on this subject, I believe staff should make a prompt notification to the stakeholders of our intended course of action. Therefore, upon issuance of the SRM for this SECY paper, staff should either verbally or in writing notify the stakeholders of the intended course of action, the schedule for publishing the EA, and the fact that they will be allowed to submit formal comments as part of the EA process before a final determination is issued.



6/28/04