

WASTE
ISOLATION
PILOT
PLANT

ASA '98

WIPP Data Entry Form

WPO 37683

Sandia
National
Laboratories

Form Number: 464

Effective: 10/10/96

Procedure: 9-2 Revision: 2 Page 1 of 1

Major Modification Error Correction New Deactivation

Parameter:	SOLCIM, SOLSIM, SOLSOM, SOLCOM, PHUMCIM, and PHUMSIM	Id:	All id's <i>enc 6/24/98</i> 3429
Material:	All Material Regions	Idmtrl:	All idmtrl's <i>enc 6/24/98</i> PHUMOX3
Model:	NUTS	Idpram:	SOLCIM, SOLSIM, SOLSOM, SOLCOM, PHUMCIM, and PHUMSIM
Category:	All categories	Units:	N/A
Distribution:			
Type:	N/A	Mean:	N/A
		Median:	N/A
Values:	N/A	Std Dev:	N/A
		Attachment:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Source: Bynum, Vann and Bob Moore. 1998. Memo to Lori Dotson, RE: "Submission of Dissolved Species Parameters for FY98 ASA," June 2, 1998.

Interpretation: The idprams SOLCIM, SOLSIM, SOLSOM, SOLCOM, PHUMCIM, and PHUMSIM need to be deactivated for all material regions (idmtrl's) as they are being replaced by a new system of parameters described in the source memo.

Attachment: Yes No

Parameter Entry Approved by:

Lori J. Dotson

Parameters Task Leader (Print)

Lori J. Dotson 6-16-98
Parameters Task Leader (Sign) Date

Requester:

Jim Garner

Requester (Print)

Jim Garner
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Concurrence: (Required for Category 1 Parameters Only)

Scientific Investigator (Print)

Scientific Investigator (Sign)

Date

Performance Assessment Analyst (Print)

Performance Assessment Analyst (Sign)

Date

Entered by:

Charlene Lattier

(Print)

Charlene Lattier 6/24/98
Sign Date

Entry Checked by:

JAMES N. EMERY

(Print)

James N. Emery 6/24/98
Sign Date

Information Only

W8042261

ID3429



Sandia National Laboratories

Operated for the U.S. Department of Energy by Sandia Corporation

Albuquerque, New Mexico 87185-

date: November 13, 1996

to: Charlene Lattier, 6848

from: *Mary-Alena Martell* Mary-Alena Martell, 6849 ; *Hans Papenguth* Hans Papenguth, 6832; *Christine Stockman* Christine Stockman, 6848

subject: Additional source information for Mobile Colloidal Actinides

The following are tables of parameters for the mobile colloid actinides that have an additional source and/or have a units change. The units stored in the wipp_db are not used by the codes; therefore, there is no impact on having stored the unit incorrectly. The values are the same and do not change.

The following parameters have a record package identified as Parameter Record Package **WPO #35855, Mobile Colloidal actinide Source Term. 3. Humic Substances. Author Hans Papenguth.** Please add this source to the bibliography for the parameters in table 1.

Table 1.

id	idpram	idmtrl	units
3457	CAPHUM	AM	moles/liter
3458	CAPHUM	NP	moles/liter
3459	CAPHUM	PU	moles/liter
3461	CAPHUM	TH	moles/liter
3460	CAPHUM	U	moles/liter

The following parameters have a record package identified as Parameter Record Package **WPO #35855, Mobile Colloidal actinide Source Term. 3. Humic Substances. Author Hans Papenguth.** Please add this source to the bibliography for the parameters in table 2. The units for these parameters change to 'none' from moles/liter.

Table 2.

id	idpram	idmtrl	units
→ * 3429	PHUMCIM	PHUMOX3	none
3430	PHUMCIM	PHUMOX4	none
3431	PHUMCIM	PHUMOX5	none
3432	PHUMCIM	PHUMOX6	none
3433	PHUMSIM	PHUMOX3	none
3434	PHUMSIM	PHUMOX4	none
3435	PHUMSIM	PHUMOX5	none
3436	PHUMSIM	PHUMOX6	none

The following parameters have a record package identified as Parameter Record Package **WPO #35856, Mobile Colloidal actinide Source Term. 4. Microbes. Author Hans Papenguth.** Please add this source to the bibliography for the parameters in table 3.

Table 3.

id	idpram	idmtrl	units
3447	CAPMIC	AM	moles/liter
3313	CAPMIC	NP	moles/liter
3315	CAPMIC	PU	moles/liter
3318	CAPMIC	TH	moles/liter
3308	CAPMIC	U	moles/liter

The following parameters have a record package identified as Parameter Record Package **WPO #35852, Mobile Colloidal actinide Source Term. 2. Actinide Intrinsic Colloids.** Author **Hans Papenguth**. Please add this source to the bibliography for the parameters in table 4.

Table 4.

id	idpram	idmtrl	units
3310	CONCINT	AM	moles/liter
3312	CONCINT	NP	moles/liter
3316	CONCINT	PU	moles/liter
3319	CONCINT	TH	moles/liter
3307	CONCINT	U	moles/liter

The following parameters have a record package identified as Parameter Record Package **WPO #35850, Mobile Colloidal actinide Source Term. 1. Mineral Fragment Colloids.** Author **Hans Papenguth**. Please add this source to the bibliography for the parameters in table 5.

Table 5.

id	idpram	idmtrl	units
3441	CONCMIN	AM	moles/liter
3439	CONCMIN	NP	moles/liter
3440	CONCMIN	PU	moles/liter
3437	CONCMIN	TH	moles/liter
3438	CONCMIN	U	moles/liter

The following parameters have a record package identified as Parameter Record Package **WPO #35856, Mobile Colloidal actinide Source Term. 4. Microbes.** Author **Hans Papenguth**. Please add this source to the bibliography for the parameters in table 6. The units for these parameters change to '**none**' from moles/liter.

Table 6.

id	idpram	idmtrl	units
3311	PROPMIC	AM	none
3314	PROPMIC	NP	none
3317	PROPMIC	PU	none
3320	PROPMIC	TH	none
3309	PROPMIC	U	none

Distribution:

MS 1328 Martin Tierney

MS 1328 Amy Johnson

WBS: 1.2.07.1.2:PDD:QA: 464 Corresp/464 Form

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Let us try a "constructed" distribution with the following percentile points:

$$(x_1, P_1) = (0.065, 0.0)$$

$$(x_2, P_2) = (\bar{x}, 0.5)$$

$$(x_3, P_3) = (1.60, 1.0)$$

We apply the formula for the mean of a "constructed" distribution

$$\begin{aligned} m &= \sum_{n=2}^3 (P_n - P_{n-1}) \frac{(x_n + x_{n-1})}{2} \\ &= (0.5 - 0.0) \cdot \frac{(\bar{x} + 0.065)}{2} + (1.0 - 0.5) \cdot \frac{(1.60 + \bar{x})}{2} \\ &= \frac{1}{4} (\bar{x} + 0.065 + 1.60 + \bar{x}) \end{aligned}$$

$$\therefore 4m = 2\bar{x} + 1.665 \quad \text{or} \quad \bar{x} = \frac{1}{2} (4m - 1.665)$$

$$\text{and if } m = 1.10, \quad \bar{x} = \frac{1}{2} (4.40 - 1.665) = 1.3675 \quad \leftarrow$$

$$\text{Calculated Mean} = 1.10, \quad \text{Median} = 1.3675, \quad \text{std. dev.} = 0.4693$$

PHUMCIM, PHUMOX3

Pg. 1 of 2

Given: A triangular distribution with lower limit 0.065, upper limit 1.60 and a mean of 1.10.

Question: What is the mode of this distribution?

The mean of a triangular distribution is given by

$$m = E(X) = \frac{a+b+c}{3}$$

where a = lower limit, c = upper limit and b = mode.

Solving this formula for b gives

$$b = 3m - (a+c)$$

So, for $m = 1.10$, $a = 0.065$ and $c = 1.60$,

$b = 3.30 - (1.665) = 1.64$?! This is greater than upper limit so it is impossible to fit a triangular distn. to these parameters.

Can we fit a truncated exponential to these data?

The pdf for the truncated distn. is simply $\lambda e^{-\lambda x} dx$ and we normalize by dividing by

$$\int_a^c \lambda e^{-\lambda x} dx = - \int_a^c \frac{d}{dx} (e^{-\lambda x}) dx = - \left[e^{-\lambda x} \right]_a^c = \frac{-\lambda a}{e^{-\lambda a}} - \frac{-\lambda c}{e^{-\lambda c}}$$

Thus, the CDF has the form

$$F(x) = \left[\frac{e^{-\lambda a}}{-\lambda a} - \frac{e^{-\lambda c}}{-\lambda c} \right]^{-1} \int_a^x \lambda e^{-\lambda s} ds = \frac{\frac{-\lambda a}{e^{-\lambda a}} - \frac{-\lambda x}{e^{-\lambda x}}}{\frac{-\lambda a}{e^{-\lambda a}} - \frac{-\lambda c}{e^{-\lambda c}}} \quad a < x \leq c$$

This may be too complex a calculation!

Is there some other way we can fit a distribution to

$$a = 0.065, \quad c = 1.60, \quad m = 1.10 ?$$

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	Form Number: 464	Effective: 11/28/95
Procedure: <u>9-2</u> Revision: <u>1</u>		Page <u>1</u> of <u>1</u>

Major Modification
 Error Correction
 New
 Deactivation

Parameter: proportionality constant of actinides in castile brine with humic colloids, inorganic, with Mg-bearing minerals Id: 3429

Material: proportionality constant with humic colloids for actinides in oxidation state III Idmtrl: PHUMOX3

Model: NUTS, GRIDFLOW Idpram: PHUMCIM

Category: 1 Units: moles/Liter

Distribution Type: CUMULATIVE (WPO35268) Mean: 1.10 ✓

Median: 1.37 ✓

Values: lo:0.065 med:1.37 hi:1.60 Std Dev: 0.469 ✓
 0.0 0.5 1.0 Prob.

Attachment: Yes No

Source: Memo: Hans W. Papenguth to Christine T. Stockman. "Colloidal Actinide Source Term Parameters, Revision 2". 4/22/96.

Interpretation: We have used a CUMULATIVE distribution with the source author's specified range and mean value - see attachment.

Qualified Parameter: Yes No
 Attachment: Yes No

Parameter Entry Approved by: Martin Tierney Martin Tierney 4/24/96
Parameters Task Leader (Print) Parameters Task Leader (Sign) Date

Requester: Mary-Alena Martell for Christine Stockman Mary-Alena Martell 4/25/96
Requester (Print) Requester (Sign) Date

Concurrence: (Required for Category 1 Parameters Only)

Hans Papenguth Hans W. Papenguth 4/29/96
Scientific Investigator (Print) Scientific Investigator (Sign) Date

Mary-Alena Martell for Christine Stockman Mary-Alena Martell 4/29/96
Performance Assessment Analyst (Print) Performance Assessment Analyst (Sign) Date

Entered by: Kelly Rost Kelly Rost 5/10/96
(Print) Sign Date

Entry Checked by: JT Schneider JT Schneider 5/10/96
(Print) Sign Date

Reviewer: Alex H. J. ... 5/8/96
 5/3 11-18-96

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