

8.0 ALTERNATIVES TO PROPOSED ACTION

8.1 Areas of Review

The staff will review comparative reconnaissance level evaluations of available alternatives to the licensing action proposed in the *in situ* leach facility application in accordance with the requirements of National Environmental Policy Act of 1969 including realistic alternatives for the various processing stages. As part of this review, the staff should consider the no-action alternative. Alternative designs do not have to be described in as great detail as the proposed action. The purpose of these evaluations is to determine that alternatives that provide a significant reduction in impacts to human health and the environment have not been overlooked. The reviews should include descriptions of the ground-water quality restoration programs to be applied for each alternative other than the no-action alternative. The staff should evaluate alternatives that may reduce or avoid significant adverse environmental, social, and economic effects expected to result from construction and operation of the proposed facility. The staff should also review the bases and rationales for the choices in regard to number, availability, suitability, and factors limiting the range of alternatives that might avoid some or all of the environmental effects identified in Section 7.0 of this standard review plan. The preferred alternative need not be the one with the least adverse impact. For commercial-scale operations, the review should include the comparative evaluation of available alternatives using results obtained from research and development operations, if applicable.

The staff should also review waste management alternatives considering siting, design, and operational performance objectives developed by NRC staff, in addition to the plans for final disposal discussed in Section 6.0 of this standard review plan.

The review should include discussions regarding locating the liquid impoundment areas at sites where disruption and dispersion by natural forces are eliminated or reduced to acceptable levels, and designing the impoundment areas so that seepage of materials into the ground-water system would be eliminated or reduced to acceptable levels.

8.2 Review Procedures

The staff should determine that the applicant has justified the choice of particular economic recovery processes for the mineralized zone by considering and choosing among techniques and processes that affect the environment in minimal ways. The justification should include a comparative evaluation of the available practicable alternatives. Strengths and weaknesses associated with the likely effects of the use of each technique or process, including the ground-water quality restoration program, should be presented. The staff should determine whether the applicant has considered and chosen those alternatives that may reduce or avoid significant adverse environmental, social, and economic effects expected to result from the construction and operation of the proposed facility. The staff should evaluate the basis and rationale the applicant used for the consideration and rating of the alternatives. The staff should determine that, for commercial-scale operations, the comparative evaluation of available alternatives includes results from research and development operations or similar production-scale sites, if appropriate. The preferred alternative need not be the one with the least adverse environmental impact, and the staff shall evaluate whether the proposed action would meet the requirements of 10 CFR Part 40, Appendix A.

Alternatives to Proposed Action

For license renewals and amendment applications, Appendix A to this standard review plan provides guidance for examining facility operations and the approach that should be used in evaluating amendments and renewal applications.

8.3 Acceptance Criteria

The evaluation of alternatives to the proposed action is acceptable if it meets the following criteria:

- (1) The applicant considers process alternatives to the proposed action. The applicant identifies alternatives to the operation of the proposed facility in the manner reviewed in Sections 2.0, 3.0, 4.0, 5.0, and 6.0 of this standard review plan that may mitigate adverse environmental, social, and economic effects reviewed in Section 7.0 of this standard review plan. These alternatives may include, but are not limited to:
 - (a) The no-action alternative (must be included.)
 - (b) Alternative ore extraction processes such as traditional open-pit and underground mining.
 - (c) Alternative lixiviant chemistry.
 - (d) Alternative ground-water restoration and long-term monitoring techniques.
 - (e) Alternative monitoring and waste management practices.
 - (f) Uranium recovery process alternatives.
 - (g) Construction of a central processing facility versus use of satellite facilities.
- (2) The alternatives are compared with the proposed actions considering the site characteristics as reviewed in Section 2.0 of this standard review plan and consistent with existing uranium extraction standards and practices.

The rationale for selecting the proposed method should be provided, and the proposed action should be shown to be at least as effective as the considered alternatives in meeting all regulatory requirements. If the application is for a new commercial-scale license, the consideration should be based on the results of the research and development site, if applicable.
- (3) The applicant considers the environmental, social, and economic effects of a no-action alternative. Presumably, the applicant will provide information to demonstrate that the proposed action will provide social and economic benefits that outweigh the environmental impact of operating the facility.

- (4) The applicant clearly identifies the preferred alternative and demonstrates that it would meet the requirements of 10 CFR Part 40, Appendix A.

8.4 Evaluation Findings

If the staff review, as described in this section, results in the acceptance of the alternatives to the proposed action, the following conclusions may be presented in the technical evaluation report.

NRC has completed its review of the alternatives to the proposed action at the _____ *in situ* leach facility. This review included an evaluation of the methods that will be used to develop the alternatives to the proposed action using the review procedures in standard review plan Section 8.2 and the acceptance criteria outlined in standard review plan Section 8.3.

The applicant has considered other alternatives to its proposed *in situ* leach facility such as open-pit or underground mining. Alternatives to the proposed facility operations that might mitigate environmental, social, and economic effects identified in standard review plan Section 7.0 are presented in a form similar to that required in Sections 2.0, 3.0, 4.0, 5.0, and 6.0, of this standard review plan. Alternatives were acceptably considered for lixiviant chemistry, ground-water restoration techniques, waste management practices, and uranium recovery processes. The applicant has demonstrated that the choice of alternative is effective in meeting the applicable requirements of 10 CFR Part 40, Appendix A. Data from past operations or considerations based on results of research and development site were included in the evaluation of the alternatives, as appropriate. The applicant has considered a no-licensing alternative and has demonstrated that the social and economic benefits of the proposed _____ *in situ* leach facility outweigh any adverse environmental impact of the facility.

Based on the information provided in the application and the detailed review conducted of alternatives to the proposed action for the _____ *in situ* leach facility, the staff concludes that the assessment of alternatives to the proposed action is acceptable and is in compliance with 10 CFR Part 51.45(b)(3) which requires that alternatives to the proposed action be analyzed and applicable portions of 10 CFR Part 40, Appendix A, which provides the requirements for extracting source material from ores and for disposal of the associated wastes.

8.5 References

None.