SUA-1548

LICENSE RENEWAL

PRPOSED TECHNICAL REPORT OUTLINE

1.0.Proposed Activities

- 1.1.Licensing Action Requested
- 1.2. Project and Ownership History
 - 1.2.1. Project Ownership History
- 1.3.Location(s) of Facilities and Land Ownership
 - 1.3.1. Smith Ranch
 - 1.3.1.1. Location
 - 1.3.1.2. Land Ownership
 - 1.3.2. North Butte
 - 1.3.2.1. Location
 - 1.3.2.2. Land Ownership
 - 1.3.3. Ruth
 - 1.3.3.1. Location
 - 1.3.3.2. Land Ownership
 - 1.3.4. Gas Hills 1.3.4.1

1.3 4.2.

- Location
- 1.4 Description of Existing Facilities and Processes (This section could include a brief narrative of remaining reserves at SRH; historical production /operations; description of existing processing facilities, mine units, waste water disposal facilities; restoration/reclamation plans)
- 2.0. Site Characterization and Description
 - 2.1.Introduction
 - 2.2. Smith Ranch Site
 - 2.2.1. Site Location and Layout
 - 2.2.2. Uses of Adjacent Lands and Waters
 - 2.2.3. Population Distribution
 - 2.2.4. Historic, Scenic and Cultural Resources
 - 2.2.5. Meteorology
 - 2.2.6. Geology and Seismology
 - 2.2.7. Hydrology
 - 2.2.8. Ecology
 - 2.2.9. Background Radiological Characteristics
 - 2.2.10. Background Non-Radiological Characteristics
 - 2.3.North Butte Site
 - 2.3.1. Site Location and Layout
 - 2.3.2. Uses of Adjacent Lands and Waters
 - 2.3.3. Population Distribution
 - 2.3.4. Historic, Scenic and Cultural Resources
 - 2.3.5. Meteorology
 - 2.3.6. Geology and Seismology
 - 2.3.7. Hydrology

- 2.3.8. Ecology
- 2.3.9. Background Radiological Characteristics
- 2.3.10. Background Non-Radiological Characteristics
- 3.0. Description of the Proposed Facilities
 - 3.1. Site Description and Facilities Lavout
 - 3.1.1. Smith Ranch Site
 - 3.1.2. North Butte Site
 - 3.2. Description of the Orebodies
 - 3.2.1. Smith Ranch
 - 3.2.1.1. Orebody
 - 3.2.1.2. **Reserve Estimates**
 - 3.2.1.3. Mine Unit Locations
 - 3.2.2. North Butte Satellite
 - 3.2.2.1. Orebody
 - 3.2.2.2. **Reserve Estimates**
 - 3.2.2.3. Mine Unit Locations
 - 3.3. Mine Unit Design, Construction and Operation
 - 3.3.1. Mine Unit Design
 - 3.3.1.1. Well Pattern Types and Spacing
 - 3.3.1.2. Monitor Well Spacing and Placement
 - 3.3.2. Well Construction and Completion Techniques
 - Well Completion Techniques 3.3.2.1.
 - 3.3.2.2. Well Integrity Testing Procedures
 - 3.3~2~3~ Abandoned Exploration Drill Heles
 - 3.3.3. Mine Unit Operations 3.33.1.

3.2. 3.3

- Lixiviant Composition
- Anticipated Geochemical Reactions Mine Unit Piping, Instrumentation and Operation 3.3.3.3.
- Pattern Balancing, Injection Pressures, and Flow Rates 3.3.3.4.
- Power Transmission and Communication Lines 3.3.3.5.
- 3.3.3.6. Mine Unit Maintenance
- 3.3.3.7. Subsidence Risk Due to Mine Unit Operations
- 3.4. Uranium Recovery Processing Facilities
 - 3.4.1. Smith Ranch Central Processing Plant
 - 3.4.1.1. **General Facility Layout**
 - Ion Exchange/Lixiviant Makeup Circuit 3.4.1.2.
 - 3.4.1.3. **Elution and Precipitation Circuits**
 - 3.4.1.4. Yellowcake Dewatering, Drying and Packaging
 - Flow and Material Balance 3.4.1.5.
 - 3.4.1.6. Wastewater Management
 - 3.4.1.7. Equipment, Instrumentation and Control
 - 3.4.2. Highland Central Processing Facility
 - 3.4.2.1. **General Facility Layout**
 - Ion Exchange/Lixiviant Makeup Circuit 3.4.2.2.
 - 3.4.2.3. **Elution and Precipitation Circuits**
 - 3.4.2.4. Flow and Material Balance
 - 3.4.2.5. Wastewater Management
 - Equipment, Instrumentation and Control 3.4.2.6.
 - 3.4.3. Smith Ranch Satellite Facilities
 - 3.4.3.1. **General Facility Layout**

- 3.4.3.2. Ion Exchange/Lixiviant Makeup Circuit
- 3.4.3.3. Flow and Material Balance
- 3.4.3.4. Wastewater Management
- 3.4.3.5. Satellite Plant Equipment, Instrumentation and Controls
- 3.4.4. North Butte Satellite Facility
 - **General Facility Layout** 3.4.4.1.
 - 3.4.4.2. Ion Exchange/Lixiviant Makeup Circuit
 - 3.4.4.3. Flow and Material Balance
 - 3.4.4.4. Wastewater Management
 - Satellite Plant Equipment, Instrumentation and Controls 3.4.4.5.
- 3.5. Access roads
 - 3.5.1. Primary Access Roads
 - 3.5.2. Mine Unit Access Roads
 - 3.5.3. Monitor Well Access Roads
- 3.6. Construction Considerations
 - 3.6.1. Topsoil Management
 - 3.6.2. Erosion Control Methods
 - 3.6.3. Surface Water Diversions
 - 3.6.4. Construction Quality Control Program
- 3.7. Project Schedule and Water Balance
- 3.8. Disposal of radiologically Contaminated Wastes
- 3.9. Potential Impacts of Operations on Surrounding Water Users
 - 3.9.1. Lixiviant Migration Control
 - 3.9.2. Potential Ground and Surface Water Impacts From an Excursion, well or piping leak, or Incomplete Restoration
 3.9.3. Potential Impacts on Ground Water Flow and Water Levels
 - 3.9.4. Potential impacts on Aquifer Geochemical Properties and Water Quality
- 4.0.Effluent Control Systems
 - 4.1. Gaseous and Airborne Particulates
 - 4.1.1. Smith Ranch Central Processing Plant
 - 4.1.2. Highland Central Processing Facility
 - 4.1.3. Smith Ranch Satellite Facilities
 - 4.1.4. North Butte Satellite Facility
 - 4.2. Liquids and Solids
 - 4.2.1. Smith Ranch Central Processing Plant
 - Lined Storage Ponds 4.2.1.1.
 - 4.2.1.2. **Deep Disposal Wells**
 - 4.2.1.3. Contaminated Solid Waste Generation and Disposal
 - Non-Contaminated Solid Waste Generation and Disposal 4.2.1.4.
 - Spillage Containment System 4.2.1.5.
 - 4.2.2. Highland Central Processing Facility
 - Deep Disposal Well 4.2.2.1.
 - 4.2.2.2. Contaminated Solid Waste Generation and Disposal
 - 4.2.2.3. Non-Contaminated Solid Waste Generation and Disposal
 - 4.2.2.4. Spillage Containment System
 - 4.2.3. Smith Ranch Satellite Facilities
 - 4.2.3.1. Deep Disposal Wells
 - 4.2.3.2. Land Application
 - 4.2.3.3. Contaminated Solid Waste Generation and Disposal
 - 4.2.3.4. Non-Contaminated Solid Waste Generation and Disposal

- 4.2.3.5. Spillage Containment System
- 4.2.4. North Butte Satellite Facility
 - 4.2.4.1. Lined Surge Pond
 - 4.2.4.2. Deep Disposal Wells
 - 4.2.4.3. Contaminated Solid Waste Generation and Disposal
 - 4.2.4.4. Non-Contaminated Solid Waste Generation and Disposal
 - 4.2.4.5. Spillage Containment System
- 4.3.Contaminated Equipment
- 5.0.Operations
 - 5.1. Corporate Organization and Administrative Procedures
 - 5.1.1. Corporate Organization and Responsibilities for Safety
 - 5.1.2. Environment, Health and Safety Organization
 - 5.1.3. Environment, Health and Safety Organization Qualifications
 - 5.2. Management Control Program
 - 5.2.1. Operating Procedures
 - 5.2.2. Radiation Work Permits
 - 5.2.3. Safety and Environmental Review Panel
 - 5.2.4. Facility Posting
 - 5.2.5. Cultural Resources Protection
 - 5.2.6. Record Keeping and Reporting
 - 5.3. Management Audit and Inspection Program
 - 5.3.1. Management Reviews and Inspections
 - 5.3.2. ALARA Audits
 - 5.4. Qualifications for Personnel Conducting the Radiation Safety Program
 - 5.5.Radiation safety training
 - 5.5.1. Training Program Content
 - 5.5.2. Testing Requirements
 - 5.5.3. On-The-Job Training
 - 5.5.4. Refresher Training
 - 5.5.5. Training Records
 - 5.6.Security
 - 5.6.1. Smith Ranch Site Security
 - 5.6.2. Highland Site Security
 - 5.6.3. North Butte Site Security
 - 5.7. Radiation Safety Controls and Monitoring
 - 5.7.1. Effluent control techniques
 - 5.7.1.1. Gaseous and Airborne Particulates
 - 5.7.1.2. Spill Contingency Plans
 - 5.7.2. External Radiation Exposure Monitoring Program
 - 5.7.2.1. Gamma Surveys
 - 5.7.2.2. Personnel Dosimetry
 - 5.7.3. Airborne Radiation Monitoring Program
 - 5.7.3.1. Airborne Uranium Particulate Monitoring
 - 5.7.3.2. Radon Daughter Surveys
 - 5.7.4. Exposure Calculations
 - 5.7.4.1. Natural Uranium Exposure
 - 5.7.4.2. Radon Daughter Exposure
 - 5.7.4.3. Total Effective Dose Equivalent
 - 5.7.4.4. Respiratory Protection Program
 - 5.7.5. Bioassay program

- 5.7.6. Contamination control program
- 5.8. Environmental Monitoring Programs
 - 5.8.1. Airborne effluent and environmental monitoring program
 - 5.8.1.1. Site Environmental Particulate Monitoring
 - 5.8.1.2. Soil, Sediment and Vegetation Sampling
 - 5.8.1.3. Direct Radiation and Radon Monitoring
 - 5.8.2. Groundwater and surface water monitoring programs
 - 5.8.2.1. Regional Ground Water Monitoring
 - 5.8.2.2. Mine Unit Ground Water Monitoring
 - 5.8.2.3. Upper Control Limits and Excursion Monitoring
 - 5.8.2.4. Surface Water Monitoring
 - 5.8.2.5. Lined Pond Leak Detection Monitoring
 - 5.8.2.6. Land Application Monitoring Program
 - 5.8.2.7. Deep Disposal Well Monitoring
 - 5.8.3. Historical Monitoring Program Results
 - 5.8.3.1. Smith Ranch
 - 5.8.3.2. North Butte
 - 5.8.4. Quality Assurance
 - 5.8.4.1. Quality Assurance Program
 - 5.8.4.2. Retention of Records
 - 5.8.4.3. Historical Quality Assurance Program Results and Effectiveness
 - 5.8.5. Reporting Procedures



- 6.0.Ground Water Quality Restoration, Surface Reclamation and Facility Decommissioning 6.1.Ground Water Quality Restoration
 - 6.1.1. Ground Water Quality Criteria
 - 6.1.2. Ground Water Restoration Criteria
 - 6.1.3. Restoration Target Values
 - 6.1.4. Ground Water Restoration Schedules
 - 6.1.5. Ground Water Restoration Methodology
 - 6.1.5.1. Ground Water Sweep
 - 6.1.5.2. Treated Water Injection
 - 6.1.5.3. Chemical Reductant
 - 6.1.5.4. Waste Water Disposal
 - 6.1.6. Ground Water restoration Monitoring
 - 6.1.6.1. End of Production Sampling
 - 6.1.6.2. Restoration Sampling
 - 6.1.6.3. Restoration Stability Sampling
 - 6.1.7. Determination of Restoration Success
 - 6.1.8. Smith Ranch Restoration History
 - 6.1.9. Highland Restoration History

6.2. Plans for reclaiming disturbed lands

- 6.2.1. Decontamination and Decommissioning Plan
 - 6.2.1.1. Contamination Surveys and Sampling

- 6.2.1.2. **Decontamination Procedures**
- 6.3. Removal and disposal of structures, waste materials, and equipment
- 6.4. Methodologies for conducting post reclamation and decommissioning radiological surveys
- 6.5. Financial assurance
 - 6.5.1. Surety Estimates
 - 6.5.1.1. Smith Ranch
 - 6.5.1.2. North Butte
 - 6.5.2. Surety Arrangements

7.0. Environmental Effects

- 7.1. Site Preparation and Construction Activities
 - 7.1.1. Process Facilities, Pond Construction and Disposal Well Construction
 - 7.1.2. Mine Unit Disturbances
- 7.2. Effects of Operations
 - 7.2.1. Air Quality Impacts
 - 7.2.2. Land Use Impacts
 - 7.2.3. Water Resources Impacts
 - Ground Water Consumption 7.2.3.1
 - Ground Water Quality 7.2.3.2.
 - 7.2.3.3. Surface Water
 - 7.2.4. Impacts to Terrestrial and Aquatic Ecology
- 7.3.Radiological Effects
 - 7.3.1. Exposure Pathways
 - 7.3.1.1. Exposures From Water Pathways 7.31.2.
 - Exposures From Ar Pathways
 - Source Term Estimates 1
 - Production Releases 7.3. 7.3.1 2 2. Restoration Releases
 - New Mine Unit Releases 7.3.1.2.1.3.
 - 7.3.1.2.1.4. **Resin Transfer Releases**
 - 7.3.1.2.1.5. Radon-222 Release Summary
 - 7.3.1.2.1.6. Other Airborne Radionuclide Releases
 - **Exposures From External Radiation** 7.3.1.3.
 - 7.3.2. Receptors
 - 7.3.3. Total Human Exposures
 - 7.3.4. Exposures to Flora and Fauna
- 7.4.Non-Radiological Effects
- 7.5. Effects of Accidents
 - 7.5.1. Process Related Accidents Involving Radioactivity
 - 7.5.1.1. Tank or Vessel Failure
 - 7.5.1.2. Pipe Failure
 - Well Failure 7.5.1.3.
 - 7.5.1.4. Lined Pond Failure
 - 7.5.1.5. Lixiviant Excursion
 - 7.5.2. Transportation Related Accidents
 - Accidents Involving Yellowcake Shipments 7.5.2.1
 - **Accidents Involving Resin Trailers** 7.5.2.2.
 - 7.5.2.3. Accidents Involving Shipments of Process Chemicals
 - Accidents Involving Shipments of Radioactive Wastes 7.5.2.4.
 - 7.5.3. Other Accidents

7.6. Socioeconomic Effects of Construction and Operation

- 7.6.1. Increased State and Local Tax Base
- 7.6.2. Creation of New Jobs
- 7.6.3. Regional Productivity Increase
- 7.6.4. Enhancement of Recreational Values and Wildlife Habitats
- 7.6.5. Improvement of Local Roads or Other Transportation Facilities
- 7.6.6. Other Effects
- 8.0. Alternatives to Proposed Action

8.1.No Action Alternative

- 8.2. Alternative Uranium Recovery Process Alternatives
- 8.3.Alternative Uranium Extraction Processes
- 8.4. Alternative Sites for Processing Facilities
- 8.5. Alternative Energy Sources
- 8.6 Alternative Lixiviant Chemistry
- 8.7. Construction of a Central Processing Facility instead of Satellite facilities
- 8.8. Ground Water Restoration Alternatives and Long Term Monitoring Techniques
- 8.9. Alternative Monitoring and Waste Management Practices
- 9.0.Cost-Benefit Analysis
 - 9.1.General
 - 9.2. Quantifiable Costs and Benefits
- 10.0. Environmental Approvals and Consultations
- 11.0. References (References can be provided at the end of the document or at the end of each major section)
- 12.0. Other Requirements for License Renewals Chesenings can either be a separate
- section of the TR or included within an existing appropriate section) 12.1. Provide historical record of site operations, including air and ground water quality
 - 12.1. Provide historical record of Siteroperations, including air and ground water quality monitoring, such as:
 - 12.1.1. NRC Inspection Reports and License Performance Reports
 - 12.1.2. Discussion of Amendments and Changes to Operating practices and Procedures
 - 12.1.3. Discussion of License Violations identified During NRC Site Inspections
 - 12.1.4. Discussion of Excursions, incident investigations or root cause analyses, and resultant cleanup histories or status
 - 12.1.5. Discussion of exceedence of any regulatory standard or license condition pertaining to radiation exposure, contamination or release limits
 - 12.1.6. Discussion of exceedence of any non-radiation contaminant exposure or release limit
 - 12.1.7. Discussion of updates and changes to any site characterization information that may impact the evaluation of exposure pathways and doses including site layout and location; uses of adjacent lands and waters; population distributions; meteorology; geology or hydrology; ecology; background radiological or non-radiological characteristics; or any other environmental features
 - 12.1.8. Discussion of environmental effects of operations including radiological and non-radiological effects, accidents and the economic and social effects of the operation
 - 12.1.9. Discussion of updates and changes that may cause reconsideration of alternatives to the proposed action

- 12.1.10.Discussion of updates and changes to economic costs and benefits for the operation since the last renewal
- 12.1.11.Discussion of the results and effectiveness of any mitigation proposed and implemented since the last renewal.

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SUA-1548

LICENSE RENEWAL

PROPOSED ENVIRONMENTAL REPORT OUTLINE

1.0.Introduction to the Environmental Report

- 1.1.Purpose and Need for the Proposed Actions This section can be combined for all three sites as it defines the need for further resource development within the larger context of national uranium production and defines the context for the license renewal submittal.
- 1.2. The Proposed Action
 - 1.2.1. Smith Ranch
 - 1.2.2. North Butte
 - 1.2.3. Ruth
 - 1.2.4. Gas Hills

1.3.Applicable Regulatory Requirements, Permits and Required Consultations 2.0.Alternatives

- 2.1. Detailed Description of Alternatives
- 2.2. No Action Alternative
- 2.3. Proposed Action This section includes all relevant information from both the Operations and Reclamation plans. Subsections including but not limited to; Site Location and General Project Description, Site Preparation Activities, Production Processes, Mine Unit Operation, Groundwater Restoration, Surface Reclamation and Decommissioning.
 - 2.3.1. Smith Ranch
 - 2.3.2. North Butte
- 2.4. Reasonable Alternatives
- 2.5. Alternatives Considered but Eliminated
- 2.6.Cumulative Effects
- 2.7. Comparison of Predicted Environmental Impacts

NOTE: The general structure of the Environmental Report follows closely with NEPA in the sense that the impacts associated with each resource (i.e. Socioeconomics, Water Resources or Visual Resources, Noise) compare the No Action Alternative, the Proposed Action and any Reasonable Alternatives. If the Reasonable Alternatives align between projects (Traditional Open Pit Mining, or Alternative Lixiviant Chemistry) the comparisons will be more simplistic throughout.

3.0. Description of the Affected Environment

- 3.1.Land Use This section is site specific as it includes current land use, statements related to NRCS prime farmland, nearby areas of special land use designation, and mineral resources among others.
 - 3.1.1. Smith Ranch Land Use
 - 3.1.2. North Butte Land Use
- 3.2. Transportation This section is also site specific as transportation routes, corridor widths and any transportation restrictions will change depending on the site location.
 - 3.2.1. Smith Ranch Transportation
 - 3.2.1.1. Regional Transportation Corridors

- 3.2.1.2. Proposed transportation Corridors for access to and From the Site
- 3.2.1.3. Identification of Offsite Transportation Areas
- 3.2.2. North Butte Transportation
 - 3.2.2.1. Regional Transportation Corridors
 - 3.2.2.2. Proposed transportation Corridors for access to and From the Site
 - 3.2.2.3. Identification of Offsite Transportation Areas
- 3.3. Geology and Soils
 - 3.3.1. Regional Geology
 - 3.3.1.1. Powder River Basin
 - 3.3.2. Site Specific Geology and Topography
 - 3.3.2.1. Smith Ranch
 - 3.3.2.2. North Butte
 - 3.3.3. Soils
 - 3.3.3.1. Smith Ranch
 - 3.3.3.2. North Butte
- 3.4. Water Resources
 - 3.4.1. Smith Ranch Water Resources
 - 3.4.1.1. Regional Surface Water Resources
 - 3.4.1.2. Regional Ground Water Resources
 - 3.4.1.3. Site Specific Surface Water Resources
 - 3.4.1.4. Site Specific Ground Water Resources
 - 3.4.2. North Butte Water Resources



2.3.



Site Specific Surface Water Resources

Site Specific Ground Water Resources

3.5.Ecological Resources

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- 3.5.1. Smith Ranch Ecological Resources
 - 3.5.1.1. Regional and Site Specific Wildlife and Vegetation Resources
- 3.5.2. North Butte Ecological Resources
 - 3.5.2.1. Regional and Site Specific Wildlife and Vegetation Resources
- 3.6. Meteorology, Climatology and Air Quality Since all of the sites are within the NRC "Wyoming Eastern Milling Region", it is likely that regional climatology and air quality can be discussed in one section borrowing information from the ISR GEIS. The North Butte ER also contains regional data as analyzed from nearby met stations.
 - 3.6.1. Meteorology and Climatology
 - 3.6.1.1. Regional Meteorology and Climatology
 - 3.6.1.2. Smith Ranch Site Meteorology and Climatology
 - 3.6.1.3. North Butte Site Meteorology and Climatology
 - 3.6.2. Air Quality
 - 3.6.2.1. Regional Air Quality
 - 3.6.2.2. Smith Ranch Local Monitoring including Radionuclides and Particulates
 - 3.6.2.2.1. North Butte Local Monitoring including Radionuclides and Particulates

3.7.Noise – This section is site specific as it requires local noise impact analysis.

3.7.1. Smith Ranch Noise

- 3.7.2. North Butte Noise
- 3.8. Historic and Cultural Resources *This section is site specific as it requires local cultural resources surveys.*
 - 3.8.1. Smith Ranch Historic and Cultural Resources
 - 3.8.2. North Butte Historic and Cultural Resources
- 3.9.Visual and Scenic Resources This section is site specific as it requires local visual resources analysis.
 - 3.9.1. Smith Ranch Visual Resources
 - 3.9.2. North Butte Visual Resources
 - 3.9.3. Socioeconomics
 - 3.9.4. Smith Ranch (Converse County)
 - 3.9.4.1. Population Characteristics
 - 3.9.4.2. Health and Social Services
 - 3.9.4.3. Economic Trends (Unemployment and Income)
 - 3.9.4.4. Tax Structure and Distribution
 - 3.9.4.5. Population Trends and Projections
 - 3.9.5. North Butte (Campbell County)
 - 3.9.5.1. Population Characteristics
 - 3.9.5.2. Health and Social Services
 - 3.9.5.3. Economic Trends (Unemployment and Income)
 - 3.9-5-4 Tax Structure and Distribution
 - 3.9 5.5. Population Trends and Projections
- 3.10. Public and Occupational tealth / Sections 3.11.1 through 3.11.4 are generic and can be written borrowing language from the GEIS, DOL statistics and published mortality studies.
 - 3.10.1. Major Sources of Background Radiation Exposure
 - 3.10.2. Major Sources of Chemical Exposure
 - 3.10.3. Occupational Injury and Fatality Rates
 - 3.10.4. Historical Exposures to Radioactive Materials
 - 3.10.5. Summary of Health Effects Studies
 - 3.10.6. Baseline Radiological Information
 - 3.10.6.1. Smith Ranch Historical Baseline Radiological Survey Results
 - 3.10.6.2. North Butte Historical Baseline Radiological Survey Results
- 3.11. Waste Management
 - 3.11.1. Smith Ranch Processing and Satellite Facilities Waste Management
 - 3.11.1.1. Description of current waste systems
 - 3.11.1.2. Information on disposal methods and activities
 - 3.11.1.3. Identification of all sources of radioactive liquid, solid and gaseous waste materials
 - 3.11.2. North Butte Satellite Facility Waste Management
 - 3.11.2.1. Description of current waste systems
 - 3.11.2.2. Information on disposal methods and activities
 - 3.11.2.3. Identification of all sources of radioactive liquid, solid and gaseous waste materials

- 4.0. Environmental Impacts This section describes the impacts from the operation(s) to each resource described in Section 3 above. Each alternative must be considered for direct. indirect and cumulative effects. Some of the impacts may be common to all sites and discussed together. Other impacts site-specific and require separate sections for each site.
 - 4.1.Land Use Impacts
 - 4.2. Transportation Impacts
 - 4.3. Geology and Soils Impacts
 - 4.3.1. Smith Ranch Geology and Soils Impacts
 - 4.3.2. North Butte Geology and Soils Impacts
 - 4.4. Water Resources Impacts
 - 4.4.1. Smith Ranch Water Resources Impacts
 - 4.4.2. North Butte Water Resources Impacts
 - 4.5. Ecological Resources Impacts
 - 4.5.1. Smith Ranch Ecological Resources Impacts
 - 4.5.2. North Butte Ecological Resources Impacts
 - 4.6. Air Quality Impacts This section has historically been limited to impacts related to fugitive dust created from vehicle traffic travelling on unpaved roads.
 - 4.6.1. Smith Ranch/Highland Air Quality Impacts
 - 4.6.2. North Butte Air Quality Impacts
 - 4.7.Noise Impacts
 - 4.7.1. Smith Ranch Noise Impacts
 - 4.7.2. North Butte Noise Impacts
 - 4.8. Historic and Cultural Resources Impacts
 - 4.8.1. Smith Ranch Historic and Cultural Resources Impacts 4.8.2. North Butte Historic and Cultural Resources Impacts 4.9.Visual and Scenic Resources Impacts 4.9.1. Smith Ranch Visual and Scenic Resources Impacts

 - - 4.9.2. North Butte Visual and Scenic Resources Impacts
 - 4.10. Socioeconomic Impacts
 - 4.10.1. Smith Ranch Socioeconomic Impacts
 - 4.10.2. North Butte Socioeconomic Impacts
 - 4.11. Environmental Justice
 - 4.11.1. Smith Ranch Site
 - 4.11.2. North Butte Site
 - 4.12. Public and Occupational Health Impacts
 - 4.12.1. Smith Ranch Public and Occupational Health Impacts
 - 4.12.1.1. Nonradiological Impacts
 - **Radiological Impacts** 4.12.1.2.
 - 4.12.1.2.1. Pathway Assessment
 - 4.12.1.2.2. Public and Occupational Exposure
 - 4.12.2. North Butte Public and Occupational Health Impacts
 - Nonradiological Impacts 4.12.2.1.
 - 4.12.2.2. **Radiological Impacts**
 - 4.12.2.2.1. Pathway Assessment
 - 4.12.2.2.2. Public and Occupational Exposure
 - 4.13. Waste Management Impacts
 - 4.13.1. Smith Ranch Waste Management Impacts
 - 4.13.2. North Butte Waste Management Impacts

- 5.0. Mitigation Measures This section should include any and all mitigation measures, residual and unavoidable impacts and a comparison of what would be different for each of the reasonable alternatives.
 - 5.1.Smith Ranch Mitigation Measures
 - 5.2. North Butte Mitigation Measures
 - 5.3. Environmental Measurements and Monitoring Programs
 - 5.3.1. Radiological Monitoring
 - 5.3.1.1. Preoperational Gamma Surveys
 - 5.3.1.2. Soil Sampling
 - 5.3.1.3. Sediment Sampling
 - 5.3.1.4. Vegetation Sampling
 - 5.3.1.5. Surface Water Sampling
 - 5.3.1.6. Ground Water Monitoring
 - 5.3.1.7. Ambient Gamma and Radon Monitoring
 - 5.3.1.8. Air Particulate Monitoring
 - 5.3.1.9. Radon Flux Measurements
 - 5.3.2. Physiochemical Monitoring
 - 5.3.2.1. Ground Water Sampling
 - 5.3.2.1.1. Mine Unit Baseline Sampling

Rand

- 5.3.2.1.2. Monitor well Baseline Water Quality
- 5.3.2.1.3. Mine Unit Hydrologic Data Package
- 5.3.3. Ecological Monitoring
 - 5.3.3.1. Wildlife

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- 5.3.3.1.1 Smith Ranch
- 5.9.3.1.2. North Butte 3.2. Conste Meteorological Monitoring
- 6.0.Cost Benefit Analysis

6.1.Introduction

6.2. Alternatives and Assumptions

5.

- 6.2.1. Alternatives
 - 6.2.1.1. No Action Alternative
 - 6.2.1.2. Proposed Action
- 6.2.2. Key Assumptions
 - 6.2.2.1. Operating Life
 - 6.2.2.2. Discount Rate
 - 6.2.2.3. Impact Scope
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8.0.List of Preparers

DRAFT