July 10, 2009

MEMORANDUM FOR: Chairman Jaczko
Commissioner Klein
Commissioner Svinicki

FROM: Charles L. Miller, Director **/RA/**
Office of Federal and State Materials
and Environmental Management Programs

SUBJECT: STAFF ASSESSMENT OF GROUNDWATER IMPACTS FROM PREVIOUSLY LICENSED IN-SITU URANIUM RECOVERY FACILITIES

As a result of the December 11, 2008, Commission Briefing on the Status of Uranium Recovery, the Commission instructed the staff to "provide the Commission with the data that it has in hand that assesses environmental impacts to the groundwater from previously licensed in-situ uranium recovery (ISR) facilities" (SRM M081211). This memorandum provides results of the staff's review of information on groundwater impacts from ISR facilities.

Potential groundwater impacts at an ISR facility can result from: (1) residual constituent concentrations in excess of baseline concentrations after the restoration of the production aquifer; (2) a migration of production liquids from the production aquifer to the surrounding aquifers during operation; (3) a mechanical failure of the subsurface well materials releasing production fluids into the overlying aquifers; and (4) movement of constituents to groundwater outside the licensed area.

The staff examined the available data from the three U.S. Nuclear Regulatory Commission (NRC) licensed ISR facilities that are operational. With regard to Item 1 mentioned above, our records indicate that NRC has approved 11 groundwater restorations at the 3 facilities. The data show that over 60 percent of the constituents were restored to their pre-operational concentrations. Although the remaining constituents were restored to concentrations that were above baseline levels, they were all restored to levels that NRC staff found to be protective of public health and the environment.

With regard to the migration of production liquids toward the surrounding aquifer, each licensee must define and monitor a set of nonhazardous parameters to identify any unintended movement toward the surrounding aquifer. Exceedances of those parameters result in an event termed an excursion; excursion events are not necessarily environmental impacts but just indicators of the unintended movement of production fluids. The data show over 60 events had occurred at the 3 facilities. For most of those events, the licensees were able to control and

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reverse them through pumping and extraction at nearby wells. Most excursions were short-lived, although a few of them continued for several years. None had resulted in environmental impacts.

Mechanical integrity tests (MIT) are performed on a routine basis to determine if wells have a potential to leak during operation. The data indicates that a small percentage of the wells tested failed and they were replaced. One licensee also investigated the overlying aquifers and found no impacts for five of six MIT failures and mitigated the impact found from the remaining failure. The other two licensees did not specifically investigate the overlying aquifers; however, the aquifer above the production zone is continually monitored as part of the excursion monitoring program and data from that monitoring did not identify any impact attributable to well failure.

Routine regional aquifer monitoring programs are conducted by the existing ISR facilities as a license condition. The data from those monitoring programs do not show impacts attributable to the ISR facility. The staff is unaware of any situation indicating that: (1) the quality of groundwater at a nearby water supply well has been degraded; (2) the use of a water supply well has been discontinued; or (3) a well has been relocated because of impacts attributed to an ISR facility.

The enclosure discusses the staff's findings in more detail. It is the staff's intention to notify participants of the December 11, 2008 Commission briefing of the availability of the enclosed report once it is made public.

Enclosure: Data on Groundwater Impacts
at the Existing ISR Facilities

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