From: James A Davis <jadavis@usgs.gov>
To: <WRO1@nrc.gov>, <jdr@nrc.gov>, <ALS2.twf5_po.TWFN_DO@nrc.gov>
Date: 2/22/06 5:25PM
Subject: Fw: Comments on NUREG/CR-6870

These comments might or might not take some effort to respond to. One could just add some language to address the comments or one could add additional scenarios, modeling, etc. to more quantitatively respond to their comments.

5/2/06
70 FR 22728
(3)

Dr. James A. Davis
U. S. Geological Survey
Mail Stop 465
345 Middlefield Rd.
Menlo Park, CA 94025
tel: 650-329-4484
fax: 650-329-4327
email: jadavis@usgs.gov

----- Forwarded by James A Davis/WRD/USGS/DOI on 02/22/2006 02:23 PM -----

"John Randall" <jdr@nrc.gov>
09/16/2005 04:35 AM

To
<gpcurtis@usgs.gov>, <jadavis@usgs.gov>
cc

Subject
Fwd: Comments on NUREG/CR-6870

Please read and respond to the attachment in your revision of NUREG/CR-6870.
----- Message from "Leland Huffman" <huffman@vcn.com> on Wed, 31 Aug 2005 10:58:44 -0600 -----
To:
<jdr@nrc.gov>
cc:
"Ken Milmine" <kmilmine@vcn.com>, "Chuck Foldenauer" <cfoldenauer@vcn.com>, <Steve_Collings@cameco.com>
Subject:
Comments on NUREG/CR-6870
Sir or Madam,

Please find attached a correspondence from Power Resources, Inc.with comments on the NUREG/CR-6870 report.

Thank you,

Leland Huffman
Restoration Superintendent

SISP Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = A. Schwartzman (ALS2)

CC: Gary P Curtis <gpcurtis@usgs.gov>

Mail Envelope Properties (43FCE4C1.05E : 6 : 41054)

Subject:	Fw: Comments on NUREG/CR-6870
Creation Date:	2/22/06 5:24PM
From:	James A Davis <jadavis@usgs.gov>
Created By:	jadavis@usgs.gov

Recipients

nrc.gov
- twf5_po.TWFN_DO
  - WRO1 (W Ott)
  - JDR (John Randall)
  - ALS2 (Adam Schwartzman)

usgs.gov
- gpcurtis CC (Gary P Curtis)

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	usgs.gov

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MESSAGE	1129	02/22/06 05:24PM
050831_Comments on NUREGCR-6870_PRI.doc	208384	
Mime.822	287695	

Options

Expiration Date:	None
Priority:	Standard
Reply Requested:	No
Return Notification:	None
Concealed Subject:	No
Security:	Standard

POWER
RESOURCES

Smith Ranch - Highland
Uranium Project
P.O. Box 1210
Glenrock, Wyoming USA 82637
Casper: 307-235-1628
Douglas: 307-358-6541
Fax: 307-358-4533

August 31, 2005

Chief, Rules Review and Directives Branch
U. S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, DC 20555-0001

RE: Comments Regarding NUREG/CR-6870

Dear Sir or Madam:

Power Resources, Inc. (PRI) has reviewed the recently published NRC NUREG/CR-6870 prepared by the U.S. Geological Survey on geochemical modeling of ground water during restoration at uranium in-situ leach facilities. PRIs comments regarding this report are discussed in this correspondence.

The report authors agree that reducing conditions sufficient to decrease the concentrations of uranium, arsenic, selenium and vanadium by forming less soluble mineral complexes are easily achieved during active restoration. The authors main concern centered on the stability of the reduced mining zone formation as several (96) pore volumes of upgradient ground water flow through the restored mine unit. Therefore, PRI will confine its comments to this concern.

The authors state in their conclusion based on their long term stabilization simulations that " the decrease in the concentrations of dissolved U, SE, and As that are predicted to occur as a result of the hydrogen sulfide treatment are due to the precipitation of reduced mineral phases, such as uraninite, orpiment and ferrous selenide. Thus, these elements are still present in the mined zone and can potentially be re-oxidized by influent oxic groundwater." These statements suggest that upgradient ground water entering the restored mining zone, will cause reduced mineral phases to be oxidized, which will lead to increased concentrations of uranium, selenium and arsenic in the ground water.

PRIs Comments:

- The authors do not discuss the depth of the ground water they are modeling. The depths that PRI mines at are generally greater than 300 feet therefore, it is unlikely that oxic ground water will be present to contact the restored mining zone.
- PRI tested this scenario in a wellfield near Header House 16E in Mine Unit B. Following reduction of the mining zone in this area, PRI flushed the area with RO permeate fluid that was in

contact with the atmosphere prior to injection. At this altitude, the estimated oxygen content is about 8 mg/L. The area was flushed with several pore volumes and the selenium concentration remained at 0.01 mg/L, the arsenic concentration remained below 0.01 mg/L and the uranium concentration ranged between 2 to 3 mg/L, which is below the target concentration for uranium of 5 mg/L.

- If oxic ground water were to flow through the restored mining zone and oxidize these reduced minerals, then their concentrations would be limited by the formation of iron hydroxides. If this were not the case, then during baseline sampling on the oxidized side of the role fronts, the concentrations of these elements would be greatly increased.
- Another consideration is that the formation downgradient of the restored mining zone is also reducing and therefore these elements would be precipitated from solution within a very short distance should they be re-oxidized.

The comments made by the authors imply that ground water restoration following in situ leach uranium mining is temporary and therefore a case can be made to prohibit in situ leach mining. However, based on actual field experience and the depth of deposition of the ore bodies, PRI believes that successful ground water restoration can be achieved and that the restored mining zone will not pose a threat to downgradient resources.

Sincerely,

Leland Huffman
Restoration Superintendent

LAH/lah

cc: S.P. Collings C. Foldenauer K. Milmine
File HUP-4.3.3.1