USDA Forest Service
Tonto National Forest
Arizona

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Process Memorandum to File

Air Quality Resource Analysis: Assumptions; Methodology Used; Relevant Regulations, Laws, and Guidance; and Key Documents

This document is deliberative and is prepared by the third-party contractor in compliance with the National Environmental Policy Act and other laws, regulations, and policies to document ongoing process and analysis steps. This document does not take the place of any Line Officer's decision space related to this project.

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Revision History

Date	Personnel	Revisions Made
08/06/18	Emily Newell	Process memorandum created
10/25/18	Chris Garrett	Comments, edits
10/26/18	Emily Newell	Response to comments by Chris Garrett: added laws and regulations from Rosemont environmental impact statement, added references
11/06/18	Brad Sohm	Addressed comments by Chris Garrett and Emily Newell
11/09/18	Emily Newell	Filled in applicability for recently added relevant laws and regulations
1/7/19	Chris Garrett	Accepting changes and adding health assessment screening
1/14/19	Emily Newell	Ready for project manager review
7/12/19	Donna Morey	Update process memorandum to draft environmental impact statement section
8/6/2019	Emily Newell	Final consistency review
9/25/2020	Bruce Macdonald, Chris Garrett	Update for revisions to conformity and regulatory review.
12/30/20	Chris Garrett	Final update for consistency prior to final environmental impact statement release

Purpose of Process Memorandum

In order to provide a concise and accessible summary of resource impacts, certain detailed information has not been included directly in the environmental impact statement (EIS). The purpose of this process memorandum is to describe additional supporting resource information in detail. The air quality section of chapter 3 of the EIS includes brief summaries of the information contained in this process memorandum. This process memorandum covers the following topics:

- Resource analysis area
- Analysis methodology
- Regulations, laws, and guidance
- Key documents and references cited

Detailed Information Supporting Environmental Impact Statement Analysis

Resource Analysis Area

The full analysis area consists of the area modeled for potential air quality impacts (the "near field" and "far field" areas, see figure 1). The physical nature of the emission, along with the location, operating times, and amount of emissions are developed for each emission source. The ambient air quality impacts are assessed at locations (receptors) that begin at the fence line or ambient air boundary of each of the plant sites (East Plant Site, West Plant Site, tailings storage facility, filter plant and loadout facility). The applicable regulations and policies have established thresholds for evaluating air quality impacts and include special provisions for sensitive areas (Class I areas such as national parks and wilderness areas, and certain sensitive Class II areas); these sensitive areas fall within the analysis area as well.

Changes in air quality could result from each phase of the proposed action, including construction, planned operations, and ultimate reclamation activities. Modeling was conducted specifically for mine year 14, which represents a year in which process sources would be operating at maximum capacity.

Analysis Methodology

Ambient Air Quality Monitoring

Table 1 summarizes the ambient air quality monitoring that has been conducted by Resolution Copper Mining, LLC (Resolution Copper), since 2012 through 2017 and depicted graphically in the EIS. The project record contains numerous quarterly meteorological and baseline air quality monitoring reports from which these data were derived.

Table 1. Ambient Air Quality Monitoring Conducted by Resolution Copper

Location	Pollutant/Standard	2012	2013	2014	2015	2016	2017
West Plant Site	24 hour PM_{10}	88.4	134.2	99.1	67.1	101	117
East Plant Site	24 hour PM_{10}	73.5	109	90.2	44.0	80.1	110
West Plant Site	24 hour $PM_{2.5}$	11.4	12.6	9.5	9.2	11.3	14.0
East Plant Site	24 hour $PM_{2.5}$	11.7	14.8	9.0	7.3	10.2	11.8
West Plant Site	Annual $PM_{2.5}$	2.7	3.1	3.1	4.2	4.7	4.5
East Plant Site	Annual $PM_{2.5}$	6.0	5.2	3.7	3.4	4.0	4.25
East Plant Site	1 hour NO_2	25.5	11.6	11.4	7.9	8.4	21.7
East Plant Site	Annual NO_2	0.7	0	0	0	0	0
East Plant Site	1 hour SO_2	20.7	11.8	13.6	9.9	6.1	14.7
East Plant Site	8 hour ozone	0.077	0.064	0.070	0.073	0.071	0.073

Notes: PM_{10} = particulate matter 10 microns in diameter or smaller; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or smaller; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide.

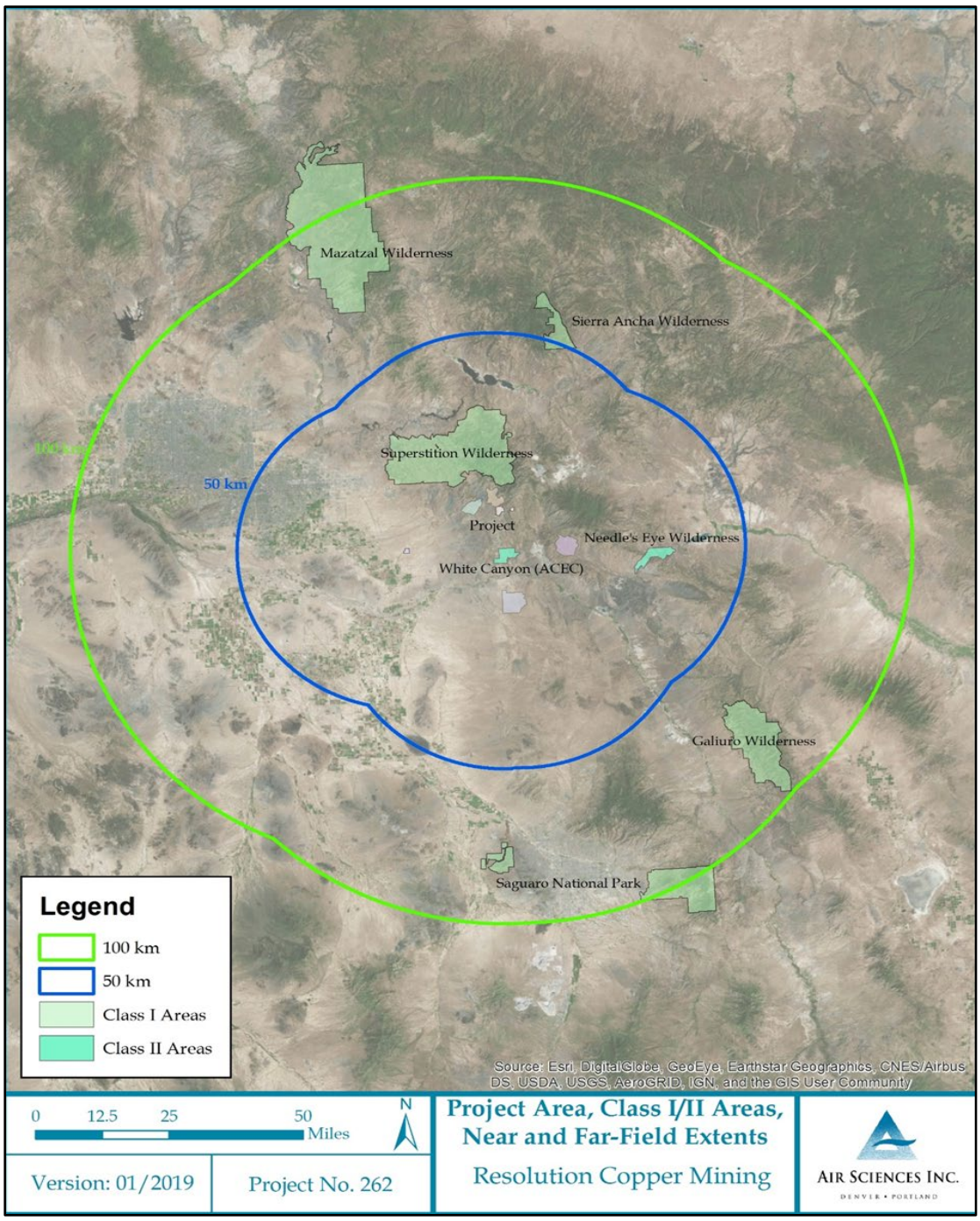

Figure 1. Near- and far-field modeling extents and Class I and Class II areas (Air Sciences 2019).

Conformity Analysis for Alternatives 5 and 6 for Particulate Matter 10 Microns in Diameter or Smaller Nonattainment Area

The General Conformity Rule was established under the Clean Air Act (CAA) Section 176(c)(4) and implemented in 40 Code of Federal Regulations (CFR) 93; and it serves to ensure that Federal actions

do not inhibit States' attainment plans for areas designated as nonattainment or maintenance. The rule effectively applies to all Federal actions that take place in areas designated as nonattainment or maintenance. De minimis levels, established under the General Conformity Rule (in 40 CFR 93.153), are based on the severity of an area's air quality problem and establish a threshold for determining if a general conformity determination must be performed. Activities below this threshold level are assumed to have no significant impact on air quality attainment status.

The near-field project analysis area is located within three counties in Arizona (Pinal, Maricopa, and Gila). The East Plant Site and the Skunk Camp tailings storage facility site both will be wholly located in the Hayden Particulate Matter 10 Microns in Diameter or Smaller (PM_{10}) Nonattainment Area, and the filter plant and loadout facility will be located in the West Pinal PM_{10} Nonattainment Area. Both areas are identified as "moderate" nonattainment areas, and a 100 tons per year (tpy) major source threshold for direct and indirect emissions is used to determine PM_{10} applicability of a conformity demonstration. All remaining facilities will be located in areas that are unclassified or in attainment for all criteria pollutants, including the U.S. Environmental Protection Agency's (EPA's) recently determined nonattainment area for the 2015 8-hour ozone national ambient air quality standards (NAAQS).

The project analysis area includes counties that are in nonattainment for criteria pollutants, but direct and indirect emissions within those areas are below the PM_{10} thresholds for moderate nonattainment areas. Thus, the General Conformity Rule applies to analysis of the East Plant Site emissions and potentially for Alternatives 5 and 6, which are located in or partially located in the Hayden PM_{10} Nonattainment Area.

At the time of the draft EIS (DEIS), the Arizona Department of Environmental Quality (ADEQ) is petitioning the EPA to have the Hayden PM_{10} area designated as Attainment, based on the fact that ambient concentrations have not exceeded the standards for several years (Arizona Department of Environmental Quality 2018). A conformity analysis can be demonstrated with modeling results as provided in 40 CFR 93.159(b)(2), (c), and (d), based on direct and indirect emissions from the action. Modeling results provided by Air Sciences (2020a) demonstrate that the impacts from the proposed alternatives do not exceed the ambient air quality standards. Therefore, the U.S. Forest Service has determined that a conformity analysis for this area can be demonstrated through use of the cumulative dispersion modeling results in accordance with 40 CFR 93.153(b)(2).

The filter plant and loadout facility are located within the West Pinal PM_{10} Nonattainment Area, but a formal general conformity analysis would not be required for this nonattainment area for the following reasons:

- The direct and indirect PM_{10} emissions from this site are 2.5 tpy, well below the 100 tpy threshold.
- Dispersion modeling analysis demonstrates that the PM_{10} impacts around this facility are well below the applicable standard.

- ADEQ has submitted a proposed state implementation plan for this nonattainment area, but it has not been finalized; therefore, the modeling results can be used to demonstrate conformity with the air quality standard.
- A minor source air permit is required for construction of this facility, and that application demonstrates that the operations will not lead to or cause an exceedance of the 24-hour PM_{10} standard (see 40 CFR 93.153(d)(1)).

Emissions of Hazardous Air Pollutants

Table 2 lists the total emissions of hazardous air pollutants (HAPS) from the proposed action, not including the tailings storage facility alternatives. The total emissions are well below the major source threshold for HAP emissions (10 tpy of a single HAP, 25 tpy of total HAPs).

Table 2. Total Emissions of Hazardous Air Pollutants

CAS No.	HAP	tpy	Pounds/year
106990	1,3-Butadiene	0.040	80
83329	Acenaphthene	0.0021	4.2
208968	Acenaphthylene	0.0065	13
75070	Acetaldehyde	0.79	1,580
107028	Acrolein	0.096	192
120127	Anthracene	0.0021	4.2
7440382	Arsenic	0.0099	19.8
56553	Benzo(a)anthracene	0.0018	3.6
71432	Benzene	1.1	2,200
50328	Benzo(a)pyrene	0.00023	0.46
205992	Benzo(b)fluoranthene	0.00026	0.52
191242	Benzo(g,h,l)perylene	0.00058	1.16
207089	Benzo(k)fluoranthene	0.00019	0.38
7440417	Beryllium	0.0038	7.6
92524	Biphenyl	0.00019	0.38
7440439	Cadmium	0.0037	7.4
7440473	Chromium	0.038	76
218019	Chrysene	0.00058	1.16
7440484	Cobalt	0.0034	6.8
53703	Dibenzo(a,h)anthracene	0.00065	1.3
100414	Ethylbenzene	0.000024	0.048
206440	Fluoranthene	0.0084	16.8

CAS No.	HAP	tpy	Pounds/year
86737	Fluorene	0.032	64
50000	Formaldehyde	1.2	2,400
110543	Hexane	0.0027	5.4
193395	Indeno(1,2,3-c,d)pyrene	0.00044	0.88
7439921	Lead	0.023	46
7439965	Manganese	0.033	66
7439976	Mercury	0.036	72
91203	Naphthalene	0.11	220
7440020	Nickel	0.0078	15.6
85018	Phenanthrene	0.036	72
108952	Phenol	0.00012	0.24
129000	Pyrene	0.0054	10.8
7782492	Selenium	0.019	38
100425	Styrene	0.000060	0.12
108883	Toluene	0.46	920
1330207	Xylene	0.32	640
95636	1,2,4-trimethylbenzene		
7783064	Hydrogen sulfide	0.026	52
106445	p-Cresol	0.000025	0.05
79061	Acrylamide	0.015	30
106467	Dichlorobenzene	0.00000057	0.00114
7440360	Antimony	0.00013	0.26
HAPs	**All HAPs**	**4.4**	**8,800**

Source: Air Sciences (2019:appendix A)

Lead Emissions and Impacts

Total lead emissions would be 0.023 tpy (46 pounds [lb]/year), which is below the significance threshold of 0.6 tpy used for air permitting by Pinal County Air Quality Control District (PCAQCD) (PCAQCD Code of Regulations Chapter 1, Article 3 and 40 CFR 52.12). Potential lead impacts could be compared with the 3-month ambient standard (0.15 micrograms per cubic meter [$\mu g/m^3$]) in a very conservative manner using the average annual maximum receptor PM_{10} concentration from project sources (7 $\mu g/m^3$; see table 3.6.4-1 of the DEIS) multiplied by 4 to capture a (mathematically) maximum quarterly level and the lead content in fugitive dust and process emissions (0.0104 percent) to reach a Resolution Copper Mine–generated maximum concentration of 0.002 $\mu g/m^3$. When added to a regional background lead concentration (0.04 $\mu g/m^3$), the maximum impact is 0.042 $\mu g/m^3$, which is well below the ambient standard of 0.15 $\mu g/m^3$ (Air Sciences 2020b).

Secondary Particulate Matter 2.5 Microns in Diameter or Smaller and Ozone Formation

Air Sciences (2019) conducted an analysis of the formation of secondary particulate matter 2.5 microns in diameter or smaller ($PM_{2.5}$) and ozone caused by emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), and volatile organic compounds (VOCs) from the project. This "Tier 1" approach requires calculation of a maximum emission rates of precursors (MERPs). If project emissions (NO_x and SO_2 for $PM_{2.5}$ and NO_x and VOCs for ozone) are below the MERPs values, then any air quality impacts of $PM_{2.5}$ or ozone from the project would be expected to be below the critical air quality thresholds defined in the analysis.

Clarification was requested during review of the administrative draft of the DEIS for how the MERPs values were calculated. EPA guidance allows for MERPs to be based on either the most conservative (lowest) value across a region/area, or a source-specific value derived from a more similar hypothetical source modeled specifically for the project. In this case, the most conservative (lowest) values for the western United States were used, taken from table 7.1 of EPA (2016)[1] rather than a project-specific hypothetical source. This leads to a lower MERPs value, which would overestimate rather than underestimate project impacts, and is, therefore, a conservative approach.

Estimate of Indirect Emissions

Indirect emissions for employee traffic and deliveries were calculated for the project and disclosed in the DEIS. The following assumptions were used for this analysis:

<u>Employee Travel</u>

- Assumes 726 vehicles per day (Air Sciences 2019:appendix A, p. 112)
- Assumes 25 percent come from the town of Superior with a round-trip mileage of 10 miles; 10 percent come from near Superior with a round-trip mileage of 20 miles; and 65 percent come from Phoenix with a round-trip mileage of 80 miles
- Per vehicle mile traveled (VMT), the following factors were used to estimate indirect emissions:
    - PM: 0.014 lb/VMT for fugitives, 0.099 grams (g)/VMT for fuel consumption
    - PM_{10}: 0.0028 lb/VMT for fugitives, 0.099 g/VMT for fuel consumption
    - $PM_{2.5}$: 0.00069 lb/VMT for fugitives, 0.018 g/VMT for fuel consumption
    - NO_x: 0.18 g/VMT for fuel consumption
    - SO_2: 0.0096 g/VMT for fuel consumption
    - Carbon monoxide (CO): 3.9 g/VMT for fuel consumption
    - VOCs: 0.042 g/VMT for fuel consumption

[1] Updated guidance is available from EPA (2019a), "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program." Memorandum from R. Weyland to Regional Air Division Directors, April 30, 2019. Updated results would show a lower impact for threshold evaluation.

Deliveries

- Assumes 13,101 trips per year (Air Sciences 2019:appendix A, p. 115)
- Assumes 10 percent come from the town of Superior with a round-trip mileage of 10 miles; 10 percent come from near Superior with a round-trip mileage of 20 miles; and 80 percent come from Phoenix with a round-trip mileage of 80 miles
- Per VMT, the following factors were used to estimate indirect emissions:
    - PM: 0.21 lb/VMT for fugitives, 1 g/VMT for fuel consumption
    - PM_{10}: 0.0042 lb/VMT for fugitives, 1 g/VMT for fuel consumption
    - $PM_{2.5}$: 0.01 lb/VMT for fugitives, 0.3 g/VMT for fuel consumption
    - NO_x: 3.8 g/VMT for fuel consumption
    - SO_2: 0.012 g/VMT for fuel consumption
    - CO: 1.3 g/VMT for fuel consumption
    - VOCs: 0.3 g/VMT for fuel consumption

Modeling Results for All Alternatives.

The DEIS primarily presents the results for Alternative 2, and then indicates that the results from all other alternatives are similar. The air quality modeling was conducted for all of the alternatives and the modeling data are available. The conclusions that results for all alternatives are similar are based on the results shown in table 3. Results between alternatives vary less than 3 percent.

Table 3. Modeling Results for all Alternatives (from Air Sciences 2019a)*

Pollutant	Averaging Time	Alt. 2 Proposed Action ($\mu g/m^3$)	Alt. 3 Near West ($\mu g/m^3$)	Alt. 4 Silver King ($\mu g/m^3$)	Alt. 5 Peg Leg ($\mu g/m^3$)	Alt. 6 Skunk Camp ($\mu g/m^3$)	AAQS ($\mu g/m^3$)	Below AAQS (all)
CO	1 hour	8,080.8	8,080.7	8,099.8	8,079.8	8,090.5	40,000.0	Yes
	8 hours	3,558.8	3,558.8	3,559.7	3,558.2	3,559.3	10,000.0	Yes
NO_2	1 hour	146.4	146.4	149.8	146.5	148.1	188.0	Yes
	1 year	4.7	4.7	4.7	4.2	4.2	100.0	Yes
PM_{10}	24 hours	96.8	96.8	97.1	99.5	97.0	150.0	Yes
	1 year	24.5	24.4	24.5	23.5	21.2	50.0	Yes
$PM_{2.5}$	24 hours	17.7	17.7	17.8	17.7	17.8	35.0	Yes
	1 year	5.9	5.9	6.0	5.9	5.9	12.0	Yes
SO_2	1 hour	116.6	116.6	117.1	116.6	116.6	196.0	Yes
	3 hours	86.4	86.4	86.4	86.4	86.4	1,300.0	Yes
	24 hours	20.4	20.4	20.4	20.4	20.4	365.0	Yes
	1 year	2.9	2.9	2.9	2.9	2.9	80.0	Yes

Note: NO_2 = nitrogen dioxide

* Data include background concentrations.

Health-Based Risk Assessment Screening

Inorganic metals naturally occur in copper ore and thus will be present in tailings deposited in the tailings storage facility from the project. Therefore, small quantities could be contained in the wind-blown dust from the facility. As part of their tailings geochemical characterization program, Resolution Copper has analyzed tailings material samples for concentrations of inorganic metals for which regional screening levels (RSLs) for carcinogenic and/or non-carcinogenic chronic health effects have been derived by EPA. All tailings storage facility alternatives, except for Alternative 4, have potentially acid generating (PAG) tailings under water cover and not available to be entrained as windblown dust from the tailings storage facility. Thus, the screening level risk assessment for all alternatives except Alternative 4 is based on inorganic metals content data for non-potentially acid generating (NPAG) tailings. For Alternative 4, the screening level risk is based on inorganic metals content data for both PAG and NPAG tailings.

In assessing the inhalation pathway for comparison to the RSL data, maximum annual PM_{10} concentrations from emissions related to the project are modeled to be 7.27 $\mu g/m^3$ at a receptor at the northwestern boundary of the Alternative 2 tailings storage facility. Calculated maximum air concentrations (C_{MAX}) of the inorganic metals are obtained by multiplying the maximum modeled annual PM_{10} impact concentration (7.27 $\mu g/m^3$) by the inorganic metal percentage of NPAG tailings.

Screening levels are derived from equations combining exposure assumptions with chemical-specific toxicity values and represent chemical-specific concentrations for individual contaminants in air. Screening levels were derived for the inorganic metals of NPAG tailings, where SL_C represents carcinogenic risk (excess cancer risk of 1×10^{-6}) and SL_{NC} represents non-carcinogenic chronic health effects risk (Health Index of 1). The EPA uses these human health risk levels as the basis for screening levels, as they are commonly considered acceptable levels of risk.

Assessing health risk for each inorganic metal can, therefore, be represented by the following equations:

C_{MAX} / SL_C = Cancer risk health quotient (HQ_C)

C_{MAX} / SL_{NC} = Non-carcinogenic chronic health effects health quotient (HQ_{NC})

Where HQ_C is less than 1, excess cancer risk is less than 1×10^{-6}, and where HQ_{NC} is less than 1, the Health Index for non-carcinogenic chronic health effects is less than 1. Results of the health quotient summary are shown in table 4. The sum of HQ_C equals 0.18 and the sum of HQ_{NC} equals 0.043. Therefore, the estimated human health risk associated with the maximum air concentrations of inorganic metals for all tailings storage facility alternatives except Alternative 4 are less than 1×10^{-6} cancer risk (representing a risk below 1.0 for cancer) and below 1.0 for non-carcinogenic chronic health effects.

Results differ for Alternative 4 because inorganic metals concentrations in PAG tailings need to be incorporated into the risk estimate calculation. The tailings streams are planned to be split into 85 percent NPAG and 15 percent PAG. From this, it is assumed 85 percent of the surface area will be NPAG tailings and 15 percent will be PAG tailings. The same assumption was applied to windblown

dust from NPAG and PAG surfaces—85 percent and 15 percent, respectively. Total metals concentration ($C_{MAX\text{-}Total}$) was derived from the sum of air concentrations of inorganic metals estimated due to PAG ($C_{MAX\text{-}PAG}$) and NPAG ($C_{MAX\text{-}NPAG}$). The sums of the health quotient values for Alternative 4 are $HQ_C = 0.89$ and $HQ_{NC} = 0.081$. These indicate that the estimated human health risk associated with the maximum air concentrations of inorganic metals due to windblown dust from Alternative 4 are below 1.0 for cancer (less than 1×10^{-6} cancer risk) and below 1.0 for non-carcinogenic chronic health effects.

To evaluate deposition on residential soils, the analysis uses the annual PM_{10} concentration multiplied by a conservative estimate of deposition velocity to calculate an annual deposition rate of PM_{10} particulate matter per square meter of soil surface. The result provides an accumulated concentration within the top 10 centimeter (cm) of soil over the life of the project. Only the dry deposition component is calculated in this approach. Details of the calculations were provided in a memorandum (SLR 2020).[2]

In response to comments on the DEIS, this memorandum includes the data from the original results as well as updated deposition data for antimony, boron, thallium, and zinc:

- Comments also addressed impacts of fluorides, but there is no available trace constituent analysis of fluorides in the Resolution Copper Mine ore.
- Data for antimony were also requested, but the relevant analysis noted all antimony levels at or below the detection limit. The detection limit was used in this case to represent maximum antimony levels.
- Trace metal data for boron, thallium, and zinc from Duke Hydro|Chem (2016)[3] using the geometric mean of the 12 samples in table 4.4-7 of that report. There are no listed RSLs for residential air in the EPA table (EPA 2019b),[4] so only the deposition data are added to this report.

In all cases the calculated deposition rate over a 40-year period was calculated assuming a soil depth of 10 cm and a density of 2 g/cm^3.

Results for air quality and deposition are depicted in table 4, indicating the maximum impact for all metals and providing a calculation of the total hazard quotient as the sum of the ratios of projected concentration or deposition divided by the screening level concentration or deposition. The results indicate that all of the trace metals concentrations and deposition rates are below the respective RSLs, and the total hazard quotient for all combined metals is less than 1.0. Results indicate that health risk impacts are below a level of concern.

[2] SLR 2020. Draft Deposition Calculations – Resolution Copper Mine EIS. SLR Fort Collins, Colorado. March 24, 2020.
[3] Duke Hydro|Chem 2016. Geochemical Characterization of Resolution Tailings Update: 2014–2016. Report Duke Hydro|Chem, Tucson, Arizona. June 8, 2016.
[4] EPA 2019b. Regional Screening Levels for Chemical Contaminants at Superfund Sites.

Table 4. Analysis of Maximum Impacts of Trace Metals Concentration and Deposition

		Maximum AQ Impact		Air Quality Concentrations				Deposition		
		7.27	ug/m3	Air		Air		Res Soil		
Metal	Conc (NAPG)	Conc Air		SL(C)[3]	HQC[4]	SL(NC)[3]	HQ(NC)[4]	SL(C/NC)[3]	mg/kg	HQ[4]
	ppm[1]	ug/m3[2]		ug/m3		ug/m3		mg/kg		
Antimony	0.8	5.82E-06	0.00001					3.10E+01	3.66E-04	1.18E-05
Arsenic	1.84	1.34E-05	0.00001	6.50E-04	0.02	1.60E-02	0.001	6.80E-01	8.43E-04	1.24E-03
Barium	304.65	2.21E-03	0.00221			5.20E-01	0.004	1.50E+04	1.40E-01	9.30E-06
Beryllium	2.18	1.58E-05	0.00002	1.20E-03	0.01	2.10E-02	0.001	1.60E+02	9.98E-04	6.24E-06
Boron	3.16	2.30E-05	0.00002					1.60E+04	1.45E-03	9.05E-08
Cadmium	0.07	5.09E-07	0.00000	1.60E-03	0.00	1.00E-02	0.000	7.10E+01	3.21E-05	4.52E-07
Cobalt	4.14	3.01E-05	0.00003	3.10E-04	0.10	6.30E-03	0.005	2.30E+01	1.90E-03	8.24E-05
Lead	34.72	2.52E-04	0.00025			1.50E-01	0.002	4.00E+02	1.59E-02	3.98E-05
Manganese	92.93	6.76E-04	0.00068			5.20E-02	0.013	1.80E+03	4.26E-02	2.36E-05
Mercury	0.05	3.64E-07	0.00000			3.10E-01	0.000	1.10E+01	2.29E-05	2.08E-06
Nickel	36.29	2.64E-04	0.00026	5.80E-03	0.05	1.50E-02	0.018	1.50E+03	1.66E-02	1.11E-05
Selenium	0.73	5.31E-06	0.00001			2.10E+01	0.000	3.90E+02	3.34E-04	8.57E-07
Thallium	0.45	3.27E-06	0.00000					7.80E-01	2.06E-04	2.64E-04
Zinc	30.64	2.23E-04	0.00022					3.20E+03	1.40E-02	4.39E-06
			TOTAL HQ		0.18		0.043			0.002

(1) Geometric Mean Ore Trace Metals from Duke Hydro|Chem (2016) Table 4.4-7

(2) Maximum Concentration times Geometric Mean Trace Metal Concentration

(3) Regional Screening Levels (RSL) for Residential Air and Soil

USEPA 2019: regional Screening Levels for Chemical Contaminants at Superfund Sites.

(4) HQ calculations = Concentration / RSL

Regulations, Laws, and Guidance

Mine operations are subject to a wide range of Federal, State, and local requirements. Many of these require permits before the mine operations begin; others may require approvals or consultations, mandate the submission of various reports, and/or establish specific prohibitions or performance-based standards. The following provides a summary of the key regulations as they relate to the air quality resource. Table 5 provides a summary of air quality laws, regulations, policies, and plans at the Federal, State, and local level.

Table 5. Air Quality Laws, Regulations, Policies, and Plans at the Federal, State, and Local Level

Laws, Ordinances, Regulations, and Standards	Description	Applicability
Class II Air Permit	Issued by the PCAQCD, for all components of the proposed action, except for the preferred action tailings storage facility Alternative 6 Skunk Camp Site. This permit addresses the applicable County, State, and Federal air quality requirements under the CAA.	Point-source and other regulated emissions of criteria pollutants from the Resolution Copper Mine for purposes of obtaining an air quality construction permit would be less than the threshold for a major source construction prevention of significant deterioration (PSD) permit (250 tpy) and less than the Title V source threshold of 100 tpy. Process, emergency, and some fugitive emission sources would be regulated, with established emissions limits under the PCAQCD-issued permit.
Class II Air Permit	Issued by the ADEQ for the preferred alternative tailings storage facility, which is located in both Pinal and Gila Counties.	Applicability is the same as above; however, the permit would be issued by the ADEQ for the Skunk Camp tailings storage facility.
General Conformity Rule (CAA 176(c)(4)) implemented under 40 CFR 93	Ensures that Federal actions do no inhibit States' attainment plans for areas designated as nonattainment or maintenance. The rule effectively applies to all Federal actions that take place in areas designated as nonattainment or maintenance. De minimis levels, established under the General Conformity Rule, are based on the severity of an area's air quality problem and establish a threshold for determining if a general conformity determination must be performed. Activities below this threshold level are assumed to have no significant impact on air quality.	The near-field project analysis is located within three counties (Pinal, Maricopa and Gila Counties, Arizona). The East Plant Site will be wholly located in the Hayden PM_{10} Nonattainment Area and the filter plant and loadout facility will be located in the West Pinal PM_{10} Nonattainment Areas, and a 100 tpy major source threshold for project direct and indirect emissions from proposed units or sources in the nonattainment area is used for PM_{10} applicability.

Laws, Ordinances, Regulations, and Standards	Description	Applicability
Federal new source review/PSD, 40 CFR 51(I) and 40 CFR 52.2(1)	The PSD program was developed to prevent significant deterioration in the air quality of those areas that meet the NAAQS. In general, the new source review/PSD rules define a "major source" as any source with the potential to emit 250 tpy or more of a criteria pollutant. A more stringent threshold is defined for a limited number of "categorical sources," source categories for which the PSD applicability threshold is tpy of any criteria pollutant.	PSD review is triggered based on point source emissions >250 tpy. PSD review for greenhouse gas emissions is not triggered unless triggered by other criteria air pollutants. Greenhouse gas emissions would total up to 126,000 tpy, based on mine year 14 with the highest emission rates.
New source performance standards (NSPS), 40 CFR 60	The Federal NSPS are technology-based standards applicable to new and modified stationary sources of regulated air emissions. Although the NAAQS emphasize air quality in general, the NSPS focus on particular sources of pollutants. The NSPS program set uniform emission limitations for approximately 70 industrial source categories or subcategories of sources that are designated by size as well as by type of process.	Resolution Copper Mine is a stationary source of regulated air emissions, and thus NSPS are applicable.
NAAQS, 40 CFR 50	The establishment of the NAAQS set maximum concentrations in ambient air for lead, NO_x, SO_2, CO, suspended PM_{10}, $PM_{2.5}$, and ozone.	For all alternatives, maximum impacts for CO, nitrogen dioxide, and SO_2 would occur at or near the East Plant Site, within the analysis area. Dispersion modeling demonstrates compliance with all NAAQS in accord with guidance provided by the ADEQ (2018).
National emission standards for hazardous air pollutants (NESHAP) 40 CFR 61 and 63	NESHAP rules address health concerns that are considered too localized to be included under the scope of NAAQS. In general, NESHAP regulations apply to affected sources that are located at (or are themselves) major sources of HAP emissions, as defined in 40 CFR 63.2. That is, any stationary source that emits or has the potential to emit (considering controls in the aggregate) 10 tpy or more of any single HAP or of any combination of HAPs.	There are small amounts of HAPs emitted from the proposed project. The estimated potential HAP emissions from the project are less than the major source thresholds (10 tpy of any one HAP or 25 tpy of all HAPs) under the NESHAP. Proposed actions at Resolution Copper Mine also do not trigger requirements for area source NESHAPs standards.

Laws, Ordinances, Regulations, and Standards	Description	Applicability
Acid Rain Program emission monitoring, 40 CFR 72 and 75	The EPA established a program to control emissions that contribute to the formation of acid rain. The overall goal of the Acid Rain Program is to achieve significant environmental and public health benefits through reductions in emissions of SO_2 and NO_x, the primary causes of acid rain. The acid rain regulations are applicable to "affected units" as defined in the regulations.	The proposed action does not include affected units as defined in 40 CFR 72 and the acid rain program.
Regional Haze Rule, 40 CFR 51(P)	The Regional Haze Rule addresses visibility impairment in national parks and wilderness (Class I) areas. Under PSD requirements, a new source of criteria pollutant and air toxic emissions must analyze its impacts to Class I areas, including visibility and regional haze.	A threshold value of 5% from a single source is considered a significance threshold for conducting an additional impact analysis, and a 10% cumulative impact is considered a perceptible impact. All impacts are well below the 5% threshold that requires further analysis, demonstrating that impacts on regional haze at these locations would not be perceptible for any of the alternatives.
Compliance Assurance Monitoring program, 40 CFR 64	The Federal regulations implementing compliance-assurance monitoring apply to major sources that must obtain a Title V operating permit pursuant to 40 CFR 70. The compliance-assurance monitoring rules are primarily aimed at emission units that are individually above major source thresholds and that use control devices in order to comply with an emission limitation (40 CFR 64.2).	Point-source and other regulated emissions of criteria pollutants from the Resolution Copper Mine would be less than the Title V source threshold of 100 tpy. Compliance Assurance Monitoring regulations do not apply to non-Title V sources.
Stratospheric Ozone Protection Regulations, 40 CFR 82(F)	Under Title VI of the CAA, the EPA is responsible for programs that protect the stratospheric ozone layer, including identification of controlled substances.	Resolution Copper would need to ensure those assigned to provide maintenance, handling, storage, and disposal of controlled substances follow applicable regulations, including recordkeeping and reporting.

Laws, Ordinances, Regulations, and Standards	Description	Applicability
49 Arizona Revised Statutes; 18 Arizona Administrative Code	The policies, regulations, and responsibilities of the ADEQ, including State and County air pollution control measures, are defined in 49 Arizona Revised Statutes and 18 Arizona Administrative Code.	Based on guidance from the ADEQ, the EPA, and the U.S. Forest Service, analysts examined the impacts within 50 kilometers (km) ("near field") of the site locations with one model and impacts on air quality-related values beyond 50 km ("far field") with a different dispersion model. The EPA approves the EPA guideline AERMOD modeling system to determine impacts in the near field of the source or facility. A separate, larger grid-scale model platform, CALPUFF, is used to determine air quality related values far-field impacts from 50 km to 100 km from the facility or operation.

Key Documents and References Cited for Air Quality

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