

Technical Memorandum

To:	Kathy Arnold	From:	Michael Dieckhaus
Company:	Rosemont Copper Company	Date:	August 30, 2010
Re:	Rosemont 2006-2008 Tailings Material Sample Sources	Doc #:	235/10-320887-5.3
CC:	Mark Williamson, Amy Hudson, David Krizek, P.E. (Tetra Tech)		

1.0 Introduction

This Technical Memorandum provides details related to the source of the tailings material samples analyzed in 2006, 2007, and 2008 as part of the proposed Rosemont Copper Project (Project) located in Pima County, Arizona. Details related to the 2006-2008 tailings samples, such as specific boreholes and depth intervals, were derived from the Rosemont Copper Project core database. The results of the geochemical characterization of the four (4) 2006-2008 tailings material samples were documented in the Technical Memorandum titled *Tailings Geochemistry* dated March 24, 2009 (Tetra Tech, 2009b). This March 24, 2009 Technical Memorandum is provided in Attachment 1 for reference.

This information is provided in response to the April 14, 2010 Comprehensive Request for Additional Information from the Arizona Department of Environmental Quality (ADEQ) to Rosemont Copper Company (Rosemont) in the response to the Aquifer Protection Permit (APP) application dated February 2009 (Tetra Tech, 2009a). Specifically, this Technical Memorandum partially answers item no. 9 on page 8 of 18:

- *Tailings Geochemistry: To date, four samples were tested for acid-generating potential and metal release for the tailings material. (Ref. Technical Memorandum – Tailings Geochemistry, March 24, 2009).*

Though the test results indicate less than 0.01% sulfide-sulfur and possess a high capacity for acid neutralization, yet, the number of samples tested to establish tailings geochemistry is insufficient and cannot be considered representative of the varying lithology present in the orebody. The sampling program should be designed so that the collected samples are representative of the geochemical behavior of various rock units with respect to acid generation. Please submit a revised sampling plan.

2.0 Sample Plan and Details

The 2006-2008 tailings samples were generated in May 2006, February 2007, June 2007, and July 2008. The May 2006 sample was prepared Mountain States R&D International, Inc. (Mountain States) under guidance from the Washington Group. The 2007-2008 samples were prepared directly by Mountain States. Geochemical test work on the samples was performed by Turner Labs or SVL Analytical, Inc. (SVL).



The July 2008 tailings sample was a weight proportioned composite to represent the major lithologies that would be removed during the first three (3) years of mining operations. This composite sample was assembled using previously crushed coarse core reject material. During the metallurgical testing program, core samples were crushed and the unused portions of the material were archived in drums at the Rosemont Project site. Typically, about 75 percent of the crushed rock material from any given core interval was archived. The drums were coded with the lithology, interval depth, and drill hole to enable later identification and use of the material.

The original core samples were logged by a geologist with coding that was entered into a database based on the drill hole, interval, and lithology. This metallurgical coding is documented in Attachment 2.

The 2008 composite tailings sample was selected from core samples to ensure that the sample was representative of the rock types to be tested; that the material was sulfide ore and not oxide ore; and that the samples contained between 0.2 percent and one (1) percent copper.

The tailing sample details, including the source cores and depth intervals for the 2006-2007 tailings material samples, are documented in Attachment 3. Attachment 4 documents the production year 0-3 composite sample (July 2008 sample).

3.0 Geochemical Test Results

The rock composition of each of the tailings samples submitted for geochemical testing are provided in Table 1. Table 2 provides a summary of the analyses completed for each sample. The analyses performed included acid-generating capacity and metals release using standard static and short-term leaching procedures such as: Acid-Base Accounting (ABA) (Sobek et al, 1978), Net Acid Generation pH (NAG pH) (Stuart, 2005), Synthetic Precipitation Leaching Procedure (SPLP) (EPA Method 1312 - EPA, 1994), whole rock analysis, and Meteoric Water Mobility Procedure (MWMP) (ASTM, 2002). The analytical results for the tailings geochemical characterization conducted to date are presented in the Technical Memorandum titled *Tailings Geochemistry* (Tetra Tech, 2009b) dated March 24, 2009 (see Attachment 1).

Table 1: Rock Composition of 2006-2008 Tailings Samples

Sample ID	Rock Units
Tailings – May 2006	Horquilla
Tailings 022807	Horquilla
Tailings-05 June2007	Horquilla
Year 0-3 Tailings (July 2008)	21.3% Earp 72.9% Horquilla 5.8% Escabrosa (Year 0 to 3 composite)

Table 2: Tailings Test Protocols

Sample ID	Sample Date	ABA	NAG pH	Whole Rock	SPLP	MWMP
Tailings – May 2006	05/19/2006	X		X	X	
Tailings 022807	02/28/2007	X	X	X	X	
Tailings-05 June2007	06/05/2007	X	X	X	X	X
Year 0-3 Tailings	July 2008	X		X	X	X



REFERENCES

- ADEQ (2009). *Arizona Mining BADCT Guidance Manual: Aquifer Protection Program*.
- American Society for Testing and Materials (ASTM) (2002), *Standard Test Method for Column Percolation Extraction of Mine Rock by the Meteoric Water Mobility Procedure, Designation D2242-02*, ASTM, Conshohocken, PA, 7p.
- EPA. 1994. *Method 1312 - Synthetic Precipitation Leaching Procedure. Revision 1*. SW-846 online. <http://www.epa.gov/epaoswer/hazwaste/test/pdfs/1312.pdf>.
- Sobek, A.A., W.A. Schuller, J.R. Freeman, and R.M. Smith, (1978). *Field and laboratory methods applicable to overburden and minesoils*. U.S. E.P.A. Report EPA-600/2-78-054.
- Tetra Tech (2009a) *Aquifer Protection Permit (APP) Application*. Prepared for Rosemont Copper Company. Report dated February 2009.
- Tetra Tech (2009b), Williamson, M., (2010). *Tailings Geochemistry*. Technical Memorandum to Jamie Sturgess (Rosemont Copper Company). Technical Memorandum Dated March 24, 2009.

ATTACHMENT 1
TECHNICAL MEMORANDUM
TAILINGS GEOCHEMISTRY

Rosemont Copper Project
Locator Sheet

Record # 012406

Document Date 2009 03 24

Document Title: Tailings Geochemistry

Author/Recipient Mark A. Williamson

Description Four samples of tailings material were tested for acid-generating capacity and metals release ...

Other Notes Attachment 1 of 013410

This document is located in the following: [CIRCLE THE CATEGORY (from the list below) IN WHICH THIS ITEM IS FILED]

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|---|--|
| <p>1. Project Management</p> <ul style="list-style-type: none">a. Formal recommendations & Directionsb. Formal meeting minutes & memosc. General Correspondenced. Contracts, Agreements, & MOUs (Rosemont, Udall, SWCA)e. Other <p>2. Public Involvement</p> <ul style="list-style-type: none">a. Announcements & Public Meetingsb. Mailing Listsc. Scoping Period Commentsd. Udall Foundation Working Groupe. Scoping Reportsf. Comments after Scoping Periodg. DEIS Public Comments <p>3. Agency Consultation & Permits</p> <ul style="list-style-type: none">a. Army Corps of Engineers (404 permit)b. US Fish & Wildlife Service (Sec. 7 T&E)c. State Historic Preservation Office (Sec. 106)d. Tribes (Sec. 106)e. Advisory Council on Historic Preservation (Sec. 106)f. Otherg. AZ Dept of Environmental Quality (APP) <p>4. Communication</p> <ul style="list-style-type: none">a. Congressionalb. Cooperating Agenciesc. Organizationsd. Individualse. FOIAf. Internalg. Proponent <p>5. Proposed Action</p> <ul style="list-style-type: none">a. Mine Plan (including compilation)b. Supporting Documentsc. Detailed Designsd. References <p>6. Alternatives</p> | <ul style="list-style-type: none">a. Cumulative Effects Catalogb. Connected Actionsc. Dismissed from Detailed Analysisd. Analyzed in Detail<ul style="list-style-type: none">i. Barrel McClearyii. Barrel Onlyiii. Scholefield McCleary <p>7. Resources</p> <ul style="list-style-type: none">a. Air Quality & Climate Changeb. Biologicalc. Dark Skiesd. Fuels & Fire Managemente. Hazardous Materialsf. Heritageg. Land Useh. Livestock Grazingi. Noise & Vibrationj. Public Health & Safetyk. Recreation & Wildernessl. Riparianm. Socioeconomics & Environmental Justicen. Soils & Geologyo. Transportation & Accessp. Visualq. Water <p>8. Reclamation</p> <ul style="list-style-type: none">a. Plans & Reportsb. Notes & Correspondencec. Referencesd. Other <p>9. DEIS</p> <ul style="list-style-type: none">a. DEISb. References <p>10. FEIS</p> <p>11. Geospatial Analysis (GIS Data)</p> <p>12. FOIA Exempt Documents</p> <p>13. ROD (including BLM & ACOE)</p> |
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ATTACHMENT 2
2006-2008 TAILINGS MATERIAL SAMPLE
METALLURGICAL DATABASE CODES

Attachment 2
Tailings Material Samples Metallurgical Database Codes
Rosemont Copper Project
August 2010

Work Date	Type Of Sample	Sample Processor/ Laboratory	Material Type	Lithology Type	Composite Name	Data File Code	Comments
2006	Initial Metallurgical Testwork	Washington Group	Core	Horquilla	NA	999	Source of May 2006 and February/ June 2007 initial tailings samples
2007	Scoping Flotation - 50 Composite Variability	Mountain States	Coarse Rejects Primarily/ Minor Core	Various	NA	50	
2007	Definitive Flotation	Mountain States	Coarse Rejects	Horquilla (5)	Composite 1	1	Source of tailings samples analyzed in July 2010
2007	Definitive Flotation	Mountain States	Coarse Rejects	Colina (3)	Composite 2	2	
2007	Definitive Flotation	Mountain States	Coarse Rejects	Earp (4)	Composite 3	3	
2007	Definitive Flotation	Mountain States	Coarse Rejects	Epitaph (2)	Composite 4	4	
2007	Definitive Flotation	Mountain States	Coarse Rejects	Escabrosa (6)	Composite 5	5	
2007	Definitive Flotation	Mountain States	Coarse Rejects	Horquilla (5)	Composite 1A	10	
2007	Comminution - work indexes	Hazen	Core	Various	by dh & depth	not coded	
2008	Mixed Oxide- Sulfide - Leaching Testwork	Mountain States	Coarse Rejects	Horquilla (5)	Comp. 1	31	

Attachment 2
 Tailings Material Samples Metallurgical Database Codes
 Rosemont Copper Project
 August 2010

Work Date	Type Of Sample	Sample Processor/ Laboratory	Material Type	Lithology Type	Composite Name	Data File Code	Comments
2008	Definitive Flotation- EOY03	Mountain States	Coarse Rejects	Horquilla (5)	Composite EOY03 - 1	701	Source of tailings samples used for weight proportioned 4-7 year composite
2008	Definitive Flotation- EOY03	Mountain States	Coarse Rejects	Earp (4)	Composite EOY03 - 2	702	
2008	Definitive Flotation- EOY03	Mountain States	Coarse Rejects	Colina (3)	Composite EOY03 - 3	703	
2008	Definitive Flotation- EOY03	Mountain States	Coarse Rejects	Epitaph (2)	Composite EOY03 - 4	704	
2008	Mixed Oxide- Sulfide - Flotation Testwork	Mountain States	Core	Horquilla (5)	Composite 1	95	

ATTACHMENT 3
2006-2007 TAILINGS MATERIAL SAMPLE CORES

Attachment 3
 2006-2007 Tailings Material Samples Source Cores
 Rosemont Copper Project
 August 2010

Rock Type	Borehole	Sample ID	Code	Interval		ABA/NAG	Whole Rock	SPLP	MWMP
				Depth from	Depth to				
Horquilla	AR-2018	NA	999	313	565	X	X	X	X
	AR-2018	NA	999	565	621	X	X	X	X
	AR-2018	NA	999	621	727	X	X	X	X

ATTACHMENT 4
2008 TAILINGS 0-3 YEAR COMPOSITE MATERIAL
SAMPLE CORES

0-3 year Composite Tailings Sample Source Cores
Rosemont Copper Project
August 2010

Rock Type	Borehole	Sample ID	Code	Interval		ABA/NAG	Whole Rock	SPLP	MWMP
				Depth from	Depth to				
0-3 Year Composite (72.9% Horquilla)	A-844	234115	301	335	340	X	X	X	X
	A-844	234116	301	340	345	X	X	X	X
	A-844	234117	301	345	349	X	X	X	X
	A-844	234118	301	349	354	X	X	X	X
	A-844	234119	301	354	357	X	X	X	X
	A-844	234120	301	357	363	X	X	X	X
	A-844	234121	301	363	367	X	X	X	X
	A-844	234122	301	367	369	X	X	X	X
	A-844	234123	301	369	370	X	X	X	X
	A-844	234124	301	370	374	X	X	X	X
	A-844	234125	301	374	379	X	X	X	X
	A-846	275331	301	537	542	X	X	X	X
	A-846	275332	301	542	544	X	X	X	X
	A-846	275333	301	544	551	X	X	X	X
	A-846	275334	301	551	558	X	X	X	X
	A-846	275335	301	558	561	X	X	X	X
	A-846	275336	301	561	565	X	X	X	X
	A-846	275338	301	565	570	X	X	X	X
	A-846	275339	301	570	573	X	X	X	X
	A-846	275340	301	573	577	X	X	X	X
	A-846	275341	301	577	582	X	X	X	X
	A-853	322063	301	170	175	X	X	X	X
	A-853	322065	301	181	187	X	X	X	X
	A-853	322066	301	187	191	X	X	X	X
	A-853	322067	301	191	195	X	X	X	X
	A-853	322068	301	195	200	X	X	X	X
	A-853	322069	301	200	205	X	X	X	X
	A-853	322070	301	205	210	X	X	X	X
	A-853	322071	301	210	215	X	X	X	X
	A-853	322072	301	215	220	X	X	X	X
	A-856	322032	301	497	502	X	X	X	X
	A-856	322033	301	502	506	X	X	X	X
	A-856	322034	301	506	512	X	X	X	X

Attachment 4
 0-3 year Composite Tailings Sample Source Cores
 Rosemont Copper Project
 August 2010

Rock Type	Borehole	Sample ID	Code	Interval		ABA/NAG	Whole Rock	SPLP	MWMP
				Depth from	Depth to				
0-3 Year Composite (72.9% Horquilla)	A-856	322035	301	512	516	X	X	X	X
	A-856	322036	301	516	519	X	X	X	X
	A-856	322037	301	519	523	X	X	X	X
	A-856	322038	301	523	525	X	X	X	X
	A-856	322039	301	525	527	X	X	X	X
	A-856	322040	301	527	532	X	X	X	X
	A-856	322041	301	532	537	X	X	X	X
	A-866	276456	301	452	457	X	X	X	X
	A-866	276457	301	457	462	X	X	X	X
	A-866	276458	301	462	467	X	X	X	X
	A-866	276459	301	467	472	X	X	X	X
	A-866	276460	301	472	477	X	X	X	X
	A-866	276461	301	477	482	X	X	X	X
	A-866	276462	301	482	487	X	X	X	X
	A-866	276463	301	487	492	X	X	X	X
	A-869	274528	301	594	599	X	X	X	X
	A-869	274529	301	599	604	X	X	X	X
	A-869	274530	301	604	609	X	X	X	X
	A-869	274531	301	609	614	X	X	X	X
	A-869	274532	301	614	619	X	X	X	X
	A-869	274533	301	619	624	X	X	X	X
	A-869	274534	301	624	629	X	X	X	X
	A-869	274535	301	629	634	X	X	X	X
	A-869	274536	301	634	637	X	X	X	X
	A-869	274537	301	637	640	X	X	X	X
	A-873	240917	301	719	724	X	X	X	X
	A-873	240918	301	724	729	X	X	X	X
	A-873	240919	301	729	734	X	X	X	X
	A-873	240920	301	734	739	X	X	X	X
	A-873	240921	301	739	744	X	X	X	X
A-873	240922	301	744	749	X	X	X	X	
A-873	240922	301	749	750	X	X	X	X	
A-873	240923	301	750	754	X	X	X	X	

Attachment 4
0-3 year Composite Tailings Sample Source Cores
Rosemont Copper Project
August 2010

Rock Type	Borehole	Sample ID	Code	Interval		ABA/NAG	Whole Rock	SPLP	MWMP
				Depth from	Depth to				
0-3 Year Composite (72.9% Horquilla)	A-873	240924	301	754	758	X	X	X	X
	A-873	240925	301	758	764	X	X	X	X
	A-873	240926	301	764	767	X	X	X	X
	A-875	314550	301	314	316	X	X	X	X
	A-875	314551	301	316	320	X	X	X	X
	A-875	314552	301	320	326	X	X	X	X
	A-875	314553	301	326	330	X	X	X	X
	A-875	314554	301	330	336	X	X	X	X
	A-875	314555	301	336	341	X	X	X	X
	A-875	314556	301	341	346	X	X	X	X
	1485	170141	301	638	643	X	X	X	X
	1485	170142	301	643	647	X	X	X	X
	1485	170143	301	647	652	X	X	X	X
	1485	170145	301	657	661	X	X	X	X
	1485	170146	301	661	666	X	X	X	X
	1485	170147	301	666	671	X	X	X	X
	1502	326792	301	633	638	X	X	X	X
	1502	326793	301	638	643	X	X	X	X
	1502	326794	301	643	648	X	X	X	X
	1502	326795	301	648	653	X	X	X	X
	1502	326796	301	653	656	X	X	X	X
	1502	326798	301	656	658	X	X	X	X
	1502	326799	301	658	663	X	X	X	X
	1502	326800	301	663	668	X	X	X	X
	AR-2004	176447	301	600	605	X	X	X	X
	AR-2004	176448	301	605	610	X	X	X	X
	AR-2004	176449	301	610	615	X	X	X	X
	AR-2004	176450	301	615	620	X	X	X	X
	AR-2004	176451	301	620	625	X	X	X	X
	AR-2004	176452	301	625	630	X	X	X	X
	AR-2004	176454	301	635	640	X	X	X	X
	AR-2004	176455	301	640	645	X	X	X	X
	AR-2004	176456	301	645	650	X	X	X	X

0-3 year Composite Tailings Sample Source Cores
Rosemont Copper Project
August 2010

Rock Type	Borehole	Sample ID	Code	Interval		ABA/NAG	Whole Rock	SPLP	MWMP
				Depth from	Depth to				
0-3 Year Composite (21.3% Earp)	A-834	170682	302	535	540	X	X	X	X
	A-834	170683	302	540	546	X	X	X	X
	A-834	170684	302	546	553	X	X	X	X
	A-836	232782	302	579	582	X	X	X	X
	A-836	232783	302	582	584	X	X	X	X
	A-836	232790	302	605.5	610.5	X	X	X	X
	A-836	232791	302	610.5	615.5	X	X	X	X
	A-836	232792	302	615.5	620.5	X	X	X	X
	1504	275429	302	800	804	X	X	X	X
	1504	275430	302	804	809	X	X	X	X
	1504	275431	302	809	814	X	X	X	X
	1504	275432	302	814	819	X	X	X	X
	1504	275433	302	819	824	X	X	X	X
	1916	276649	302	482	488	X	X	X	X
	1916	276652	302	495	500	X	X	X	X
	1916	276673	302	587	590	X	X	X	X
	1916	276679	302	610	613	X	X	X	X
	1916	276682	302	623	628	X	X	X	X
	1941	237776	302	729	734	X	X	X	X
	1941	237777	302	734	737	X	X	X	X
	1941	237778	302	737	744	X	X	X	X
	1941	237779	302	744	749	X	X	X	X
	1941	237780	302	749	753	X	X	X	X
	AR-2000	174746	302	593	595	X	X	X	X
	AR-2000	174747	302	595	600	X	X	X	X
	AR-2000	174749	302	600	605	X	X	X	X
	AR-2000	174751	302	610	615	X	X	X	X
	AR-2029	243177	302	585	590	X	X	X	X
	AR-2029	243178	302	590	595	X	X	X	X
	AR-2029	243182	302	610	615	X	X	X	X
AR-2029	243183	302	615	620	X	X	X	X	
0-3 Year Composite (5.8% Escabrosa)	1506	228926	303	550	556	X	X	X	X

Attachment 4
 0-3 year Composite Tailings Sample Source Cores
 Rosemont Copper Project
 August 2010

Rock Type	Borehole	Sample ID	Code	Interval		ABA/NAG	Whole Rock	SPLP	MWMP
				Depth from	Depth to				
0-3 Year Composite (5.8% Escabrosa)	1506	228930	303	570	574	X	X	X	X
	1506	228932	303	577	583	X	X	X	X
	1580	241491	303	638	644	X	X	X	X
	1580	241495	303	660	665	X	X	X	X
	1580	241496	303	665	670	X	X	X	X
	1580	241507	303	736	741	X	X	X	X
	1580	241508	303	741	746	X	X	X	X
	1580	241513	303	766	770	X	X	X	X