RAI 27: Description of Deficiency: The applicant did not provide details on its ventilation equipment related to minimum performance specifications and frequencies of tests and inspections.

Basis for Request: NUREG-1569, Acceptance Criterion 5.7.1.3 (4), states, in part: "The applicant describes minimum performance specifications for the operation of the effluent controls and the frequencies of tests and inspections to ensure proper performance to specifications..."

The applicant stated in TR Section 5.7.1.1 that ventilation equipment will be inspected for proper operation as recommended in RG 3.56 and that this equipment will be inspected during radiation safety inspections as discussed in TR Section 5.3.1.

Staff observes that RG 3.56 does not specifically address ventilation systems and only provides a general description of maintenance and testing, relying on manufacturer's recommendations and minimum timeframes. In addition, the applicant does not address ventilation systems operations in its radiation safety inspections discussed in TR Section 5.3.1.

Request for Additional Information: Please provide details on the applicant's testing, maintenance, and inspection program for ventilation systems at the Marsland satellite facility, including wellhouse ventilation units. Specifically, please provide minimum performance specifications and frequencies of tests, inspections, and maintenance activities for these ventilation systems or indicate where this information can be found in the application.

Consistent with RG 3.56, please also describe any specialized training for those performing inspections on the ventilation systems.

RAI Response 27 (09/25/14)

Section 4.1.2.3 and of the application has been revised. Also, see RAI Response 21 for revision to Section 4.3.1.

4.1.2.1 Airborne Uranium Emissions

One process area at the proposed MEA where small quantities of airborne uranium particulates have the potential for occurring is the resin transfer station, where minor spills may occur. The loaded IX resin is transferred to a truck for transport to the CPF for completion of uranium recovery. Spills can occur during resin transfer, and this is where exposure to uranium particulates is possible. All spills will be cleaned up as soon as possible to prevent the wet materials from drying and creating the potential for airborne particulates. Spills associated with resin transfer would involve the impregnated resin itself. The uranium is still bound to the resin at this stage, reducing the potential of employee exposure.

Maintenance activities on piping containing pregnant lixiviant could also result in the release of radon and uranium. Any spills or releases during maintenance of these potential sources would be cleaned up promptly to prevent drying of the material and creation of particulates subject to dispersion. All non-routine operations or maintenance activities where the potential exists for significant exposure to radioactive materials, and for which there is no SOP, require a Radiation Work Permit (RWP). The RWP ensures that the applicable radiological safety measures are used by the workers, and identifies the type of personnel monitoring that would be required for determining radiation exposure (i.e., internal and external radiation).

One stationary sample point would be established near the resin transfer station and sampled monthly for potential airborne uranium particulates. Monitoring activities for routine operations, maintenance activities, and spill cleanups are discussed in Section 5.7.

4.1.2.2 Wellfield Radon Emissions

Injection wells are generally closed and pressurized, but are periodically vented, releasing radon to the atmosphere. Production wells will be continually vented to the surface, but water levels will typically be low and radon venting will be minimal. All of the well releases will be outside of buildings and directly vented to the atmosphere.

Wellhouses are vented, with exhaust fans located in the wall directly opposite the entryway. This allows personnel to immediately verify that the vent is operational. In addition, all wellhouse vents are inspected daily. Direct release to the atmosphere from the wellhouses results in rapid dispersion of the radon emissions. For the majority of the year (except during extreme cold weather), the doors will remain opened when the buildings are accessed, allowing for additional ventilation of the building during entry by personnel.

Wellfield and wellhouse offgassing is not considered a significant source of radon or a safety issue. This statement is supported by monitoring at the current CPF. Radon individual exposure levels from 1994 through 2006 for Crow Butte employees ranged from 5 to 16 percent of the occupational exposure limit of 4 working level months. Exposure to radon is reported as working level months, a unit commonly used in occupational environments and refers to exposure to a set concentration of radon and its associated progeny. Radiological exposure pathways are discussed in Section 7.3.

4.1.2.3 Satellite Plant Radon Emissions

At the CPF, a combination of passive and active ventilation systems keeps radon and radon progeny levels ALARA. An evaluation of these systems is presented in **Appendix Y**. The

evaluation noted that the large overhead doors may be open or closed at any time in the course of a day. Most important, even when all the overhead doors are closed, there is sufficient air intake capacity to maintain the desired negative pressure.

As at the CPF, in addition to exhaust fans installed in the walls, hard-piped ventilation systems will be installed for all indoor non-sealed process tanks and vessels where radon-222 or process fumes would be expected. The system consisting of air ducts or piping system connected to the top of each of the process tanks that could produce radon will include:

- IX tanks
- resin transfer tanks
- bicarbonate mix tanks

Separate hard-piped ventilation systems will be installed for areas known to emanate especially large amounts radon, such as the bicarbonate mix tanks, to ensure that exposures are maintained ALARA.

Exhaust fans will direct collected gases to discharge piping that will exhaust fumes to the outside atmosphere. The fans will be designed such that the system will be capable of limiting employee exposures with the failure of any single fan. Discharge stacks will be located away from building ventilation intakes to prevent introducing exhausted radon into the facility as recommended in RG 8.31 (NRC 2002). Airflow through any openings in the vessels will be from the process area into the vessel and into the ventilation system, controlling any releases that occur inside the vessel. These exhaust fans would be located at different levels to ensure sufficient ventilation of areas where radon could accumulate. The exhaust fans will create negative pressure, ensuring that air will not enter the process areas from vessels and systems within the satellite building. Separate ventilation systems may be used as needed for the functional areas within the satellite facility.

A tank ventilation system of this type is used in the existing CPF. An evaluation of that system is provided in **Appendix Y**. Operational radiological in-plant monitoring for radon concentrations and recent upgrades have demonstrated this system to be an effective method for minimizing employee exposure. The ventilation system at the proposed Marsland facilities would be similar to that used at the CPF. Separate and independent local ventilation systems may be used temporarily as needed for non-routine activities such as maintenance. Similar to the CPF, the Marsland Satellite Plant will be designed to achieve 4 to 5 air exchanges per hour. A preoperational test will be conducted to verify the air exchange rate.

As discussed above for the CPF, radon daughter monitoring at the proposed satellite facility would be used to verify that radon daughters are maintained below the 25 percent Derived Air Concentration (DAC) action level. Ongoing operations would ensure that the ventilation system operates satisfactorily and as designed through the use of SOPs.