

**APPENDIX K. SUMMARY OF CONTENT OF RESOURCE
ANALYSIS PROCESS MEMORANDA**

Analysis Process Memoranda

Overview of Process

Under the National Environmental Policy Act of 1969, as amended (NEPA), the U.S. Department of Agriculture Forest Service (Forest Service) is responsible for taking a “hard look” at potential impacts from the Resolution Copper Project and Land Exchange (project) using the best available information and science. The project involves multiple facilities, multiple phases, a large and diverse geographic area, and several exceptionally complex analyses, including subsidence modeling, groundwater modeling, and geochemical modeling. A substantial amount of detailed documentation is necessary to describe the analysis approaches, assumptions, and results.

At the same time, the Forest Service has strived to make the environmental impact statement (EIS) accessible and understandable, as is made clear in the Council on Environmental Quality (CEQ) regulations (emphasis added):

40 Code of Federal Regulations (CFR) 1502.2 – Implementation

To achieve the purposes set forth in §1502.1 agencies shall prepare environmental impact statements in the following manner:

- (a) Environmental impact statements shall be *analytic rather than encyclopedic*.
- (b) Impacts shall be discussed in proportion to their significance. There shall be *only brief discussion of other than significant issues*. As in a finding of no significant impact, there should be only enough discussion to show why more study is not warranted.
- (c) Environmental impact statements shall be *kept concise and shall be no longer than absolutely necessary* to comply with NEPA and with these regulations. Length should vary first with potential environmental problems and then with project size.

40 CFR 1502.8 – Writing

Environmental impact statements shall be *written in plain language and may use appropriate graphics* so that decisionmakers and the public can readily understand them. Agencies should employ writers of clear prose or editors to write, review, or edit statements, which will be based upon the analysis and supporting data from the natural and social sciences and the environmental design arts.

To accomplish this balance, some details of the complex analysis have been left out of the EIS itself. These details are still available to the public in a series of memoranda, one for each resource in chapter 3. This is consistent with CEQ regulations:

40 CFR 1502.21 – Incorporation by reference

Agencies shall incorporate material into an environmental impact statement by reference when the effect will be to cut down on bulk without impeding agency and public review of the action. The incorporated material shall be cited in the statement and its content briefly described. No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for

comment. Material based on proprietary data which is itself not available for review and comment shall not be incorporated by reference.

The purpose of this appendix is to summarize the available memoranda and the contents in each. Table K-1 shows a summary of the available process memoranda. Each subsection briefly summarizes the topics included in the individual process memoranda.

Table K-1. Summary of analysis process memoranda

Resource	Reference
Geology, Minerals, and Subsidence	(Newell and Garrett 2018b)
Soils and Vegetation	(Newell 2018h)
Noise and Vibration	(Newell 2018d)
Transportation and Access	(Newell 2018i)
Air Quality	(Newell and Garrett 2018a)
Water Resources	(Newell and Garrett 2018d)
Wildlife	(Newell 2018k)
Recreation	(Newell 2018e)
Public Health and Safety	(Newell and Garrett 2018c)
Scenic Resources	(Newell 2018f)
Cultural Resources	(Newell 2018a)
Socioeconomics	(Newell 2018g)
Tribal Values and Concerns	(Newell 2018j)
Environmental Justice	(Newell 2018b)
Livestock and Grazing	(Newell 2018c)

Geology, Minerals, and Subsidence

The contents of the process memorandum that supports the “Geology, Minerals, and Subsidence” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
 - Approach – Baseline Data
 - Approach – Subsidence Modeling
 - Approach – Vetting of Geologic and Subsidence Modeling
 - Status of Geology and Subsidence Workgroup
 - Detailed Information on Geologic Framework and Geologic Units
 - Regional Geology
 - Regional Geologic Units
 - Structural Geology and Faults

- Local Geology of Mine Area and Associated Infrastructure
- Mineral Deposit
- Tailings Storage Facility Area – Alternatives 2 and 3
- Tailings Storage Facility Area – Alternative 4
- Tailings Storage Facility Area – Alternative 5
- Tailings Storage Facility Area – Alternative 6
- East Plant Site
- West Plant Site
- Tunnels between East and West Plant Sites
- Magma Arizona Railroad Company (MARRCO) Corridor
- Filter/Loadout Facility
- Pipeline Corridors
- Regulations, Laws, and Guidance
- Key Documents and References Cited for Geology, Minerals, and Subsidence

Soils and Vegetation

The contents of the process memorandum that supports the “Soils and Vegetation” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology and Selected Outcomes
 - Soils
 - Revegetation
 - Vegetation Communities, Noxious Weeds, and Special Status Plant Species
 - Concern for Impacts to Stability from Revegetation
 - Previous and Existing Disturbance
 - Assessment of Need to Collect Additional Information
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Soils and Vegetation
- Appendix 1: Additional Information for Vegetation Communities Affected Environment
- Appendix 2: Detailed Soil Analysis Results

Noise and Vibration

The contents of the process memorandum that supports the “Noise and Vibration” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
 - Noise Modeling
 - Non-Blasting Noise Modeling
 - Blasting Noise Modeling
 - Blasting Vibration Modeling
 - Non-Blasting Vibration Modeling
 - Noise and Vibration Metrics
- Regulation, Laws, and Guidance
- Key Documents and References for Noise and Vibration

Transportation and Access

The contents of the process memorandum that supports the “Transportation and Access” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Transportation and Access

Air Quality

The contents of the process memorandum that supports the “Air Quality” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Temporal Analysis
 - Spatial Analysis Area
 - Analysis Methodology
 - Standard Source/Distance (Q/D) Analysis for Class I Areas
 - Ambient Air Quality Monitoring
 - Conformity Analysis for Alternatives 5 and 6 for PM₁₀ Non-Attainment Area
 - Emissions of Hazardous Air Pollutants
 - Lead Emissions
 - Secondary PM_{2.5} and Ozone Formation

- Estimate of Indirect Emissions
- Health Based Risk Assessment Screening
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Air Quality

Water Resources

The contents of the process memorandum that supports the “Water Resources” section of chapter 3, which has three subsections, includes the following:

GROUNDWATER QUANTITY AND GROUNDWATER-DEPENDENT ECOSYSTEMS

- Detailed Information Supporting EIS Analysis – Groundwater Quantity and Groundwater-Dependent Ecosystems
 - Resource Analysis Area
 - Temporal Analysis
 - Spatial Analysis Area
 - Analysis Methodology
 - Status of Groundwater Modeling Workgroup
 - Detailed Modeling Results for GDEs Summarized in DEIS
 - Assumption of Hydrologic Connection
 - Assessment of Need to Collect Additional Information
 - Rationale for Use of East Salt River Valley Model for Desert Wellfield
 - Subsidence Related to Groundwater Withdrawal – Desert Wellfield
 - Subsidence Related to Groundwater Withdrawal – East Plant Site
 - Inability to Analyze Individual Wells
 - Available Groundwater in East Salt River Valley
 - Full Detail for Tailings Water Balances
 - Percent Contribution of Spring DC6.6W to Devil’s Canyon
 - Regulation, Laws, and Guidance – Groundwater Quantity
 - References and Key Documents – Groundwater Quantity and Groundwater Modeling

GROUNDWATER AND SURFACE WATER QUALITY

- Detailed Information Supporting EIS Analysis – Groundwater and Surface Water Quality
 - Resource Analysis Area
 - Temporal Analysis
 - Spatial Analysis Area
 - Analysis Methodology
 - Details of Geochemistry Workgroup

- Assimilative Capacity Calculations
- Reduced Assimilative Capacity from Reductions in Runoff
- Existing Groundwater Quality – Frequency of Samples with Concentrations above Standards
- Evolution of the Fully-Lined Alternative
- Estimate of Seepage from a Fully-Lined Facility
- Evaluation of Filtered Tailings at Other Tailings Locations
- Consideration of Consolidation of Tailings in Seepage Analysis
- Comparison of Alternative 5 and 6 surface water samples to additional Gila River water quality samples
- Calculations of Pollutant Loading for Constituents of Concern from Each Alternative
- Analysis for Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)
- Regulation, Laws, and Guidance – Groundwater and Surface Water Quality
- Key Documents and References Cited for Groundwater and Surface Water Quality

SURFACE WATER QUANTITY

- Detailed Information Supporting EIS Analysis – Surface Water Quantity
 - Resource Analysis Area
 - Analysis Methodology
 - Surface Water Effects – Modeling Approaches
 - Floodplains and Lack of Available Data
 - Detailed Floodplain Impacts
 - Detailed Wetland Impacts
 - Acreage Differences
 - Differences in Stormwater and Erosion Control between Alternatives
 - General Sediment and Erosion Control Measures
 - East Plant Site Facility Stormwater Controls
 - West Plant Site Facility Stormwater Controls
 - Filter Plant and Loadout Facility Stormwater Controls
 - Alternatives 2 and 3 Tailings Storage Facility Stormwater Controls
 - Alternative 4 Tailings Storage Facility Stormwater Controls
 - Alternative 5 Tailings Storage Facility Stormwater Controls
 - Alternative 6 Tailings Storage Facility Stormwater Controls
 - Full Details of Streamflow Discharge-Duration-Frequency Analysis

- Regulation, Laws, and Guidance – Surface Water Quantity
- Key Documents and References Cited for Surface Water Quantity

Wildlife

The contents of the process memorandum that supports the “Wildlife” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Wildlife
- Appendix A – Wildlife Screening Tables

Recreation

The contents of the process memorandum that supports the “Recreation” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Recreation

Public Health and Safety

The contents of the process memorandum that supports the “Public Health and Safety” section of chapter 3, which has three subsections, includes the following:

TAILINGS AND PIPELINE SAFETY

- Detailed Information Supporting EIS Analysis – Tailings and Pipeline Safety
 - Resource Analysis Area
 - Temporal Analysis
 - Spatial Analysis Area
 - Analysis Methodology
 - Available Options for Breach Analysis
 - Empirical Method
 - Rheological and Energy Balance Methods
 - Advanced Modeling

- Forest Service Chosen Methodology
- Assessment of Need to Collect Additional Information
- Regulation, Laws, and Guidance – Tailings and Pipeline Safety
- Key Documents and References Cited for Tailings and Pipeline Safety

FUELS AND FIRE MANAGEMENT

- Detailed Information Supporting EIS Analysis – Fuels and Fire Management
 - Resource Analysis Area
 - Analysis Methodology
- Regulation, Laws, and Guidance – Fuels and Fire Management
- Key Documents and References Cited for Fuels and Fire Management

HAZARDOUS MATERIALS

- Detailed Information Supporting EIS Analysis – Hazardous Materials
 - Resource Analysis Area
 - Analysis Methodology
- Regulation, Laws, and Guidance – Hazardous Materials
- Key Documents and References Cited for Hazardous Materials

Scenic Resources

The contents of the process memorandum that supports the “Scenic Resources” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
 - Viewshed Analysis
 - Key Observation Points and Contrast Rating Analysis
 - Visual Simulation
 - Additional Detail for Scenery Resources in the Analysis Area
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Scenic Resources
- Appendix A: Viewshed Analyses for each Alternative
- Appendix B: Contrast Rating Worksheets for Each Key Observation Point
- Appendix C: Visual Simulations

Cultural Resources

The contents of the process memorandum that supports the “Cultural Resources” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
 - Impact Indicators
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Cultural Resources

Socioeconomics

The contents of the process memorandum that supports the “Socioeconomics” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Socioeconomics

In addition, a key technical report was prepared by BBC Research and Consulting to document the details of the economic modeling and analysis, titled “Socioeconomic Effects Technical Report: Resolution Copper Mine Environmental Impact Statement,” and dated November 12, 2018 (BBC Research and Consulting 2018).

Tribal Values and Concerns

The contents of the process memorandum that supports the “Tribal Values and Concerns” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
 - Impact Indicators
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Tribal Values and Concerns

Environmental Justice

The contents of the process memorandum that supports the “Environmental Justice” section of chapter 3 includes the following:

- Detailed Information Supporting EIS Analysis
 - Resource Analysis Area
 - Analysis Methodology
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Environmental Justice

Livestock and Grazing

The contents of the process memorandum that supports the “Livestock and Grazing” section of chapter 3, includes the following:

- Detailed Information Supporting EIS Analysis
 - Analysis Area
 - Analysis Methodology
 - Reduction in AUMs
- Regulation, Laws, and Guidance
- Key Documents and References Cited for Livestock and Grazing