

**From:** <Christina\_Maes@fws.gov>  
**To:** <nrcprep@nrc.gov>  
**Date:** Wed, Sep 5, 2007 3:35 PM  
**Subject:** ER\_07\_0604\_NOI uranium Miling response

(See attached file: ER\_07\_0604.pdf)

Thank You,  
Christina M. Maes  
Region 6 RO Fisheries/Ecological Services  
Administrative Assistant  
303-236-4516 Direct Line  
303-236-0027 Fax  
Christina\_Maes@fws.gov

7/24/07  
72 FR 40344

191

RECEIVED

2007 SEP -6 PM 12:55

RULES AND DIRECTIVES  
REGION  
154473

SUNSI Review Complete  
Template = ADM-013

E-RIDS = ADM-03  
Add = J. Park (JRP)  
W. Vontell (RWV)

**Mail Envelope Properties** (46DF04FD.9A6 : 2 : 27046)

**Subject:** ER\_07\_0604\_NOI uranium Miling response  
**Creation Date** Wed, Sep 5, 2007 3:34 PM  
**From:** <Christina\_Maes@fws.gov>

**Created By:** Christina\_Maes@fws.gov

**Recipients**

nrc.gov  
 TWGWPO01.HQGWDO01  
 NRCREP

**Post Office**

TWGWPO01.HQGWDO01

**Route**

nrc.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	201	Wednesday, September 5, 2007 3:34 PM
ER_07_0604.pdf	185286	
Mime.822	255722	

**Options**

**Expiration Date:** None  
**Priority:** Standard  
**ReplyRequested:** No  
**Return Notification:** None

**Concealed Subject:** No  
**Security:** Standard

**Junk Mail Handling Evaluation Results**

Message is eligible for Junk Mail handling  
 This message was not classified as Junk Mail

**Junk Mail settings when this message was delivered**

Junk Mail handling disabled by User  
 Junk Mail handling disabled by Administrator  
 Junk List is not enabled  
 Junk Mail using personal address books is not enabled  
 Block List is not enabled



IN REPLY REFER TO

FWS/R6  
FR-ES

United States Department of the Interior  
FISH AND WILDLIFE SERVICE  
Mountain-Prairie Region



MAILING ADDRESS:  
Post Office Box 25486  
Denver Federal Center  
Denver, Colorado 80225-0486

STREET LOCATION:  
134 Union Blvd.  
Lakewood, Colorado 80228-1807

SEP 05 2007

Patrice Bubar, Deputy Director  
Division of Intergovernmental Liaison and Rulemaking  
U.S. Nuclear Regulatory Commission  
Mail Stop T-6D59  
Washington, D.C. 20555-0001

Dear Ms. Bubar:

The U.S. Fish and Wildlife Service, Region 6 (Service) has reviewed the Notice of Intent to prepare a Generic Environmental Impact Statement for Uranium Milling Facilities (GEIS). We offer the following comments and recommend the Nuclear Regulatory Commission incorporate safeguards or management actions to prevent or minimize adverse impacts to our trust resources addressed below.

#### **Contaminants Associated with In-situ Uranium Mining**

High selenium concentrations can occur in wastewater from in-situ mining of uranium ore as uranium-bearing formations are usually associated with seleniferous strata (Boon 1989). Boon (1989) reported that uranium deposits in the southern Powder River Basin in Converse County, Wyoming can contain up to 4,500  $\mu\text{g/g}$  (ppm) of selenium. The leaching solution dissolves selenium present in the formation. The disposal of this wastewater can expose migratory birds to selenium which is known to cause impaired reproduction and mortality in sensitive species of birds such as waterfowl.

The in-situ mining wastewater is typically disposed of through deep-well injection or discharge into large evaporation ponds. However, we do not recommend land application using center pivot irrigation for the disposal of in-situ mining wastewater. In 1998, the Service conducted a study of a grassland irrigated with wastewater from an in-situ uranium mine and found that selenium was mobilized into the food chain and bioaccumulated by grasshoppers and songbirds (Ramirez and Rogers 2002). Disposal of the in-situ wastewater through irrigation is not recommended because selenium bioaccumulation in the food chain can cause adverse effects to migratory birds. Additionally, land application may result in the contamination of groundwater which may reach surface waters. Additionally, the selenium-contaminated groundwater could seep into low areas or basins in upland sites and create wetlands which would attract migratory birds and other wildlife.

The Service also is concerned with the potential for elevated selenium in evaporation ponds receiving in-situ wastewater. Waterborne selenium concentrations  $> 2 \mu\text{g/L}$  are considered hazardous to the health and long-term survival of fish and wildlife (Lemly 1996). Additionally, water with more than 20  $\mu\text{g/L}$  is considered hazardous to aquatic birds (Skorupa and Ohlendorf 1991). Selenium toxicity also will cause embryonic deformities and mortality (see et al. 1992,

Skorupa and Ohlendorf 1991, Ohlendorf 2002). Chronic effects of selenium manifest themselves in immune suppression to birds (Fairbrother et al. 1994) which can make affected birds more susceptible to disease and predation.

If submerged aquatic vegetation and/or aquatic invertebrates are present in evaporation ponds with elevated waterborne selenium concentrations, extremely high dietary levels may be present in vegetation and insects and thus become available to aquatic migratory birds. Ramirez and Rogers (2000) documented selenium concentrations ranging from 434 to 508  $\mu\text{g/g}$  in pondweed (*Potamogeton vaginatus*) collected from a uranium mine wastewater storage reservoir that had waterborne selenium concentrations ranging from 260 to 350  $\mu\text{g/L}$ .

The potential for selenium and other contaminants to impact migratory birds should be assessed if the proposed facility will use ponds to store or dispose of the wastewater or if the wastewater will be disposed of in such a manner as to potentially expose migratory birds or other wildlife to contaminants.

Accidental releases/spills of uranium in-situ production water can result in the ponding or pooling of this production water which could be ingested by wildlife, including migratory birds thus exposing them to uranium, radionuclides, and selenium. Spills or releases of production water also could reach surface waters which could impact aquatic organisms inhabiting the affected waters.

We also recommend a requirement that leak detection systems in all injection wells and production wells be installed to enable operators to immediately respond to releases of injection or production water onto the environment.

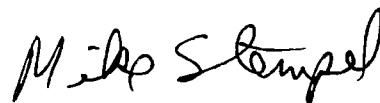
### **Contaminants Associated with the Conventional Uranium Milling Process**

Our primary concern with the conventional uranium milling process is the management of milling wastes. Milling wastes should not be stored in the 100-year floodplain and these wastes should be contained in facilities with impermeable liners to prevent contamination of groundwater or surface waters. We recommend the draft GEIS identify other constituents found in the ores, or added during the milling/processing phase, and that the document address possible impacts of those constituents on the environment. We also recommend that location and stability of any leach piles, disposal piles, or any other disposal units be identified.

### **Conclusion**

Thank you for the opportunity to review and comment on this Notice of Intent. If you have any questions, please contact Larry Gamble, Environmental Contaminants Coordinator, at (303) 236-4260.

Sincerely,



Assistant Regional Director  
Fisheries - Ecological Services

**References Cited:**

- Boon, D.Y. 1989. Potential selenium problems in Great Plains soils. In L.W. Jacobs, ed. Selenium in agriculture and the environment. American Society of Agronomy, Inc, and Soil Science Society of America. SSSA Special Pub. No. 23. Madison, WI. pp: 107-121.
- Fairbrother, A.F., M. Fix, T. O'Hara, and C.A. Ribic. 1994. Impairment of growth and immune function of avocet chicks from sites with elevated selenium, arsenic, and boron. Journal of Wildlife Diseases. 30(2):222-233.
- Lemly, A.D. 1996. Selenium in aquatic organisms. Pages 427-445 in W.N. Beyer, G.H. Heinz, and A.W. Redmon-Norwood (eds.). Environmental contaminants in wildlife: Interpreting tissue concentrations. Lewis Publishers, Boca Raton, Florida.
- Ohlendorf, H.M. 2002. Ecotoxicology of selenium. In Handbook of Ecotoxicology, 2nd ed.; Hoffman, D.J., Rattner, B.A., Burton Jr., G.A., Cairns, Jr., J., Eds.; Lewis Publishers, Boca Raton, FL, 2003; pp 465-500.
- Ramirez, P. and B. Rogers. 2000. Selenium in a Wyoming grassland community receiving wastewater from an in situ uranium mine. U.S. Fish and Wildlife Service Contaminant Report # R6/715C/00. Cheyenne, WY. Sept. 31.
- Ramirez, P. Jr. and B.P. Rogers. 2002. Selenium in a Wyoming grassland community receiving wastewater from an *in situ* uranium mine. Arch. Environ. Contam. Toxicol. 42:431-436.
- See, R.B., D.L. Naftz, D.A. Peterson, J.G. Crock, J.A. Erdman, R.C. Severson, P. Ramirez, Jr., and J.A. Armstrong. 1992. Detailed study of selenium in soil, representative plants, water, bottom sediment, and biota in the Kendrick Reclamation Project Area, Wyoming, 1988-90. U.S. Geological Survey Water Resources Investigations Report 91-4131. 142 pp.
- Skorupa, J.P., and H.M. Ohlendorf. 1991. Contaminants in drainage water and avian risk thresholds. Pages 345-368 in A. Dinar and D. Zilberman (eds.). The economics and management of water and drainage in agriculture. Kluwer Academic Publishers, Boston, MA.