

9.0 COST- BENEFIT ANALYSIS

9.1 Areas of Review

The benefit-cost analysis proposed in this section is intended to be a summary of the benefits and costs of the proposed facility. The staff should review the discussion provided and any accompanying illustrations and tables that explain the important benefits and costs of the proposed facility and operations to determine that the issuance of a license is justified. It is important that both quantitative and qualitative justifications be supported with acceptable data and appropriate rationale.

The review should include evaluation against criteria for assessing and comparing benefits and costs where these are expressed in nonmonetary or qualitative terms and rationales for the selection of process alternatives as well as subsystem alternatives. The staff should also evaluate descriptions of any likely cumulative effects, and the rationale for omitting apparent benefits or costs.

The staff should review irreversible and irretrievable commitments of resources caused by the construction, operation, restoration, reclamation, and decommissioning of the proposed facility. This review should include both relative impacts and long-term net effects. Such resources should include permanent land withdrawal, irreversible or irretrievable commitments of mineral resources, water resource needs and ground-water consumption, permanent vegetation and wildlife losses (e.g., unique habitat, species), and consumption of material resources during operation such as processing chemicals and power or energy needs. The staff should review information presented concerning the percentage terms in which the expected resource loss is related to the total resource in the immediate region and in which the immediate region is related to the surrounding regions in terms of affected areas and distances from the site.

9.2 Review Procedures

The reviewer should determine that the benefit-cost statement has been summarized in the form of a narrative and accompanying tables and charts. The important benefits and costs should be contrasted and discussed appropriately to justify the issuance of the license.

The reviewer should determine that the applicant has developed criteria for assessing and comparing benefits and costs where they are expressed in nonmonetary or qualitative terms. Among the criteria that should be considered are (i) ground-water quality or quantity effects, (ii) radiological impact, and (iii) disturbance of the land. The applicant should present the rationales for the selection of process alternatives as well as subsystem alternatives. The reviewer should ascertain that any likely cumulative and symbiotic effects have been detailed along with appropriate rationales for any tradeoffs. If any apparent benefits or costs have been omitted by the applicant, the reviewer should determine that the applicant has presented the rationale for such omissions. The staff should determine that the applicant has related all the terms used in the benefit-cost analysis to the relevant sections of the application. Overall, the benefit-cost section should demonstrate to reviewer satisfaction that the proposed project is a positive economic and social activity.

Cost-Benefit Analysis

The staff should determine whether sufficient detail is presented to evaluate irreversible and irretrievable commitments of resources because of the construction, operation, restoration, reclamation, and decommissioning of the proposed facility. These commitments should be reviewed considering the facility description and operations discussed in other sections of this SRP to ensure consistency and completeness. Resource needs previously identified in existing environmental reports for similar facilities that are currently operating can be used in the staff's review for comparison.

NUREG-1748 (NRC, 2001) provides guidance for compliance with the socioeconomic and cost-benefit considerations required by the National Environmental Protection Act.

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.

9.3 Acceptance Criteria

The benefit-cost analysis is acceptable if it meets the following criteria:

- (1) The economic benefits of the construction and operation of the proposed facility are acceptably summarized. These may include, but are not limited to
 - (a) Tax revenues to be received by federal, state, and local governments
 - (b) Temporary and permanent jobs
 - (c) Incremental increases in regional productivity of goods and service
 - (d) Enhancement of recreational values
 - (e) Environmental enhancement in support of the propagation or protection of wildlife and the improvement of wildlife habitats
 - (f) Creation and improvement of local roads, waterways, or other transportation facilities
 - (g) Increased knowledge of the environment as a consequence of ecological research and environmental monitoring activities associated with plant operation and technological improvements from the applicant's research program
- (2) Economic benefits are estimated based on realistic assumptions and objective sources such as census data, tax information, and other site characteristics reviewed in Section 2.0 of this standard review plan.
- (3) The applicant provides a summary of the costs of plant decommissioning and site reclamation costs, and ground-water restoration.

Cost-Benefit Analysis

- (4) The applicant summarizes short-term external costs as they affect the interests of people other than the owners and operators of the proposed facility. These may include, but are not limited to
 - (a) Housing shortages
 - (b) Local inflation
 - (c) Noise and congestion
 - (d) Overloading of the water supply, water treatment facilities, and disposal landfills
 - (e) Crowding of schools, hospitals, recreational facilities, or other public facilities
 - (f) Disruption of people's lives (e.g., ranching, farming) through the acquisition of land
- (5) The applicant summarizes long-term external costs as they affect the interests of people other than the owners and operators of the proposed facility. These may include, but are not limited to
 - (a) Impairment of recreational values through reduction in wildlife and sport animals
 - (b) Restrictions on access to land or water
 - (c) Aesthetic impacts
 - (d) Degradation or limited access to areas of historical, scenic, or cultural interests
 - (e) Lost income related to limitations on access to land and facilities
 - (f) Decreased real estate values
 - (g) Increased cost to provide government services for increased populations
- (6) The applicant identifies who is most likely to be affected by the construction and operation of the proposed facility, and to the extent possible, identifies how long the disturbance is expected. This information should be consistent with the population information reviewed in Section 2.3 of this standard review plan.
- (7) If the application is for a renewal, the applicant provides a summary of the actual economic benefits and costs of the facility since the last licensing action.
- (8) A comparison of the benefits and costs is presented that acceptably justifies proceeding with the *in situ* leach operations.

Cost-Benefit Analysis

- (9) For special case environmental assessments (e.g., those that have substantial public interest, decommissioning cases involving on-site disposal, decommissioning/decontamination cases that allow radioactivity in excess of release criteria, or cases where environmental justice issues have been previously raised) the applicant has provided sufficient data to assess environmental justice issues in accordance with NUREG-1748 (NRC, 2001).
- (10) The irreversible and irretrievable commitments of resources for the construction, operation, restoration, reclamation, and decommissioning of the proposed facility are appropriate considering the following:
 - (a) Permanent land withdrawal
 - (b) Permanent commitment of mineral resources
 - (c) Permanent commitment of water resources

Post ground-water restoration impacts at public water supply wells are acceptable if the water quality at town wells is consistent with EPA primary and secondary drinking water standards and NRC standards for uranium
 - (d) Irreversible loss of surface vegetation
 - (e) Irreversible loss of wildlife or wildlife habitat
 - (f) Irreversible commitments of material resources including processing chemicals and energy needs
- (11) For each resource area, the applicant identifies who is affected, the duration of impacts, and any mitigation measures proposed as necessary to alleviate or reduce impacts

9.4 Evaluation Findings

If the staff review, as described in this section, results in the acceptance of the cost-benefit analysis, the following conclusions may be presented in the environmental assessment.

NRC has completed its review of the cost-benefit analysis for the _____ *in situ* leach facility. This review included an evaluation of the methods that will be used to conduct the benefit-cost analysis and the results using the review procedures in standard review plan Section 9.2 and the acceptance criteria outlined in standard review plan Section 9.3.

The applicant has acceptably summarized the social and economic benefits of the construction and operation of the proposed _____ *in situ* leach facility including (i) additional tax revenues, (ii) temporary and permanent jobs, (iii) incremental increases in regional product, (iv) enhancement of recreational values, (v) environmental enhancement including protection or propagation of wildlife, (vi) creation and improvements in local infrastructure, and (vii) increased

awareness of the environment resulting from ecological research and monitoring and any technological improvements resulting from the applicant's program. The applicant has determined economic benefits from objective sources including (i) census data, (ii) tax information, and (iii) other data as evaluated in Section 2.0 of this standard review plan. The applicant has acceptably summarized costs including plant decommissioning, site reclamation, and ground water restoration. The costs for ground-water restoration, decommissioning, and reclamation, as considered in the financial assessment for surety reviewed in Section 6.5 of this standard review plan, are acceptable. The applicant has identified all short-term *in situ* leach facility-driven external costs including (i) housing shortages, (ii) local inflation, (iii) noise and congestion, (iv) overloading of infrastructure (e.g., schools, water supply, transportation links), and (v) disruption of people's lives as a result of land acquisition. The applicant has acceptably determined all facility-driven long-term external costs including (i) impacts on recreation through reduction in wildlife or sport animals; (ii) restrictions to access to land or water; (iii) aesthetic impacts; (iv) degradation or limited access to historic, scenic, or cultural interests; (v) lost income related to limitations on access to land or recreational facilities; (vi) decreased real estate values; and (vii) increased costs to provide government services for any additional population. The applicant has acceptably identified and considered the extent and longevity of the effect of construction and operation on individuals. The applicant has presented a comparison of the societal benefits and costs to society that acceptably justifies the proposed *in situ* leach facility and operations.

The applicant has acceptably described all anticipated economic and social effects of resources committed at the facility covering the affected environment and the full extent of activities discussed in Sections 2.0, 3.0, 4.0, 5.0, and 6.0 of this standard review plan. The applicant has provided an acceptable analysis of probable effects consistent with the facility design and industry-wide experience. The applicant has included analyses of (i) permanent land withdrawal; (ii) permanent commitment of mineral resources; (iii) permanent commitment of water resources; (iv) irreversible loss of surface vegetation; (v) irreversible loss of wildlife or wildlife habitat; and (vi) irreversible commitments of material resources, such as processing chemicals and energy needs. The applicant has acceptably identified, for each resource committed, who is affected, to what extent, and the expected duration of the effect. Overall, the applicant has demonstrated that its analysis of resources committed as a result of the construction, operation, restoration, reclamation, and decommissioning of the proposed *in situ* leach facility is supported by properly interpreted data, calculations, and model results.

Based on the information provided in the application and the detailed review conducted of the benefit-cost analysis for the _____ *in situ* leach facility, the staff concludes that the benefit-cost analysis is acceptable and is in compliance with 10 CFR Part 51.45(c) which requires that economic, technical, and other benefits and costs of the proposed action and alternatives be considered.

9.5 Reference

NRC. NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." Washington, DC: NRC. 2001.