



# SUPERIOR WATERSHED PARTNERSHIP

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### CEMP Monitoring Report – September 17, 2013

**RE:** Exceedances of Eagle Mine Groundwater Discharge Permit

**Type of Monitoring (Permit Verification or Additional):** Verification Monitoring – Background and Operations Data Review

#### **Summary:**

Permit limits used to screen Groundwater Discharge Permit (GWDP) groundwater monitoring data are specified by the Michigan Department of Environmental Quality (MDEQ) and are referred to as Maximum Daily Limits (MDLs).

As required by the GWDP, groundwater at Eagle Mine is monitored quarterly from hydraulically upgradient (background) monitoring locations to provide a basis for determining if changes in water quality at downgradient (compliance) monitoring locations are related to mining activities or to an unrelated naturally occurring influence.

The permit limits set for Eagle Mine are currently regulatory program derived rather than reflective of site-specific baseline conditions. As a result, monitoring results for some parameters/locations have exceeded the MDL's (permit limits) both prior to and after Eagle Mine commenced with operations in September 2011.

#### **Details:**

Baseline concentrations of groundwater parameters including pH, vanadium, copper and lead exceeded the MDLs at one or more of the compliance monitoring locations (QAL008A, QAL008D, QAL050A, QAL051A, QAL051D, QAL052A and QAL057A) and background monitoring locations without set permit limits (QAL026A, QAL026D, QAL029A, QAL029D, QAL053A, QAL055A, and QAL056A), indicating that the natural range of baseline groundwater quality at these locations for these parameters encompasses concentrations that exceed the respective permit limits.

A detailed summary of the Groundwater Discharge Permit *compliance monitoring* locations currently exceeding permit limits is provided below.

#### **SWP Concerns:**

CEMP groundwater monitoring confirmed pH, vanadium, copper and lead levels that exceeded permit limits during the first and second quarters of 2013. The MDEQ has attributed these exceedances to natural background levels and/or well development. The SWP has evaluated the data and concurs with the MDEQ analysis.

**SWP Recommendations:**

The GWDP for Eagle Mine is currently up for renewal by the MDEQ and will be available for public review/comment shortly. Eagle Mine has requested revised permit limits to encompass background values observed at the site.

SWP recommends that the MDEQ establish permit limits for the renewed Groundwater Discharge Permit that is reflective of baseline conditions and protective of the environment.

**Eagle Mine Groundwater Discharge Permit Groundwater Monitoring Locations**



**Highlights:**

- Orange** - Compliance monitoring location
- Blue** - Background monitoring location

**Summary of Exceedances of Groundwater Discharge Permit Limits at  
Compliance Monitoring Locations**

LOCATION	PARAMETER	EVENT DATE	UNIT	MAXIMUM DAILY LIMIT	RESULT	QUALIFIER	NOTES
QAL008A	pH	5/13/2008	SU	6.5-9.0	9.4		Historically, background levels of pH at location QAL008A ranged from 7.2-9.7. Ten of 18 baseline sampling events reported results greater than the maximum daily limit of 9.0.
QAL008A	pH	6/10/2008	SU	6.5-9.0	9.3		
QAL008A	pH	7/1/2008	SU	6.5-9.0	9.4		
QAL008A	pH	8/12/2008	SU	6.5-9.0	9.3		
QAL008A	pH	9/16/2008	SU	6.5-9.0	9.3		
QAL008A	pH	10/1/2008	SU	6.5-9.0	9.4		
QAL008A	pH	2/26/2009	SU	6.5-9.0	9.7		
QAL008A	pH	11/2/2009	SU	6.5-9.0	9.1		
QAL008A	pH	2/1/2010	SU	6.5-9.0	9.1		
QAL008A	pH	8/8/2011	SU	6.5-9.0	9.3		
QAL008A	pH	11/1/2011	SU	6.5-9.0	9.1		
QAL008A	pH	2/5/2013	SU	6.5-9.0	9.1		
QAL008D	pH	7/1/2008	SU	6.5-9.0	9.3		
QAL008D	Vanadium	2/26/2009	ug/L	2.2	2.3		
QAL008D	Vanadium	5/1/2012	ug/L	2.2	2.3		
QAL050A	pH	2/5/2013	SU	6.5-9.0	9.1		Consistent with baseline data that has been recorded during previous sampling events.

LOCATION	PARAMETER	EVENT DATE	UNIT	MAXIMUM DAILY LIMIT	RESULT	QUALIFIER	NOTES
QAL051A	Vanadium	8/12/2008	ug/L	2.2	2.7		Historically, background levels of V at location QAL051A ranged from 1.4-3.4µg/L with average baseline results of 2.2µg/L. The maximum daily limit for V is 2.2µg/L.
QAL051A	Vanadium	11/2/2009	ug/L	2.2	2.5		
QAL051A	Vanadium	8/2/2010	ug/L	2.2	3.4		
QAL051A	Vanadium	11/4/2010	ug/L	2.2	2.3		
QAL051A	Vanadium	5/2/2011	ug/L	2.2	2.3		
QAL051A	Vanadium	11/1/2011	ug/L	2.2	2.5		
QAL051A	Vanadium	5/1/2012	ug/L	2.2	3.3		
QAL051A	Vanadium	8/1/2012	ug/L	2.2	2.6		
QAL051A	Vanadium	11/5/2012	ug/L	2.2	3		
QAL051A	Vanadium	2/5/2013	ug/L	2.2	2.9	f	
QAL051A	Vanadium	5/13/2013	ug/L	2.2	3.3		
QAL051A	Vanadium	8/5/2013	ug/L	2.2	3.9		
QAL051D	pH	7/1/2008	SU	6.5-9.0	9.5		Pre-operations (Sept 2011)
QAL051D	Vanadium	5/13/2008	ug/L	2.2	2.6		Pre-operations (Sept 2011)
QAL051D	Vanadium	11/4/2010	ug/L	2.2	2.7		
QAL052A	Copper	11/4/2010	ug/L	10	67	R	This is a low yield well that was modified during construction of the TWIS berm. Following these modifications some of the well samples had positive trace metal detections (Cu, Pb) greater than the maximum daily limit, similar to those seen in Q2 2013 which were believed to have been introduced when the
QAL052A	Copper	2/1/2011	ug/L	10	17	R	
QAL052A	Copper	5/13/2013	ug/L	10	35		
QAL052A	Lead	11/4/2010	ug/L	3	14	R	
QAL052A	Lead	5/13/2013	ug/L	3	7.4		

LOCATION	PARAMETER	EVENT DATE	UNIT	MAXIMUM DAILY LIMIT	RESULT	QUALIFIER	NOTES
							dedicated sampling pump at QAL052A failed and was replaced with temporary (non-dedicated) equipment.
QAL057A	pH	6/10/2008	SU	6.5-9.0	9.1		Historically, background levels of pH at location QAL057A ranged from 7.8-9.2 with average baseline results of 8.9. The maximum daily limit for pH is 9.0.
QAL057A	pH	9/16/2008	SU	6.5-9.0	9.1		
QAL057A	pH	10/1/2008	SU	6.5-9.0	9.2		
QAL057A	pH	8/4/2009	SU	6.5-9.0	9.2		
QAL057A	pH	11/2/2009	SU	6.5-9.0	9.1		
QAL057A	pH	2/1/2010	SU	6.5-9.0	9.1		
QAL057A	pH	2/5/2013	SU	6.5-9.0	9.2		
QAL057A	pH	5/13/2013	SU	6.5-9.0	9.1		

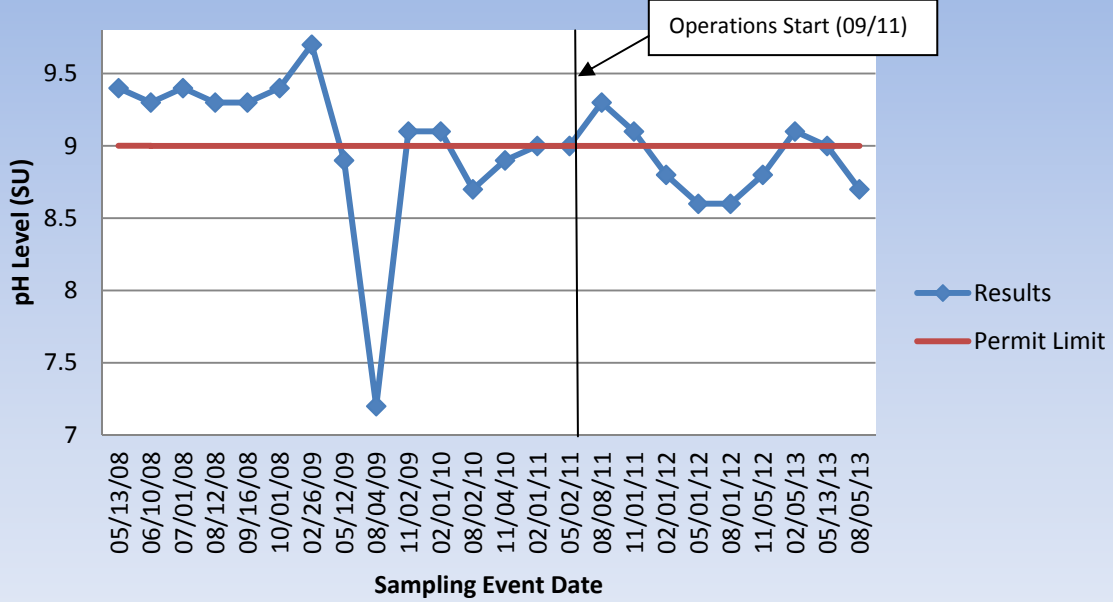
**Notes:**

This table summarizes the exceedances of the groundwater discharge permit limits from the installation of the wells through August 2013.

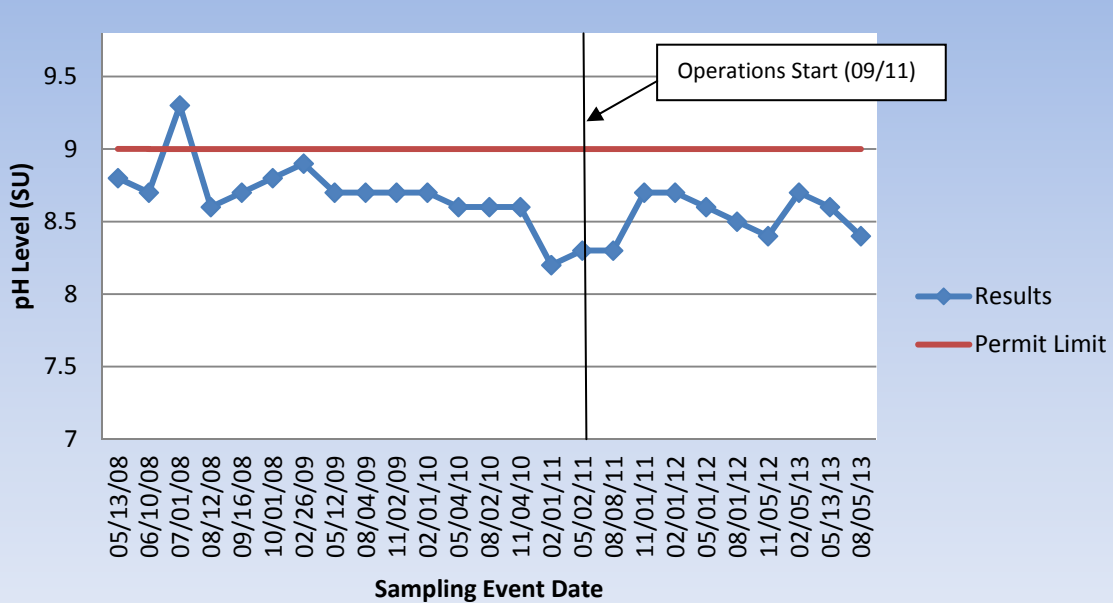
f = Value should be considered an estimate because field stabilization was not achieved of at least one parameter.

R = Measured value was rejected based on quality control procedures.

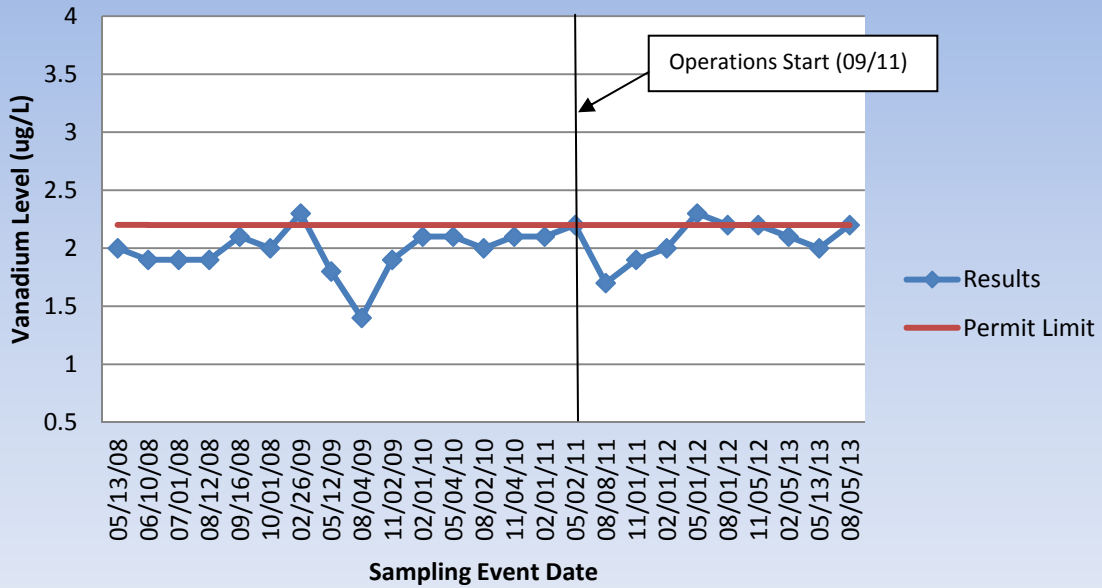
### QAL008A pH Exceedences



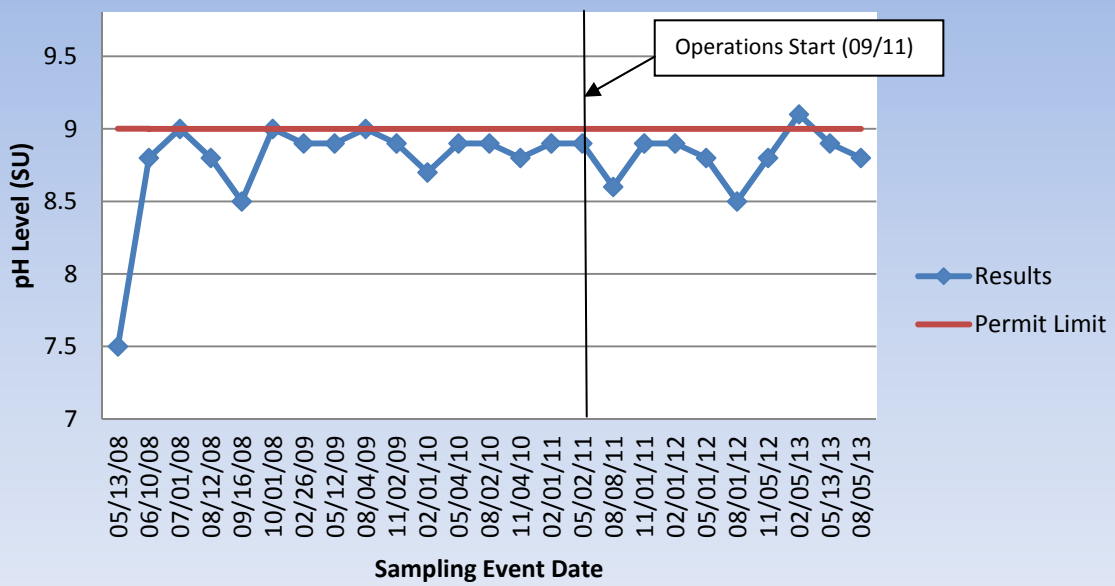
### QAL008D pH Exceedences



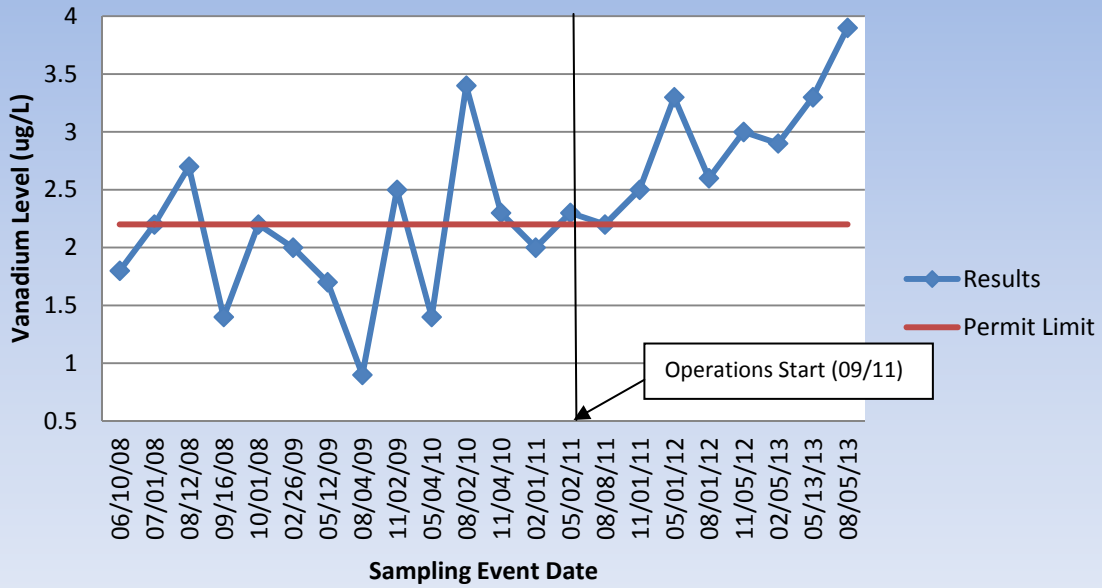
### QAL008D Vanadium Exceedences



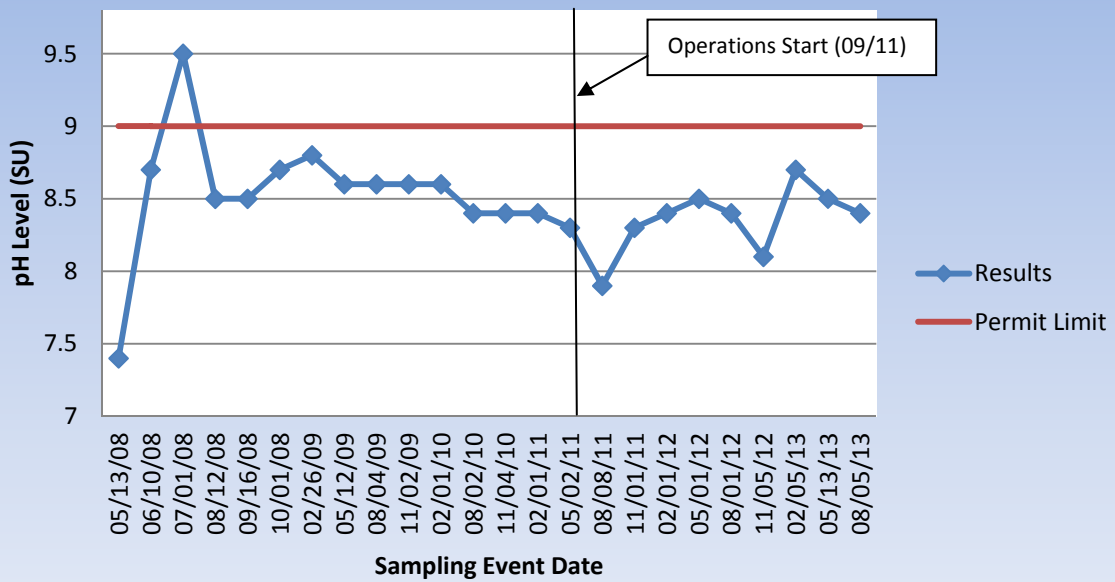
### QAL050A pH Exceedences



### QAL051A Vanadium Exceedences

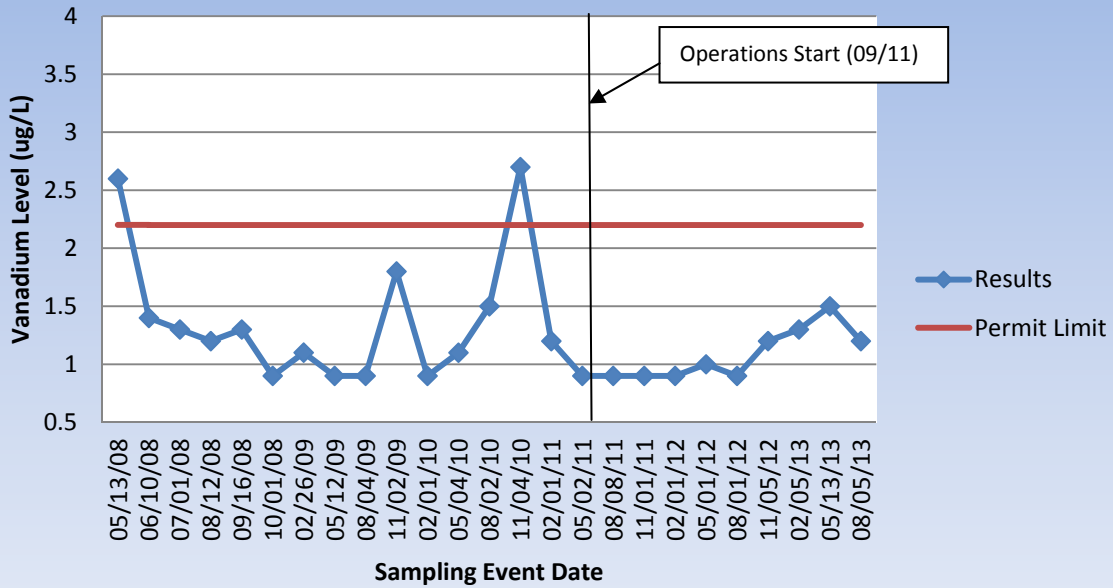


### QAL051D pH Exceedences

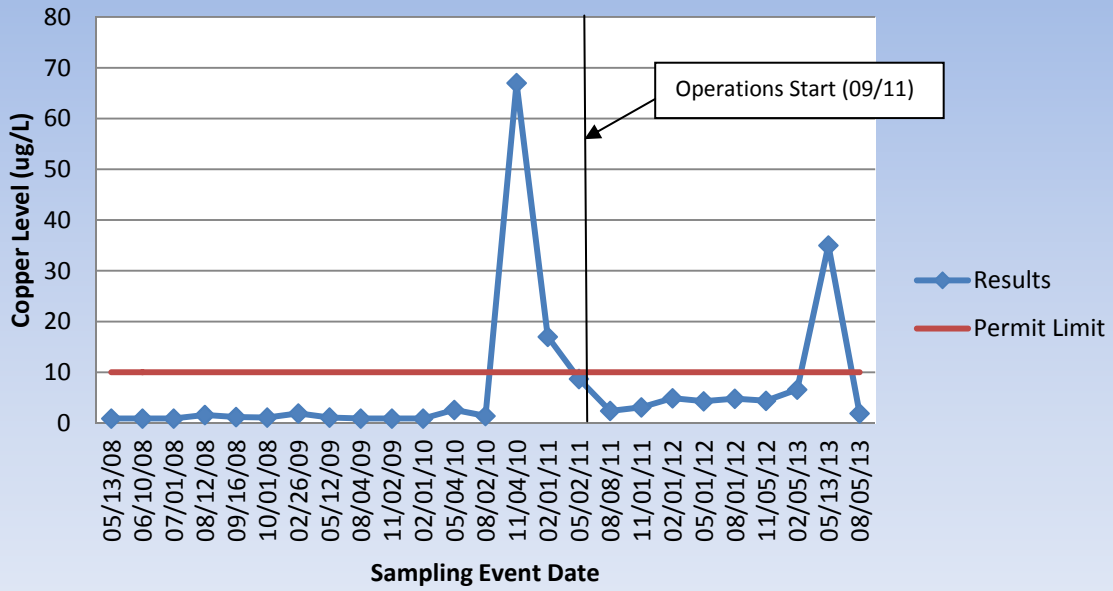




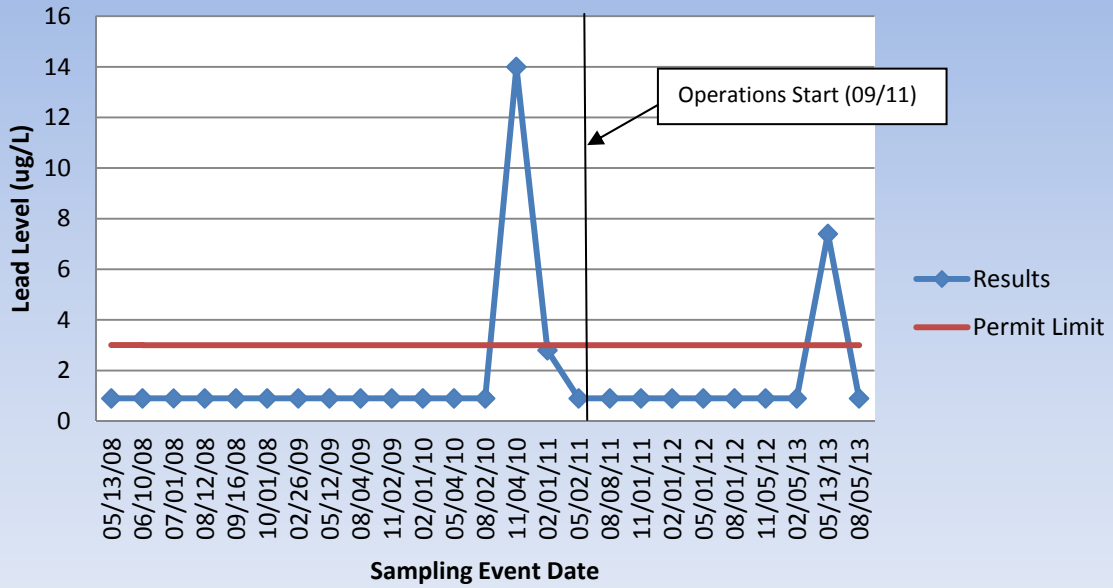
### QAL051D Vanadium Exceedences



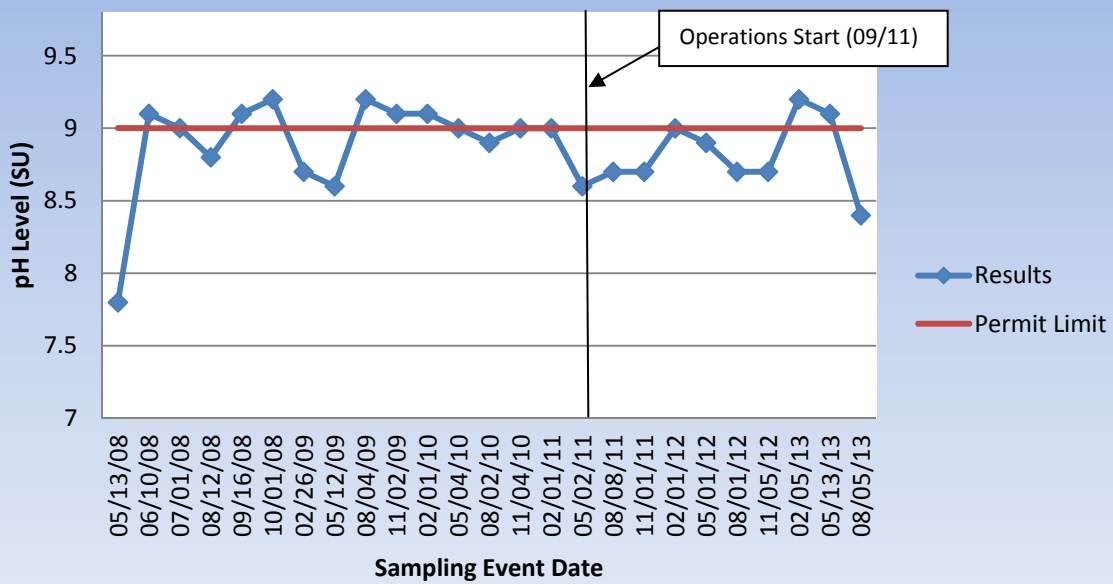
### QAL052A Copper Exceedences



### QAL052A Lead Exceedences



### QAL057A pH Exceedences



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