**From:** Palmer Joss <tlateott@yahoo.com>
**To:** <NRCREP@nrc.gov>
**Date:** Wed, Aug 2, 2006 3:04 PM
**Subject:** Fwd: Fw: Standard Review Plan for Activities related to U.S. Department of Energy Waste Determinations

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Add = A. Bradford (AHB1)

**Mail Envelope Properties** (44D0F71E.8AA : 24 : 22698)

**Subject:** Fwd: Fw: Standard Review Plan for Activities related to U.S. Department of Energy Waste Determinations
**Creation Date** Wed, Aug 2, 2006 11:03 AM
**From:** Palmer Joss <tlateott@yahoo.com>

**Created By:** tlateott@yahoo.com

**Recipients**
nrc.gov
TWGWPO01.HQGWDO01
NRCREP

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| MESSAGE | 297 | Wednesday, August 2, 2006 11:03 AM |
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**Options**

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| **Expiration Date:** | None |
| **Priority:** | Standard |
| **ReplyRequested:** | No |
| **Return Notification:** | None |
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**NRCREP - Fw: Standard Review Plan for Activities related to U.S. Department of Energy Waste Determinations**

**From:** Palmer Joss <lateoft@yahoo.ca>
**To:** <tlateott@yahoo.com>
**Date:** 08/01/2006 2:47 AM
**Subject:** Fw: Standard Review Plan for Activities related to U.S. Department of Energy Waste Determinations

----- Forwarded Message ----
From: Palmer Joss <lateoft@yahoo.ca>
To: Palmer Joss <lateoft@yahoo.ca>; nrcrep@nrc.gov
Sent: Monday, July 31, 2006 10:58:13 PM
Subject: Re: Standard Review Plan for Activities related to U.S. Department of Energy Waste Determinations

Second attempt. Your mail server refused to answer earlier.

----- Original Message ----
From: Palmer Joss <lateoft@yahoo.ca>
To: nrcrep@nrc.gov
Sent: Monday, July 31, 2006 11:23:26 AM
Subject: Standard Review Plan for Activities related to U.S. Department of Energy Waste Determinations

Dear Ms. Bradford.

Re: NUREG-1854

**Though NRC staff might like to have one standard, Hanford was excluded under the NDAA precisely becuase it is a different case.**

**Using one standard review risks NRC reviewing Hanford to an unlawful standard not applicable there.**

**Hanford is unsuitable for radioactive waste disposal.** There are several reasons for this.

First, the principal hazard in the wastes (Uranium, Technetium, Neptunium, Americium, Plutonium and others) are all anions in Hanfords soil. Most of these are actinides, which readily form oxoanion complexes, most notably carbonate and hydroxide complexes.

Second, Hanford's soils have virtually no capacity to retain anions.

Third, the high carbonate content of Hanford's sandy soil makes it a certainty that these wastes will in short order after release be converted to oxoanion complexes, with the sole exception of plutonium. Plutonium tends to form an oxide polymer when deposited out of nitric acid waste solutions in the absence of carbonate. This polymer is resistant to attack except around the edges, thereby limiting its release to the environment. However, Hanford like Savannah River Site frequently enocuntered cloggin of waste sites which was "fixed" by washing the cribs and related waste sites with nitric acid. This dissolved the plutonium polymer and washed it off the soil. As it came back out of solution it formed both fine colloids of polymer which move through the soil as neutral colloids, and oxoanion complexes, which are freely mobile in the soil. (Cite: Los Alamos actinide programs)

Fourth, the geology and hydrology of the Hanford site are dominated by the land forms created by the 60 or so massive ice age floods that happened between 14,500 and 11,500 years ago. These massive floods were among the largest flood events in the entire geologic record. They laid down a complex set of riverine deposits including varves, benches, channels, and near uniform sand layers. Following these, the rapid pressurization and depressurization of the soil under 400-800 feet of muddy water led to massive earthquakes and flood intrusions. These in turn led to the complex and massive formation of near vertical clastic dikes (six feet and 100 layers wide; 150-200 feet high; and 20-600 feet long). (Cite Karl Fecht "Clastic Dikes of the Pasco Basin", and extensive work by many site geologists)

The soil beneath the site is a complex hash of horizontally layered and structured sands with near impermeable tops interwoven with massive nearly impermeable dike walls. Taken together, these structures dramatically alter the fate and flow of water and wastes through the soil. They effectively channel flow in the subsurface sideways downslope on the old surfaces, then wick this vertically down the faces (not down the volume) of the dikes. This results in rapid transport over a longer path than the vertical downward path. It has caused ALL of Hanford's tank farms to impact the groundwater today, far in advance of anything predicted by any numerical model applied to date.

Idaho evidences similar subsurface layering dating back even farther to the previous ice age.

Fifth, the site work to date ignores ALL of this and erroneously models the flow of wastes and water as if it didn't exist. This is particularly true of the Performance Assessments done on site which NRC is at this moment reviewing.

Sixth, extensive work on the science of how the tank wastes in particular interact with soil have shown that the extreme alkaline wastes destroy the soil. As it comes back out of solution, the soil forms zeolites, sodalites and cancrinites. These do not readily retain radionuclides, and those they do become bound to the extremely fine colloids formed and are freely mobile in the soil.

Section four of the review plan does a generally good job of identifying the key issues that NRC needs to question in its review. At Hanford, the conceptual models used do NOT emulate or bound the actual observed movement of waste. Conceptual models which do emulate it have been specifically excluded from study. The kd and other site soil parameters used are inappropriate and appear designed to make it appear that waste will not move. The "calibration" of the site vertical bulk transport model used with real world data behaving under entirely different physical phenomenon leads to wholly erroneous predictions.

NRC staff will need to challenge and question every assumption and every piece of data and model used in Hanford's assessments if NRC is to do a credible assessment. Your reputation and credibility are on the line here.

In performing the Systems Assessment Capability (SAC), DOE used the best information they had at their disposal. The results of the first 25 runs of the model showed huge groundwater impacts across the entire site for the first thousand years. DOE discovered errors in the source term used in the first 25 runs that over represented the amount of technetium-99 on site. They then further refined the model incorrectly applying â€œhistory matchingâ€□ of the model to observed levels in the soils (which are moving in a way that is incompatible with the model used), to adjust the parameters used in the SAC. The final version of SAC was used in the Solid Waste EIS and were ten thousand fold different from that shown in the first 25 runs.

DOE was sued by the State of Washington over this modeling work and agreed that it was deficient. It is now being revised/updated as part of the Tank Closure & Waste Management EIS. That work has not yet taken on the problem with the conceptual models used. The Single-Shell Tank Performance Assessment continues to use the same wholly discredited conceptual model.

The conceptual models used in all of the models rely on direct vertical transport through the bulk of the soil. Lateral transport is represented erroneously as lateral spreading by changing the anisotropy used in the numerical models. The actual observed transport is quite often dominated by thin layer fast transport on old surface boundaries. The numerical models used by DOE represent this by lateral advection, which dramatically slows transport â€“ and which is directly contrary to the observed contaminant transport behavior. What is needed are models that emulate the preferential funnel flow, finger flow, macropore flow and dynamic reactive transport that is actually occurring, as well as more accurately representing the known subsurface features and channels.

DOE has acknowledged impacts to groundwater from all five waste management areas and from dozens of cribs, trenches and other facilities. The models used do not show impact in the very near term.

Be diligent in your reviews. Recognize that the groundwater is immensely valuable and must be returned to free use in a reasonable (less than centuries) time frame, including that directly beneath the tanks.

P.