



MEMORANDUM

TO: David Krizek **FROM:** Mark A. Williamson, PhD
ORGANIZATION: Rosemont Copper **DATE:** July 9, 2012
CC: File **PROJECT:** 1002.4
SUBJECT: Update of Rosemont ABA Testing

Acid-Base Accounting (ABA) testing for the Rosemont Copper project was initiated in 2006 and a summary report prepared in 2007 (Tetra Tech, 2007). For that report, 165 waste rock samples were obtained and submitted for ABA analysis (Sobek, et al., 1978). Since the preparation of Tetra Tech (2007) additional samples of Rosemont Copper waste rock have been submitted for ABA analysis. The purpose of the present memo is to provide an update of summary ABA results.

Since Tetra Tech (2007) 46 additional waste rock samples have been submitted for ABA analysis. Table 1 provides a summary of the distribution of samples among rock types, and is taken from Tetra Tech (2010). There are some very minor variations with respect to number of samples for each rock type, between Table 1 below and Tetra Tech (2007), owing to reclassification of some samples since 2007.

Table 1. Summary of waste rock types, tonnages and number of ABA tests.

Rock Type	Tons of Material	Percent of Material (by weight)	No. of ABA Tests
Arkose	546,336,000	44.38%	55
Tertiary Gravel	141,227,000	11.47%	5
Abrigo	113,815,000	9.24%	6
Horquilla	87,141,000	7.08%	26
Glance	80,841,000	6.57%	4
Andesite	49,118,000	3.99%	38
Concha	34,107,000	2.77%	6
Martin	32,304,000	2.62%	7
Earp	29,577,000	2.40%	14
Epitaph	27,150,000	2.21%	16
Escabrosa	22,859,000	1.86%	10
Bolsa	23,447,000	1.90%	13
Colina	16,145,000	1.31%	11
Quartz Monzonite Porphyry	13,047,000	1.06%	9
Scherrer	8,524,000	0.69%	0
Pre-Cambrian	4,203,000	0.34%	0
Undefined	941,000	0.08%	0
Overburden	391,000	0.03%	6
Total Amounts	1,231,173,000	100%	226

Figure 1 present a standard graph of ABA data of Acid Generation Potential (AGP) versus Acid Neutralizing Potential (ANP). Figure 1 includes lines for the ANP/AGP equal to 3 and to 1, as well as +20 and -20 Net Neutralizing Potential (NNP). These graph features are related to Arizona BADCT guidance (ADEQ, 2004) which states that samples with ANP/AGP greater than 3, or NNP greater than +20 are considered low risk (non-acid generating) with respect to formation of acid rock drainage (ARD). A breakdown of samples to date that are likely, uncertain or non-acid generating is presented in Tetra Tech (2010).

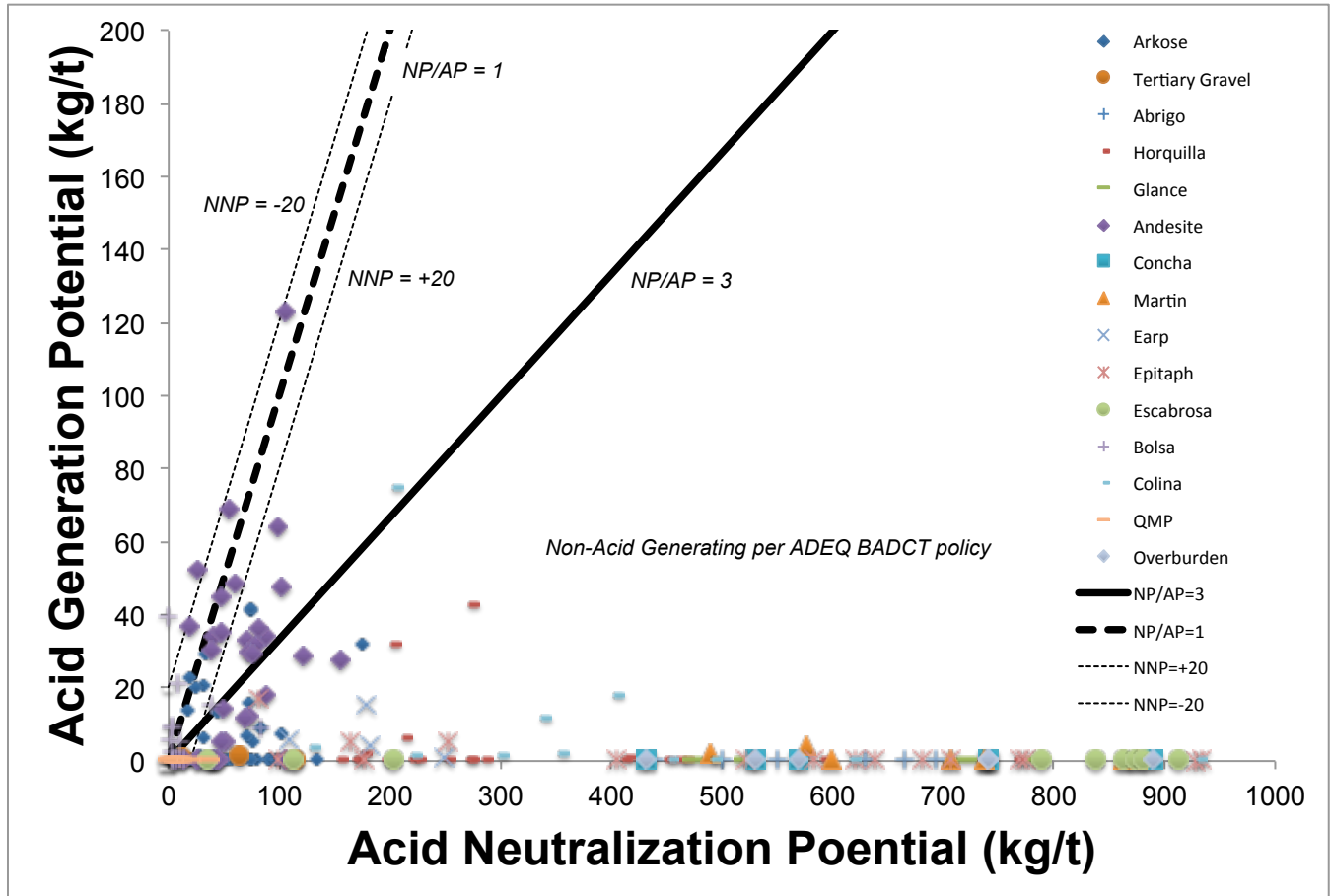


Figure 1. Graph of ABA data for Rosemont Copper waste rock samples.

Consistent with Tetra Tech (2007), Figure 2 below is a graph of the Net Acid Generation (NAG) pH versus the NNP of all Rosemont Copper waste rock samples. Per the description presented in Tetra Tech (2007) the samples circled in the graph may be considered likely to generate acid. This assessment indicates that only three (3) samples of waste rock are characterized as likely to produce acid. This number of samples is consistent with two (2) samples identified as likely to produce acid on an NNP basis of interpretation (Tetra Tech 2007; NNP less than -20 are considered likely to produce acid). Figure 2 does not speak directly to samples that are uncertain as to their likelihood to produce acid.

Overall, additional sampling and analysis of ABA since 2007 reinforces initial interpretations of potential to generate ARD. Most waste rock is characterized as non-acid generating, with limited amounts of rock characterized as uncertain, or likely (see Tetra Tech, 2007 for a tabular breakdown).

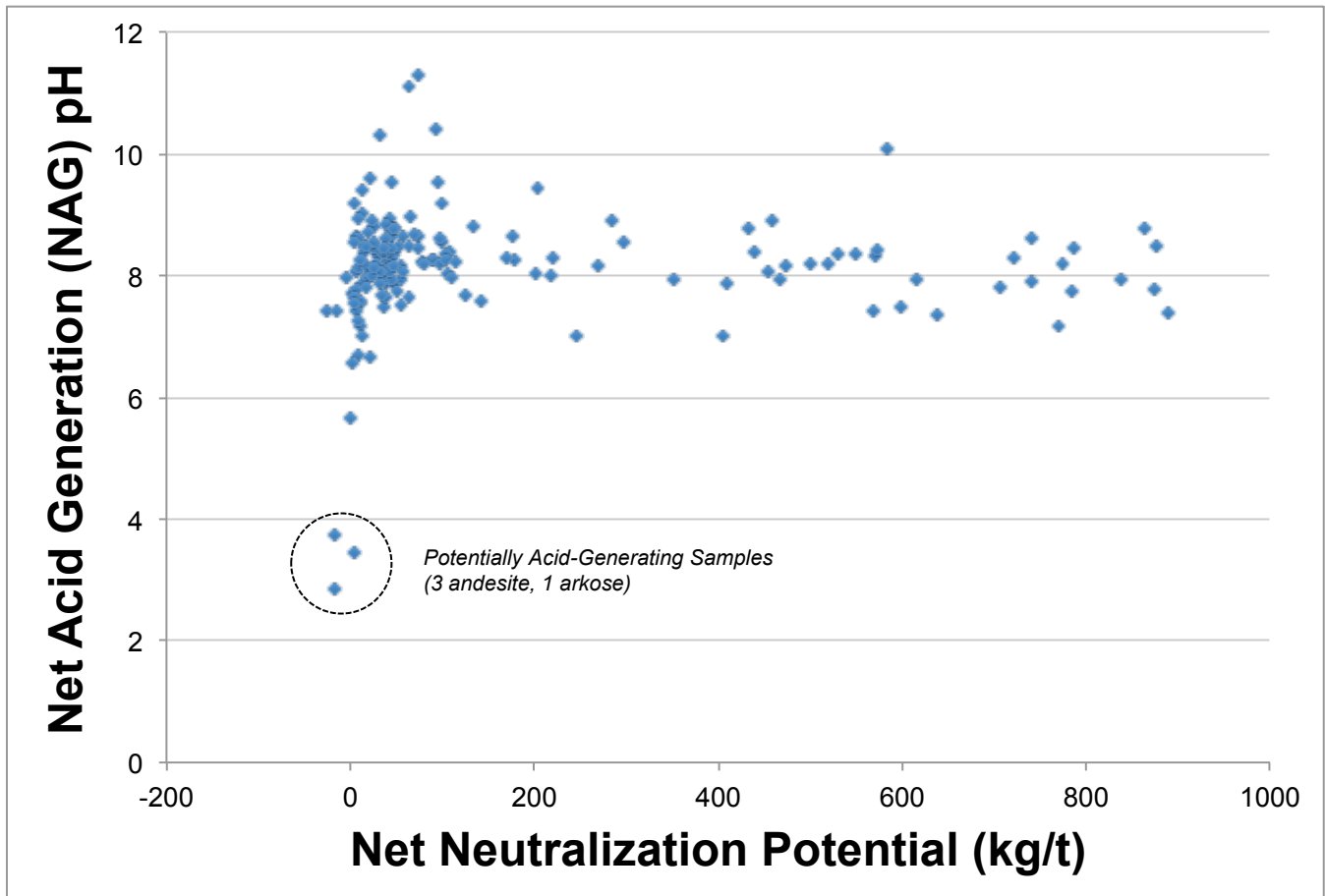


Figure 2. NAG pH versus NNP to assess acid generation potential of Rosemont waste rock samples.

References

- ADEQ (2004) ARIZONA MINING GUIDANCE MANUAL BADCT. Arizona Department of Environmental Quality, Publication # TB 04-01, 2004.
- 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 (2007) Geochemical Characterization, Addendum 1. Report to Rosemont Copper dated September 2007.
- Tetra Tech (2010) Rosemont Preliminary Geochemistry Review Response to Comments. Technical Memorandum to Kathy Arnold, Rosemont Copper Company. Technical Memorandum Dated November 23, 2010.