Resolution Copper Project and Land Exchange Environmental Impact Statement

USDA Forest Service Tonto National Forest Arizona

November 10, 2017 (Update #1 February 26, 2018)

Process Memorandum to File

Mine Life Phase Durations

Purpose of Process Memorandum

The purpose of this process memorandum is to provide consistent time frames for each of the three mine phases—(1) construction, (2) operations, and (3) closure and reclamation—and the overall mine life as described for the proposed action in the "General Plan of Operations" (GPO). At this time, these time frames and mine life are applicable to all action alternatives. If necessary, time frames and mine life specific to an action alternative may be developed in the future. The term "mine year" is defined as a year after the final record of decision (ROD) has been signed and the final GPO has been approved. The primary source for these time frames is table 1.8-1 of the GPO.

<u>Overall Mine Life</u>: 51 to 56 years after ROD and final GPO approval, depending on duration of closure and reclamation phase

Construction Phase: Mine years 1 through 9

The construction phase would begin after the final ROD has been issued and a final GPO is approved by the Tonto National Forest. Some construction activities are already occurring on private lands because they are not subject to this National Environmental Policy Act (NEPA) review or because other federal/state/local oversight and/or have already obtained any required federal/state/local permits for the activities (e.g., deepening Mine Shaft 9. The overall construction phase would have a duration of up to 9 years; however, the construction of the filter plant and loadout facility would be completed at approximate mine year 2. Construction activities at the tailings storage facility during the construction phase would include site preparation (e.g., roads, admin building, soil stockpiling); however, it is important to note that the construction of the tailings storage facility would continue throughout the entire mine life while tailings are being produced and, for certain action alternatives, while the facilities are concurrently reclaimed. Section 3.3.10.7 in the GPO provides details on the tailings storage facility construction phases for the proposed action.

Operations Phase: Mine years 6 through 46

The operations phase would begin before the construction phase is complete because ore processing facilities would be operational at approximate mine year 6. All main facilities will be functioning for the full 40-year duration of the operations phase. The operations phase duration assumes that an interim shutdown would not occur. Should an interim shutdown occur, modification of the mine life and remaining mine phase durations would be dependent on the extent and duration of the interim shutdown.

Closure and Reclamation Phase: Mine years 46 through 51 to 56

Closure would occur at mine year 46 and reclamation activities would occur at the main facilities for a duration of 5 to 10 years. The GPO states that this time frame will be "further refined during the NEPA process," so this time frame could change. Reclamation activities are not relegated to occur during this phase; some reclamation activities will occur concurrently during construction and operations phases. Post-closure monitoring would continue after the closure and reclamation phase is completed.

¹ Should construction implementation be substantially delayed after the GPO has been approved by the Forest Service (for example, by litigation), the trigger for tracking mine years will be reviewed and updated by the Forest Service.

² Multiple versions of the GPO exist. See process memo titled "History of Revisions to General Plan of Operations" (Project Record #0000995) for full details. The version of the GPO in question is dated May 9, 2016 (Project Record #0000802).

Other Time Frames:

Pre-Decision Activities: Throughout the GPO, activities are described that are either currently occurring or will occur on private lands prior to the final ROD and final GPO approval. Examples of these activities include underground geology characterization studies, rehabilitating mine shafts, and conducting baseline studies, all of which are either authorized by previous NEPA decisions, or do not require federal approval. The GPO states defines this time frame as the 5 years prior to the final ROD and final GPO approval; in reality this time frame is concurrent with preparation of the environmental impact statement.

Subsidence (from ITASCA Consulting Group assessment): A subsidence analysis completed in July 2017 by ITASCA Consulting Group updated the original subsidence analysis provided in appendix E of the GPO. Surface break through would be expected to occur approximately 6 years after commercial mining starts (approximately mine year 12). Subsidence in the Caved Rock Zone and Fracture Zone would continue through operations and generally stop widening and deepening at mine year 47. Subsidence would continue indefinitely within the Continuous Subsidence Zone, but would not be visibly noticeable.

Water Supply: Annual water use will vary throughout the life of the mine as described in section 3.6 of the GPO and summarized in the June 5, 2017 (revised October 9, 2017), process memo titled "Summary of Mine Water Balance and Sources." For the purposes of estimating total water use, years with similar water use were lumped together into the general phases to reflect construction/startup, operations, and ramp down of operations/mine closure. The majority of water use for construction will occur during mine years 1 through 7. The majority of water use for operations will occur during mine years 8 through 36. As operations ramp down and ore production decreases, water use will decrease. This occurs in mine years 37 through 45.

Update #1- Alternatives Portfolios:

Resolution Copper was requested to cross check the information in this memo and to provide clarification regarding the timing terminology and timeframes that Resolution Copper and their consultants use in the GPO and supporting documentation. On February 8, 2018, Resolution Copper provided clarification on mine phase terminology and time frames in their documents, per the attached schedule. Note that Resolution uses the term "mine year" for the production phase only. The EIS will continue to use the mine phases and "mine years" identified above in this memo. The following information is intended to help clarify mine phase terminology that authors may encounter in Resolution Copper's documents. In summary, Resolution Copper uses the following mine phases and timeframes:

Mine Phase	Sub-phase	Description	Years
Care and Maintenance/Baseline	None	Now through Final ROD (anticipated in 2020)	2017-2020
Construction	None	Starts at ROD, no ore production, site preparation/started dam construction	2021-2027
Production		Start of ore production.	2028-2068
	First Ore	Mine Year 1	2028
	Ramp Up	Mine Year 2 through 7	2029-2034

	Full Production	Mine Year8 through 31	2035-2058
	Ramp Down	Mine Year 32 through 41	2059-2068
Closure	None	Cessation of ore production.	2069

Year	Description	Mine Year	Development Rock Tons/year	Development Cumulative Tons	Cave Production Tons/year	Cave Production Cumulative Tons	Milled Ore Tons/year	Milled Ore Cumulative Tons	Bulk Concentrate Tons/year	Bulk Concentrate Cumulative Tons	Scavenger Tailings Tons/year	Pyrite Tailings Tons/year	Scavenger Tailings Cumulative Tons	Pyrite Tailings Cumulative Tons	Total Tailings Cumulative Tons
2047	Carra and Maria				-				-		-	-			
2017	Care and Maint	-	S	-	-	=	-	-	-	-	-	=	-	-	-
2018	Care and Maint	-		-	-	-	-	-	-	-	-	-	-	-	-
2019	Care and Maint	-		-	-	-	-	-	-	-	-	-	-	-	=
2020	Care and Maint	-		-	-	-	-	-	-	-	-	-	-	-	-
2021	Construction	-	36'8	-	=	-	=	-	-	-	-	-	-	-	=
2022	Construction	-	10,098,995	-	-	-	-	-	-	-	-	-	-	-	-
2023	Construction	-		-	-	-	-	-	-	-	-	-	-	-	-
2024	Construction	-		-	-	-	-	-	-	-	-	-	-	-	-
2025	Construction	-		-	-	-	-	-	-	-	-	-	-	-	-
2026	Construction	-		-	-	-	-	-	-	-	-	-	-	-	-
2027	Construction	-		-	-	-	-	-	-	-	-	-	-	-	-
2028	First Ore	1	826,388	10,925,383	370,965	370,965	6,246,851	6,246,851	133,733	133,733	5,346,486	766,631	5,346,486	766,631	6,113,118
2029	Ramp up	2	859,158	11,784,542	2,537,121	2,908,086	8,445,777	14,692,628	266,632	400,366	7,187,504	991,640	12,533,990	1,758,272	14,292,262
2030	Ramp up	3	772,437	12,556,978	8,660,368	11,568,453	9,432,804	24,125,432	520,303	920,669	7,897,945	1,014,556	20,431,935	2,772,828	23,204,763
2031	Ramp up	4	778,422	13,335,401	17,466,701	29,035,155	18,245,123	42,370,555	1,048,772	1,969,440	15,085,826	2,110,526	35,517,761	4,883,354	40,401,115
2032	Ramp up	5	778,933	14,114,334	26,163,652	55,198,806	26,942,585	69,313,140	1,712,008	3,681,449	21,902,288	3,328,288	57,420,049	8,211,642	65,631,691
2033	Ramp up	6	720,296	14,834,630	34,976,839	90,175,645	35,697,134	105,010,274	2,346,851	6,028,300	28,780,765	4,569,518	86,200,814	12,781,160	98,981,974
2034	Ramp up	7	883,176	15,717,805	41,768,675	131,944,320	42,651,851	147,662,125	2,680,041	8,708,341	34,178,734	5,793,075	120,379,548	18,574,236	138,953,784
2035	Full Production	8	783,266	16,501,071	47,375,560	179,319,880	48,158,826	195,820,951	2,968,779	11,677,120	37,849,588	7,340,459	158,229,136	25,914,695	184,143,831
2036	Full Production	9	748,398	17,249,470	47,532,827	226,852,707	48,281,225	244,102,176	2,968,917	14,646,037	37,128,274	8,184,034	195,357,410	34,098,729	229,456,139
2037	Full Production	10	690,398	17,939,868	47,590,826	274,443,533	48,281,224	292,383,401	2,758,379	17,404,417	36,749,978	8,772,867	232,107,388	42,871,596	274,978,984
2038	Full Production	11	863,343	18,803,211	47,417,877	321,861,410	48,281,220	340,664,621	2,367,100	19,771,517	37,121,210	8,792,910	269,228,598	51,664,506	320,893,104
2039	Full Production	12	831,004	19,634,215	47,189,275	369,050,685	48,020,279	388,684,900	1,960,329	21,731,845	38,040,923	8,019,027	307,269,521	59,683,534	366,953,054
2040	Full Production	13	815,173	20,449,388	45,270,505	414,321,190	46,085,678	434,770,577	1,798,446	23,530,291	37,486,298	6,800,935	344,755,818	66,484,468	411,240,286
2041	Full Production	14	815,427	21,264,815	47,235,072	461,556,262	48,050,499	482,821,076	1,948,873	25,479,164	39,582,789	6,518,836	384,338,608	73,003,305	457,341,912
2042	Full Production	15	777,276	22,042,090	47,503,949	509,060,211	48,281,225	531,102,301	2,024,590	27,503,755	39,666,729	6,589,905	424,005,337	79,593,209	503,598,546
2043	Full Production	16	806,485	22,848,576	47,474,738	556,534,949	48,281,223	579,383,524	2,150,126	29,653,881	39,211,923	6,919,174	463,217,260	86,512,384	549,729,644
2044	Full Production	17	806,723	23,655,299	47,474,501	604,009,450	48,281,224	627,664,748	2,240,747	31,894,627	38,679,739	7,360,739	501,896,999	93,873,123	595,770,121
2045	Full Production	18	604,075	24,259,374	47,677,149	651,686,599	48,281,224	675,945,973	2,169,357	34,063,984	38,273,841	7,838,027	540,170,839	101,711,149	641,881,989
2046	Full Production	19	767,231	25,026,606	47,513,993	699,200,592	48,281,224	724,227,197	1,999,614	36,063,598	38,130,733	8,150,877	578,301,573	109,862,027	688,163,599
2047	Full Production	20	748,781	25,775,386	47,532,442	746,733,034	48,281,223	772,508,420	1,864,155	37,927,752	38,448,597	7,968,471	616,750,170	117,830,497	734,580,668
2048	Full Production	21	766,860	26,542,246	47,514,363	794,247,397	48,281,223	820,789,643	1,816,368	39,744,121	38,926,908	7,537,946	655,677,079	125,368,443	781,045,522
2049	Full Production	22	777,108	27,319,354	47,504,115	841,751,512	48,281,223	869,070,866	1,869,706	41,613,827	39,028,952	7,382,565	694,706,031	132,751,008	827,457,039
2050	Full Production	23	771,422	28,090,776	47,509,799	889,261,311	48,281,221	917,352,087	1,907,101	43,520,928	39,006,219	7,367,901	733,712,249	140,118,909	873,831,159
2051	Full Production	24	453,407	28,544,183	47,827,821	937,089,132	48,281,228	965,633,315	1,892,577	45,413,506	38,564,309	7,824,341	772,276,558	147,943,251	920,219,809
2052	Full Production	25	497,547	29,041,730	47,783,680	984,872,812	48,281,227	1,013,914,541	1,865,674	47,279,180	38,008,651	8,406,901	810,285,209	156,350,152	966,635,361
2053	Full Production	26	722,756	29,764,486	47,558,466	1,032,431,278	48,281,222	1,062,195,763	1,829,270	49,108,450	37,822,090	8,629,862	848,107,300	164,980,014	1,013,087,313
2054	Full Production	27	665,280	30,429,766	47,615,940	1,080,047,218	48,281,220	1,110,476,983	1,778,769	50,887,219	38,599,981	7,902,469	886,707,281	172,882,483	1,059,589,764
2055	Full Production	28	610,145	31,039,911	47,671,080	1,127,718,298	48,281,225	1,158,758,209	1,820,712	52,707,932	39,472,443	6,988,070	926,179,724	179,870,553	1,106,050,277
2056	Full Production	29	547,716	31,587,627	47,733,509	1,175,451,807	48,281,225	1,207,039,434	1,904,382	54,612,314	39,579,974	6,796,869	965,759,698	186,667,422	1,152,427,120
2057	Full Production	30	454,070	32,041,697	47,827,152	1,223,278,959	48,281,222	1,255,320,656	1,898,700	56,511,014	39,595,841	6,786,681	1,005,355,539	193,454,103	1,198,809,642
2058	Full Production	31	494,089	32,535,786	47,521,480	1,270,800,439	48,015,569	1,303,336,225	1,771,844	58,282,859	39,503,382	6,740,343	1,044,858,921	200,194,445	1,245,053,366
2059	Ramp Down	32	377,184	32,912,971	37,875,562	1,308,676,001	38,252,746	1,341,588,971	1,379,397	59,662,255	31,481,866	5,391,484	1,076,340,787	205,585,929	1,281,926,716
2060	Ramp Down	33	394,175	33,307,145	29,635,236	1,338,311,237	30,029,411	1,371,618,382	1,132,356	60,794,611	24,576,943	4,320,111	1,100,917,730	209,906,040	1,310,823,770
2061	Ramp Down	34	127,329	33,434,474	22,909,428	1,361,220,664	23,036,757	1,394,655,138	851,072	61,645,683	18,707,166	3,478,519	1,119,624,896	213,384,559	1,333,009,455
2062	Ramp Down	35	52,055	33,486,530	16,346,836	1,377,567,500	16,398,891	1,411,054,029	609,704	62,255,388	13,146,108	2,643,079	1,132,771,004	216,027,637	1,348,798,641
2063	Ramp Down	36	9,110	33,495,640	11,940,896	1,389,508,396	11,950,006	1,423,004,035	431,017	62,686,405	9,566,562	1,952,428	1,142,337,565	217,980,065	1,360,317,631
2064	Ramp Down	37	0	33,495,640	6,293,407	1,395,801,803	6,293,407	1,429,297,442	220,572	62,906,977	4,993,554	1,079,281	1,147,331,119	219,059,346	1,366,390,465
2065	Ramp Down	38	0	33,495,640	2,761,987	1,398,563,789	2,761,987	1,432,059,429	95,262	63,002,239	2,121,484	545,241	1,149,452,603	219,604,587	1,369,057,190
2066	Ramp Down	39	0	33,495,640	1,244,540	1,399,808,329	1,244,540	1,433,303,969	41,611	63,043,850	928,110	274,819	1,150,380,713	219,879,406	1,370,260,119
2067	Ramp Down	40	0	33,495,640	440,693	1,400,249,021	440,693	1,433,744,661	14,091	63,057,941	326,877	99,724	1,150,707,590	219,979,130	1,370,686,720
2068	Ramp Down	41	0	33,495,640	25,295	1,400,274,317	25,295	1,433,769,956	855	63,058,796	19,505	4,936	1,150,727,095	219,984,066	1,370,711,161
2069	Closure	_	-		-	-	-	-	-	-	-	-	-	-	-