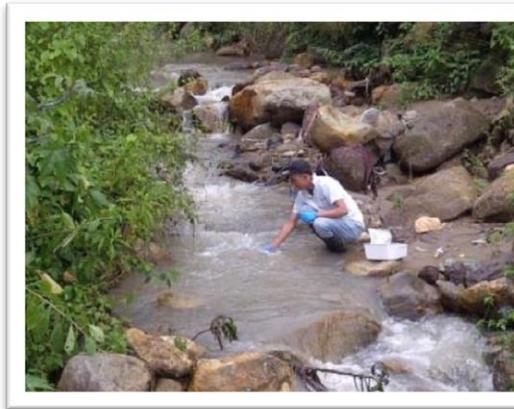
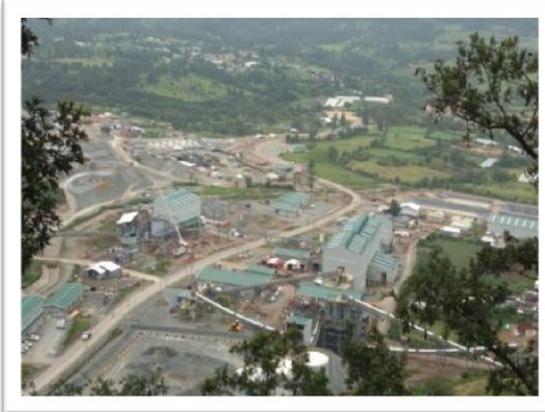


**Proyecto Minero Escobal  
San Rafael Las Flores, Santa Rosa**

**Informe de Monitoreo Ambiental**



06 - 2013





Preparado para:



**Ministerio de Ambiente y Recursos Naturales (MARN)**

## **Informe Trimestral de Monitoreo Ambiental**

Preparado por:



**Departamento de Ambiente**

San Rafael Las Flores, Santa Rosa, Guatemala

AGOSTO – OCTUBRE 2013



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## 1. Introducción

El presente informe ilustra al Ministerio de Ambiente y Recursos Naturales (**MARN**) lo siguiente:

- A. Resultados obtenidos durante los monitoreos ambientales referente a la calidad del aire (material particulado, gases de combustión y niveles de presión sonora), calidad de agua, vibraciones, salud y seguridad ocupacional y geoquímica de roca llevados a cabo durante los meses de agosto a octubre 2013.

Esto como parte de los compromisos ambientales de Minera San Rafael, S.A. (**la empresa**) en base a la resolución 549-2012/DIGARN/ODGR/hapc, inciso B, el cual se lee “La entidad MINERA SAN RAFAEL, SOCIEDAD ANÓNIMA, deberá continuar realizando los monitoreos en base a lo descrito en cada una de las resoluciones citadas en el primer considerando (4590-2008/ELER/CG), (262-2011/ECM/caml), (3061-2011/DIGARN/ECM/beor), llevando su respectivo registro y presentar los resultados de los monitoreos de cada uno de los proyectos de forma trimestral”.

- ❖ Proyecto de Exploración Minera Oasis ante el MARN con base en la resolución 4590-2008/ELER/CG, compromiso número VII; el cual se lee: “llevar un monitoreo mensual de la calidad de aire y niveles de ruido en el Área de Influencia Directa (**AID**) y presentar resultados mensualmente al MARN.”
- ❖ Proyecto de Túneles de Exploración Minera Oasis ante el MARN con base en la resolución 262-2011/ECM/caml, compromiso número XII; el cual se lee: “Continuar con el programa de monitoreo de la calidad del agua y aire, implementado desde 2008.”
- ❖ Proyecto Minero Escobal ante el MARN con base en la resolución 3061-2011/DIGARN/ECM/beor, compromisos número III y número VI; los cuales se leen: “La Empresa deberá de implementar el plan de monitoreo ambiental descrito en capítulo 13 y cumplirá con los límites establecidos por el MARN, además de lineamientos internacionales como Banco Mundial, Corporación Financiera internacional (CFI), Agencia de Protección Ambiental de los Estados Unidos (USEPA), Organización Mundial de la Salud (OMS) y Administración de la Salud y Seguridad Ocupacional (OSHA), según el componente que sea monitoreado...” y “Llevar un registro documentado del caudal bombeado de los pozos de abastecimiento y del agua bombeada desde los túneles hacia las piletas, así como de las descargas y los parámetros de descarga...”.

- B.** Resultados de calidad de agua y de calidad de aire, como parte de los compromisos ambientales de la empresa ante el MARN con base en la resolución 3061-2011/DIGARN/ECM/beor, compromisos número XXXI; el cual se lee: “Presentar los informes de monitoreo de la calidad del agua de los cuerpos naturales de agua potencialmente afectados por las actividades del proyecto y de la calidad del aire a este Ministerio en forma anual.”
- C.** Copia de registro documentado del Caudal bombeado desde los túneles hacia la planta de tratamiento y de su descarga hacia la Quebrada Escobal, como parte de los compromisos ambientales de la empresa ante el MARN con base en la resolución 3061-2011/DIGARN/ECM/beor, compromisos número VI; el cual se lee: “llevar un registro documentado del caudal bombeado de los pozos de abastecimiento y del agua bombeada desde los túneles hacia las piletas, así como de las descargas y los parámetros de descarga, remitiendo a este Ministerio una copia mensual de estos registros.”

El contenido del presente informe corresponde a la evaluación de los siguientes componentes ambientales:

- Calidad de Aire: Se monitorearon nueve estaciones ubicadas dentro del área de Influencia (AI) del proyecto para medir la concentración de material particulado igual o menor a 10 micrómetros ( $PM_{10}$ ), en microgramos por metro cúbico ( $\mu g/m^3$ ). También se monitorearon siete estaciones para medir la concentración de metales en  $PM_{10}$ , sólidos sedimentables totales (**PST**), y gases de combustión: dióxido de azufre (**SO<sub>2</sub>**) y óxidos nitrosos (**NO<sub>x</sub>**).
- Calidad de Presión Sonora: Se monitorearon nueve estaciones ubicadas dentro del ID del proyecto, para determinar los niveles de presión sonora, en decibeles escala A (**dBa**). y respuesta lenta.
- Calidad de Agua: Se tomaron muestras en 11 estaciones de agua superficial, 5 estaciones de agua subterránea (manantiales), 1 estación de pozos de producción y 10 estaciones de agua en pozos de monitoreo ubicadas en el ID del proyecto
- Sedimentos: Se tomaron muestras de sedimentos en las mismas estaciones de agua superficial ubicadas en el AI del proyecto.
- Calidad de Efluente: Se tomaron muestras mensuales en el efluente de la Planta de tratamiento de aguas proveniente de túneles y del agua contenida en la pileta de cumplimiento ambiental; además de mediciones diarias de datos In Situ y kit de cianuro de estos mismos puntos. En el anexo 11.2 se presenta una copia de los registros diarios.



- Vibraciones: Se instalaron tres medidores de vibraciones, los cuales registraron la velocidad de partícula durante cada una de las voladuras. En total se registraron 587 voladuras durante los meses de agosto a octubre 2013.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 34 muestras de material extraído de los túneles.
- Mediciones de Seguridad y Salud Ocupacional: Se analizaron seis estaciones de monitoreo de presión sonora, tres estaciones de material particulado, y se presenta un extracto de las mediciones rutinarias de gases para determinar ácido sulfhídrico (H<sub>2</sub>S)
- Copia de registro documentado del caudal bombeado de los pozos del agua bombeada desde los túneles hacia las piletas. En el anexo 11.1 se presenta copia de las lecturas diarias de flujómetros y los cálculos realizados para determinar los caudales bombeados del portal Este y el portal Oeste, durante los meses de agosto a octubre 2013.
- Copia de registro documentado del análisis In Situ y kit de Cianuro de efluentes. En el anexo 11.2 se presenta copia de las lecturas diarias de parámetros In Situ (pH, temperatura, Conductividad, Turbidez) así como los resultados obtenidos con el Kit de Cianuro (método colorimétrico) y resultados de muestras enviadas al laboratorio ACZ para la verificación del método colorimétrico; durante los meses de agosto a octubre 2013.



## 2. Condiciones Ambientales

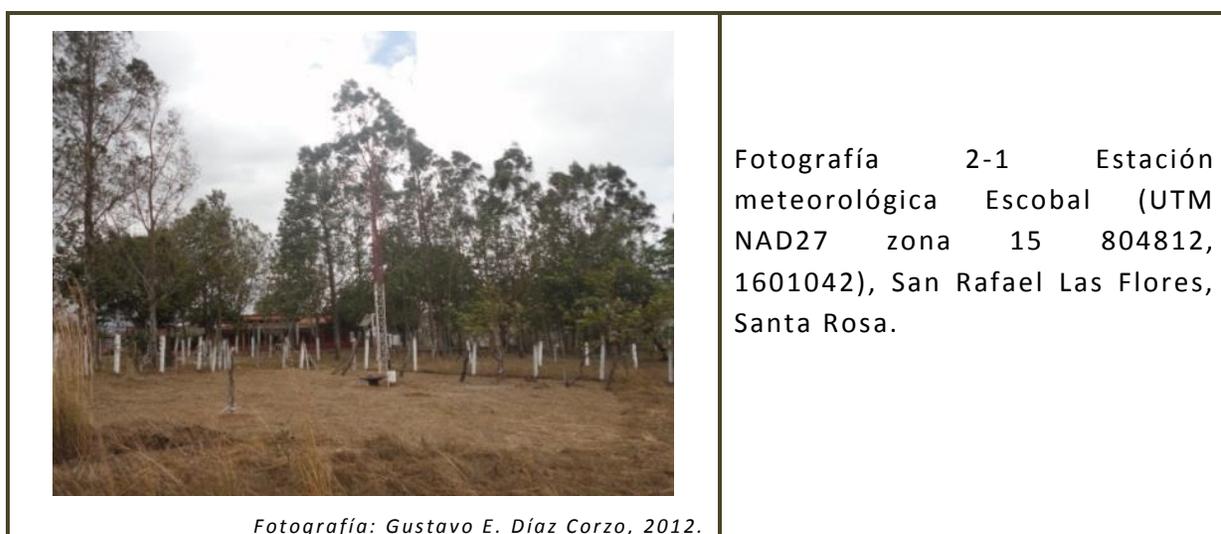
En el Cuadro 2-1 se enlistan algunos parámetros meteorológicos imperantes en el área del Proyecto correspondientes a los meses de agosto a octubre 2013; y en las Figura 2-1 a Figura 2-3 se representa la dirección del viento durante los diferentes meses de estudio.

Cuadro 2-1. Información meteorológica correspondiente a los meses de agosto a octubre 2013, Proyecto Minero Escobal.

TEMPERATURA (°C)			VELOCIDAD DEL VIENTO (km/h)			RAFAGAS (km/h)	HUMEDAD RELATIVA (%)			EVAPORACIÓN (mm)		
Max	Min	Media	Max	Min	Media	Max	Max	Min	Media	Max	Min	Media
AGOSTO 2013												
30.9	11.8	20.6	73.0	0.3	10.1	160.9	99.9	18.8	77.2	311.0	23.2	227.5
SEPTIEMBRE 2013												
28.3	19.6	13.3	32.6	0.3	1.9	61.7	99.9	46.5	88.0	311	225.1	275.8
OCTUBRE 2013												
28.5	13.5	20.1	59.8	7.0	0.3	160.9	99.9	37.1	83.4	306.7	229.3	278.8

Donde Max = valor máximo; Min = valor mínimo; °C = grados centígrados; Km/h = kilómetros por hora; % = porcentaje; mm = milímetros.

Fuente: Estación Meteorológica Escobal, 2013.



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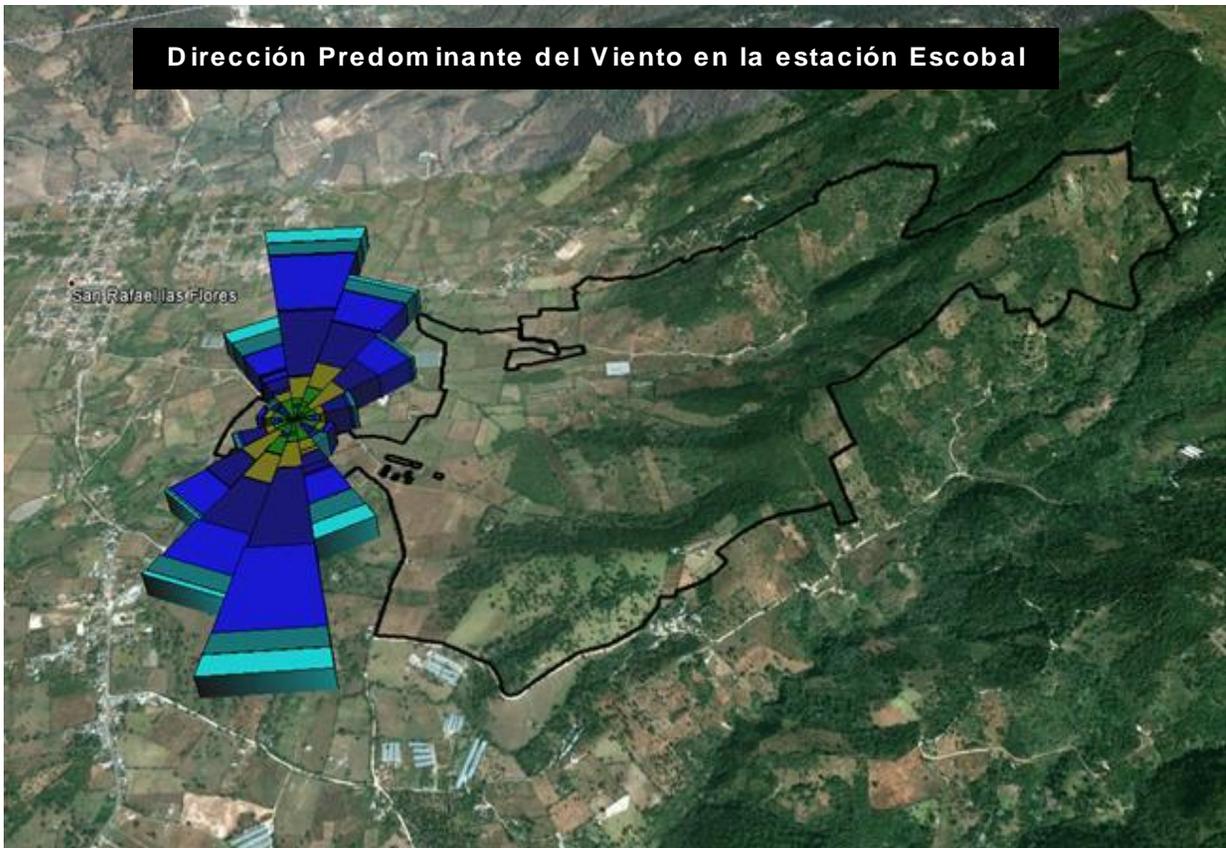
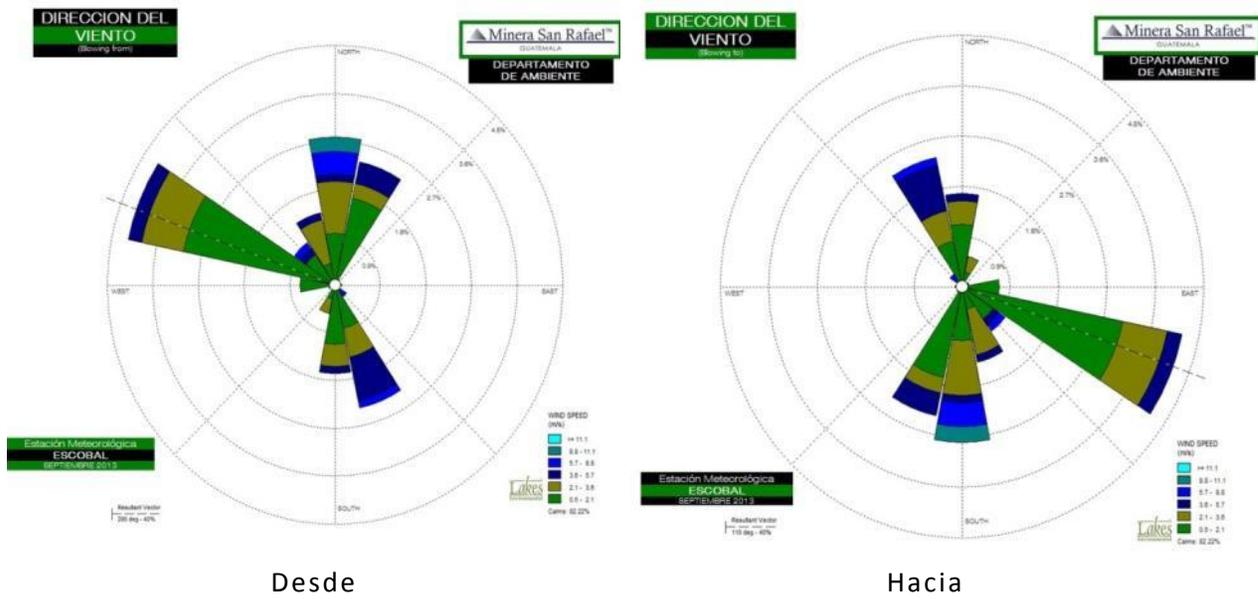


Figura 2-1 Dirección de Viento durante el mes de agosto 2013. Proyecto Minero Escobal



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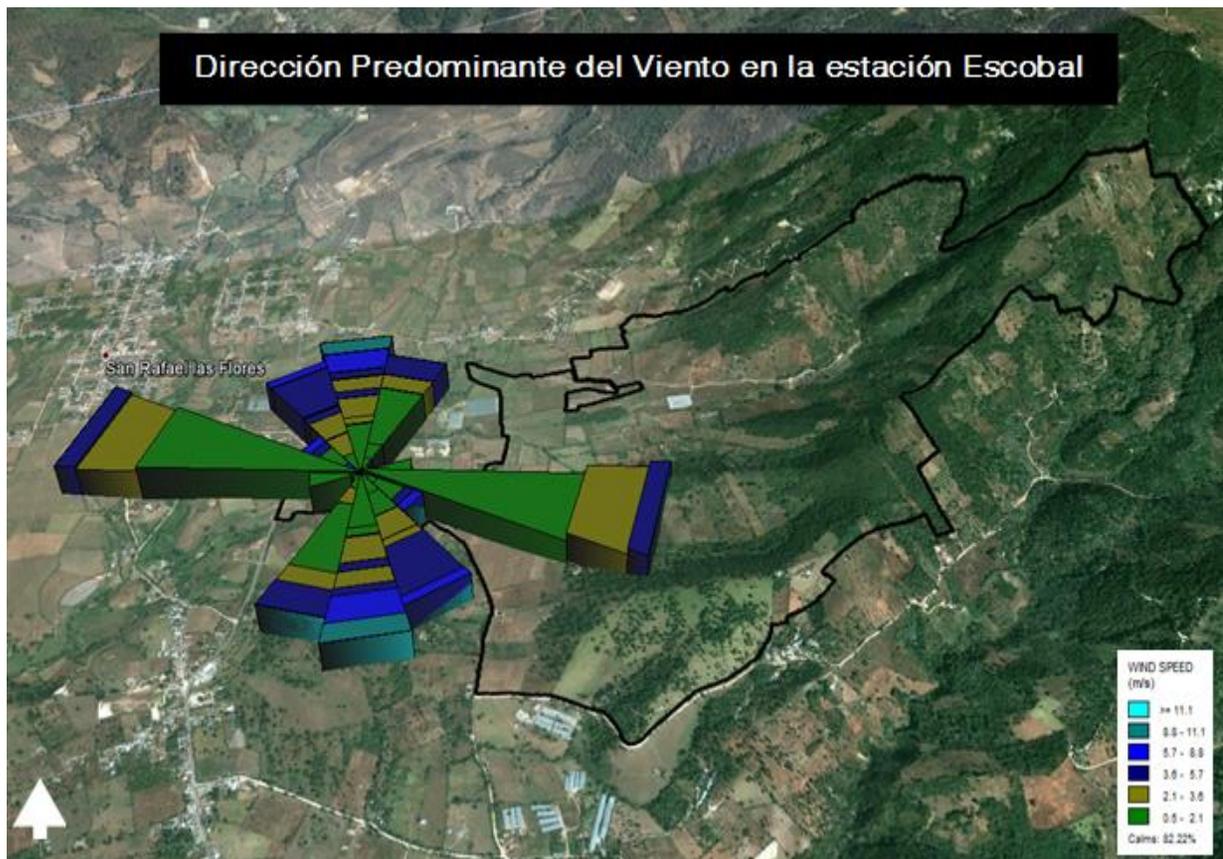
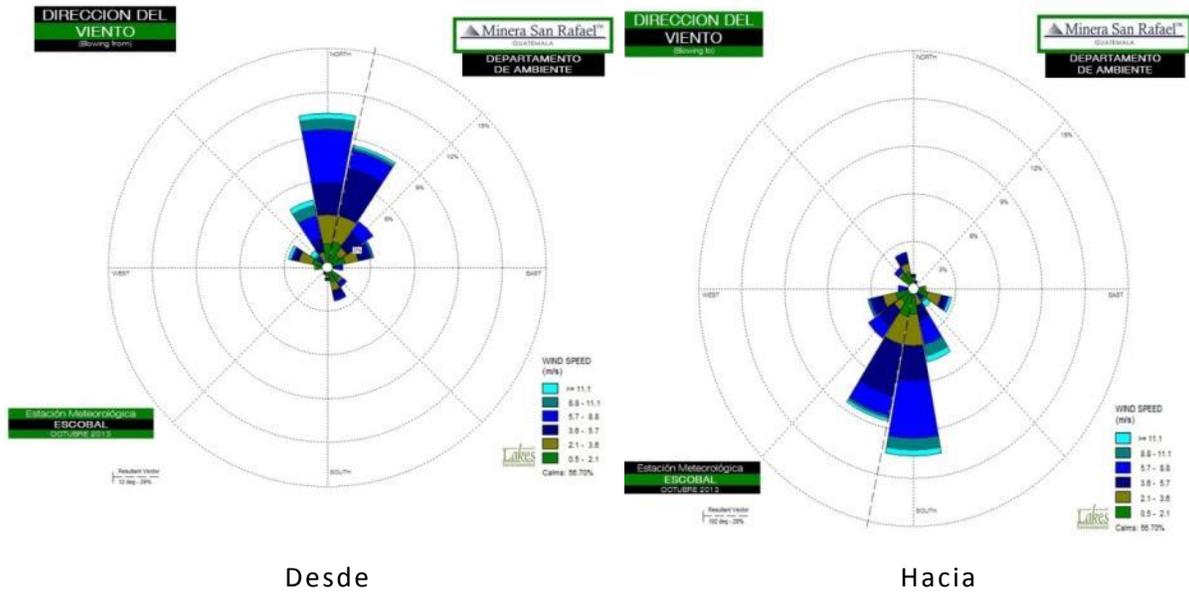


Figura 2-2 Dirección de Viento durante el mes de septiembre 2013. Proyecto Minero Escobal



Desde

Hacia

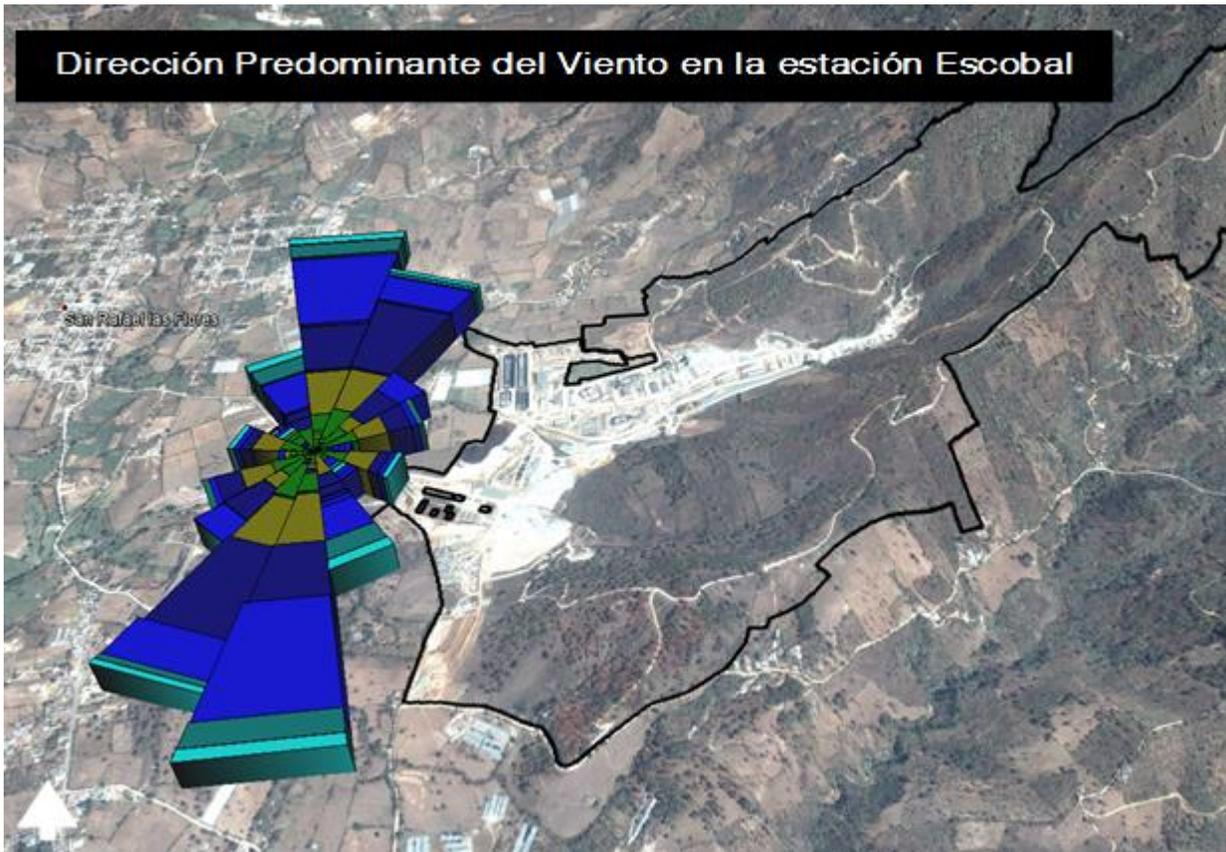


Figura 2-3 Dirección de Viento durante el mes de octubre 2013. Proyecto Minero Escobal

Durante los meses de agosto y octubre se presentó un viento predominante de NNE a SSO, y durante el mes de septiembre se presentó un viento predominante de ONO a ESE.

En el Cuadro 2-2 se enlistan la Precipitación Pluvial registrada en diferentes puntos de la propiedad correspondientes a los meses de agosto a septiembre 2013; y en la Figura 2-4 se representa la ubicación de los pluviómetros de medición.

Se observó una mayor precipitación pluvial en las áreas de operación (Planta de proceso, edificios administrativos, depósito de suelos, etc.) en comparación con la parte alta de la propiedad (área de bosques).

Cuadro 2-2. Precipitación Pluvial en mm, correspondiente a los meses de agosto a octubre 2013, Proyecto Minero Escobal.

Pp-01	Pp-02	Pp-03	Pp-04	Pp-05	Pp-06
<b>AGOSTO 2013</b>					
184	216*	204*	199*	214*	118*
<b>SEPTIEMBRE 2013</b>					
28.3	19.6	13.3	32.6	0.3	1.9
<b>OCTUBRE 2013</b>					
28.5	13.5	20.1	59.8	7.0	0.3

\*los pluviómetros se instalaron el 14/08/2014, por tanto los datos corresponden únicamente a los últimos 18 días del mes.



Figura 2-4 Ubicación de Pluviómetros Manuales. Proyecto Minero Escobal



### 3. Calidad de Aire

#### 3.1 Material Particulado

##### 3.1.1. Sitios de Monitoreo

En el Cuadro 3-1 se enlistan las estaciones de monitoreo de material particulado menor o igual a 10 micrómetros (PM<sub>10</sub>) localizadas dentro de los terrenos de la mina, y en la jurisdicción de los centros poblados ubicados en el área de influencia (AI) del Proyecto: Los Planes, La Cuchilla, El Fucio, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. Su ubicación se presenta en la Figura 3-1.

Cuadro 3-1. Sitios de Monitoreo de PM<sub>10</sub> en el AI del Proyecto.

Estación	Sistema de Coordenadas Projectadas UTM, NAD27 ZONA 15		Altitud (msnm)	Sitio	Período Línea Base
<b>Periodicidad de Monitoreo Mensual</b>					
EA-1A	805797	1601582	1417	Depósito de suelos, a inmediaciones de Aldea Los Planes	febrero 2009 a mayo 2011
EA-2A	806427	1601605	1564	Aldea La Cuchilla	febrero 2009 a mayo 2011
EA-3	807165	1601255	1679	Área Este del proyecto, a inmediaciones de Aldea El Fucio.	febrero 2009 a mayo 2011
EA-7A	805425	1601523	1320	al noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción de Aldea Los Planes	julio 2010 a abril 2011 para la estación EA-7. No se cuenta con línea base de EA-7A
<b>Periodicidad de Monitoreo Trimestral</b>					
EA-1B	803894	1601727	1328	Poblado San Rafael Las Flores, cercano a Escuela	No se cuenta con línea base
EA-3A	806000	1600108	1416	Aldea El Fucio	No se cuenta con línea base
EA-4A	805142	1599903	1360	Caserío El Portón de los Ángeles	enero 2011 a abril 2011

Estación	Sistema de Coordenadas Proyectadas UTM, NAD27 ZONA 15		Altitud (msnm)	Sitio	Período Línea Base
EA-5A	804352	1600408	1339	Aldea Sabana Redonda, al sur-oeste del proyecto	julio 2010 a abril 2011 para la estación EA-5. No se cuenta con línea base de EA-5A
EA-6	805168	1603247	1434	Al norte del Proyecto, ruta a Mataquescuintla	julio 2010 a abril 2011

Fuente: Departamento de ambiente, Minera San Rafael.

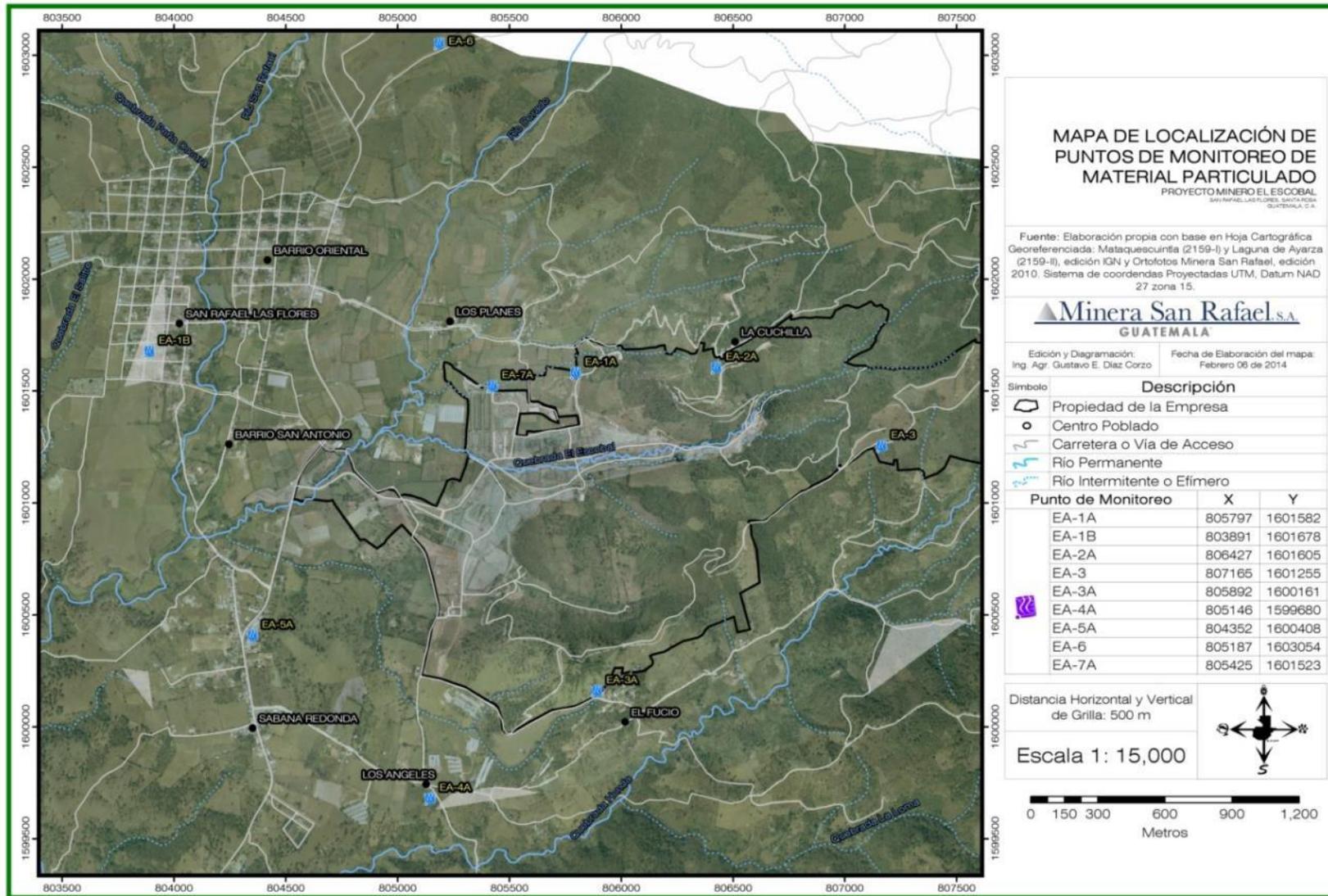


Figura 3-1 Mapa de localización de las estaciones de monitoreo de material particulado, Proyecto Minero Escobal.

### 3.1.2. Metodología

En el Cuadro 3-2 se describe el procedimiento, parámetros y equipo utilizados en la medición de PM<sub>10</sub>.

Cuadro 3-2. Procedimiento y equipo utilizado para la medición de material particulado, Proyecto Minero Escobal

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<b>PARÁMETROS ANALIZADOS</b>	
PM <sub>10</sub>	Material particulado igual o menor a 10 micrómetros ( $\leq 10 \mu\text{m}$ ).
<b>PROCEDIMIENTO</b>	
La medición se realiza haciendo pasar un flujo continuo de aire durante $24 \pm 1$ horas por un filtro de fibra de vidrio que ha sido pesado inicialmente en un laboratorio equipado para realizar el análisis gravimétrico correspondiente; luego de la toma de muestra, el filtro es enviado de nuevo al mismo laboratorio para determinar su peso final, Con los datos obtenidos del muestreo y del análisis gravimétrico, se determina la concentración de PM <sub>10</sub> . El equipo de medición utilizado cumple con las especificaciones de la Agencia de Protección Ambiental de los Estados Unidos (EPA).	
<b>EQUIPO UTILIZADO</b>	
Nombre	PM <sub>10</sub> Air Sampler
Modelo	PQ 200
Fabricante	BGI INSTRUMENTS
<b>LABORATORIO CONTRATADO</b>	
Nombre	Laboratorio Ambiental, S.A. Laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados (análisis gravimétrico de filtros) cuentan con validez internacional según OGA-LE 050-12.

### 3.1.3. Resultados

Los valores de PM<sub>10</sub> registrados durante la mayoría de muestreos realizados, se mantienen dentro de los valores esperados para las diferentes localidades, conforme a la línea base de calidad del aire y los valores establecidas por la EPA y el Banco Mundial (150 µg/m<sup>3</sup>). En el Cuadro 3-3 y Gráfica 3-1 se presentan los resultados de PM<sub>10</sub> durante los meses de agosto a octubre 2013, los resultados de laboratorio del análisis gravimétrico de filtros y los cálculos realizados para determinar el PM<sub>10</sub> se presentan en el anexo 11.3.1

Cuadro 3-3. Resultados de PM<sub>10</sub> en estaciones de monitoreo durante los meses de agosto a octubre 2013, Proyecto Minero Escobal.

Estación	Norma*	Guías*		Línea Base			Resultados		
	USEPA <sup>1</sup>	Banco Mundial <sup>2</sup>	OMS <sup>3</sup>	Promedio	Máximo	Mínimo	ago-13	sep-13	oct-13
(µg/m <sup>3</sup> )									
EA-1A	150	150**	50	24.36	89.95	3.67	11.49	15.22	16.40
EA-1B				NR	NR	NR	31.67	NA	NA
EA-2A				21.40	76.20	2.74	13.07	10.29	9.33
EA-3				25.68	78.85	1.25	13.18	11.92	17.83
EA-3A				NR	NR	NR	17.92	NA	NA
EA-4A				103.55	120.40	86.70	89.82	NA	NA
EA-5A				50.73 <sup>¥</sup>	104.80 <sup>¥</sup>	11.80 <sup>¥</sup>	20.16	NA	NA
EA-6				23.05	57.90	1.70	72.33	NA	NA
EA-7A				46.48 <sup>¥</sup>	115.90 <sup>¥</sup>	13.40 <sup>¥</sup>	12.57	13.73	19.19

Nota: µg/m<sup>3</sup> = microgramos por metro cúbico; **NR** = Cálculo No Realizado por falta de datos de línea base; **NA** = no analizado (ver periodicidad en Cuadro 3-1)

<sup>1</sup>USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US).

<sup>2</sup>Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. <sup>3</sup>Guía de Calidad del Aire, OMS 2005.

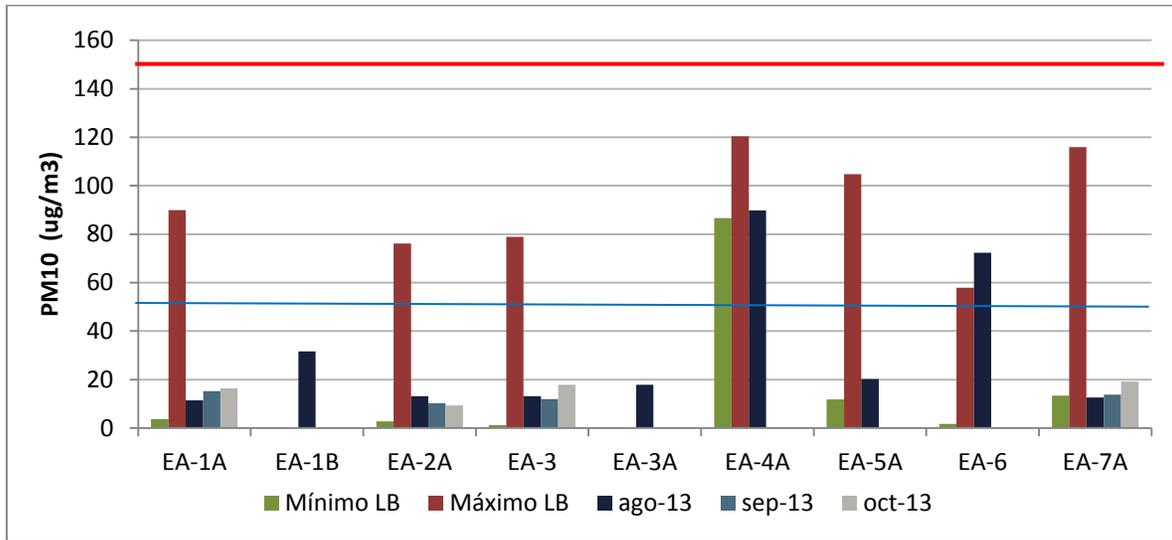
\* Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos; \*\* este valor corresponde al límite provisional 1 dado por esta guía.

¥: Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente.

Los resultados obtenidos durante los meses de agosto a octubre 2013 se encontraron entre 9.33 a 89.82 µg/m<sup>3</sup>. La estación EA-1A presentó el menor valor de PM<sub>10</sub> durante el mes de agosto (11.49 µg/m<sup>3</sup>), y la estación EA-2A durante los

meses de septiembre y octubre (10.29 y 9.33  $\mu\text{g}/\text{m}^3$  respectivamente). El mayor valor de  $\text{PM}_{10}$  se observó en la estación EA-4A durante el mes de agosto (89.82  $\mu\text{g}/\text{m}^3$ ), la estación EA-1A durante el mes de septiembre (15.22  $\mu\text{g}/\text{m}^3$ ) y la estación EA-7A durante el mes de octubre (19.19  $\mu\text{g}/\text{m}^3$ ).

Gráfica 3-1. Resultados de  $\text{PM}_{10}$  en estaciones de monitoreo durante los meses de agosto a octubre 2013, Proyecto Minero Escobal.



Donde  $\mu\text{g}/\text{m}^3$ : microgramos por metro cúbico; **Azul**: Límite máximo establecido por las guías de la OMS; **Rojo**: Límite máximo establecido por las guías del Banco Mundial y norma de la USEPA.

Los valores de  $\text{PM}_{10}$  registrados están por debajo de los límites máximos establecidos durante el levantamiento de línea base, a excepción de los registrados en la estación EA-6 para el mes de agosto 2013.

El aumento de  $\text{PM}_{10}$  en la estación EA-6 es atribuido a fuentes externas al proyecto, ya que como se observa en la Figura 3-2 la velocidad (2.1-8.8m/s) y dirección del viento (sur-oeste) imperantes durante el muestreo hacen muy poco probable que el material particulado de la zona provenga del proyecto ubicado a aproximadamente 1.3 kilómetros al sur-este de dicha estación. Se dará seguimiento a esta estación en futuros muestreos para comprobar o descartar la contribución de esta fuente de material particulado por las actividades realizadas dentro de la propiedad.

Las estaciones EA-1B y EA-3A no cuentan con línea base, en la Gráfica 3-2 se presentan los valores históricos registrados de  $\text{PM}_{10}$  en estas estaciones. Los resultados obtenidos durante agosto 2013 son menores al límite máximo establecido por las Guías de la OMS, comportamiento similar al observado en la temporada húmeda del año 2012.

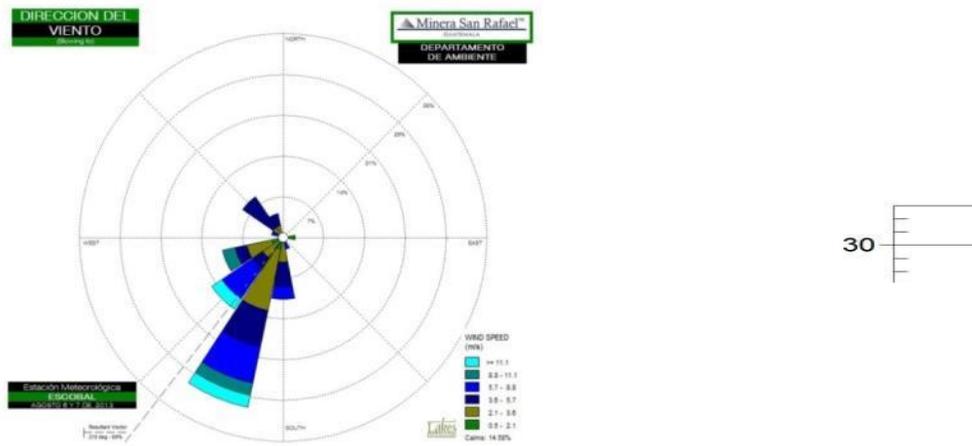
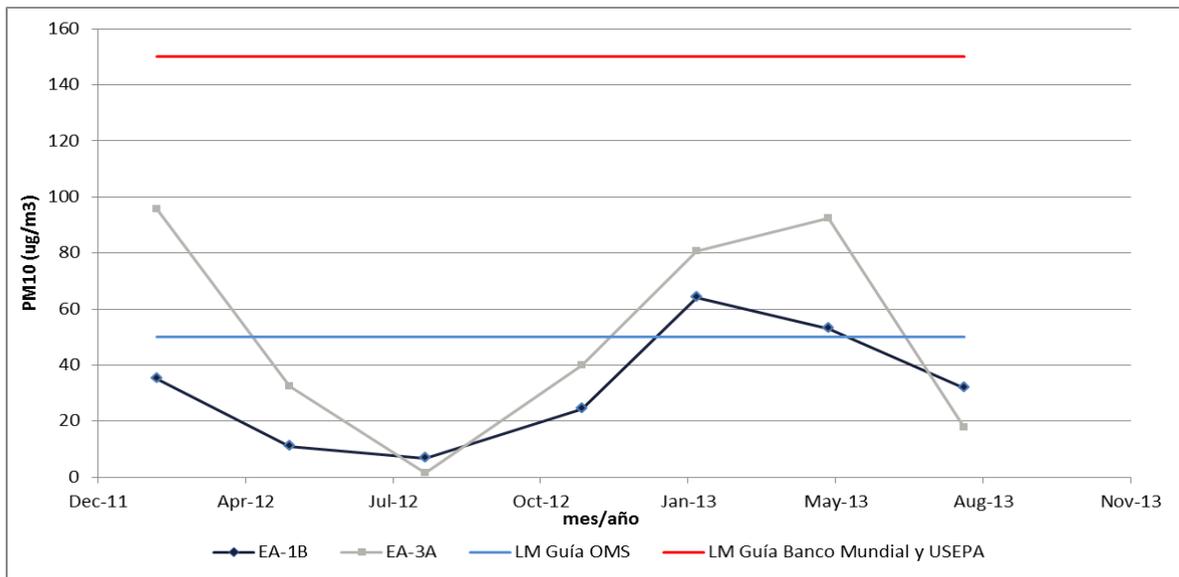


Figura 3-2 Roseta de viento y Viento imperante durante determinación PM10, 6-7 agosto 2013, Proyecto Minero Escobal.

Gráfica 3-2. Tendencia de PM<sub>10</sub> en estaciones EA-1B y EA-3A, febrero-2012 a agosto-2013, Proyecto Minero Escobal.



Donde ug/m3: microgramos por metro cúbico; **Azul**: Límite máximo establecido por las guías de la OMS; **Rojo**: Límite máximo establecido por las guías del Banco Mundial y norma de la USEPA.

Los valores de PM<sub>10</sub> registrados para las estaciones muestreadas fueron menores a los valores establecidas por la EPA y el Banco Mundial (150 ug/m<sup>3</sup>). Las estaciones ubicadas dentro del proyecto y aledañas a aldeas; EA-1A, EA-2A, EA-3, EA-3A y EA-7A; registraron valores de PM<sub>10</sub> por debajo de las guías de OMS (50 ug/m<sup>3</sup>).

### 3.2 Metales en Material Particulado

#### 3.2.1. Sitios de Monitoreo

En el Cuadro 3-4 se enlistan las estaciones de monitoreo de metales en material particulado menor o igual a 10 micrómetros (PM<sub>10</sub>) localizadas dentro de los terrenos de la mina, y en la jurisdicción de los centros poblados ubicados en el área de influencia (AI) del Proyecto: Los Planes, La Cuchilla, El Fucio, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. Su ubicación se presenta en la Figura 3-1.

Cuadro 3-4. Sitios de Monitoreo de metales en PM<sub>10</sub>, proyecto minero El Escobal.

Estación	Sistema de Coordenadas Projectadas UTM, NAD27 ZONA 15		Altitud (msnm)	Sitio	Período Línea Base
EA-1B	803891	1601678	1328	Poblado San Rafael Las Flores, cercano a Escuela	No cuenta con línea base
EA-2A	806427	1601605	1564	aledaño a Aldea La Cuchilla	julio 2010 a abril 2011
EA-3A	805892	1600161	1416	aledaño a Aldea El Fucio	No cuenta con línea base
EA-4A	805146	1599680	1360	Caserío El Portón de los Ángeles	enero a abril 2011
EA-5A	804352	1600408	1339	Aldea Sabana Redonda, al sur-oeste del proyecto	julio 2010 a abril 2011 para EA-5, no se cuenta con línea base para EA-5A
EA-6	805187	1603054	1434	Al norte del Proyecto, ruta a Mataquescuintla	julio 2010 a abril 2011
EA-7A	805425	1601523	1320	al noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción de Aldea Los Planes	julio 2010 a abril 2011 para EA-7, no se cuenta con línea base para EA-7A

Fuente: Departamento de ambiente, Minera San Rafael

Nota: 1er y 3er trimestre del año se analiza metales totales, 2do y 4to trimestre únicamente mercurio total. El análisis del laboratorio es destructivo, por tanto es imposible analizar metales y mercurio en un mismo filtro.

#### 3.2.2. Metodología

En el Cuadro 3-5 se describe el procedimiento, parámetros y laboratorio empleado para la determinación de metales en PM<sub>10</sub>.



Cuadro 3-5. Procedimiento y laboratorio empleado para la determinación de metales en PM<sub>10</sub>, Proyecto Minero Escobal

<b>PARÁMETROS ANALIZADOS</b>	
Metales en PM <sub>10</sub>	Al, Sb, As, S, Ba, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Sn, Sr, P, Fe, Mg, Mn, Mo, Ni, Ag, Pb, K, Se, Si, Na, Tl, Ti, V, Zn, Zr
<b>PROCEDIMIENTO</b>	
<p>Los mismos filtros empleados para determinar el PM<sub>10</sub> del muestreo trimestral, son enviados al laboratorio para determinar la cantidad de metales por el método analítico EPA 6010Bmod y EPA 6020mod, los resultados se dan en µg por filtro. Este peso se divide por el volumen de aire muestreado para obtener la concentración en µg/m<sup>3</sup>. El análisis de laboratorio es destructivo, por tanto es imposible analizar metales y mercurio en un mismo filtro; por tanto en el 1er y 3er trimestre del año se analiza metales totales, 2do y 4to trimestre únicamente mercurio total.</p>	
<b>LABORATORIO</b>	
Nombre	Laboratorio Ambiental S.A. (parte de CTA). Laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados (análisis gravimétrico de filtros) cuentan con validez internacional según OGA-LE 050-12.

**3.2.3. Resultados**

En el Cuadro 3-6 se presentan los resultados de concentración de metales en PM<sub>10</sub> durante el mes de agosto 2013, los resultados de laboratorio del análisis de metales en filtros y los cálculos realizados para determinar el PM<sub>10</sub> se presentan en el anexo 11.3.2.

La concentración de metales registradas durante agosto 2013 estuvieron por debajo de los valores registrados en línea base y fueron menores a las registradas durante febrero 2013 para la mayoría de las estaciones.

Cuadro 3-6. Resultados de concentración de metales en PM<sub>10</sub> (µg/m<sup>3</sup>) durante el mes de agosto 2013, Proyecto Minero Escobal, (1/2)

Parámetros	EA-1B	EA-2A			EA-3A	EA-4A				
	ago-13	Línea Base			ago-13	ago-13	Línea Base			ago-13
	2191-0639	Promedio	Máximo	Mínimo	2215-0404	2186-0113	Promedio	Máximo	Mínimo	2179-0551
Aluminio	<0.24	<b>0.23</b>	<b>0.28</b>	<b>&lt;0.34</b>	<0.24	<0.24	<b>1.27</b>	<b>1.27</b>	<b>1.27</b>	1.50
Antimonio	<0.05	<b>&lt;0.10</b>	<b>&lt;0.17</b>	<b>&lt;0.04</b>	<0.05	<0.05	<b>&lt;0.17</b>	<b>&lt;0.17</b>	<b>&lt;0.17</b>	<0.05
Arsénico	<0.03	<b>&lt;0.07</b>	<b>&lt;0.10</b>	<b>&lt;0.03</b>	<0.03	<0.03	<b>&lt;0.10</b>	<b>&lt;0.10</b>	<b>&lt;0.10</b>	<0.03
Azufre	0.42	<b>1.49</b>	<b>2.17</b>	<b>0.80</b>	0.36	0.17	<b>1.23</b>	<b>1.23</b>	<b>1.23</b>	0.95
Bario	<0.005	<b>0.01</b>	<b>0.01</b>	<b>&lt;0.02</b>	<0.005	<0.005	<b>&lt;0.02</b>	<b>&lt;0.02</b>	<b>&lt;0.02</b>	<0.005
Bismuto	<0.03	<b>&lt;0.07</b>	<b>&lt;0.10</b>	<b>&lt;0.03</b>	<0.03	<0.03	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<0.03
Boro	<0.03	<b>0.27</b>	<b>0.50</b>	<b>0.03</b>	<0.03	<0.03	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<0.03
Cadmio	<0.01	<b>&lt;0.02</b>	<b>&lt;0.03</b>	<b>&lt;0.01</b>	<0.01	<0.01	<b>&lt;0.03</b>	<b>&lt;0.03</b>	<b>&lt;0.03</b>	<0.01
Calcio	1.50	<b>0.65</b>	<b>1.10</b>	<b>0.20</b>	0.45	0.46	<b>0.78</b>	<b>0.78</b>	<b>0.78</b>	2.47
Cromo	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02
Cobalto	<0.01	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.01	<0.01	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.01
Cobre	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02
Estaño	<0.05	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.05	<0.05	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.05
Estroncio	<0.005	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.005	<0.005	<b>ND</b>	<b>ND</b>	<b>ND</b>	0.012
Hierro	<0.24	<b>0.26</b>	<b>0.32</b>	<b>0.20</b>	<0.24	<0.24	<b>1.22</b>	<b>1.22</b>	<b>1.22</b>	1.98
Magnesio	<0.24	<b>0.11</b>	<b>0.14</b>	<b>&lt;0.17</b>	<0.24	<0.24	<b>&lt;0.33</b>	<b>&lt;0.33</b>	<b>&lt;0.33</b>	0.73
Manganeso	0.006	<b>0.01</b>	<b>0.01</b>	<b>&lt;0.02</b>	<0.005	<0.005	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	0.049
Níquel	<0.01	<b>&lt;0.03</b>	<b>&lt;0.05</b>	<b>&lt;0.01</b>	<0.01	<0.01	<b>&lt;0.05</b>	<b>&lt;0.05</b>	<b>&lt;0.05</b>	<0.01
Plata	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02
Plomo	<0.01	<b>&lt;0.03</b>	<b>&lt;0.05</b>	<b>&lt;0.01</b>	<0.01	<0.01	<b>&lt;0.05</b>	<b>&lt;0.05</b>	<b>&lt;0.05</b>	<0.01
Potasio	<0.49	<b>0.55</b>	<b>0.60</b>	<b>0.50</b>	<0.49	<0.49	<b>0.73</b>	<b>0.73</b>	<b>0.73</b>	<0.49
Silicio	0.22	<b>0.42</b>	<b>0.53</b>	<b>0.30</b>	0.00	0.10	<b>0.55</b>	<b>0.55</b>	<b>0.55</b>	0.61
Sodio	1.72	<b>0.53</b>	<b>0.60</b>	<b>0.46</b>	1.38	1.46	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>	2.75
Talio	<0.05	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.05	<0.05	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.05
Titanio	0.009	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<0.005	<0.005	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	0.046
Zinc	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02	<0.02	<b>ND</b>	<b>ND</b>	<b>ND</b>	<0.02

Cuadro 3-7. Resultados de concentración de metales en PM<sub>10</sub> (µg/m<sup>3</sup>) durante el mes de agosto 2013, Proyecto Minero Escobal, (2/2)

Parámetros	EA-5A				EA-6				EA-7A			
	Línea Base			ago-13	Línea Base			ago-13	Línea Base			ago-13
	Promedio	Máximo	Mínimo	2187-0220	Promedio	Máximo	Mínimo	2181-0775	Promedio	Máximo	Mínimo	2189-0404
Aluminio	<0.33	<0.33	<0.33	<0.24	0.31	0.45	<0.33	1.43	0.45	0.73	<0.33	<0.24
Antimonio	<0.17	<0.17	<0.17	<0.05	<0.17	<0.17	<0.17	<0.05	<0.17	<0.17	<0.17	<0.05
Arsénico	<0.1	<0.1	<0.1	<0.03	<0.10	<0.10	<0.10	<0.03	<0.10	<0.10	<0.10	<0.03
Azufre	<0.42	<0.42	<0.42	0.29	3.02	4.73	1.30	0.85	2.28	4.35	<0.42	0.30
Bario	<0.02	<0.02	<0.02	<0.005	0.01	0.01	<0.02	<0.005	0.01	0.01	<0.02	<0.005
Bismuto	<0.1	<0.1	<0.1	<0.03	<0.10	<0.10	<0.10	<0.03	<0.10	<0.10	<0.10	<0.03
Boro	<0.1	<0.1	<0.1	<0.03	<0.10	<0.10	<0.10	<0.03	<0.10	<0.10	<0.10	<0.03
Cadmio	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.01
Calcio	1.03	1.03	1.03	0.49	0.79	1.50	<0.17	2.49	0.28	0.48	<0.17	0.48
Cromo	ND	ND	ND	<0.02	ND	ND	ND	<0.02	ND	ND	ND	<0.02
Cobalto	ND	ND	ND	<0.01	ND	ND	ND	<0.01	ND	ND	ND	<0.01
Cobre	ND	ND	ND	<0.02	ND	ND	ND	<0.02	ND	ND	ND	<0.02
Estaño	ND	ND	ND	<0.05	ND	ND	ND	<0.05	ND	ND	ND	<0.05
Estroncio	ND	ND	ND	<0.005	ND	ND	ND	0.011	ND	ND	ND	<0.005
Hierro	0.18	0.18	0.18	<0.24	0.38	0.45	0.30	1.83	0.31	0.58	<0.08	<0.24
Magnesio	<0.33	<0.33	<0.33	<0.24	3.05	6.02	<0.17	0.78	0.23	0.38	<0.17	<0.24
Manganeso	<0.02	<0.02	<0.02	<0.005	0.02	0.02	<0.02	0.036	0.02	0.03	<0.02	<0.005
Níquel	<0.05	<0.05	<0.05	<0.01	0.25	0.48	<0.05	<0.01	0.04	0.05	<0.05	<0.01
Plata	ND	ND	ND	<0.02	ND	ND	ND	<0.02	ND	ND	ND	<0.02
Plomo	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.01
Potasio	<0.5	<0.5	<0.5	<0.49	0.83	1.05	0.60	<0.49	0.80	1.43	<0.33	<0.49
Silicio	<0.17	<0.17	<0.17	0.12	0.49	0.58	0.40	0.74	0.43	0.78	<0.17	0.07
Sodio	<0.08	<0.08	<0.08	1.55	0.07	0.10	<0.08	2.66	1.27	2.50	<0.08	1.71
Talio	ND	ND	ND	<0.05	ND	ND	ND	<0.05	ND	ND	ND	<0.05
Titanio	<0.02	<0.02	<0.02	<0.005	0.02	0.03	<0.02	0.037	0.02	0.03	<0.02	<0.005
Zinc	ND	ND	ND	<0.02	ND	ND	ND	<0.02	ND	ND	ND	<0.02

### 3.3 Partículas Sedimentables Totales (PST)

#### 3.3.1. Sitios de Monitoreo

En el Cuadro 3-8 se enlistan las estaciones de monitoreo de PST ubicada en el área de influencia (AI) del Proyecto. Su ubicación se presenta en la Figura 3-3

Cuadro 3-8. Sitios de Monitoreo de PST en el AI del Proyecto.

Estación	Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15		Altitud (msnm)	Sitio	Período Línea Base
EA-1C	803887	1601801	1337	Poblado San Rafael Las Flores, cercano a Escuela	no se cuenta con línea base
EA-2B	806470	1601796	1555	Aldea La Cuchilla	no se cuenta con línea base
EA-3B	806538	1600367	1427	Aldea El Fucio	no se cuenta con línea base
EA-4A	805142	1599903	1360	Caserío El Porton de los Ángeles	diciembre 2010 a mayo 2011
EA-5A	804352	1600408	1339	Aldea Sabana Redonda, al sur-oeste del proyecto	agosto 2010 a mayo 2011 para EA-5, no se cuenta con línea base de EA-5A
EA-6	805168	1603247	1434	Al norte del Proyecto, ruta a Mataquescuintla	no se cuenta con línea base
EA-7A	805425	1601523	1320	noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción Aldea Los Planes	no se cuenta con línea base

Fuente: Departamento de ambiente, Minera San Rafael.

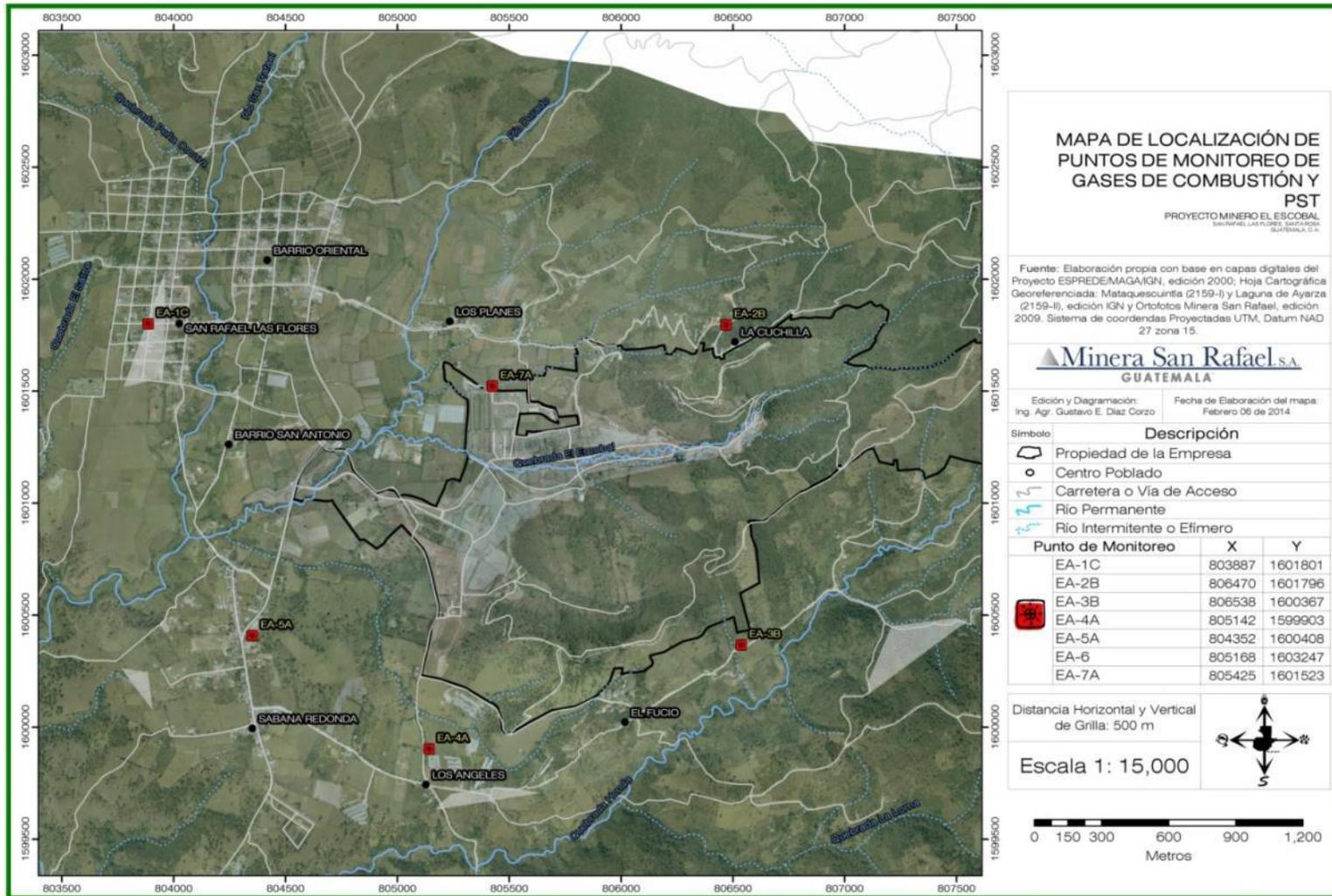


Figura 3-3 Mapa de localización de las estaciones de monitoreo de PST y gases de combustión, Proyecto Minero Escobal

### 3.3.2. Metodología

En el Cuadro 3-9 se describe el procedimiento, parámetros y equipo utilizados en la medición de PST.

Cuadro 3-9. Procedimiento y equipo utilizado para la medición de PST, Proyecto Minero Escobal

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<b>PARÁMETROS ANALIZADOS</b>	
PST	Partículas Sedimentables Totales
<b>PROCEDIMIENTO</b>	
<p>Los muestreos fueron realizados por personal de la empresa Consultoría y Tecnología Ambiental (CTA), siguiendo la metodología ASTM D 1739-98 (re-aprobación 2004). La medición se realiza dejando reposar un recipiente limpio y de dimensiones conocidas en la estación de monitoreo durante un lapso de tiempo de 30 ± 2 días. El recipiente es enviado al laboratorio donde se determina los sólidos insolubles, sólidos solubles y sólidos totales que sedimentaron dentro de dicho recipiente.</p>	
<b>EQUIPO UTILIZADO</b>	
Nombre	High Altitude Ambient Particulate Sampler
Modelo	Diseño establecido en norma ASTM D 1739-98
Fabricante	CTA

### 3.3.3. Resultados

Las actividades realizadas dentro del proyecto minero no han generado un incremento en los valores de PST registrados en las estaciones monitoreadas. En el Cuadro 3-10 se presentan los resultados de Partículas Sedimentables Totales (PST) realizado durante agosto 2013. El resumen del informe de resultados presentado por el contratista se presenta en el anexo 11.3.3

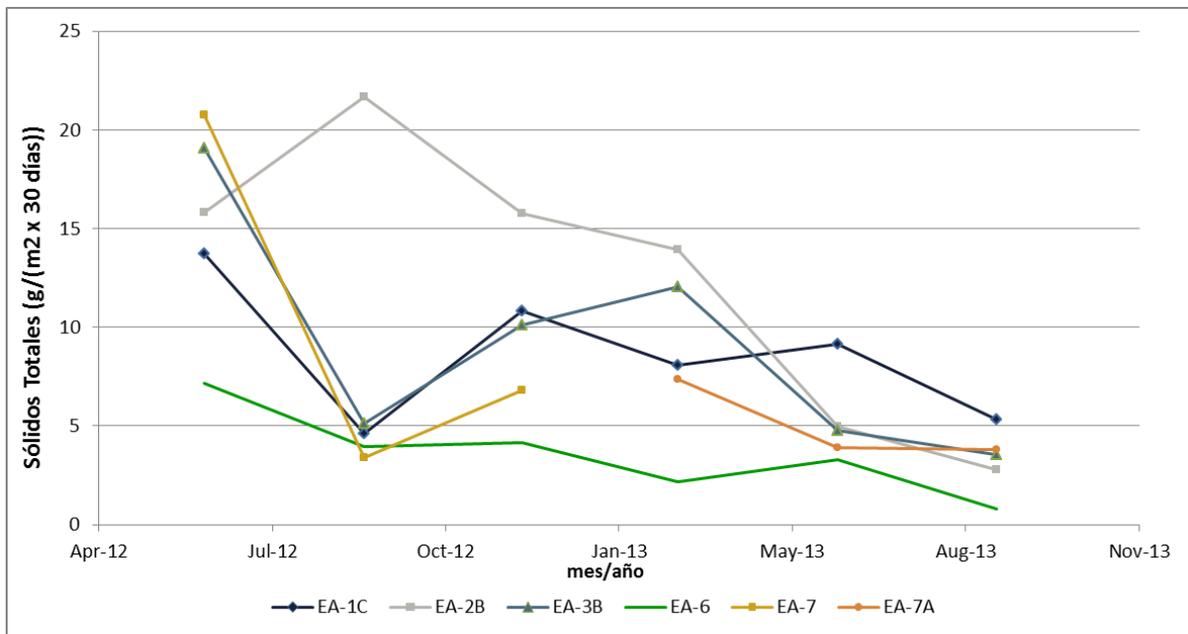
Cuadro 3-10. Resultados de PST en estaciones de monitoreo durante septiembre 2013, Proyecto Minero Escobal.

Parámetro	Norma	Guías	EA-1C	EA-2B	EA-3B	EA-4A				EA-5A				EA-6	EA-7A
	USEPA	Banco Mundial y OMS	sep-13	sep-13	sep-13	Línea Base		Muestreo	sep-13	Línea Base (EA-5)			sep-13	sep-13	sep-13
						Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo			
g/(m <sup>2</sup> x 30 días)															
Sólidos Insolubles	ND	ND	3.26	1.14	1.32	6.3	2.6	10.8	2.09	6.5	0.8	16.0	10.99	0.18	1.54
Sólidos Solubles	ND	ND	2.09	1.62	2.24	2.1	0.9	2.9	2.26	11.3	2.0	37.0	33.86	0.62	2.26
Sólidos Totales	ND	ND	5.34	2.76	3.55	8.4	4.6	13.0	4.35	17.6	3.2	50.0	44.85	0.8	3.81

Nota: g/(m<sup>2</sup> x 30 días)= gramos por metro cuadrado durante 30 días. ND: estas normas y guías no establecen un límite para estos parámetros

Los valores de PST se encuentran entre 0.80 a 44.8 g/(m<sup>2</sup> x 30 días), los cuales corresponden a las estaciones EA-6 y EA-5A respectivamente. El valor para la estación EA-4A y EA-5A (4.35 y 44.85 g/(m<sup>2</sup> x 30 días)) se encuentra dentro de los valores mínimos y máximos registrados durante el establecimiento de la línea bases. En la Gráfica 3-3 se observa una tendencia negativa de los valores registrados de PST en las estaciones EA-1C, EA-2B, EA-3B, EA-6 y EA-7A las cuales no cuentan con línea base.

Gráfica 3-3. Tendencia de PST en estaciones EA-1C, EA-2B, EA-3B, EA-6 y EA-7A, junio-2012 a agosto-2013, Proyecto Minero Escobal.



Donde g/(m<sup>2</sup>x30 días): gramos por metro cuadrado durante 30 días.

### 3.4 Gases de Combustión (SO<sub>2</sub> y NO<sub>2</sub>)

#### 3.4.1 Sitios de Monitoreo

En el Cuadro 3-11 se enlistan las estaciones de monitoreo de dióxido de azufre (SO<sub>2</sub>) y de dióxido de nitrógeno (NO<sub>2</sub>) ubicada en el área de influencia (AI) del Proyecto. Su ubicación se presenta en la Figura 3-3.



Cuadro 3-11. Sitios de Monitoreo de SO<sub>2</sub> y NO<sub>2</sub> en el AI del Proyecto.

Estación	Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15		Altitud (msnm)	Sitio	Período Línea Base
EA-1C	803887	1601801	1337	Poblado San Rafael Las Flores, cercano a Escuela	no se cuenta con línea base
EA-2B	806470	1601796	1555	Aldea La Cuchilla	no se cuenta con línea base
EA-3B	803887	1601801	1427	Aldea El Fucio	no se cuenta con línea base
EA-4A	805142	1599903	1360	Caserío El Porton de los Ángeles	No se cuenta con línea base
EA-5A	804352	1600408	1339	Aldea Sabana Redonda, al sur-oeste del proyecto	Julio 2010 a abril 2011 para EA-5, no se cuenta con línea base de EA-5A
EA-6	805168	1603247	1434	Al norte del Proyecto, ruta a Mataquesuintla	no se cuenta con línea base
EA-7A	805425	1601523	1320	noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción Aldea Los Planes	Julio 2010 a abril 2011 para EA-7, no se cuenta con línea base para EA-7A

Fuente: Departamento de ambiente, Minera San Rafael.

### 3.4.2 Metodología

En el Cuadro 3-12 se describe el procedimiento, parámetros y equipo utilizados en la medición de gases de combustión.

Cuadro 3-12. Procedimiento y equipo utilizado para la medición de gases de combustión, Proyecto Minero Escobal

PARÁMETROS ANALIZADOS	
SO <sub>2</sub>	Dióxido de azufre
NO <sub>2</sub>	Dióxido de nitrógeno
PROCEDIMIENTO	
<p>Los muestreos fueron realizados por personal de la empresa Consultoría y Tecnología Ambiental siguiendo las metodologías:</p> <p><b>SO<sub>2</sub>:</b> Metodología descrita en el CFR, del título 40, parte 50, apéndice A de la USEPA.</p> <p><b>NO<sub>2</sub>:</b> Metodología descrita en el método de referencia designado por la USEPA</p>	

No. EQN-1277-026.	
<b>EQUIPO UTILIZADO</b>	
Nombre	RAC3 Gas Sampler
Modelo	209063
Fabricante	Andersen Instrument's

### 3.4.3 Resultados

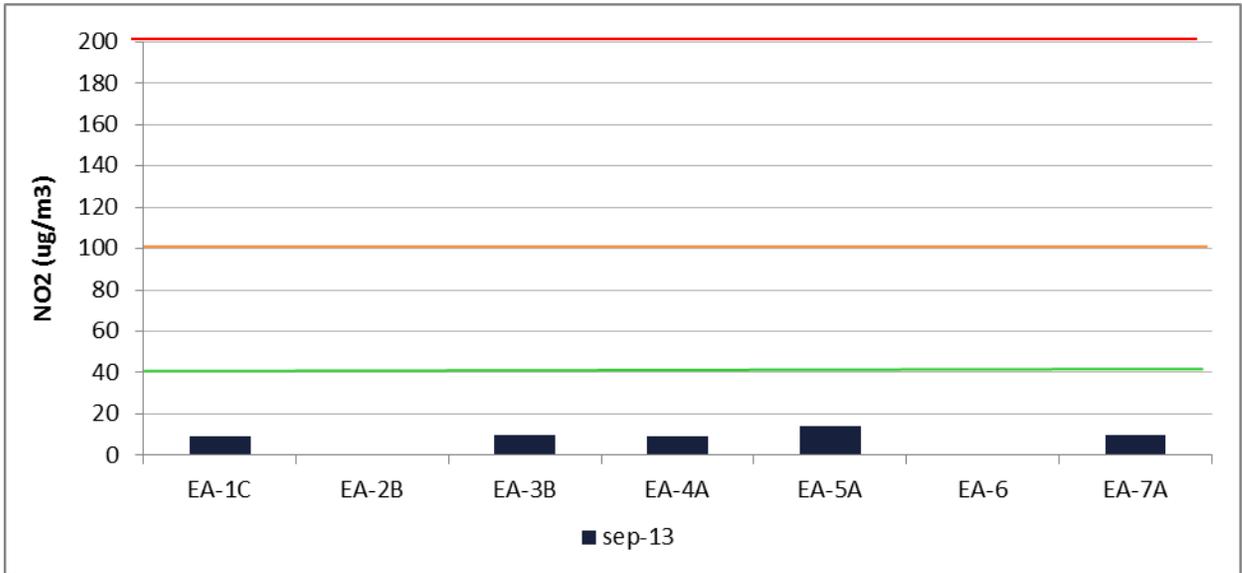
En el Cuadro 3-13 se presentan los resultados de las mediciones de SO<sub>2</sub> y NO<sub>2</sub> realizadas en siete estaciones de Calidad de Aire; el resumen del informe de resultados presentado por el contratista se presenta en el anexo 11.3.3.

En las mediciones efectuadas durante este trimestre se obtuvieron valores por debajo del límite de detección del método en todas las estaciones para SO<sub>2</sub> (<13µg/m<sup>3</sup>).

Se detectaron concentraciones muy cercanas al límite de detección (<9µg/m<sup>3</sup>) en las estaciones EA-1C, EA-3B, EA-4A, EA-5A y EA-7A. En la Gráfica 3-4 se puede observar que el mayor valor se registró en la estación EA-5A con 14 µg/m<sup>3</sup> y no fue detectado en las estaciones EA-2B y EA-6.

Todos los valores registrados de SO<sub>2</sub> y de NO<sub>2</sub> son menores a los valores guías establecidos por el Banco Mundial, la OMS, British Columbia y la USEPA. Lo anterior indica que las actividades realizadas durante el período reportado no han originado variaciones significativas en los parámetros reportados.

Gráfica 3-4. Resultados de Gases de combustión en estaciones de monitoreo durante el mes de septiembre 2013, Proyecto Minero Escobal.



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Donde ug/m3: microgramos por metro cúbico; Verde: Límite máximo establecido por las guías de la OMS y Banco Mundial para una concentración promedio anual; Naranja: Límite máximo establecido por la norma de la USEPA para una concentración promedio anual; Rojo: Límite máximo establecido por la British Columbia para mediciones de 24horas.

Cuadro 3-13. Resultados de Gases de combustión en estaciones de monitoreo durante el mes de septiembre 2013, Proyecto Minero Escobal.

Parámetro	Norma	Guías			EA-1C	EA-2B	EA-3B	EA-4A	EA-5A			EA-6	EA-7A				
	USEPA <sup>1</sup>	Banco Mundial <sup>2</sup>	OMS <sup>3</sup>	British Columbia <sup>4</sup>	sep-13	sep-13	sep-13	Muestreo	Línea Base**			Muestreo	Línea Base**				
								sep-13	Promedio	Mínimo	Máximo	sep-13	sep-13	Promedio	Mínimo	Máximo	sep-13
(µg/m <sup>3</sup> )																	
SO <sub>2</sub>	370	20	20	160	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
NO <sub>2</sub>	100*	40*	40*	200	9	<9	10	9	<9	<9	<9	14	<9	<9	<9	<9	10

Nota: µg/m<sup>3</sup> = microgramos por metro cúbico; SO<sub>2</sub>= dióxido de azufre, NO<sub>2</sub>= dióxido de nitrógeno.

<sup>1</sup>Guía USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). <sup>2</sup>Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. <sup>3</sup>Guía de Calidad del Aire, OMS 2005. <sup>4</sup> Guías para la calidad del aire ambiental.

\* Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos; \*\* este valor corresponde a la concentración promedio anual.

\*\* Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente.

### 3.5 Niveles de Presión Sonora

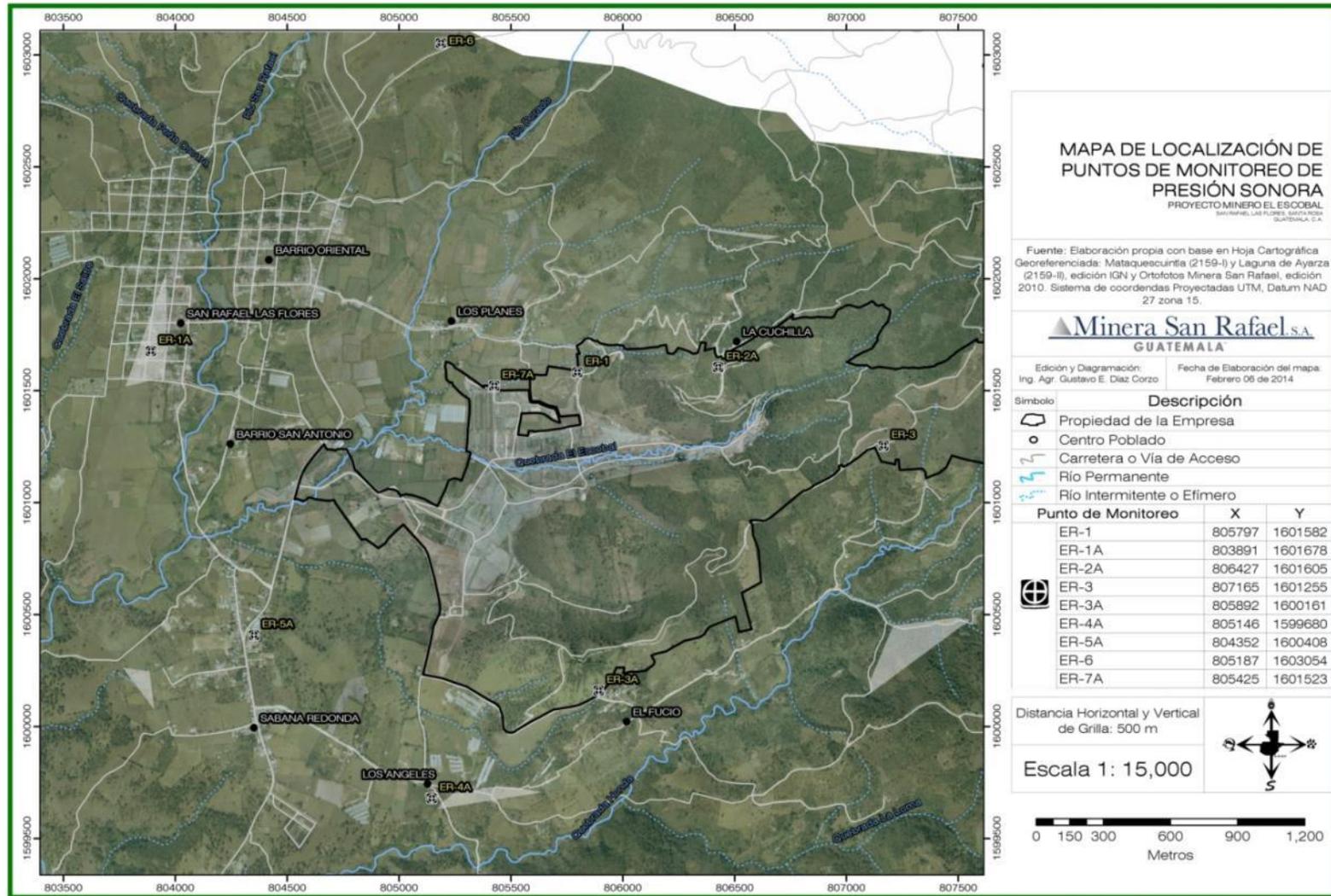
#### 3.5.1 Sitios de Monitoreo

En el Cuadro 3-14 se enlistan las estaciones de monitoreo de presión sonora ubicados en el AI del Proyecto, localizadas en la jurisdicción de los centros poblados: Los Planes, La Cuchilla, El Fucío, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. Su ubicación se presenta en la Figura 3-4.

Cuadro 3-14. Sitios de Monitoreo de Presión Sonora en el AI del Proyecto.

ESTACIÓN	PERIODICIDAD	SISTEMA DE COORDENADAS PROYECTADAS UTM, NAD27 ZONA 15		ALTITUD (msnm)	SITIO
ER-1	Mensual	805797	1601582	1417	Depósito de suelos, a inmediaciones de Aldea Los Planes
ER-1A	Trimestral	803891	1601678	1328	Poblado San Rafael Las Flores, cercano a Escuela
ER-2	Mensual	806427	1601605	1564	Aldea La Cuchilla
ER-3	Mensual	807165	1601255	1679	Área este del proyecto, a inmediaciones de Aldea El Fucio.
ER-3A	Trimestral	805892	1600161	1416	Aldea El Fucio
ER-4A	Trimestral	805146	1599680	1360	Caserío El Portón de los Ángeles
ER-5A	Trimestral	804352	1600408	1339	Aldea Sabana Redonda, al sur-oeste del proyecto
ER-6	Trimestral	805187	1603054	1434	Al norte del Proyecto, ruta a Mataquescuintla
ER-7A	Mensual	805425	1601523	1320	al noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción de Aldea Los Planes

Fuente: Departamento de ambiente, Minera San Rafael.



Recorte de pantalla realizado: 10/02/2014 01:42 p.m.

Figura 3-4 Mapa de localización estaciones de monitoreo de presión sonora en el Proyecto. Proyecto Minero Escobal

### 3.5.2 Metodología

En el Cuadro 3-15 se describe el procedimiento, parámetros y equipo utilizado en la medición de los niveles de presión sonora ubicados dentro del AI del Proyecto.

Cuadro 3-15. Procedimiento y equipo utilizado para la medición de presión sonora, Proyecto Minero Escobal

<b>PARÁMETROS ANALIZADOS</b>	
$L_{MAX}$	Dato máximo durante 24 horas.
$L_{MIN}$	Dato mínimo durante 24 horas.
$L_{EQ}$	Promedio ponderado equivalente de datos.
Promedio Diurno	Promedio ponderado equivalente de datos de 07:00 am a 10:00 pm
Promedio Nocturno	Promedio ponderado equivalente de datos de 10:00 pm a 07:00 am
<b>PROCEDIMIENTO</b>	
<p>La medición del nivel de presión sonora se realiza durante 24 horas, efectuando lecturas de decibeles en escala A en respuesta lenta en intervalo de 10 minutos. Los datos obtenidos en las mediciones son crudos y automáticamente grabados en el equipo, los cuales se descargan a una computadora utilizando el programa Quest Professional II. Solamente el promedio diurno y nocturno son calculados por separado.</p>	
<b>EQUIPO UTILIZADO</b>	
Nombre	Sound Pro
Modelo	SE/DL
Fabricante	Quest Technologies, Inc.

**3.5.3. Resultados**

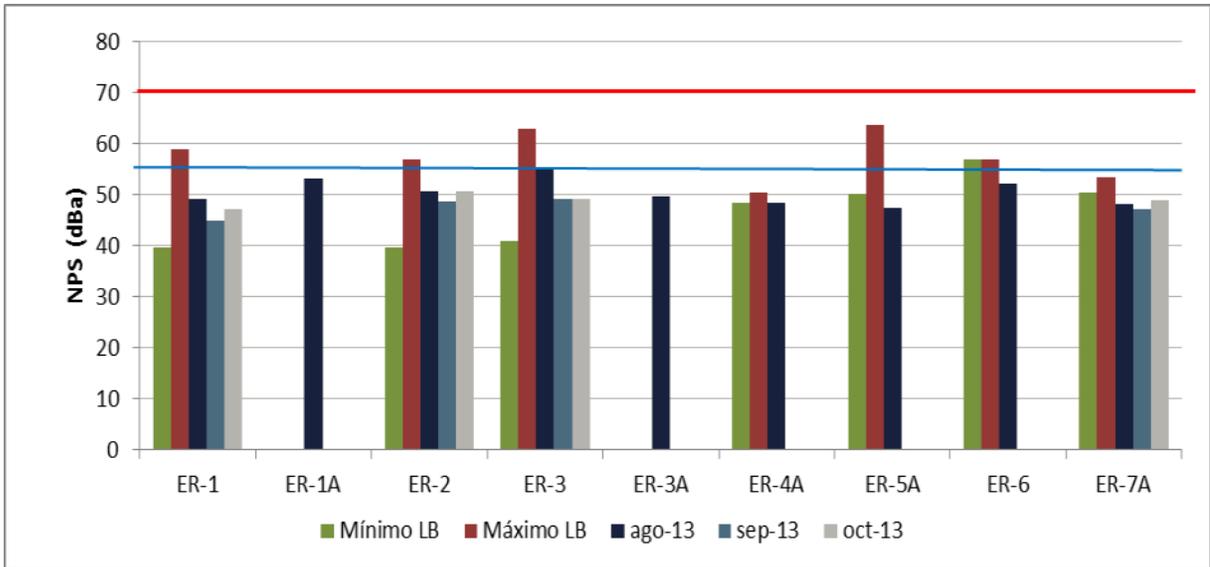
En el Cuadro 3-16, Cuadro 3-17, Gráfica 3-5 y Gráfica 3-6 se observan los niveles de presión sonora (NPS) registrados durante los meses de agosto a octubre 2013. Los informes generados por los equipos de medición se presentan en el anexo 11.3.4.

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Los resultados obtenidos de NPS en las estaciones muestreadas respecto al parámetro de Leq están dentro del rango de 45.5 dBA y 59.5 dBA, los cuales corresponden a las estaciones ER-1 y ER-3 respectivamente.

La estación ER-1 presentó el menor promedio diario (45.1 dBA) y la estación ER-6 el menor promedio nocturno (45.2 dBA) de todas las mediciones efectuadas en los meses de agosto a octubre 2013; mientras que la estación ER-3 presentó el mayor promedio diario (62.8 dBA) y el mayor promedio nocturno (56.6 dBA).

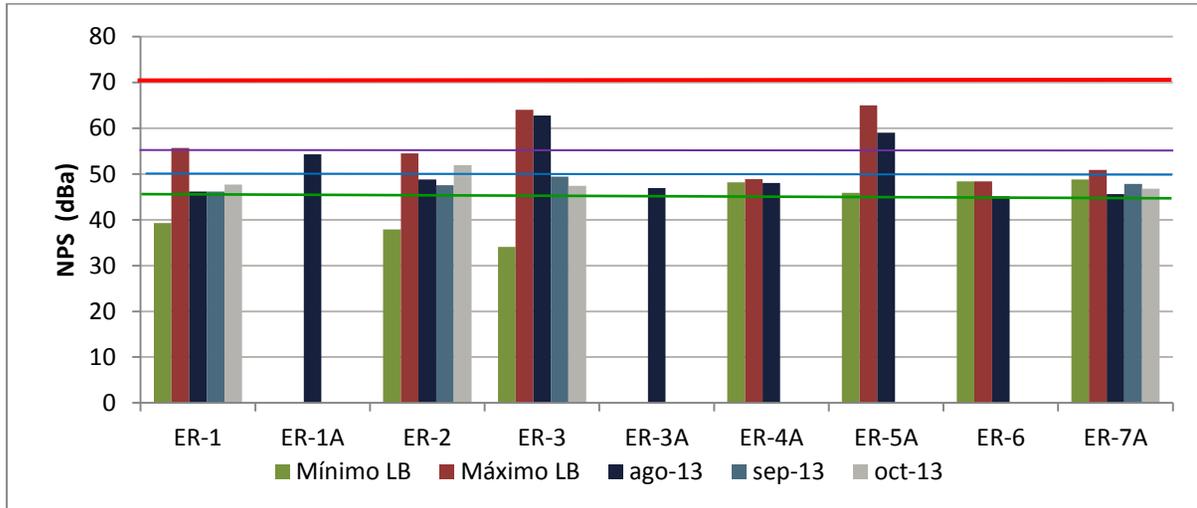
Gráfica 3-5. Promedio diarios en estaciones de monitoreo durante el mes de agosto-octubre 2013, Proyecto Minero Escobal.



Donde NPS: niveles de presión sonora; dBA: decibeles en escala "a"; Azul: Límite máximo establecido por USEPA, OMS y Banco Mundial para zonas residenciales. Rojo: Límite máximo establecido por Banco Mundial para zonas industriales.



Gráfica 3-6. Promedio nocturnos en estaciones de monitoreo durante el mes de agosto-octubre 2013, Proyecto Minero Escobal



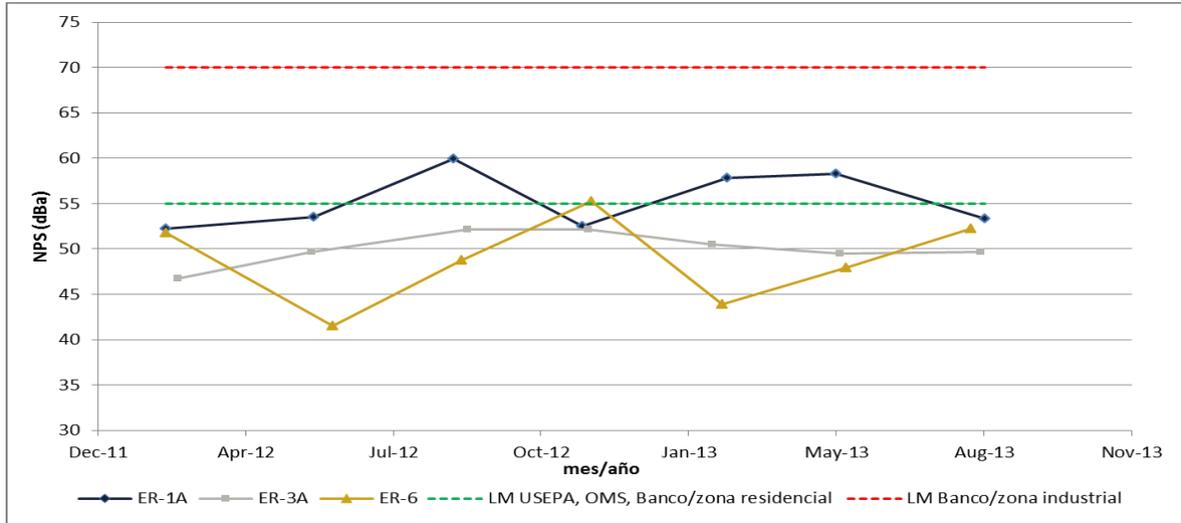
Donde NPS: niveles de presión sonora; dBa: decibeles en escala “a”; verde: límite máximo establecido por el Banco Mundial para zonas residenciales; Azul: Límite máximo establecido por OMS; Morado: Límite máximo establecido por USEPA; Rojo: Límite máximo establecido por Banco Mundial para zonas industriales.

Las estaciones ER-1, ER-2, ER-3, , ER-5A, y ER-7A presentaron valores de promedio diurno y nocturno dentro de los valores mínimos y máximos registrados en el establecimiento de la línea base. Los valores históricos registrados en las estaciones ER-1A, ER-3A y ER-6 se muestran en Gráfica 3-7 y Gráfica 3-8, observándose una variabilidad constante sin una tendencia marcada.

Durante el trimestre pasado en la estación ER-4A se registraron valores de promedio nocturno (49.7 dBa) y promedio diurno (53.37 dBa) mayores a los valores máximos establecidos en el levantamiento de la línea base (48.9 dBa y 50.4 dBa respectivamente), y se atribuyó dicho aumento a fuentes externas del proyecto, especialmente a los sonidos de vegetación localizados alrededor del equipo debido a las ráfagas imperantes en la zona durante el muestreo (velocidad máxima del viento de 73.77 kph y ráfagas entre 20.45 a 108 kph). Durante este trimestre se registraron valores de promedio nocturno (48.5 dBa) y promedio diurno (48.1 dBa) menores a los valores máximos registrados en el levantamiento de línea base.

A pesar que la estación ER-7A se encuentra dentro del proyecto, a unos 250m de la antigua estación (ER-7) que se ubicaba en el poblado; todos los promedios diurnos (entre 47.2 a 49.1 dBa) y nocturnos registrados en los meses de agosto a octubre 2013 (entre 45.6 y 47.8 dBa) fueron incluso menores a los registrados en el levantamiento de la línea base (48.8 a 50.9 dBa).

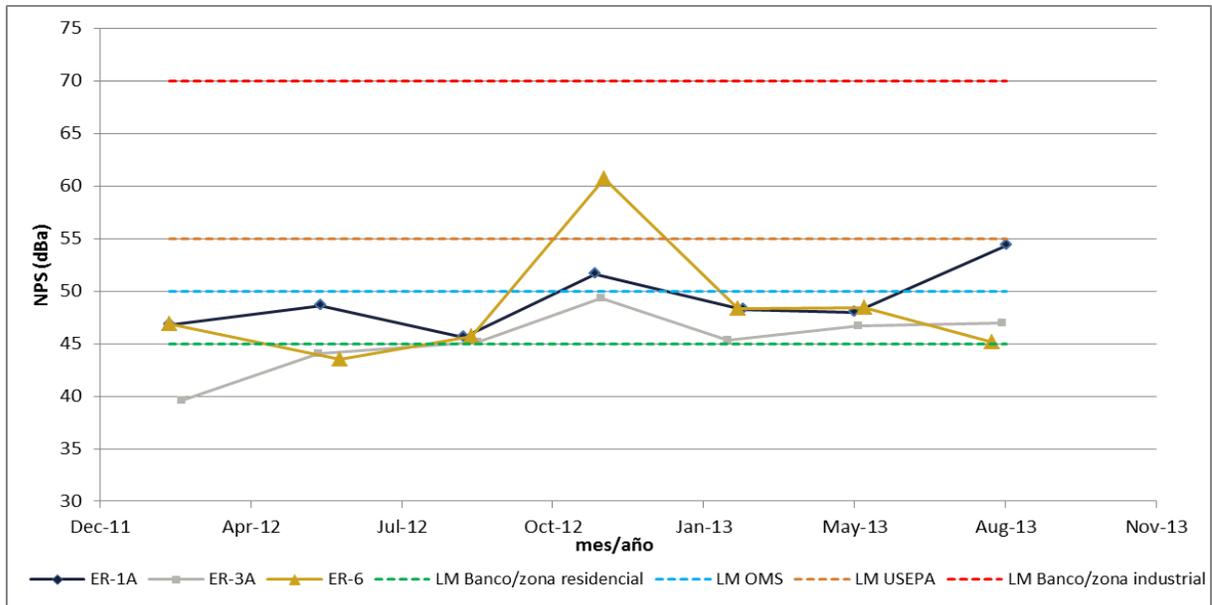
Gráfica 3-7. Promedio diurno registrados en estaciones ER-1A, ER-3A y ER-6, febrero 2012 a agosto 2013, Proyecto Minero Escobal



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Donde NPS: niveles de presión sonora; dBa: decibeles en escala "a"; Verde: Límite máximo establecido por USEPA, OMS y Banco Mundial para zonas residenciales Rojo: Límite máximo establecido por Banco Mundial para zonas industriales.

Gráfica 3-8. Promedio nocturno registrados en estaciones ER-1A y ER-3A, febrero 2012 a agosto 2013, Proyecto Minero Escobal



Donde NPS: niveles de presión sonora; dBa: decibeles en escala "a"; verde: límite máximo establecido por el Banco Mundial para zonas residenciales; Azul: Límite máximo establecido por OMS; Naranja: Límite máximo establecido por USEPA; Rojo: Límite máximo establecido por Banco Mundial para zonas industriales.

Los promedios diarios registrados durante los meses de agosto a octubre 2013 estuvieron por debajo del límite establecido por la OMS, USEPA y Banco Mundial para zonas residenciales.

A excepción de ER-5A, los promedios nocturnos registrados estuvieron por debajo del límite establecido por la USEPA (55 dBa), y ninguna estación de monitoreo estuvo por debajo del límite establecido por el Banco Mundial para zonas residenciales (45 dBa); este mismo comportamiento se observó durante el levantamiento de la línea base.

Cabe recalcar que durante el tercer trimestre 2013 ninguna de las estaciones monitoreadas presentaron valores promedio diario y nocturno superiores al valor de la guía para jornada diaria y nocturna del Banco Mundial para zonas industriales (70 dBa).

Cuadro 3-16. Resultados de los niveles de presión sonora en estaciones de monitoreo mensual durante los meses de agosto a octubre 2013, Proyecto Minero Escobal.

Parámetro	Norma	Guías		ER-1						ER-2						
				Línea Base			ago-13	sep-13	oct-13	Línea Base			ago-13	sep-13	oct-13	
	USEPA	OMS	Banco Mundial		Promedio	Máximo				Mínimo	Promedio	Máximo				Mínimo
			Residencial	Industrial												
dBA																
Lmax	NL	NL	NL	NL	89.3	99.5	64.6	73.0	84.5	76.2	86.7	97.8	64.9	76.5	75.1	78.7
Lmin	NL	NL	NL	NL	32.5	37.7	27.0	44.0	38.5	38.3	35.2	42.8	26.5	41.7	39.6	40.1
Leq	NL	NL	NL	NL	49.9	57.1	41.2	48.4	45.5	47.3	49.4	58.7	39.7	50.0	48.3	51.2
PD	55	55	55	70	50.5	59.1	39.7	49.3	45.1	47.2	48.8	57.1	39.8	50.6	48.8	50.8
PN	55	50	45	70	47.6	55.7	39.3	46.2	46.2	47.7	46.6	54.5	37.9	48.8	47.6	51.9

Parámetro	Norma	Guías		ER-3						ER-7A						
				Línea Base			ago-13	sep-13	oct-13	Línea Base*			ago-13	sep-13	oct-13	
	USEPA	OMS	Banco Mundial		Promedio	Máximo				Mínimo	Promedio	Máximo				Mínimo
			Residencial	Industrial												
dBA																
Lmax	NL	NL	NL	NL	87.4	100.7	67.2	103.6	75.3	81.5	87.5	89.0	82.1	78.3	76.7	80.1
Lmin	NL	NL	NL	NL	49.4	56.2	26.9	43.8	44.8	38.8	NR	NR	NR	38.5	39.2	39.9
Leq	NL	NL	NL	NL	56.8	63.2	39.7	59.5	49.0	48.5	52.8	54.5	50.9	47.4	47.4	48.3
PD	55	55	55	70	56.5	63.1	41.0	55.0	49.2	49.2	52.1	53.5	50.4	48.3	47.2	49.1
PN	55	50	45	70	57.2	64.0	34.1	62.8	49.4	47.5	49.7	50.9	48.8	45.6	47.8	46.8

Nota: dBA = decibeles en escala A; PD = promedio diurno (de 07:00 a 22:00); PN = promedio nocturno (de 22:00 a 7:00); Lmax = lectura máxima registrada de dBA; Lmin= lectura mínima registrada de dBA; NL = no hay límite establecido para este parámetro; \*: los valores de línea base corresponden a la estación ER-7.

Cuadro 3-17. Resultados de los niveles de presión sonora en estaciones de monitoreo trimestral durante el mes de agosto 2013, Proyecto Minero Escobal.

Parámetro	Norma		Guías		ER-1A				ER-3A				ER-4A			
	USEPA	OMS	Banco Mundial		Línea Base			ago-13	Línea Base			ago-13	Línea Base			oct-13
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
	dBA				dBA				dBA				dBA			
Lmax	NL	NL	NL	NL	NR	NR	NR	80.4	NR	NR	NR	73.4	80.6	78.2	82.1	83.2
Lmin	NL	NL	NL	NL	NR	NR	NR	43.8	NR	NR	NR	34.9	NR	NR	NR	31.4
Leq	NL	NL	NL	NL	NR	NR	NR	53.7	NR	NR	NR	48.7	50.2	49.3	50.9	48.3
PD	55	55	55	70	NR	NR	NR	53.3	NR	NR	NR	49.7	49.5	48.4	50.4	48.5
PN	55	50	45	70	NR	NR	NR	54.3	NR	NR	NR	46.93	48.6	48.2	48.9	48.1

Parámetro	Norma		Guías		ER-5A				ER-6			
	USEPA	OMS	Banco Mundial		Línea Base			ago-13	Línea Base			ago-13
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
	dBA				dBA				dBA			
Lmax	NL	NL	NL	NL	91.6	85.1	92.2	80.5	NR	NR	NR	87.2
Lmin	NL	NL	NL	NL	NR	NR	NR	37.7	NR	NR	NR	38.5
Leq	NL	NL	NL	NL	65.8	51.6	67.6	55.2	NR	NR	NR	50.6
PD	55	55	55	70	61.2	50.2	63.8	47.4	NR	NR	NR	52.2
PN	55	50	45	70	62.8	45.9	65.0	59.0	NR	NR	NR	45.2

Nota: dBA = decibeles en escala A; PD = promedio diurno (de 07:00 a 22:00); PN = promedio nocturno (de 22:00 a 7:00); Lmax = lectura máxima registrada de dBA; Lmin= lectura mínima registrada de dBA; NL = no hay límite establecido para este parámetro; NR = Cálculo No Realizado por falta de datos de línea base.



## 4. Calidad del Agua

### 4.1. Sitios de Monitoreo

En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el AI del Proyecto. Su ubicación se presenta en la Figura 4-1, Figura 4-2 y Figura 4-3.

A partir de este trimestre los pozos MW1 y MW10, ubicados en la zona mineralizada, dejaron de ser monitoreados debido a:

- **MW1:** Este pozo no profundo fue construido en diciembre 2010. Durante la construcción en superficie de las instalaciones auxiliares necesarias para el desarrollo del túnel, debido al espacio reducido en dicha área y la logística del proceso, este pozo quedó ubicado en donde se construyó la planta de concreto (ver Fotografía 4-1 y Fotografía 4-2) la cual tiene una superficie aproximada de 40 mt<sup>2</sup> y su función principal es la preparación y distribución del concreto lanzado en los trabajos de reforzamiento de los túneles. Con el objetivo de prevenir incidentes relacionados a mantener un pozo abierto en un área de gran circulación de personas y de maquinaria pesada, en agosto 2013 se tomó la decisión de sellar el pozo con cemento (ver Fotografía 4-3 y Fotografía 4-4).
- **MW10:** Este pozo profundo fue construido en enero 2011 previo al inicio de la construcción de los túneles. En el proceso de avance de construcción del túnel este pozo fue interceptado subterráneamente a 213 m de la superficie en el nivel 1230 en el mes de julio de 2013. El pozo fue sellado con cemento como una medida de prevenir incidentes tanto en superficie como en el subterráneo, dejando de funcionar como pozo de monitoreo.



Fotografía 4-1 Fotografía aérea de área donde se localiza pozo MW-1. Año 2010



Fotografía 4-2 Fotografía aérea de área donde se localiza pozo MW-1 y Planta de Concreto. Año 2013



Fotografía 4-3. Construcción planta de concreto y pozo MW-1, marzo 2013.



Fotografía 4-4 sellado del pozo MW-01, agosto 2013.

Cuadro 4-1. Sitios de Monitoreo de Calidad de Agua en el AI del Proyecto.

Estación	Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15		Sitio	Período Línea Base
<b>Agua Superficial</b>				
SW-1	807053	1601682	Quebrada El Escobal, aguas arriba.	Junio 2008 a marzo 2011
SW-2	805811	1601164	Quebrada El Escobal, en medio de la propiedad	Junio 2008 a septiembre 2010
SW-2A	805295	1601230	Quebrada El Escobal, Salida de la propiedad	No cuenta con línea base
SW-3	805337	1602453	Rio El Dorado, aguas arriba	Septiembre 2008 a marzo 2011
SW-4	804781	1601228	Rio El Dorado, aguas abajo	Septiembre 2008 a marzo 2011



Estación	Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15		Sitio	Período Línea Base
SW-4A	804629	1601052	Río El Dorado, por puente de acceso al Proyecto, 30mts aguas abajo SW-4	No cuenta con línea base
SW-5	810882	1603313	Río Tapalapa	Septiembre 2008 a marzo 2011
SW-6	808391	1597689	Río Los Vados	Septiembre 2008 a marzo 2011
SW-7	806989	1600618	Quebrada La Honda.	Septiembre 2008 a marzo 2011
SW-8	804054	1600834	Unión Río San Rafael y El Dorado.	
SW-9	803772	1597635	Río Tapalapa, aguas abajo (cercano a la Ceibita)	
<b>Agua Subterránea, Nacimientos</b>				
GW-1A	808670	1599754	Nacimiento de agua permanente, Aldea El Volcancito	Diciembre 2010 a marzo 2011
GW-2	807515	1601059	Nacimiento de agua permanente, Aldea El Fucio	Marzo 2010 a marzo 2011
GW-3	806193	1601194	El Mora, zona central del proyecto (frente a portal Oeste)	Marzo 2010 a marzo 2011
GW-4	805992	1600533	Aguas arriba del depósito de colas y de GW5	Diciembre 2010
GW-5	805962	1600525	Aguas arriba del depósito de colas.	No cuenta con línea base
<b>Agua Subterránea, Pozos de monitoreo</b>				
MW-1	806309	1601203	Área de planta de pasta (Amate)	Diciembre 2010 a marzo 2011
MW-2	805206	1600565	Sur-oeste del depósito de colas.	Diciembre 2010 a marzo 2011
MW-3	805153	1600790	Al oeste del depósito de colas	Diciembre 2010 a marzo 2011
MW-4	805186	1601009	Al sur de montículos (acuífero somero)	Diciembre 2010 a marzo 2011
MW-5	805304	1601277	Al oeste de taller, en el límite de la propiedad de MSR.	Diciembre 2010 a marzo 2011
MW-6	805457	1601454	Al norte de almacén general	Diciembre 2010 a marzo 2011
MW-7	805796	1601582	Al oeste de depósito de suelos No. 1.	Diciembre 2010 a marzo 2011
MW-8	805304	1601277	Al oeste de taller, pozo de abastecimiento de oficinas temporales.	Enero 2011 a marzo 2011
MW-9	805198	1601019	Al sur de montículos (Acuífero profundo)	Febrero 2011 a marzo 2011
MW-10	806601	1601397	Al norte del Portal Este	Febrero 2011 a mayo 2011

Estación	Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15		Sitio	Período Línea Base
MW-11	805612	1601064	Al norte de zona de infiltración quebrada Escobal.	Marzo 2011
RW-1	804809	1600972	Pozo artesanal ubicado en Finca Suandys	No cuenta con línea base
<b>Agua Subterránea, pozo de producción</b>				
PSA-SR	803678	1602044	Pozo mecánico ubicado en las piscinas de San Rafael las Flores	Marzo 2011
<b>Agua de grifo</b>				
HW-1			Agua de grifo, casa poblado San Rafael las Flores, cercano a Escuelita	No cuenta con línea base

Los pozos de monitoreo en el perímetro (MW-02 a MW-09) son para monitorear los impactos hidrogeológicos aguas debajo de la mina. Estos pozos forman una media luna completa alrededor de la planta y la mina. Todos, con la excepción del pozo MW-09 que está monitoreando el acuífero profundo, están monitoreando el acuífero aluvial.

El pozo MW-11 es un pozo de reserva para apoyar al pozo PSA-1 en caso que se necesite y también actúa como pozo de monitoreo al acuífero profundo debido a su ubicación entre la mina y el pozo MW-09.

Cuadro 4-2. Resumen de construcción de los pozos de monitoreo, .

Pozo	Profundidad de Agujero	Profundidad del Pozo	Diámetro del pozo	Material de la Carcasa	Zona del Filtro	
	metros ant	metros ant	pulgadas		Desde (metros ant)	A (metros ant)
MW-01	30.9	30.7	4	PVC	12.71	30.7
MW-02	32.45	31.56	4	PVC	13.57	31.56
MW-03	45	43.85	4	PVC	25.55	43.82
MW-04	37.7	37.7	4	PVC	14.91	35.7
MW-05	43.2	43.09	4	PVC	22.36	43.09
MW-06	43.7	43.04	4	PVC	22.31	43.04
MW-07	36	33.01	4	PVC	22.86	32.01

Pozo	Profundidad de Agujero	Profundidad del Pozo	Diámetro del pozo	Material de la Carcasa	Zona del Filtro	
	metros ant	metros ant	pulgadas		Desde (metros ant)	A (metros ant)
MW-08	51.25	51.15	4	PVC	12.67	51.2
MW-09	304.8	304.8	4	Acero	80	304.8
MW-10	304.8	304.8	6	Acero	80	304.8
MW-11	304.8	304.8	6	Acero	100	304.8
RW-01	5.0	4.6	59	Concreto	pozo artesanal construido por anteriores propietarios	
PSA-SR	304.8	304.8	8	Acero	100	304.8

Donde: ant: abajo del nivel del terreno.

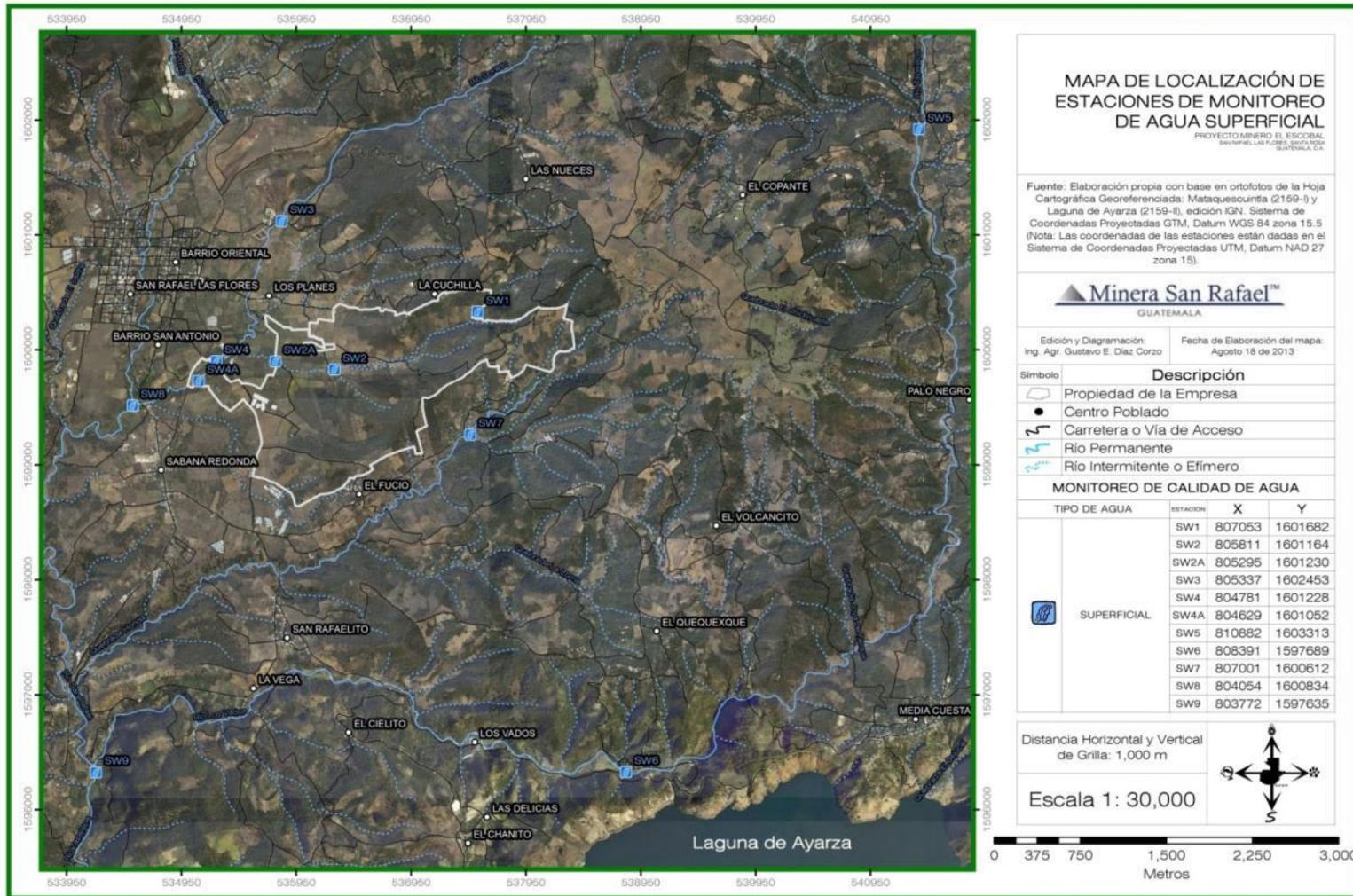


Figura 4-1 Mapa de localización de las estaciones de monitoreo de agua superficial, Proyecto Minero Escobal

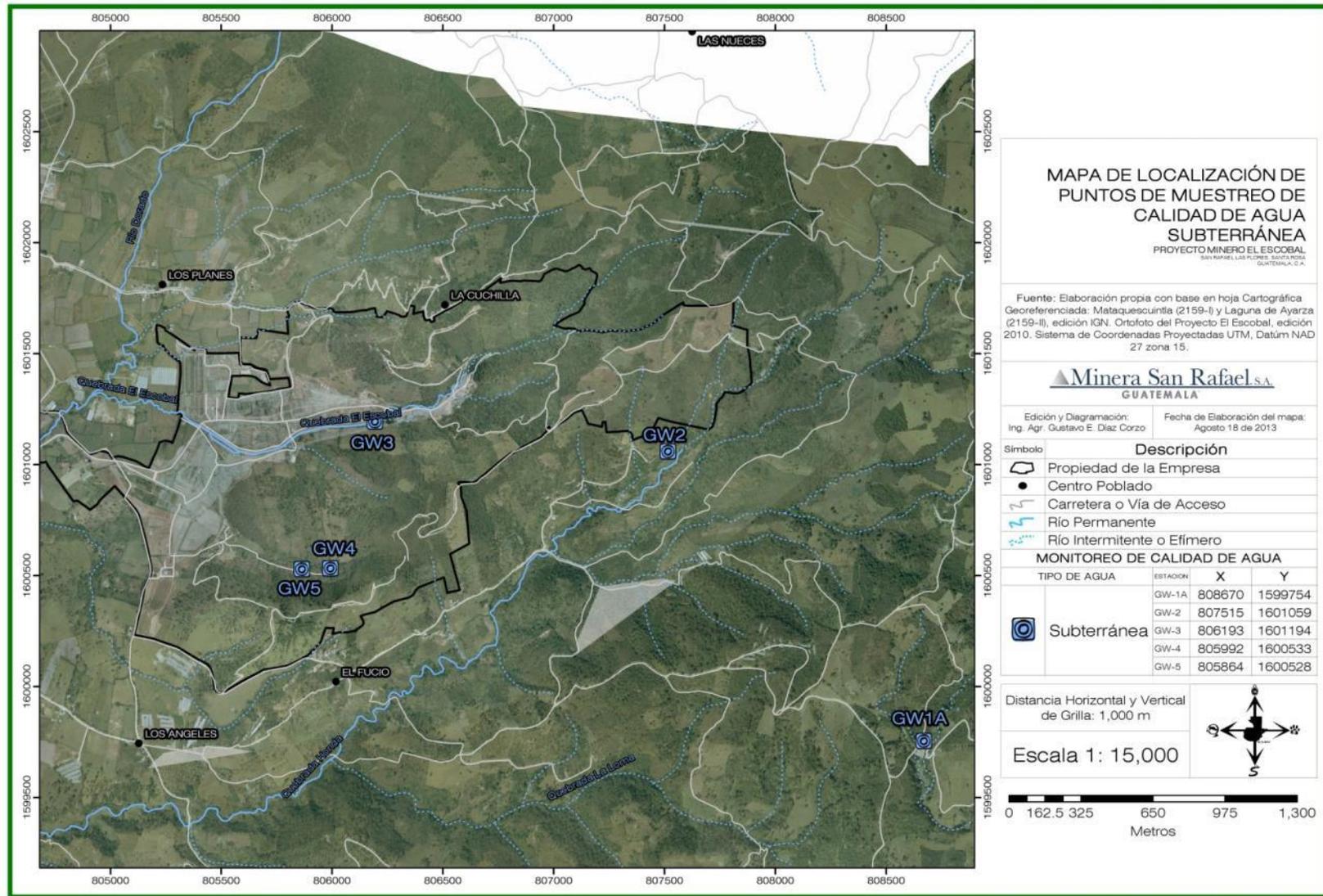


Figura 4-2 Mapa de localización estaciones de monitoreo de agua subterránea (Manantiales), Proyecto Minero Escobal

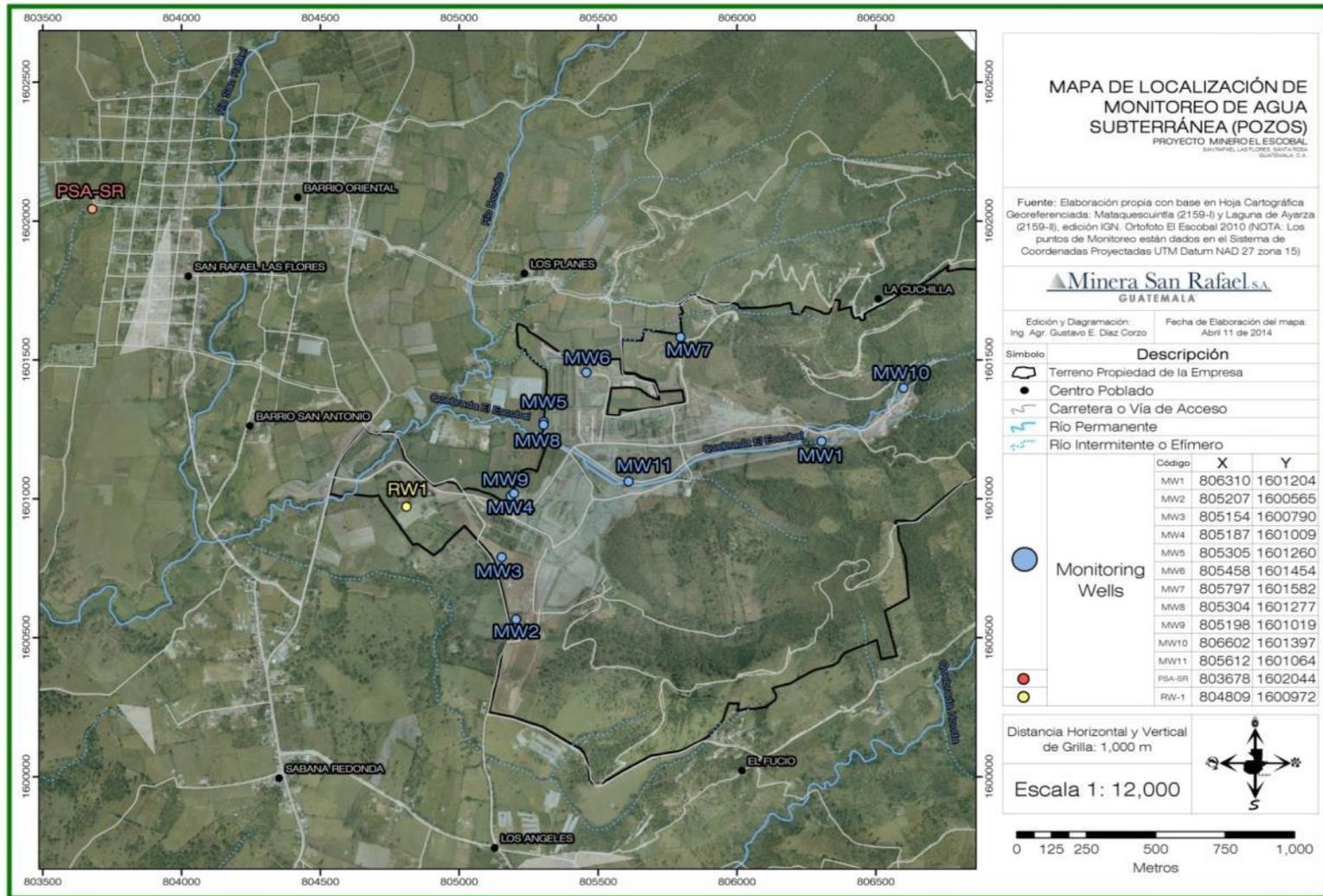


Figura 4-3 Mapa de localización pozos de monitoreo, pozo artesanal y pozo de producción. Proyecto Minero Escobal

## 4.2. Metodología

En el Cuadro 4-3 se describe el procedimiento y equipo utilizado para la toma de muestras de agua.

Cuadro 4-3 Procedimiento y equipo utilizado para medir parámetros In Situ de muestras de agua, Proyecto Minero Escobal.

PARÁMETROS ANALIZADOS	
In Situ	pH, conductividad eléctrica, oxígeno disuelto, temperatura y sólidos disueltos totales
Laboratorio	Laboratorio ACZ: Aceites y Grasas, Hidrocarburos Totales de Petróleo, Metales Totales (solo en agua superficial); Metales Disuelto, Cationes, Aniones y demás parámetros fisicoquímicos.  Laboratorio Ecosistemas: DBO, coliformes totales, color, Cromo hexavalente.
PROCEDIMIENTO	
Basado en el procedimiento de toma de muestra dado por Water Management Consultants y el laboratorio ACZ para las muestras del perfil SW y GW. Y en el procedimiento dado por <i>Standard Methods for the Examination of Water and Wastewater, part 1060 B</i> para las muestras de agua residual.	
EQUIPO UTILIZADO	
Nombre	multiparámetros
Modelo	PCD650
Fabricante	OAKTON

Laboratorio empleado y valores de referencia: Las muestras fueron analizadas en el laboratorio ACZ, 2773 Downhill Drive Steamboat Springs, Colorado USA, el cual se encuentra acreditado y avalado por la USEPA. Los análisis de color, DBO, coliformes fecales y cromo hexavalente fueron analizados en el laboratorio Ecosistemas Proyectos Ambientales, S.A., laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados cuentan con validez internacional según OGA-LE 006-04.

### 4.3. Resultados

#### 4.3.1. Control de Calidad

En el monitoreo correspondiente al mes de septiembre 2013 se emplearon muestras control para determinar la confiabilidad de los parámetros analizados por el laboratorio encargado del análisis de muestras. En total se efectuaron 3 muestras blanco y tres muestras duplicado; los resultados obtenidos se presentan en el Cuadro 4-4

En dos de las tres muestras blanco, se detectaron concentraciones mínimas de nitratos/nitritos y en una muestra bario disuelto. Debido a que las concentraciones detectadas están muy cerca a los límites de detección del método, se considera que no hay un aporte significativo de estos elementos en los resultados obtenidos. Todos los demás parámetros analizados por el laboratorio son confiables tanto en manipulación de las muestras como en precisión del análisis.

Cuadro 4-4. Resultados de control de calidad, blanco y duplicado, para los análisis de agua superficial y subterránea, septiembre 2013, Proyecto Minero Escobal

Parámetros	Unid	Blancos de Campo			Muestras Duplicado					
		Agua EMSURE (metales) y Agua Desmineralizada (FisQ)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Alcalinidad Total	mg/L	<2	<2	<2	96	94	140	126	141	141
Cloruros	mg/L	1	<1	<1	13	12	8	8	20	21
Fluoruros	mg/L	<0.1	<0.1	<0.1	0.8	0.8	0.3	0.4	1.2	1.2
Fosfatos	mg/L	<0.03	<0.03	<0.03	0.06	0.06	0.09	0.03	0.062	0.06
Cianuro Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Amonio	mg/L	<0.05	<0.05	<0.05	0.35	0.33	0.08	<0.05	<0.05	<0.05
Nitratos/Nitritos N	mg/L	<0.02	0.11	0.03	2.35	2.38	12.3	12.3	0.003	<0.02
Nitrogeno Kjeldahl	mg/L	0.2	0.1	<0.1	1	1	<0.3	0.3	0.1	0.2
Sulfatos	mg/L	<1	<1	<1	503	511	217	219	221	233
Fósforo Dis. (Orto)	mg/L	<0.01	<0.01	<0.01	0.05	0.04	0.05	0.04	0.04	0.03
Fósforo Total	mg/L	<0.01	<0.01	<0.01	0.03	0.03	0.03	0.02	0.03	0.03
STD (TDS)	mg/L	<100	<10	<10	872	882	614	642	556	530
SST (TSS)	mg/L	<5	6	<5	<5	11	<5	<5	14	15
ST (TS)	mg/L	<10	<10	<10	720	920	660	650	590	600
Hidrocarburos (TPH)	mg/L	<0.1	NA	NA	<0.1	<0.1	NA	NA	NA	NA
Grasas y Aceites	mg/L	<2	NA	NA	<2.02	<2.02	NA	NA	NA	NA
DQO	mg/L	<10	NA	NA	<10	<10	NA	NA	NA	NA



Parámetros	Unid	Blancos de Campo			Muestras Duplicado					
		Agua EMSURE (metales) y Agua Desmineralizada (FisQ)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	0.05	0.06	<0.03	<0.03	<0.03	<0.03
Aluminio Total	mg/L	<0.06	NA	NA	0.47	0.66	NA	NA	NA	NA
Antimonio Disuelto	mg/L	<0.0004	<0.0004	<0.0004	0.0048	0.0048	0.0007	0.0006	<0.0004	<0.0004
Antimonio Total	mg/L	<0.0004	NA	NA	0.0046	0.0046	NA	NA	NA	NA
Arsénico Disuelto	mg/L	<0.0002	<0.0002	<0.0002	0.0044	0.0046	0.0033	0.0032	0.0021	0.0018
Arsénico Total	mg/L	<0.0002	NA	NA	0.0061	0.0058	NA	NA	NA	NA
Bario Disuelto	mg/L	<0.003	0.004	<0.003	0.098	0.096	0.186	0.187	0.043	0.047
Bario Total	mg/L	<0.006	NA	NA	0.103	0.101	NA	NA	NA	NA
Berilio Disuelto	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total	mg/L	<0.02	NA	NA	<0.01	<0.01	NA	NA	NA	NA
Boro Disuelto	mg/L	<0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.01	0.04	0.05
Boro Total	mg/L	<0.02	NA	NA	0.02	0.02	NA	NA	NA	NA
Cadmio Disuelto	mg/L	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0003	0.0002	<0.0001	<0.0001
Cadmio Total	mg/L	<0.0001	NA	NA	<0.0001	<0.0001	NA	NA	NA	NA
Calcio Disuelto	mg/L	<0.2	<0.2	<0.2	191	187	97.6	98.3	90.6	98.5
Calcio Total	mg/L	<0.4	NA	NA	196	195	NA	NA	NA	NA
Cobalto Disuelto	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Total	mg/L	<0.02	NA	NA	<0.01	<0.01	NA	NA	NA	NA
Cobre Disuelto	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total	mg/L	<0.02	NA	NA	<0.01	<0.01	NA	NA	NA	NA
Cromo Disuelto	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total	mg/L	<0.02	NA	NA	<0.01	<0.01	NA	NA	NA	NA
Hierro Disuelto	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	7.04	7.37
Hierro Total	mg/L	<0.04	NA	NA	0.31	0.44	NA	NA	NA	NA
Magnesio Disuelto	mg/L	<0.2	<0.2	<0.2	14.9	14.7	17.7	17.7	17.9	17.8
Magnesio Total	mg/L	<0.4	NA	NA	15.2	15.1	NA	NA	NA	NA
Manganeso Disuelto	mg/L	<0.005	<0.005	<0.005	0.141	0.138	0.625	0.627	0.358	0.380
Manganeso Total	mg/L	<0.01	NA	NA	0.168	0.169	NA	NA	NA	NA
Mercurio Disuelto	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total	mg/L	<0.0002	NA	NA	<0.0002	<0.0002	NA	NA	NA	NA
Molibdeno Disuelto	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Molibdeno Total	mg/L	<0.04	NA	NA	<0.02	<0.02	NA	NA	NA	NA
Níquel Disuelto	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Níquel Total	mg/L	<0.02	NA	NA	<0.01	<0.01	NA	NA	NA	NA
Plata Disuelta	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total	mg/L	<0.00005	NA	NA	0.00009	<0.00005	NA	NA	NA	NA
Plomo Disuelto	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Plomo Total	mg/L	<0.0001	NA	NA	0.0010	0.001	NA	NA	NA	NA
Potasio Disuelto	mg/L	<0.3	<0.3	<0.3	7.2	6.9	9.7	9.7	4.4	4.6
Potasio Total	mg/L	<0.6	NA	NA	7.2	7	NA	NA	NA	NA

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Parámetros	Unid	Blancos de Campo			Muestras Duplicado					
		Agua EMSURE (metales) y Agua Desmineralizada (FisQ)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Selenio Disuelto	mg/L	<0.0001	<0.0001	<0.0001	0.0004	0.0004	0.0008	0.0008	<0.0001	<0.0001
Selenio Total	mg/L	<0.0001	NA	NA	0.0004	0.0004	NA	NA	NA	NA
Sodio Disuelto	mg/L	<0.3	<0.3	<0.3	35.4	34.6	28.7	28.7	32	34.2
Sodio Total	mg/L	<0.6	NA	NA	36.1	35.7	NA	NA	NA	NA
Zinc Disuelto	mg/L	<0.01	<0.01	<0.01	0.01	0.01	0.01	0.01	0.02	0.02
Zinc Total	mg/L	<0.02	NA	NA	0.01	0.02	NA	NA	NA	NA
Color Aparente	u Pt/Co	<0.005	<1	<1	<0.05	<0.05	<1	<1	66	32
Color Real	u Pt/Co	<10	<1	<1	<10	<10	<1	<1	645	661
Cromo Hexavalente	mg/L	<2	<0.05	<0.05	540	540	<0.05	<0.05	<0.05	<0.05
Coliformes Fecales	NMP/100mL	<1	<2	<2	45	44	<2	<2	4.5	<2
DBO	mg/L	<1	NA	NA	2	5	NA	NA	NA	NA

Dónde: **u.e.:** unidades exponenciales; **mg/L:** miligramos por litro; **NMP/100ml:** número más probable en 100ml; **u Pt/Co:** unidades platino cobalto.

### 4.3.2. Agua Superficial

Según los parámetros fisicoquímicos analizados, todas las estaciones monitoreadas cumplen con los límites máximos permisibles dados por el Acuerdo Gubernativo 236-2006 para entes generadores nuevos.

En el Cuadro 4-5 se presentan los resultados de la calidad del agua superficial para el mes de septiembre 2013 en las once estaciones de monitoreo y un resumen estadístico (promedio, valor máximo y valor mínimo) de la línea base establecida para cada estación. Los resultados del laboratorio se presentan en el anexo 11.5.1.

Las estaciones muestreadas presentaron un pH levemente alcalino (7.09 a 8.46 u.e.); en ninguna de las estaciones se detectaron valores de grasas y aceites, cianuro total, DBO y Cromo Hexavalente cumpliendo con las guías establecidas por la USEPA para la salud humana, y el IFC y Acuerdo Gubernativo 236-2006 (Acuerdo) para aguas residuales. A excepción de las estaciones SW2A y SW5, la Demanda Química de Oxígeno se detectó en concentraciones entre 10-50 mg/L, y no sobrepasaron el límite máximo establecidos durante el levantamiento de línea base para cada estación, ni sobrepasa el límite establecido por el IFC (150 mg/L).

Las estaciones muestreadas presentaron concentraciones por debajo de la directriz de la USEPA para la salud humana de Cloruros (250 mg/L),

Fluoruros (4 mg/L) y concentraciones muy por debajo de los límites establecidos por el acuerdo para Fósforo total (10 mg/l) y el Banco Mundial (2mg/L).

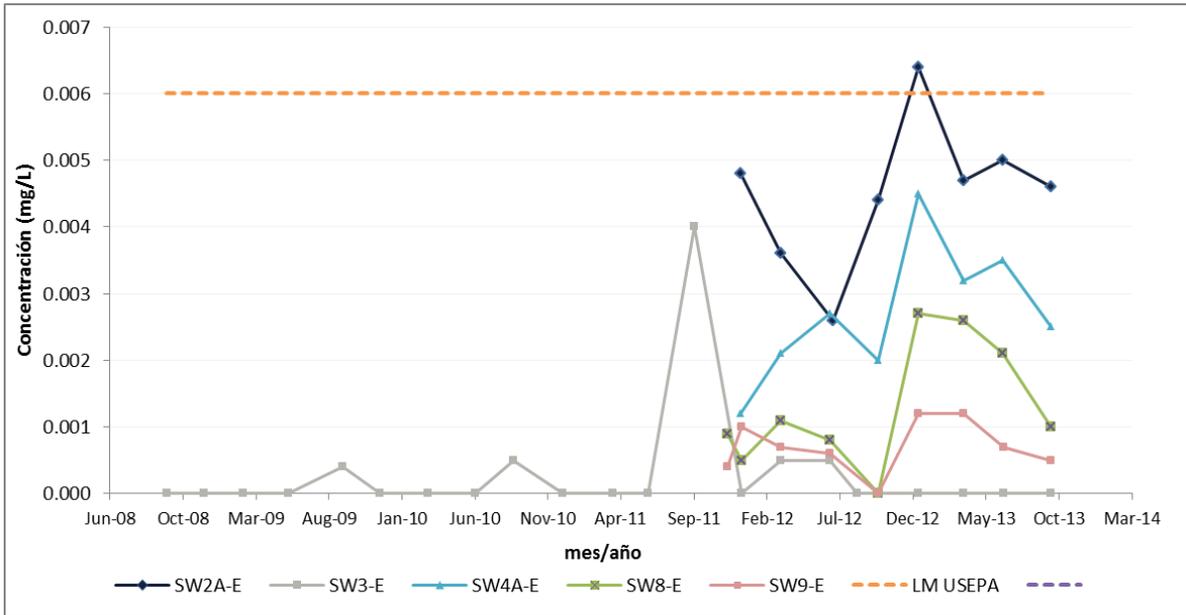
En la mayoría de estaciones se detectó sólidos suspendido en concentración entre 7 y 74 mg/L, encontrándose por debajo de los límites establecidos por el acuerdo (100 mg/L) y dentro de los valores establecidos durante el levantamiento de línea base. En la estación SW7 se reportaron concentraciones de 264mg/L, encontrándose por debajo del límite máximo establecido en la línea base (330 mg/L).

Los Sulfatos Totales y los sólidos disueltos totales (TDS) fueron detectados en la mayoría de las estaciones en concentraciones por debajo de la guía establecida por la USEPA (250 y 500 mg/L respectivamente).

La estación SW2A no cuenta con línea base pero se utiliza los valores registrados en la línea base de la estación SW2 como referencia para analizar su comportamiento, ya que las dos estaciones están ubicadas en la quebrada El Escobal aguas abajo y están separadas a escasos 400mts. Aproximadamente. En la estación SW2A se reportaron concentraciones de Sulfatos Totales de 511 mg/L y de TDS de 882 mg/L los cuales se encuentran por debajo de las concentraciones máximas registradas durante el levantamiento de línea base de la estación SW2 ( 1600 y 1620 mg/L respectivamente).

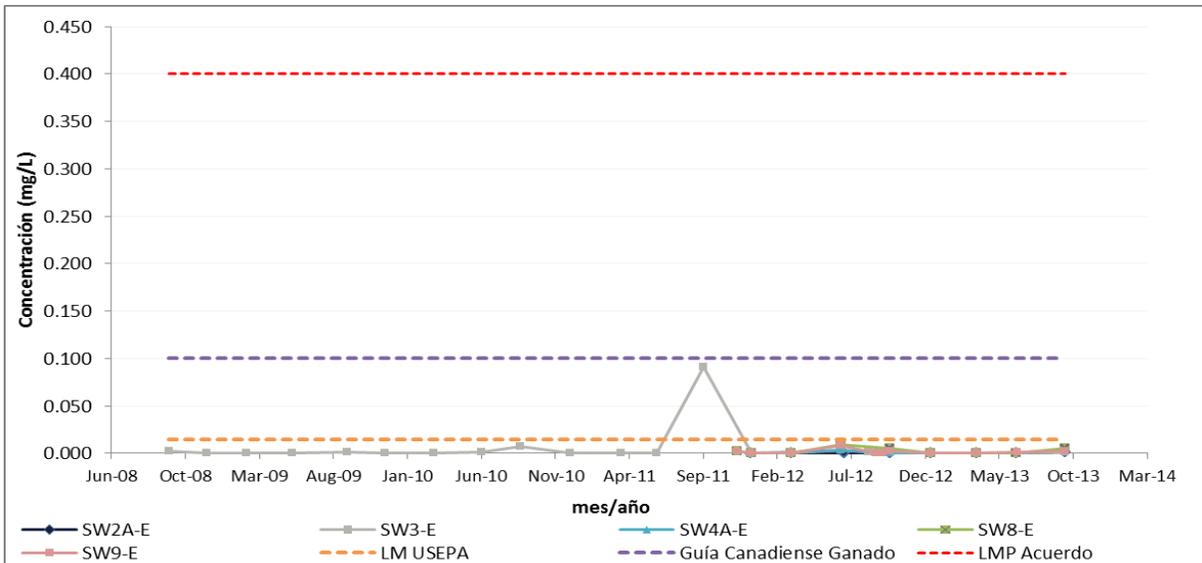
El Berilio, Cromo, Mercurio y Níquel no fueron detectados en ninguna de las estaciones muestreadas. Mientras que el Antimonio, Cadmio, Cobre, Bario, Plomo y Selenio fueron detectados en concentraciones menores a los límites máximos registrados durante el levantamiento de línea base y menores a las directrices de la USEPA (0.006mg/L, 0.003mg/L, 1.3mg/L, 1mg/L, 0.015mg/L y 0.17mg/L respectivamente). En la Gráfica 4-1 se observa las concentraciones históricas de Antimonio y en la Gráfica 4-2 las concentraciones históricas de Plomo registradas en las estaciones que no cuentan con línea base y río El Dorado aguas arriba; los cuales se mantienen por debajo de los las guías de la USEPA para la salud humana.

Gráfica 4-1. Concentración de Antimonio registrados en SW2A-E, SW3-E, SW4A-E, SW8-E y SW9-E; septiembre 2008 a septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L = miligramo por litro

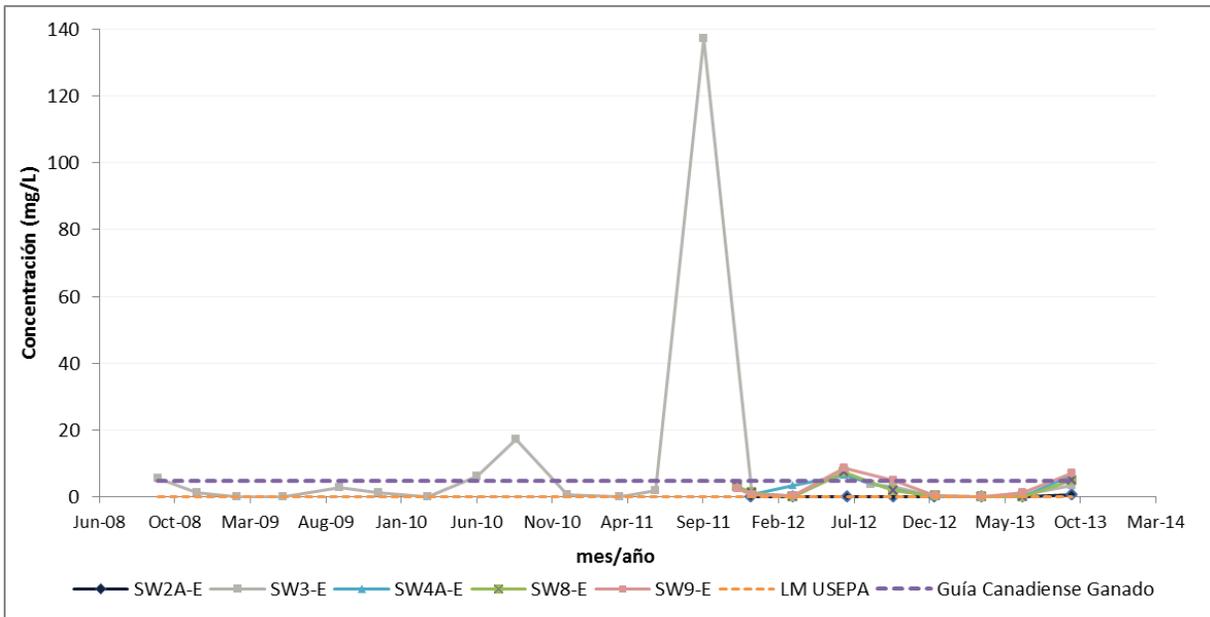
Gráfica 4-2. Concentración de Plomo registrados en SW2A-E, SW3-E, SW4A-E, SW8-E y SW9-E; septiembre 2008 a septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L = miligramo por litro

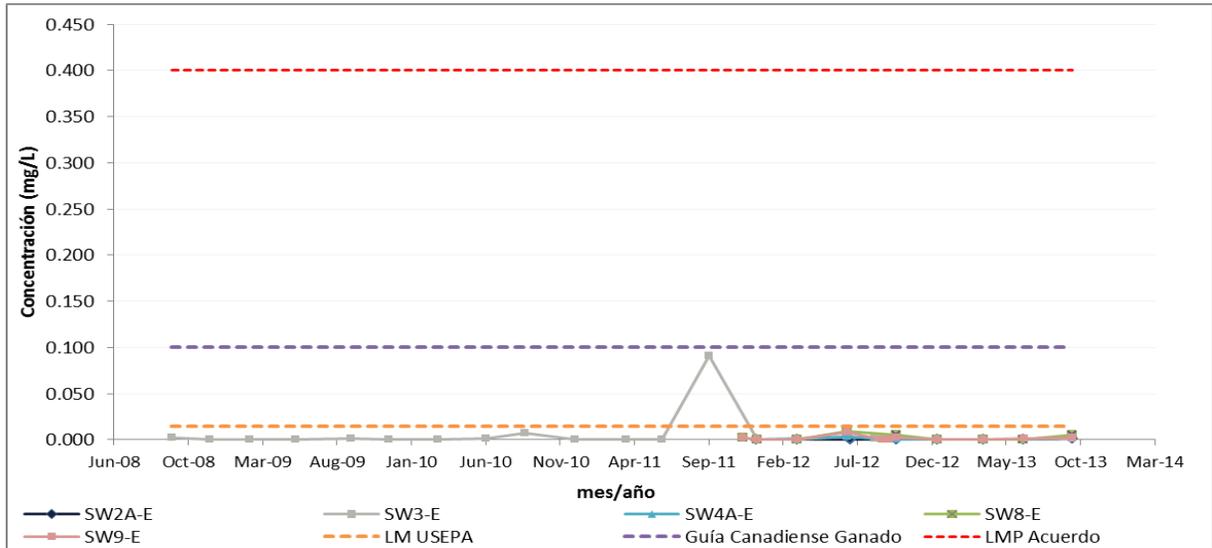
El Aluminio fue detectado en todas las estaciones en concentraciones que van de 0.66 a 18.80 mg/L, por arriba de la guía de la USEPA (0.2 mg/L) y las guías Canadienses para Ganado (5 mg/L), y las cuales se encuentra dentro de los límites establecidos durante el levantamiento de la línea base. Mismo comportamiento se observa con el Hierro que fue detectado en todas las estaciones en concentraciones que van de 0.44 a 9.90 mg/L las cuales se encuentran dentro de los límites establecidos durante el levantamiento de la línea base pero por arriba de la guía establecida por la USEPA (0.3 mg/L). En la Gráfica 4-3 se observa las concentraciones históricas de Aluminio y en la Gráfica 4-4 las concentraciones históricas de Hierro registradas en las estaciones que no cuentan con línea base y río El Dorado aguas arriba; donde se observa que la aportación de estos metales se debe a actividades ajenas al proyecto, ya que las concentraciones registradas aguas arriba del río El Dorado son mayores a las registradas en la salida de la propiedad (SW2A-E).

Gráfica 4-3. Concentración de Aluminio registrados en SW2A-E, SW3-E, SW4A-E, SW8-E y SW9-E; septiembre 2008 a septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L = miligramo por litro

Gráfica 4-4. Concentración de Hierro registrados en SW2A-E, SW3-E, SW4A-E, SW8-E y SW9-E; septiembre 2008 a septiembre 2013, Proyecto Minero Escobal

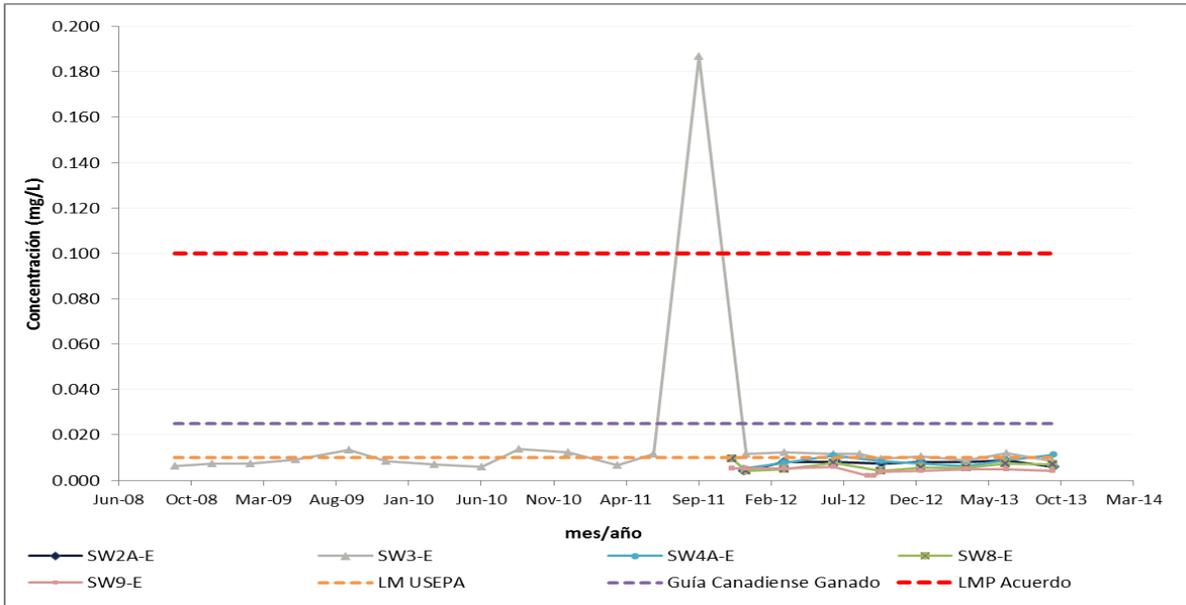


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Dónde: mg/L = miligramo por litro

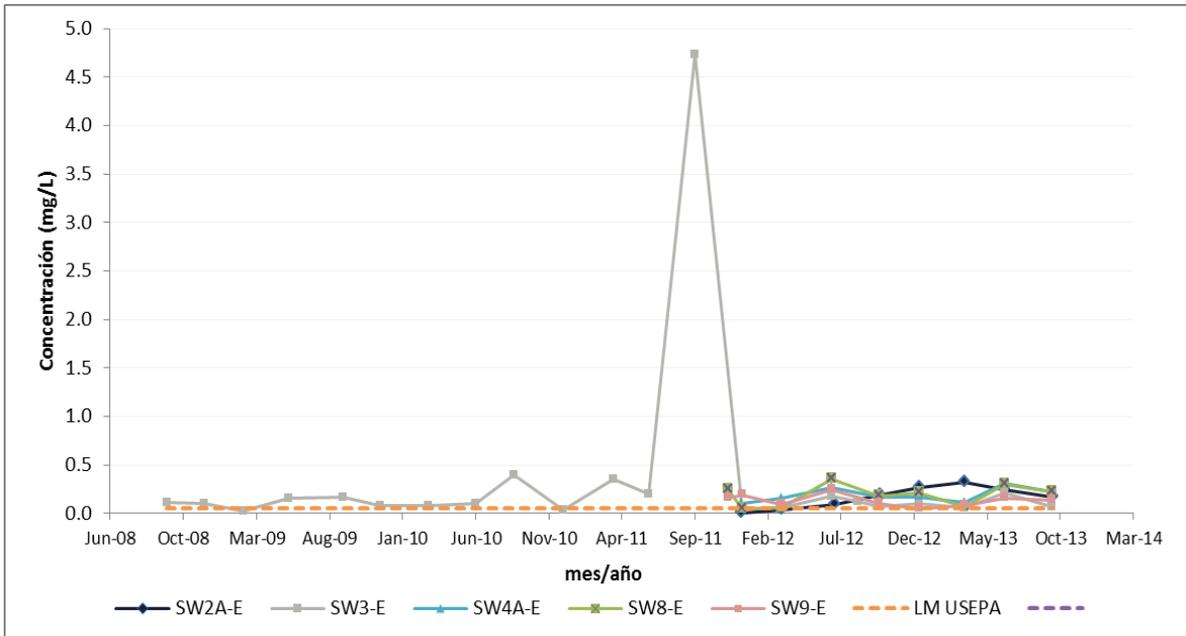
Las concentraciones de Arsénico Total se encuentran por debajo de los límites establecidos por el Acuerdo (0.1 mg/L) y por las guías Canadienses para Ganado (0.025 mg/L); y por debajo de las directrices de la USEPA (0.01mg/L) en la mayoría de las estaciones, a excepción de la estación SW4A donde se obtuvo una concentración de 0.0113 mg/L, dicho aumento se atribuye a fuentes externas del proyecto, debido a que la concentración de Arsénico Total obtenida en la muestra tomada ese mismo día en la estación SW2A, que se ubica en la quebrada Escobal justo antes que el agua abandone la propiedad, fue de 0.0058 mg/L, y la concentración obtenido en la muestra tomada en la estación SW3 ubicada aguas arriba del río El Dorado fue de 0.0084 mg/L. En la Gráfica 4-5 se observa las concentraciones históricas de Arsénico, donde se puede observar que todas las concentraciones registradas en SW3 han sido mayores a los registrados en SW2A durante todos los muestreos realizados desde diciembre 2011 a la fecha. Se dará seguimiento a la tendencia que tenga este parámetro en futuros muestreos para comprobar o descartar que dicho aumento se deba a las actividades realizadas dentro de la empresa.

Gráfica 4-5. Concentración de Arsénico registrados en SW2A-E, SW3-E, SW4A-E, SW8-E y SW9-E; septiembre 2008 a septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L = miligramo por litro

Gráfica 4-6. Concentración de Manganeso registrados en SW2A-E, SW3-E, SW4A-E, SW8-E y SW9-E; septiembre 2008 a septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L = miligramo por litro

A excepción de la estación SW5 (0.042mg/L), todas las estaciones registraron concentraciones de Manganeso por arriba de la directriz de la USEPA para resguardar la salud humana (0.05mg/L), registrándose la mayor concentración en la estación SW7 (quebrada La Honda). En la Gráfica 4-6 se observa las concentraciones históricas de Manganeso en la cual se puede apreciar que el aporte de Manganeso hacia el río El Dorado no es significativo, debido a que las concentraciones registradas aguas arriba del Río El Dorado tampoco cumplen la guía de la USEPA e históricamente se han registrado concentraciones mayores en esta estación (4.73 mg/L durante septiembre 2011).



Cuadro 4-5. Resultados de la Calidad del Agua Superficial septiembre 2013, Proyecto Minero Escobal (1/4).

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E			
					Quebrada Escobal - aguas arriba				Quebrada Escobal - en medio del proyecto				Quebrada Escobal - salida del Proyecto			
					Línea Base			sep-13	Línea Base			sep-13	Línea Base			sep-13
Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo	Promedio	Mínimo		Máximo							
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.60	7.14	8.06	7.79	7.42	6.56	7.87	8.46	NR	NR	NR	8.32
Temperatura campo	°C			+/- 7	17.4	13.0	19.8	18.6	22.4	20.3	25.6	22.8	NR	NR	NR	24.7
Conductividad de campo	uS/cm				277.9	66.3	566.6	167.7	807.3	177.3	1965.0	676.4	NR	NR	NR	1252.0
Oxígeno Disuelto campo	mg/L				3.60	0.09	6.37	4.47	4.76	3.50	5.75	4.68	NR	NR	NR	4.50
Alcalinidad Total	mg/L				104	38	161	40	80	44	119	109	NR	NR	NR	94
Cloruros	mg/L	250			5	4	7	5	31.8	6	70	4	NR	NR	NR	12
Fluoruros	mg/L	4			0.15	0.10	0.20	0.10	0.60	0.10	1.20	0.20	NR	NR	NR	0.80
Fosfatos	mg/L				0.185	0.09	0.31	0.09	0.188	0.06	0.4	0.12	NR	NR	NR	0.06
Cianuro Total	mg/L	0.14		1.00	0.004	<0.003	0.015	<0.003	<0.003	<0.003	<0.003	<0.003	NR	NR	NR	<0.003
Amonio	mg/L				<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	<0.05	NR	NR	NR	0.33
Nitratos/Nitritos como N	mg/L				1.61	0.08	4.87	3.89	2.46	0.03	4.90	2.28	NR	NR	NR	2.38
Nitrogeno Kjeldahl (TKN)	mg/L				4.0	0.2	25.9	0.6	0.3	<0.1	0.8	0.5	NR	NR	NR	1.0
Sulfatos	mg/L	250.0			26	10	42	<1	473	14	1600	166	NR	NR	NR	511
Fósforo Disuelto (Orto)	mg/L				0.06	0.03	0.10	0.07	0.06	0.02	0.13	0.08	NR	NR	NR	0.04
Fósforo Total	mg/L		2.00	10.00	0.37	0.04	2.51	0.06	0.08	0.03	0.19	0.07	NR	NR	NR	0.03
STD (TDS)	mg/L	500			225	170	280	176	754	170	1620	452	NR	NR	NR	882
SST (TSS)	mg/L		50	100	164	5	780	13	67	<5	320	39	NR	NR	NR	11
ST (TS)	mg/L				346	200	1080	200	850	230	1660	500	NR	NR	NR	920
Hidrocarburos totales (TPH)	mg/L				<0.1	<0.09	<0.1	<0.1	<0.1	<0.09	<0.1	<0.1	NR	NR	NR	<0.1
Grasas y Aceites	mg/L		10	10	<2.062	<2.062	<2.248	<2.02	<2.04	<2.04	<2.04	<2.02	NR	NR	NR	<2.02
DQO	mg/L		125.0		15.7	<10	40.0	20.0	13.0	<10	30.0	10.0	NR	NR	NR	<10
Aluminio Disuelto	mg/L				0.08	<0.03	0.09	0.05	0.04	<0.03	0.12	0.03	NR	NR	NR	0.06
Aluminio Total	mg/L	0.20			5.02	<0.03	35.10	3.78	2.35	0.06	8.77	3.80	NR	NR	NR	0.66
Antimonio Disuelto	mg/L				<0.0004	<0.0004	0.0006	<0.004	<0.0004	<0.0004	<0.0004	0.0007	NR	NR	NR	0.0048
Antimonio Total	mg/L	0.006			<0.0004	<0.0004	0.0007	<0.004	<0.0004	<0.0004	0.0005	0.001	NR	NR	NR	0.0046
Arsénico Disuelto	mg/L				0.0022	0.0005	0.0034	0.0008	0.0018	0.0013	0.0024	0.0034	NR	NR	NR	0.0046
Arsénico Total	mg/L	0.010		0.100	0.0034	0.0015	0.0094	0.0019	0.0027	0.0012	0.0054	0.0067	NR	NR	NR	0.0058
Bario Disuelto	mg/L				0.1361	0.0860	0.2070	0.0760	0.1090	0.0880	0.1330	0.0880	NR	NR	NR	0.0960
Bario Total	mg/L	1			0.1860	0.1000	0.4340	0.1050	0.1314	0.0960	0.1860	0.1140	NR	NR	NR	0.1010
Berilio Disuelto	mg/L				<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01	NR	NR	NR	<0.01
Berilio Total	mg/L	0.004			<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01	NR	NR	NR	<0.01
Boro Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	0.114	<0.01	0.29	0.01	NR	NR	NR	0.02
Boro Total	mg/L				<0.01	<0.01	0.02	<0.01	0.108	<0.01	0.28	0.01	NR	NR	NR	0.02
Cadmio Disuelto	mg/L				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001
Cadmio Total	mg/L	0.003		0.1	<0.0001	<0.0001	0.0007	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	NR	NR	NR	<0.0001
Calcio Disuelto	mg/L				45.2	18.9	74.5	17.1	144.9	20.7	333.0	92.4	NR	NR	NR	187.0
Calcio Total	mg/L				45.5	20.9	70.5	17.5	144.6	20.5	331.0	95.2	NR	NR	NR	195.0
Cobalto Disuelto	mg/L				<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	NR	NR	NR	<0.01
Cobalto Total	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cobre Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cobre Total	mg/L	1.3		3	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01	NR	NR	NR	<0.01
Cromo Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cromo Total	mg/L	0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Hierro Disuelto	mg/L				<0.02	<0.02	0.04	0.03	0.04	<0.02	0.12	<0.02	NR	NR	NR	<0.02
Hierro Total	mg/L	0.3			2.71	<0.02	19.50	1.48	1.30	0.06	5.19	2.32	NR	NR	NR	0.44
Magnesio Disuelto	mg/L				3.93	2.60	5.30	2.50	15.94	3.20	37.30	8.90	NR	NR	NR	14.70
Magnesio Total	mg/L				4.15	2.80	5.20	2.60	15.14	3.60	32.20	9.20	NR	NR	NR	15.10
Manganeso Disuelto	mg/L				0.005	<0.005	0.020	<0.005	0.020	<0.005	0.070	0.139	NR	NR	NR	0.138
Manganeso Total	mg/L	0.05			0.104	<0.005	0.721	0.058	0.060	0.007	0.174	0.279	NR	NR	NR	0.169
Mercurio Disuelto	mg/L				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NR	NR	NR	<0.0002
Mercurio Total	mg/L	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NR	NR	NR	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.02
Molibdeno Total	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.02
Níquel Disuelto	mg/L				<0.01	<0.01	0.030	<0.01	0.013	<0.01	0.040	<0.01	NR	NR	NR	<0.01
Níquel Total	mg/L	0.61		2.00	<0.01	<0.01	0.040	<0.01	0.022	<0.01	0.040	<0.01	NR	NR	NR	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	NR	NR	NR	<0.00005
Plata Total	mg/L				<0.00005	<0.00005	0.000	<0.00005	<0.00005	<0.00005	0.00006	0.000	NR	NR	NR	<0.00005
Plomo Disuelto	mg/L				<0.0001	<0.0001	0.000	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	NR	NR	NR	<0.0001
Plomo Total	mg/L	0.015		0.400	0.0025	<0.0001	0.0191	0.0011	0.0009	<0.0001	0.0038	0.0039	NR	NR	NR	0.0010
Potasio Disuelto	mg/L				4.4	3.5	5.1	4.3	6.1	4.9	7.6	4.4	NR	NR	NR	6.9
Potasio Total	mg/L				5.3	3.5	13.0	4.5	6.3	5.2	7.4	4.8	NR	NR	NR	7.0
Selenio Disuelto	mg/L				<0.0001	<0.0001	0.0001	<0.0001	0.00045	<0.0001	0.0002	<0.0001	NR	NR	NR	0.0004
Selenio Total	mg/L	0.170			0.0001	<0.0001	0.00030	<0.0001	0.00011	<0.0001	0.00020	0.00010	NR	NR	NR	0.0004
Sodio Disuelto	mg/L				9.8	8.3	11.6	7.3	40.1	9.4	87.8	17.2	NR	NR	NR	34.6
Sodio Total	mg/L				9.5	7.8	11.8	7.2	39.8	9.4	85.2	17.4	NR	NR	NR	35.7
Zinc Disuelto	mg/L				0.05	<0.01	0.10	0.01	0.05	<0.02	0.10	<0.01	NR	NR	NR	0.01
Zinc Total	mg/L	7.40		10.00	0.06	<0.01	0.12	<0.01	0.04	<0.01	0.06	0.04	NR	NR	NR	0.02
Cromo Hexavalente	mg/L			0.1	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
DBO	mg/L			200	NR	NR	NR	<10	NR	NR	NR	<10	NR	NR	NR	<10
Coliformes Fecales	NMP/100ml			<1x10 <sup>4</sup>	NR	NR	NR	2400	NR	NR	NR	3500	NR	NR	NR	540
Color Aparente	u Pt/Co			500	NR	NR	NR	215	NR	NR	NR	240	NR	NR	NR	44
Color Real	u Pt/Co				NR	NR	NR	32	NR	NR	NR	10	NR	NR	NR	5
Turbidez	NTU				NR	NR	NR	64.70	NR	NR	NR	45.9	NR	NR	NR	27.70

Dónde: u.e.: unidades exponenciales; mg/L: miligramos por litro; µS/cm: microsiemens por centímetro; °C: grados centígrados; NMP/100ml: número más probable en 100ml; u Pt/Co: unidades platino cobalto; NA: no analizado; NR = Cálculo No Realizado por falta de datos de línea base.

Cuadro 4.4. Resultados de la Calidad del Agua Superficial septiembre 2013, Proyecto Minero Escobal (2/4).

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E			
					Río El Dorado - Aguas Arriba				Río El Dorado - sobre camino vecinal				Río El Dorado - aguas abajo			
					Línea Base			sep-13	Línea Base			sep-13	Línea Base			sep-13
Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo	Promedio	Mínimo		Máximo							
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.58	7.17	8.17	7.73	7.40	6.56	7.94	7.59	NR	NR	NR	7.94
Temperatura campo	°C			+/- 7	19.8	17.0	24.0	19.8	21.0	17.2	24.0	24.5	NR	NR	NR	19.9
Conductividad de campo	uS/cm				219.7	80.0	374.5	135.2	308.9	120.0	612.0	645	NR	NR	NR	505.7
Oxígeno Disuelto campo	mg/L				3.76	0.05	6.76	4.16	4.25	0.11	7.49	4.13	NR	NR	NR	4.64
Alcalinidad Total	mg/L				83	38	118	46	80	45	102	76	NR	NR	NR	68
Cloruros	mg/L	250			2.72727	2	3	2	8.54545	4	16	7	NR	NR	NR	7
Fluoruros	mg/L	4.00			0.15	<0.1	0.20	0.10	0.15	0.10	0.20	0.30	NR	NR	NR	0.30
Fosfatos	mg/L				0.11545	0.06	0.37	0.03	0.36455	0.09	1.21	0.16	NR	NR	NR	0.09
Cianuro Total	mg/L	0.14		1.00	<0.003	<0.003	0.015	<0.003	<0.003	<0.003	0.014	<0.003	NR	NR	NR	<0.003
Amonio	mg/L				0.05	<0.05	0.21	<0.05	0.06	<0.05	0.15	0.13	NR	NR	NR	0.19
Nitratos/Nitritos como N	mg/L				0.59	<0.02	1.51	0.70	4.49	1.96	10.10	1.36	NR	NR	NR	1.55
Nitrogeno Kjeldahl (TKN)	mg/L				0.4	<0.1	0.6	0.5	0.6	0.1	1.3	0.8	NR	NR	NR	0.9
Sulfatos	mg/L	250			17	4	25	<1	27	10	57	177	NR	NR	NR	163
Fósforo Disuelto (Orto)	mg/L				0.04	0.02	0.12	0.05	0.12	0.03	0.39	0.08	NR	NR	NR	0.07
Fósforo Total	mg/L		2.00	10.00	0.05	0.02	0.14	0.04	0.17	0.04	0.39	0.06	NR	NR	NR	0.09
STD (TDS)	mg/L	500			184	140	220	154	233.636	150	350	416	NR	NR	NR	372
SST (TSS)	mg/L		50	100	74	5	340	18	115	<5	880	32	NR	NR	NR	74
ST (TS)	mg/L				232	140	500	160	378	260	1180	460	NR	NR	NR	510
Hidrocarburos totales (TPH)	mg/L				<0.1	<0.09	<0.2	<0.1	<0.1	<0.09	<0.1	<0.1	NR	NR	NR	<0.1
Grasas y Aceites	mg/L		10	10	<2.062	<2.04	<2.326	<2.02	<2.062	<2.02	<2.084	<2.02	NR	NR	NR	<2.02
DQO	mg/L		125.0		10.9	<10	40.0	20.0	16.8	<10	60.0	10.0	NR	NR	NR	30.0
Aluminio Disuelto	mg/L				0.06	<0.03	0.15	0.10	0.03	<0.03	0.10	0.13	NR	NR	NR	0.09
Aluminio Total	mg/L	0.20			3.25	<0.03	17.40	3.57	5.72	0.07	36.00	3.11	NR	NR	NR	6.54
Antimonio Disuelto	mg/L				<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0.0004	0.0011	0.0025	NR	NR	NR	0.0027
Antimonio Total	mg/L	0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.00117	0.0005	0.0037	0.0024	NR	NR	NR	0.0025
Arsénico Disuelto	mg/L				0.0080	0.0041	0.0139	0.0067	0.0054	0.0039	0.0072	0.0061	NR	NR	NR	0.0060
Arsénico Total	mg/L	0.0100		0.1000	0.0089	0.0060	0.0137	0.0084	0.0087	0.0043	0.0326	0.0084	NR	NR	NR	0.0113
Bario Disuelto	mg/L				0.0915	0.0510	0.1180	0.0520	0.1645	0.0800	0.2340	0.0940	NR	NR	NR	0.1130
Bario Total	mg/L	1.0000			0.1245	0.0980	0.2530	0.0840	0.2356	0.1440	0.5670	0.1150	NR	NR	NR	0.1710
Berilio Disuelto	mg/L				<0.002	<0.0002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01	NR	NR	NR	<0.01
Berilio Total	mg/L	0.004			<0.002	<0.0002	<0.01	<0.01	0.002	<0.002	0.003	<0.01	NR	NR	NR	<0.01
Boro Disuelto	mg/L				<0.01	<0.01	0.02	<0.01	0.00818	<0.01	0.02	<0.01	NR	NR	NR	<0.01
Boro Total	mg/L				<0.01	<0.01	0.02	<0.01	0.01227	<0.01	0.02	0.01	NR	NR	NR	0.01
Cadmio Disuelto	mg/L				0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001
Cadmio Total	mg/L	0.003		0.1	<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0005	<0.0001	NR	NR	NR	<0.0001
Calcio Disuelto	mg/L				27.8	11.7	39.9	13.7	37.4	18.5	61.7	79.1	NR	NR	NR	69.0
Calcio Total	mg/L				27.9	12.3	38.7	14.2	38.3	17.2	58.9	82.1	NR	NR	NR	70.5
Cobalto Disuelto	mg/L				0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	NR	NR	NR	<0.01
Cobalto Total	mg/L				0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	NR	NR	NR	<0.01
Cobre Disuelto	mg/L				0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cobre Total	mg/L	1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	NR	NR	NR	<0.01
Cromo Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cromo Total	mg/L	0.1		0.1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01	NR	NR	NR	<0.01
Hierro Disuelto	mg/L				0.03	<0.02	0.06	0.03	0.03	<0.02	0.15	0.07	NR	NR	NR	<0.02
Hierro Total	mg/L	0.30			1.90	0.06	10.20	1.48	3.78	0.09	26.50	1.63	NR	NR	NR	3.71
Magnesio Disuelto	mg/L				2.56	1.30	3.50	1.40	4.16	2.40	7.30	6.80	NR	NR	NR	6.10
Magnesio Total	mg/L				2.69	1.60	3.50	1.40	4.56	2.50	7.30	7.20	NR	NR	NR	6.40
Manganeso Disuelto	mg/L				0.074	0.010	0.381	0.021	0.116	0.011	0.260	0.114	NR	NR	NR	0.080
Manganeso Total	mg/L	0.050			0.147	0.025	0.403	0.068	0.284	0.101	1.230	0.179	NR	NR	NR	0.228
Mercurio Disuelto	mg/L				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NR	NR	NR	<0.0002
Mercurio Total	mg/L	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NR	NR	NR	<0.0002
Molibdeno Disuelto	mg/L				0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.02
Molibdeno Total	mg/L				0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.02
Níquel Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.020	<0.01	NR	NR	NR	<0.01
Níquel Total	mg/L	0.61		2.00	<0.01	<0.01	0.050	<0.01	0.010	<0.01	0.060	<0.01	NR	NR	NR	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	NR	NR	NR	<0.00005
Plata Total	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	<0.00005	NR	NR	NR	<0.00005
Plomo Disuelto	mg/L				<0.0001	<0.0001	0.000	<0.0001	<0.0001	<0.0001	0.00020	0.000	NR	NR	NR	<0.0001
Plomo Total	mg/L	0.015		0.400	0.0013	<0.0001	0.0072	0.0014	0.0030	<0.0001	0.0198	0.0016	NR	NR	NR	0.0031
Potasio Disuelto	mg/L				4.2	3.5	5.5	3.0	5.8	4.2	8.7	4.6	NR	NR	NR	4.9
Potasio Total	mg/L				4.5	3.6	7.0	3.3	6.5	4.4	11.7	4.9	NR	NR	NR	5.8
Selenio Disuelto	mg/L				<0.0001	<0.0001	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0002	NR	NR	NR	0.0002
Selenio Total	mg/L	0.170			<0.0001	<0.0001	0.00010	<0.0001	0.00020	<0.0001	0.00020	0.00020	NR	NR	NR	0.0002
Sodio Disuelto	mg/L				12.6	7.7	16.6	7.3	12.4	9.0	15.6	17.8	NR	NR	NR	16.0
Sodio Total	mg/L				12.2	7.5	15.4	7.4	12.1	8.6	15.2	18.0	NR	NR	NR	16.0
Zinc Disuelto	mg/L				0.07	<0.01	0.14	<0.01	0.06	0.05	0.14	<0.01	NR	NR	NR	0.01
Zinc Total	mg/L	7.40		10.00	0.17	<0.01	1.01	<0.01	0.06	0.01	0.17	<0.01	NR	NR	NR	0.01
Cromo Hexavalente	mg/L			0.1	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
DBO	mg/L			200	NR	NR	NR	<10	NR	NR	NR	<10	NR	NR	NR	<10
Coliformes Fecales	NMP/100ml			<1x10 <sup>4</sup>	NR	NR	NR	1600	NR	NR	NR	54000	NR	NR	NR	1600
Color Aparente	u Pt/Co			500	NR	NR	NR	217	NR	NR	NR	218	NR	NR	NR	11
Color Real	u Pt/Co				NR	NR	NR	43	NR	NR	NR	10	NR	NR	NR	<10
Turbidez	NTU				NR	NR	NR	49.10	NR	NR	NR	32.30	NR	NR	NR	121.00

Cuadro 4.4. Resultados de la Calidad del Agua Superficial septiembre 2013, Proyecto Minero Escobal (3/4).

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW5-E				SW6-E				SW7-E			
					Río Tapalapa - aguas arriba				Río Los Vados				Quebrada Onda			
					Línea Base			sep-13	Línea Base			sep-13	Línea Base			sep-13
Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo	Promedio	Mínimo		Máximo							
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.52	7.13	8.04	7.09	7.43	7.11	7.82	7.15	7.55	6.91	7.98	7.65
Temperatura campo	°C			+/- 7	17.4	14.5	21.5	14.1	19.4	12.2	27.3	17.4	18.7	15.0	21.3	19.7
Conductividad de campo	uS/cm				72.1	0.1	160.2	107.4	259.0	60.0	948.0	90.9	216.0	120.0	416.2	128.7
Oxígeno Disuelto campo	mg/L				3.99	0.03	8.01	5.74	4.03	0.02	8.31	5.13	3.93	0.06	7.54	4.50
Alcalinidad Total	mg/L				25	13	43	16	48	22	108	31	65.8	30.0	101.0	35
Cloruros	mg/L	250			1.8	1	3	2	43.9	3	230	3	3.7	3.0	5.0	2
Fluoruros	mg/L	4			<0.1	<0.1	<0.1	<0.1	0.11	<0.1	0.30	<0.1	0.10	<0.1	0.20	0.10
Fosfatos	mg/L				0.0435	<0.03	0.18	<0.03	0.0765	<0.03	0.27	0.03	0.1	0.1	0.2	0.09
Cianuro Total	mg/L	0.14		1.00	0.003	<0.003	0.014	<0.003	<0.003	<0.003	0.014	<0.003	<0.003	<0.003	0.015	<0.003
Amonio	mg/L				<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	<0.05
Nitratos/Nitritos como N	mg/L				0.13	0.03	0.42	0.41	0.30	<0.02	1.22	1.08	1.1	<0.1	3.5	1.90
Nitrogeno Kjeldahl (TKN)	mg/L				0.2	<0.1	0.4	0.4	0.2	0.1	0.5	0.6	0.4	<0.1	0.7	0.9
Sulfatos	mg/L	250.0			17	<10	47	<1	14	<10	23	<1	26	9	38	<1
Fósforo Disuelto (Orto)	mg/L				0.15	<0.01	0.06	0.03	0.03	<0.01	0.09	0.05	0.0	0.0	0.1	0.07
Fósforo Total	mg/L		2.00	10.00	0.02	<0.01	0.05	0.02	0.04	0.02	0.08	0.05	0.1	0.0	0.2	0.14
STD (TDS)	mg/L	500			84	60	110	84	187	90	540	132	174.0	140.0	240.0	240
SST (TSS)	mg/L		50	100	95	<5	32	7	21	<5	105	49	51.8	<5	330.0	264
ST (TS)	mg/L				97	70	130	130	221	120	550	100	259	150	610	180
Hidrocarburos totales (TPH)	mg/L				<0.09	<0.09	<0.1	<0.1	11.5438	<0.1	92	<0.1	<0.1	<0.09	<0.1	<0.1
Grasas y Aceites	mg/L		10	10	<2.062	<2.02	<2.084	<2.02	<2.062	<2.02	<2.084	<2.02	<2.062	<2.02	<2.084	<2.02
DQO	mg/L		125.0		6.5	<10	20.0	<10	<10	<10	30.0	20.0	10.0	<10	40.0	50.0
Aluminio Disuelto	mg/L				0.06	<0.03	0.14	0.04	0.03	<0.03	0.08	0.05	0.03	<0.03	0.13	0.04
Aluminio Total	mg/L	0.20			1.09	<0.03	3.69	2.84	1.89	<0.03	8.13	5.90	3.1	0.1	16.4	18.80
Antimonio Disuelto	mg/L				<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	0.0005
Antimonio Total	mg/L	0.006			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.000460	<0.0004	0.00070	0.0005
Arsénico Disuelto	mg/L				0.0014	0.0005	0.0024	0.0006	0.0032	0.0007	0.0076	0.0005	0.0038	0.0022	0.0054	0.0016
Arsénico Total	mg/L	0.010		0.100	0.0018	0.0013	0.0028	0.0020	0.0039	0.0025	0.0074	0.0025	0.0045	0.0030	0.0061	0.0074
Bario Disuelto	mg/L				0.0447	0.0230	0.0720	0.0310	0.0618	0.0270	0.1360	0.0340	0.0946	0.0520	0.1430	0.0630
Bario Total	mg/L	1			0.0556	0.0390	0.0690	0.0560	0.0806	0.0550	0.1360	0.0820	0.2142	0.0880	0.9900	0.2360
Berilio Disuelto	mg/L				<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01
Berilio Total	mg/L	0.004			0.002	<0.002	<0.01	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01
Boro Disuelto	mg/L				0.01	<0.01	0.01	<0.01	0.361	<0.01	1.82	0.01	<0.01	<0.01	0.010	<0.01
Boro Total	mg/L				0.01	<0.01	0.02	<0.01	0.3785	<0.01	1.93	0.01	0.0	<0.01	0.020	0.01
Cadmio Disuelto	mg/L				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total	mg/L	0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0001	<0.0001	<0.0001	0.0003	0.0003
Calcio Disuelto	mg/L				7.9	3.4	13.7	4.3	15.1	5.4	38.9	5.5	23.1	11.2	38.1	11.1
Calcio Total	mg/L				7.7	3.4	13.1	4.5	14.8	5.9	37.5	5.9	23.0	11.5	36.7	12.7
Cobalto Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.010	<0.01
Cobalto Total	mg/L				<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	<0.01
Cobre Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total	mg/L	1.3		3	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total	mg/L	0.1		0.1	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.020	<0.01
Hierro Disuelto	mg/L				0.06	0.03	0.09	0.02	0.10	<0.02	0.28	0.02	0.02	<0.02	0.07	<0.02
Hierro Total	mg/L	0.3			0.71	0.16	1.82	1.25	1.25	0.33	4.79	2.88	1.85	0.08	9.50	9.90
Magnesio Disuelto	mg/L				1.46	0.80	2.50	1.00	3.00	1.40	7.40	1.50	4.14	2.20	6.40	2.30
Magnesio Total	mg/L				1.46	0.90	2.50	1.00	3.09	1.80	7.50	1.60	4.30	2.60	6.50	3.10
Manganeso Disuelto	mg/L				0.025	0.006	0.047	0.011	0.114	<0.005	0.551	0.011	0.032	0.014	0.074	0.041
Manganeso Total	mg/L	0.05			0.041	0.014	0.062	0.042	0.148	0.040	0.543	0.099	0.098	0.019	0.342	0.375
Mercurio Disuelto	mg/L				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total	mg/L	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Molibdeno Total	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto	mg/L				<0.01	<0.01	0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Níquel Total	mg/L	0.61		2.00	0.013	<0.01	0.030	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.040	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	0.000
Plomo Disuelto	mg/L				<0.0001	<0.0001	0.000	<0.0001	0.000	<0.0001	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Plomo Total	mg/L	0.015		0.400	0.0003	<0.0001	0.0012	0.0009	0.0007	<0.0001	0.0028	0.0017	0.0	<0.0001	0.0083	0.0103
Potasio Disuelto	mg/L				3.0	2.5	3.7	2.3	4.1	3.2	7.1	3.0	4.1	3.6	5.4	3.8
Potasio Total	mg/L				3.0	2.2	4.1	2.5	4.2	3.1	7.5	3.3	4.5	3.6	7.0	6.6
Selenio Disuelto	mg/L				<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenio Total	mg/L	0.170			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00010	<0.0001	<0.0001	<0.0001	0.0002	0.00020
Sodio Disuelto	mg/L				6.3	3.7	10.8	3.8	32.2	6.0	135.0	5.5	11.7	8.7	15.4	7.1
Sodio Total	mg/L				6.0	3.4	9.4	3.7	31.1	5.3	124.0	5.4	11.5	8.3	15.5	7.0
Zinc Disuelto	mg/L				0.04	<0.01	0.10	<0.01	<0.1	<0.1	0.40	<0.01	0.13	<0.01	0.81	0.01
Zinc Total	mg/L	7.40		10.00	0.20	<0.01	1.60	<0.01	<0.1	<0.1	0.22	<0.01	0.34	<0.01	1.87	0.02
Cromo Hexavalente	mg/L			0.1	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
DBO	mg/L			200	NR	NR	NR	<10	NR	NR	NR	<10	NR	NR	NR	<10
Coliformes Fecales	NMP/100ml			<1x10 <sup>4</sup>	NR	NR	NR	5400	NR	NR	NR	540	NR	NR	NR	9200
Color Aparente	u Pt/Co			500	NR	NR	NR	138	NR	NR	NR	282	NR	NR	NR	944
Color Real	u Pt/Co				NR	NR	NR	40	NR	NR	NR	69	NR	NR	NR	28
Turbidez	NTU				NR	NR	NR	25.40	NR	NR	NR	49.80	NR	NR	NR	433.00

Dónde: u.e.: unidades exponenciales; mg/L: miligramos por litro; µS/cm: microsiemens por centímetro; °C: grados centígrados; NMP/100ml: número más probable en 100ml; u Pt/Co: unidades platino cobalto; NA: no analizado; NR = Cálculo No Realizado por falta de datos de línea base.

Cuadro 4.4. Resultados de la Calidad del Agua Superficial septiembre 2013, Proyecto Minero Escobal (4/4).

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW8-E				SW9-E			
					Aguas debajo de la unión Río San Rafael y El Dorado			sep-13	Río Tapalapa, aguas debajo de la unión Río San Rafael, Los Vados y Quebrada Honda			sep-13
					Línea Base				Promedio	Línea Base		
Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo				
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.49	7.00	9.83	7.09	7.86	7.54	10.67	7.43
Temperatura campo	°C			+/- 7	22.1	18.9	25.1	21.6	21.8	19.1	24.2	22.8
Conductividad de campo	uS/cm				363.7	186.8	807.6	745.9	267.4	121.8	518.0	215.2
Oxígeno Disuelto campo	mg/L				5.14	0.28	7.48	4.45	6.16	0.78	8.47	4.14
Alcalinidad Total	mg/L				79	50	110	54	70	45	90	38
Cloruros	mg/L	250			10	7	19	6	11.5	6	20	6
Fluoruros	mg/L	4			0.27	0.10	0.60	0.20	0.22	0.10	0.30	0.10
Fosfatos	mg/L				0.55	0.28	1.02	0.22	0.48667	0.22	1.3	0.22
Cianuro Total	mg/L	0.14		1.00	0.007	<0.003	0.014	<0.003	0.006	<0.003	0.013	<0.003
Amonio	mg/L				0.24	<0.05	0.58	0.25	0.13	<0.05	0.22	<0.05
Nitratos/Nitritos como N	mg/L				3.07	2.01	5.23	2.28	1.97	1.14	3.85	1.48
Nitrogeno Kjeldahl (TKN)	mg/L				0.7	<0.1	1.6	1.2	0.6	0.3	0.9	1.5
Sulfatos	mg/L	250.0			91	22	360	66	60	25	169	5
Fósforo Disuelto (Orto)	mg/L				0.18	0.08	0.33	0.10	0.18	0.09	0.49	0.08
Fósforo Total	mg/L		2.00	10.00	0.27	0.12	0.51	0.15	0.25	0.09	0.58	0.09
STD (TDS)	mg/L	500			312	160	750	244	255	160	440	202
SST (TSS)	mg/L		50	100	34	<5	102	45	73	<5	340	40
ST (TS)	mg/L				362	180	750	500	310	200	450	280
Hidrocarburos totales (TPH)	mg/L				<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	0.2	<0.1
Grasas y Aceites	mg/L		10	10	<2.04	<2.02	<2.062	<2.02	<2.02	<2.02	<5	<2.02
DQO	mg/L		125.0		20.0	<10	40.0	20.0	17.8	<10	35.0	10.0
Aluminio Disuelto	mg/L				0.03	<0.03	0.06	0.13	0.09	<0.03	0.22	0.23
Aluminio Total	mg/L	0.20			2.39	0.04	7.35	4.89	2.96	0.41	8.62	7.12
Antimonio Disuelto	mg/L				0.001	<0.0004	0.0033	0.0009	0.00058	<0.0004	0.0013	<0.0004
Antimonio Total	mg/L	0.006			0.0010	<0.0004	0.0027	0.001	0.00068	<0.0004	0.0012	0.0005
Arsénico Disuelto	mg/L				0.0043	0.0025	0.0064	0.0029	0.0040	0.0023	0.0057	0.0015
Arsénico Total	mg/L	0.010		0.100	0.0060	0.0041	0.0096	0.0070	0.0042	0.0020	0.0060	0.0041
Bario Disuelto	mg/L				0.1072	0.0740	0.1430	0.0960	0.0943	0.0560	0.1350	0.0760
Bario Total	mg/L	1			0.1355	0.1020	0.1850	0.1360	0.1208	0.0900	0.1540	0.1140
Berillio Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berillio Total	mg/L	0.004			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boro Disuelto	mg/L				0.02	<0.01	0.05	<0.01	0.0425	<0.01	0.09	0.01
Boro Total	mg/L				0.02	<0.01	0.06	<0.01	0.04083	<0.01	0.1	0.02
Cadmio Disuelto	mg/L				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total	mg/L	0.003		0.1	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0002	0.0001
Calcio Disuelto	mg/L				50.4	17.5	156.0	34.0	35.7	18.2	78.3	17.1
Calcio Total	mg/L				52.1	18.6	156.0	34.6	36.2	18.5	79.7	17.6
Cobalto Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Total	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total	mg/L	1.3		3	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Cromo Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total	mg/L	0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Hierro Disuelto	mg/L				0.06	0.02	0.11	0.06	0.09	<0.02	0.17	0.22
Hierro Total	mg/L	0.3			1.53	0.05	4.36	3.05	0.98	0.25	2.17	3.50
Magnesio Disuelto	mg/L				6.30	3.20	14.70	4.20	6.02	3.30	9.70	3.00
Magnesio Total	mg/L				6.55	3.30	14.80	4.30	6.18	3.40	10.10	3.10
Manganeso Disuelto	mg/L				0.095	0.009	0.118	0.103	0.057	0.023	0.148	0.052
Manganeso Total	mg/L	0.05			0.181	0.047	0.349	0.220	0.115	0.043	0.187	0.135
Mercurio Disuelto	mg/L				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total	mg/L	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Molibdeno Total	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Níquel Total	mg/L	0.61		2.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total	mg/L				<0.00005	<0.00005	0.000	0.000	<0.00005	<0.00005	0.00007	<0.00005
Plomo Disuelto	mg/L				0.0001	<0.0001	0.000	0.000	0.000	<0.0001	0.001	0.0007
Plomo Total	mg/L	0.015		0.400	0.0030	<0.0001	0.0089	0.0048	0.0022	0.0002	0.0080	0.0028
Potasio Disuelto	mg/L				6.5	5.8	7.4	5.8	6.0	4.5	8.1	4.5
Potasio Total	mg/L				6.8	6.4	7.8	6.4	6.1	4.8	8.5	5.0
Selenio Disuelto	mg/L				<0.0001	<0.0001	0.0002	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Selenio Total	mg/L	0.170			0.0001	<0.0001	0.00020	<0.0001	<0.0001	<0.0001	0.00010	<0.0001
Sodio Disuelto	mg/L				18.8	12.3	33.7	13.0	17.6	10.7	26.9	9.7
Sodio Total	mg/L				18.4	12.9	34.3	13.0	17.4	11.0	28.5	9.7
Zinc Disuelto	mg/L				<0.01	<0.01	0.03	0.02	<0.01	<0.01	0.03	0.02
Zinc Total	mg/L	7.40		10.00	0.02	<0.01	0.04	0.04	<0.01	<0.01	0.03	0.01
Cromo Hexavalente	mg/L			0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO	mg/L			200	15	15	25	<10	<10	<10	<10	<10
Coliformes Fecales	NMP/100ml			<1x10 <sup>4</sup>	2.E+06	2.E+04	5.E+06	2.E+04	9.E+04	1.E+02	2.E+05	2.E+05
Color Aparente	u Pt/Co			500	172	19	351	269	342	29	824	340
Color Real	u Pt/Co			500	20	22	36	21	43	10	60	68
Turbidez	NTU				14.15	6.09	22.20	66.10	25.72	4.93	46.50	84.70

Dónde: u.e.: unidades exponenciales; mg/L: miligramos por litro; µS/cm: microsiemens por centímetro; °C: grados centígrados; NMP/100ml: número más probable en 100ml; u Pt/Co: unidades platino cobalto. NA: no analizado; NR = Cálculo No Realizado por falta de datos de línea base.

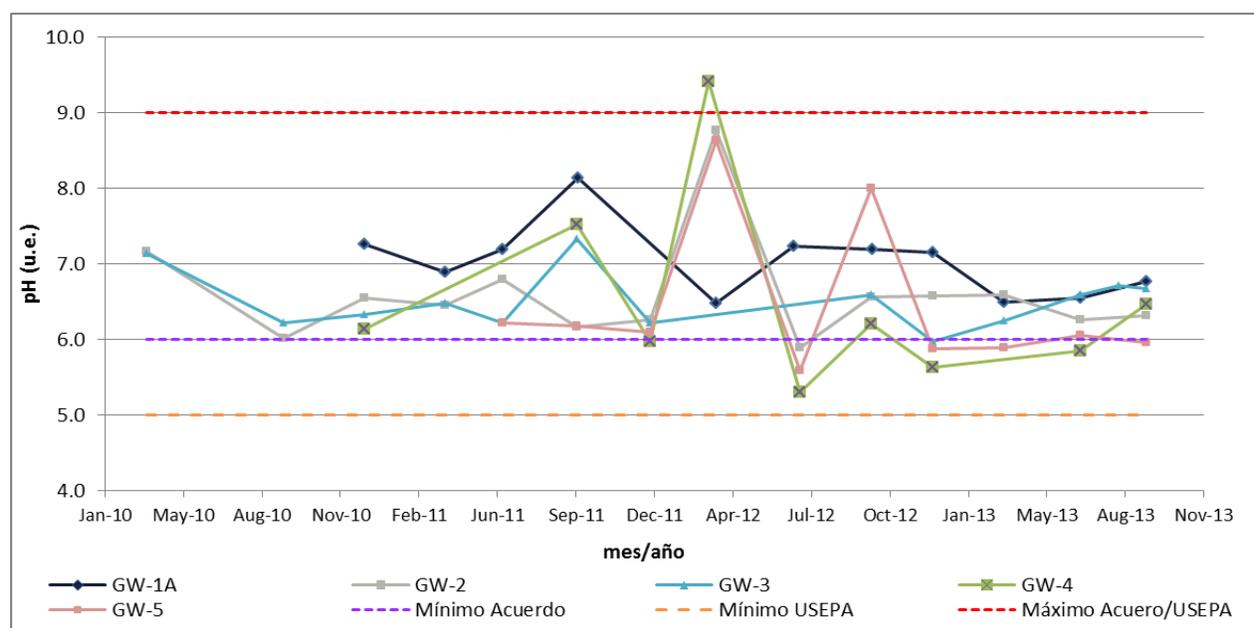
### 4.3.3. Agua Subterránea

#### 4.3.3.1. Manantiales

En general los parámetros analizados en las estaciones GW-1A, GW-2, GW-3, GW-4 y GW-5 cumplen con el Acuerdo 236-2006 y los valores en general se encuentran dentro del rango estadístico de la línea base. En el Cuadro 4-6, se presentan los resultados de la calidad del agua subterránea (manantiales) para el mes de septiembre 2013. Los resultados de laboratorio se presentan en el Anexo 11.5.2.

La temperatura de las estaciones muestreadas se encontró entre 19.9 y 23.4 °C. La lectura menor de pH se obtuvo en la estación GW-5 (5.96 u.e.) y la mayor en la estación GW-1A (6.76 u.e.), en la Gráfica 4-7 se observa los valores históricos de pH registrados en las estaciones de monitoreo, observándose que el nacimiento GW-5 ha registrado valores por debajo de pH 6 durante la temporada húmeda, lo cual se atribuye al agua de escorrentía depositada en el estanque formado por el manantial.

Gráfica 4-7. pH registrados en manantiales; marzo 2010 a septiembre 2013, Proyecto Minero Escobal.



Las concentraciones registradas de Cloruros y Fluoruros están por debajo de las guías de la USEPA (250 mg/L y 4 mg/L respectivamente).

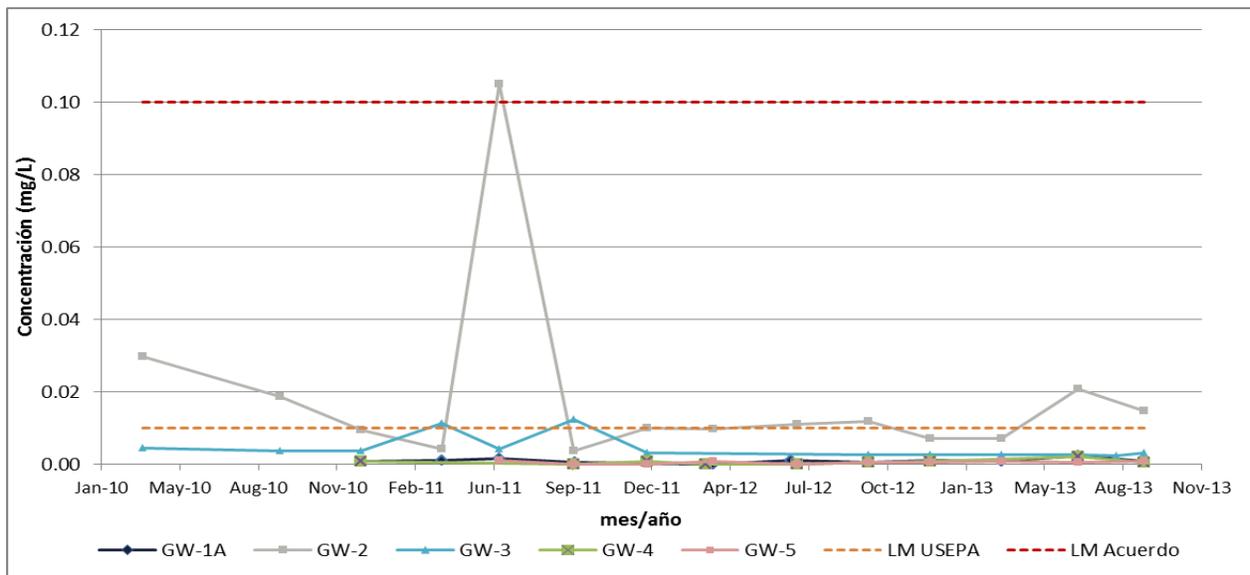
Los Sólidos Suspendidos Totales (TSS) se detectaron en las estaciones GW-1A, GW-2 y GW-5 en el rango de 5-17 mg/L; en GW-4 se registró una concentración de 389mg/L, lo cual es mayor al LMP dado por el acuerdo (100mg/L) pero es un comportamiento observado con anterioridad durante el levantamiento de línea base.

La concentración de sulfatos está por debajo de las guías de la USEPA (250mg/L) en todas las estaciones. Los sólidos disueltos totales (TDS) están por debajo de las directrices de la USEPA (500mg/L) en la mayoría de las estaciones a excepción de GW-3 (645mg/L) y GW-4 (508mg/L); se dará seguimiento a este parámetro en futuros muestreos para comprobar o descartar que dicho aumento se deba a las actividades realizadas dentro de la empresa. De corroborarse que el aumento se deba a las actividades generadas dentro del proyecto, se procederá a tomar las medidas necesarias para su corrección.

El Cianuro, Berilio, Boro, Cobalto, Cobre, Cromo, Cromo hexavalente, Mercurio, Molibdeno, Níquel y Plata no fueron detectados en ninguna de las estaciones; el Selenio fue detectado en todas las estaciones en concentraciones por debajo de la guía de la USEPA (0.17mg/L); el Antimonio fue detectado en las estaciones GW2 (0.0009 mg/L) y en GW3 (0.0006 mg/L) en concentraciones por debajo de la guía dada por la USEPA (0.01 mg/L).

En la Gráfica 4-8 se observa las concentraciones históricas de Arsénico registradas en las estaciones de monitoreo. En todas las estaciones la concentración de Arsénico se encuentra por debajo del valor máximos establecidos durante la elaboración de línea base; y en la mayoría de estaciones se encuentra en concentraciones por debajo la directriz dada por la USEPA (0.01 mg/L) a excepción de GW-2 que presentó una concentración de 0.0148mg/L, comportamiento observado durante el levantamiento de línea base donde se registraron concentraciones de hasta 0.0299 mg/L.

Gráfica 4-8. Concentración de Arsénico registrados en manantiales; marzo 2010 a septiembre 2013, Proyecto Minero Escobal

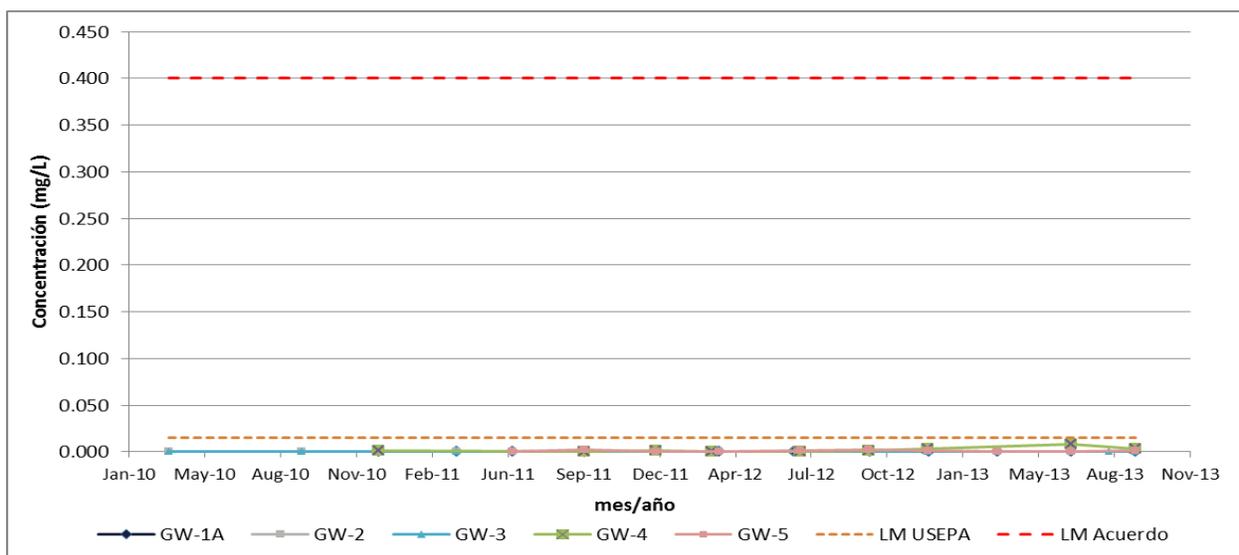


Donde mg/L : miligramo por litro.

Las concentraciones de Bario están por debajo de la guía de la USEPA (1 mg/L ) en todas las estaciones. El Cadmio se detectó únicamente en las estaciones GW-3 y GW-5 en concentraciones menores las directrices de la USEPA y Acuerdo (0.003 y 0.1 mg/l respectivamente).

En la se observa las concentraciones históricas de Plomo registradas en las estaciones de monitoreo. El Plomo se detectó en las estaciones GW-2, GW-4 y GW-5 en concentraciones por debajo de las guías de la USEPA (0.015 mg/L) y muy por debajo del LMP dado por el Acuerdo (0.4 mg/L).

Gráfica 4-9. Concentración de Plomo registrados en manantiales; marzo 2010 a septiembre 2013, Proyecto Minero Escobal

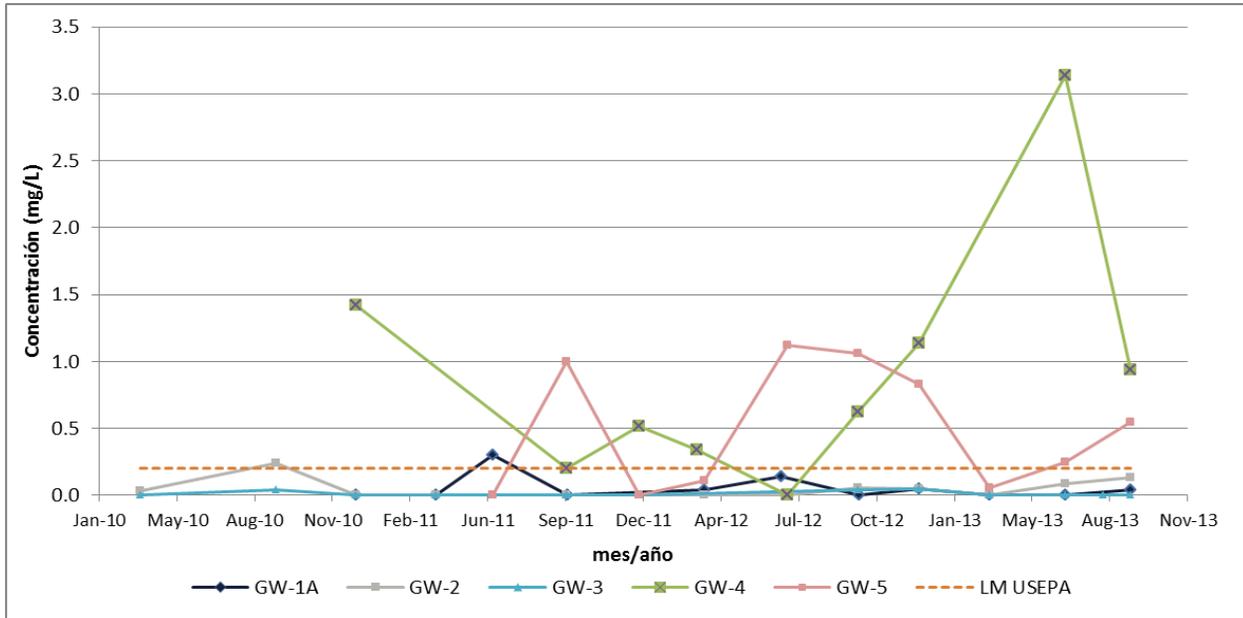


Donde mg/L : miligramo por litro.

En la

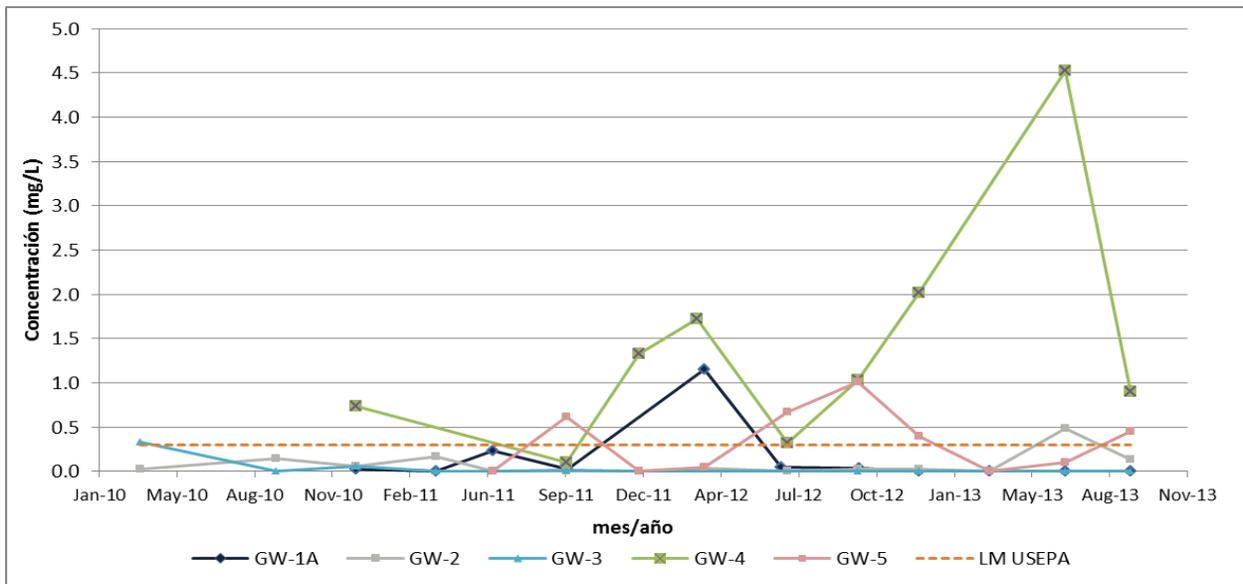
Gráfica 4-10 se presentan los datos históricos de Aluminio y en la Gráfica 4-11 se presentan los datos históricos de Hierro en las estaciones monitoreadas. En el mes de septiembre 2013, las estaciones GW-4 y GW-5 se detectaron concentraciones de Aluminio y Hierro mayores a las guías dadas por la USEPA (0.2 y 0.3 mg/L); este comportamiento ha sido observado durante los anteriores muestreos realizados en estas estaciones.

Gráfica 4-10. Concentración de Aluminio registrados en manantiales; marzo 2010 a septiembre 2013, Proyecto Minero Escobal



Donde mg/L : miligramo por litro.

Gráfica 4-11. Concentración de Hierro registrados en manantiales; marzo 2010 a septiembre 2013, Proyecto Minero Escobal



Donde mg/L : miligramo por litro.



Cuadro 4-6 Resultados de la Calidad de Agua Subterránea (manantiales) septiembre 2013, Proyecto Minero Escobal.

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	GW1-A				GW-2				GW-3				GW-4				GW-5			
					Nacimiento-Aldea El Volcancito				Nacimiento- Aldea El Fucio				Nacimiento - Zona central del Proyecto (frente portal Oeste)				Manantial - Aguas arriba de depósito de colas				Manantial - Aguas arriba de depósito de colas, debajo de GW-4			
					Línea Base				Línea Base				Línea Base				Línea Base				Línea Base			
					Promedio	Mínimo	Máximo	sep-13	Promedio	Mínimo	Máximo	sep-13	Promedio	Mínimo	Máximo	sep-13	Promedio	Mínimo	Máximo	sep-13	Promedio	Mínimo	Máximo	sep-13
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.08	6.89	7.26	6.76	6.54	6.01	7.16	6.31	6.54	6.21	7.13	6.67	6.13	6.13	6.13	6.46	NR	NR	NR	5.96
Temp de campo	°C			+/- 7	15.2	14.8	15.6	19.9	21.4	19.0	23.7	21.1	19.4	18.5	21.0	23.4	18.1	18.1	18.1	20.7	NR	NR	NR	20.2
Conductividad de campo	uS/cm				229.8	223.0	236.5	162.3	323.4	111.3	500.5	162.1	315.3	236.7	501.1	890.4	147.3	147.3	147.3	116.7	NR	NR	NR	139.4
Oxígeno Disuelto de campo	mg/L				0.10	0.03	0.17	4.41	1.18	0.13	2.35	1.87	0.68	0.03	1.26	3.12	0.14	0.14	0.14	5.59	NR	NR	NR	2.30
Alcalinidad Total	mg/L				31	31	31	29	83	35	153	47	83	71	97	126	35	35	35	31	NR	NR	NR	29
Cloruros	mg/L	250			15	14	16	8	4	2	7	2	5	3	6	8	4	4	4	7	NR	NR	NR	4
Fluoruros	mg/L	4			<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.2	0.15	0.1	0.2	0.4	<0.1	<0.1	<0.1	0.2	NR	NR	NR	<0.1
Fosfatos	mg/L				0.18	0.12	0.24	0.09	0.36	0.12	0.74	0.19	0.27	0.12	0.52	0.03	0.09	0.09	0.09	0.25	NR	NR	NR	0.06
Cianuro Total	mg/L	0.14		1.00	0.008	<0.003	0.014	<0.003	0.004	<0.003	0.012	<0.003	0.005	<0.003	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	NR	NR	NR	<0.003
Amonio	mg/L				<0.05	<0.05	0.1	<0.05	0.059	<0.05	0.160	<0.05	0.065	<0.05	0.140	<0.05	<0.05	<0.05	<0.05	<0.05	NR	NR	NR	0.09
Nitratos/Nitritos como N	mg/L				2.19	1.90	2.48	3.10	0.74	0.14	1.10	0.29	1.19	0.05	3.16	12.3	0.07	0.07	0.07	0.38	NR	NR	NR	1.08
Nitrogeno Kjeldahl (TKN)	mg/L				0.7	0.3	1.1	0.3	0.6	0.2	0.9	0.3	0.5	<0.05	1.2	0.3	0.3	0.3	0.3	1.7	NR	NR	NR	0.6
Sulfatos	mg/L	250.0			12.5	11.0	14.0	6.0	43.0	7.0	90.0	15.8	30.0	16.0	71.0	219	7.0	7.0	7.0	27.0	NR	NR	NR	30.5
Fósforo Total	mg/L		2.00	10.00	0.10	0.02	0.17	0.07	0.18	0.09	0.27	0.13	0.10	0.05	0.15	0.02	0.03	0.03	0.03	0.12	NR	NR	NR	0.03
STD (TDS)	mg/L	500.00			190	190	190	188	223	130	350	168	213	190	260	642	170	170	170	508	NR	NR	NR	308
SST (TSS)	mg/L		50	100	7	6	7	17	8	6	9	8	39	5	105	<5	206	206	206	389	NR	NR	NR	5
ST (TS)	mg/L				200	180	220	210	238	140	380	190	218	170	270	650	360	360	360	900	NR	NR	NR	340
Aluminio Disuelto	mg/L	0.200			<0.03	<0.03	<0.03	0.04	0.08	<0.03	0.24	0.13	<0.03	<0.03	0.04	<0.03	1.42	1.42	1.42	0.94	NR	NR	NR	0.55
Antimonio Disuelto	mg/L	0.01			<0.0004	<0.0004	<0.0004	<0.0004	0.0008	<0.0004	0.0011	0.0009	0.0004	<0.0004	0.0010	0.0006	<0.0004	<0.0004	<0.0004	<0.0004	NR	NR	NR	<0.0004
Arsénico Disuelto	mg/L	0.01		0.1	0.0010	0.0008	0.0011	0.0010	0.0156	0.0043	0.0299	0.0148	0.0059	0.0037	0.0115	0.0032	0.0008	0.0008	0.0008	0.0006	NR	NR	NR	0.0010
Bario Disuelto	mg/L	1			0.025	0.022	0.028	0.050	0.240	0.125	0.451	0.123	0.186	0.120	0.328	0.187	0.127	0.127	0.127	0.153	NR	NR	NR	0.166
Berilio Disuelto	mg/L	0.00400			<0.01	<0.002	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01	NR	NR	NR	<0.01
Boro Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cadmio Disuelto	mg/L	0.0030		0.1000	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	0.0002
Calcio Disuelto	mg/L				5.7	5.1	6.2	5.6	33.45	9.6	65.3	13	31.6	25.7	43.4	98.3	4.4	4.4	4.4	4.4	NR	NR	NR	4.4
Cobalto Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cobre Disuelto	mg/L	1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Cromo Disuelto	mg/L	0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Hierro Disuelto	mg/L	0.3			0.02	<0.02	0.03	<0.02	0.10	0.03	0.17	0.13	0.10	<0.02	0.33	<0.02	0.74	0.74	0.74	0.90	NR	NR	NR	0.45
Magnesio Disuelto	mg/L				3.1	2.9	3.3	2.4	5.9	1.8	12.0	2.4	4.9	3.3	8.3	17.7	2.6	2.6	2.6	2.6	NR	NR	NR	2.7
Manganeso Disuelto	mg/L	0.05			<0.005	<0.005	<0.005	<0.005	0.123	0.020	0.356	0.050	0.057	<0.005	0.133	0.627	0.069	0.069	0.069	0.082	NR	NR	NR	0.079
Mercurio Disuelto	mg/L	0.002		0.010	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NR	NR	NR	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.01
Níquel Disuelto	mg/L	0.61		2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	NR	NR	NR	<0.00005
Plomo Disuelto	mg/L	0.015		0.4	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0009	0.0009	0.0009	0.0035	NR	NR	NR	0.0015
Potasio Disuelto	mg/L				7.3	5.9	8.6	4.5	2.9	1.3	4.3	1.4	3.8	2.5	5.0	9.7	4.6	4.6	4.6	5.6	NR	NR	NR	4.9
Selenio Disuelto	mg/L	0.17			0.0002	<0.0001	0.0003	0.0003	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0008	<0.0001	<0.0001	<0.0001	0.0001	NR	NR	NR	0.0001
Sodio Disuelto	mg/L				17.6	16.9	18.2	8.1	13.5	7.2	22.0	7.5	11.5	9.3	16.4	28.7	10.3	10.3	10.3	9.8	NR	NR	NR	10.6
Zinc Disuelto	mg/L	7.4		10	<0.01	<0.01	<0.01	0.01	<0.1	<0.1	0.10	0.01	0.94	<0.1	3.47	0.01	0.10	0.10	0.10	<0.01	NR	NR	NR	0.02
turbidez	NTU				NR	NR	NR	37.5	NR	NR	NR	36.1	NR	NR	NR	6.24	NR	NR	NR	148	NR	NR	NR	73.95
Materia Flotante	visual			Ausente	NR	NR	NR	Ausente	NR	NR	NR	Ausente	NR	NR	NR	Ausente	NR	NR	NR	Ausente	NR	NR	NR	Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	144.0	NR	NR	NR	246.0	NR	NR	NR	<1	NR	NR	NR	1445.0	NR	NR	NR	528.0
Color Real	u Pt/Co				NR	NR	NR	48	NR	NR	NR	22	NR	NR	NR	<1	NR	NR	NR	421	NR	NR	NR	308
Cromo Hexavalente	mg/L			0.1	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
Coliformes Fecales	NMP/100mL			<1x10 <sup>4</sup>	NR	NR	NR	26	NR	NR	NR	1600.00	NR	NR	NR	<2	NR	NR	NR	23	NR	NR	NR	43

Dónde: u.e.: unidades exponenciales; mg/L: miligramos por litro; µS/cm: microsiemens por centímetro; °C: grados centígrados; NMP/100ml: número más probable en 100ml; u Pt/Co: unidades platino cobalto; NA: no analizado; NR = Cálculo No Realizado por falta de datos de línea base. Fuente ACZ Laboratories, Inc.

Cuadro 4-7 Resultados de la medición de calidad de agua subterránea (Pozos de Monitoreo, Producción y Artesanal), septiembre 2013, Proyecto Minero Escobal. (1/3)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					nivel estático: 31.8 m			sep-13	nivel estático: 29.9 m			sep-13	nivel estático: 31.6 m			sep-13	nivel estático: 14.5 m			sep-13
					Línea Base				Línea Base				Línea Base				Línea Base			
Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo						
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	6.53	6.37	6.77	6.62	6.43	6.34	6.49	6.49	6.31	6.23	6.41	6.53	6.17	6.04	6.34	6.45
Temp de campo	°C			+/- 7	24.4	23.4	25.1	25.1	24.1	23.7	24.5	24.4	23.3	22.2	24.4	24.4	23.4	23.0	24.6	24.5
Conductividad de campo	uS/cm				428	212	1001	153.4	803.9	741.6	829.1	536.1	916.9	872.1	944.8	683.5	469.7	401.4	494.1	890.1
Oxígeno Disuelto de campo	mg/L				0.75	0.30	1.21	3.95	0.65	0.11	1.44	4.12	0.97	0.48	1.93	3.98	0.82	0.19	1.77	3.02
Alcalinidad Total	mg/L				64	56	80	61	84	82	86	74	85	83	88	86	66	61	68	84
Cloruros	mg/L	250			12	3	28	4	16	16	17	13	20	19	21	19	9	8	9	25
Fluoruros	mg/L	4			0.4	0.2	0.7	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.2	0.1	0.2	0.2
Fosfatos	mg/L				0.23	0.21	0.27	0.53	0.32	0.27	0.37	0.22	0.25	0.24	0.27	0.16	0.20	0.15	0.24	0.06
Cianuro Total	mg/L	0.14		1.00	0.004	<0.003	0.011	<0.003	0.005	<0.003	0.014	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003
Amonio	mg/L				<0.05	<0.05	<0.05	1.52	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitratos/Nitritos como N	mg/L				2.48	2.04	2.93	0.23	2.20	2.08	2.26	2.6	2.13	1.98	2.32	2.39	3.32	3.00	3.57	3.59
Nitrogeno Kjeldahl (TKN)	mg/L				0.6	<0.1	1.1	3	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.3	0.2	<0.1	<0.1	0.3	<0.1
Sulfatos	mg/L	250.0			28.5	4.0	97.0	6.2	166.0	162.0	169.0	137	212.5	210.0	220.0	207	72.3	64.0	76.0	320
Fósforo Total	mg/L		2.00	10.00	0.24	0.06	0.44	0.42	0.09	0.08	0.10	0.08	0.07	0.06	0.08	0.06	0.06	0.05	0.07	0.04
STD (TDS)	mg/L	500.00			253	190	360	168	470	460	480	388	553	540	560	534	305	290	320	700
SST (TSS)	mg/L		50	100	346	137	584	1350	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	8
ST (TS)	mg/L				598	350	810	1120	488	450	510	420	555	520	580	550	325	280	350	730
Aluminio Disuelto	mg/L	0.200			0.04	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Antimonio Disuelto	mg/L	0.01			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0005	0.0004	<0.0004	0.0005	<0.0004
Arsénico Disuelto	mg/L	0.01		0.1	0.0011	0.0008	0.0014	0.001	0.0023	0.0021	0.0027	0.0023	0.0023	0.0021	0.0028	0.0023	0.0013	0.0010	0.0016	0.0007
Bario Disuelto	mg/L	1			0.030	0.024	0.039	0.044	0.036	0.032	0.041	0.033	0.042	0.038	0.047	0.041	0.162	0.157	0.166	0.096
Berillio Disuelto	mg/L	0.00400			<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01
Boro Disuelto	mg/L				0.01	<0.01	0.04	<0.01	0.06	0.05	0.07	0.04	0.08	0.06	0.09	0.07	0.02	<0.01	0.03	0.03
Cadmio Disuelto	mg/L	0.0030		0.1000	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcio Disuelto	mg/L				20.6	9.4	48.7	6.7	80.3	76.4	83.3	58.2	100.0	93.0	107.0	86.8	40.8	39.2	42.2	119
Cobalto Disuelto	mg/L				<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto	mg/L	1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Disuelto	mg/L	0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Hierro Disuelto	mg/L	0.3			<0.02	<0.02	0.02	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesio Disuelto	mg/L				3.5	2.4	6.1	2.4	10.3	10.1	10.7	7.3	11.3	10.9	11.6	9.4	7.3	6.8	7.6	17.3
Manganeso Disuelto	mg/L	0.05			0.108	0.030	0.308	0.348	<0.005	<0.005	0.008	<0.005	0.009	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	<0.005
Mercurio Disuelto	mg/L	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto	mg/L	0.61		2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plomo Disuelto	mg/L	0.015		0.4	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Potasio Disuelto	mg/L				2.2	1.9	2.4	2.9	4.2	3.9	4.6	3.4	4.7	4.5	5.2	4.3	6.0	5.5	6.5	7.5
Selenio Disuelto	mg/L	0.17			0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0003	0.0003	0.0004	0.0003	0.0004	0.0003
Sodio Disuelto	mg/L				22.0	17.4	33.6	14.1	29.5	28.2	30.9	24	32.3	30.4	35.8	28.5	16.9	15.6	19.1	24.3
Zinc Disuelto	mg/L	7.4		10	0.03	<0.01	0.11	0.02	0.05	<0.01	0.10	0.03	<0.01	<0.01	0.10	0.02	<0.01	<0.01	0.10	0.21
Turbidez	NTU				NR	NR	NR	396	NR	NR	NR	0.48	NR	NR	NR	0.36	NR	NR	NR	1.24
Color Aparente	u Pt/Co			500	NR	NR	NR	780	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1
Color Real	u Pt/Co				NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	NR
Cromo Hexavalente	mg/L			0.1	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
Coliformes fecales	NMP/100 ml			<1x10 <sup>4</sup>	NR	NR	NR	2E+06	NR	NR	NR	49	NR	NR	NR	23	NR	NR	NR	49

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Cuadro 4-6. Resultados de la medición de calidad de agua subterránea (Pozos de Monitoreo, Producción y Artesanal), septiembre 2013, Proyecto Minero Escobal. (2/3)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					nivel estático: 14.6 m			sep-13	nivel estático: 4.8 m			sep-13	nivel estático: ND			sep-13	nivel estático: 46.1m			sep-13
					Línea Base				Línea Base				Línea Base				Línea Base			
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	6.21	6.17	6.25	6.21	6.29	6.14	6.98	6.51	6.15	6.07	6.29	6.34	7.08	6.90	7.40	7.45
Temp de campo	°C			+/- 7	22.3	21.6	22.8	24.5	22.4	22.0	23.1	25.4	23.3	23.2	23.4	24.0	27.5	25.9	29.0	27.6
Conductividad de campo	uS/cm				538.2	342.9	752.6	983.2	299.6	285.9	323.8	910.3	426.8	424.6	428.1	711.9	1595.0	1569.0	1621.0	874.6
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	2.50	0.61	0.25	1.19	2.16	0.72	0.16	1.45	3.97	0.38	0.35	0.41	2.78
Alcalinidad Total	mg/L				65	62	68	106	48	41	60	83	68	66	70	78	147	136	157	141
Cloruros	mg/L	250			11	6	17	17	11	9	12	25	6	6	6	18	37	36	37	21
Fluoruros	mg/L	4			0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	2.6	2.5	2.6	1.2
Fosfatos	mg/L				0.17	0.15	0.21	0.12	0.11	0.09	0.18	0.06	0.23	0.21	0.24	0.12	<0.03	<0.03	<0.03	0.06
Cianuro Total	mg/L	0.14		1.00	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.007	<0.003	0.012	<0.003
Amonio	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitratos/Nitritos como N	mg/L				5.08	4.42	6.15	21.8	4.75	4.08	5.24	3.48	2.76	2.63	2.83	3.27	<0.02	<0.02	<0.02	<0.02
Nitrogeno Kjeldahl (TKN)	mg/L				<0.1	<0.1	0.2	<0.1	0.2	<0.1	0.4	0.3	0.1	<0.1	0.2	0.2	0.2	<0.1	0.4	0.2
Sulfatos	mg/L	250.0			85.3	33.0	153.0	271	19.3	17.0	23.0	327	54.7	54.0	55.0	233	440.0	440.0	440.0	233
Fósforo Total	mg/L		2.00	10.00	0.05	0.04	0.06	0.04	0.04	0.01	0.07	0.04	0.07	0.06	0.08	0.04	<0.01	<0.01	0.02	0.03
STD (TDS)	mg/L	500.00			340	260	440	710	233	220	250	696	277	270	290	524	905	890	920	530
SST (TSS)	mg/L		50	100	<5	<5	<5	<5	20	7	45	5	9	6	14	<5	27	25	29	15
ST (TS)	mg/L				345	240	450	760	260	230	280	730	300	290	310	570	940	910	970	600
Aluminio Disuelto	mg/L	0.200			<0.03	<0.03	0.05	<0.03	0.05	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Antimonio Disuelto	mg/L	0.01			0.0005	<0.0004	0.0012	0.0004	0.0006	0.0005	0.0008	<0.0004	0.0010	0.0009	0.0011	0.0008	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto	mg/L	0.01		0.1	0.0028	0.0024	0.0032	0.0027	0.0034	0.0029	0.0041	0.001	0.0021	0.0019	0.0024	0.0019	0.0030	0.0007	0.0052	0.0018
Bario Disuelto	mg/L	1			0.198	0.134	0.281	0.132	0.156	0.129	0.176	0.097	0.125	0.122	0.129	0.183	0.031	0.028	0.034	0.047
Berillio Disuelto	mg/L	0.00400			<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.01	<0.002	<0.01	<0.01
Boro Disuelto	mg/L				<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	0.01	0.02	0.09	0.08	0.10	0.05
Cadmio Disuelto	mg/L	0.0030		0.1000	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcio Disuelto	mg/L				52.5	35.1	71.9	141	16.7	13.9	19.6	126	34.6	32.5	36.3	88	185.5	170.0	201.0	98.5
Cobalto Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto	mg/L	1.3		3	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Disuelto	mg/L	0.1		0.1	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Hierro Disuelto	mg/L	0.3			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	5.52	1.53	9.51	7.37
Magnesio Disuelto	mg/L				7.5	4.9	10.5	16.2	4.8	4.6	5.0	18.2	6.4	6.3	6.7	15.3	35.8	34.4	37.2	17.8
Manganeso Disuelto	mg/L	0.05			<0.005	<0.005	0.006	<0.005	0.007	<0.005	0.012	<0.005	0.019	0.012	0.029	<0.005	0.203	0.149	0.257	0.38
Mercurio Disuelto	mg/L	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto	mg/L	0.61		2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0	<0.00005
Plomo Disuelto	mg/L	0.015		0.4	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Potasio Disuelto	mg/L				5.7	5.0	6.5	9.1	6.2	5.4	6.8	7.8	4.8	4.6	5.1	6.4	4.8	4.6	5.0	4.6
Selenio Disuelto	mg/L	0.17			0.0005	0.0004	0.0005	0.0014	0.0002	0.0001	0.0002	0.0004	0.0004	0.0003	0.0006	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Sodio Disuelto	mg/L				14.0	12.3	17.0	28.5	19.1	15.4	27.5	25.3	15.2	15.0	15.6	21.7	45.1	44.7	45.4	34.2
Zinc Disuelto	mg/L	7.4		10	0.03	<0.01	0.10	0.04	0.03	<0.01	0.10	0.04	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	0.01	0.02
Turbidez	NTU				NR	NR	NR	2.46	NR	NR	NR	1.84	NR	NR	NR	0.23	NR	NR	NR	6.3
Color Aparente	u Pt/Co			500	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	661
Color Real	u Pt/Co				NR	NR	NR	<1	NR	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR
Cromo Hexavalente	mg/L			0.1	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
Coliformes fecales	NMP/100 ml			<1x10 <sup>4</sup>	NR	NR	NR	4.5	NR	NR	NR	310	NR	NR	NR	<2	NR	NR	NR	<2

Cuadro 4-6 Resultados de la medición de calidad de agua subterránea (Pozos de Monitoreo, Producción y Artesanal), septiembre 2013, Proyecto Minero Escobal. (3/3)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-11			sep-13	PSA-SR			sep-13	HW-1			sep-13	RW-1			sep-13
					nivel estático: 61.9 m				nivel estático: ND				nivel estático: NA				nivel estático: 2.9 m			
					Línea Base				Línea Base				Línea Base				Línea Base			
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.05	7.05	7.05	7.06	7.45	7.45	7.45	7.63	NR	NR	NR	7.72	NR	NR	NR	6.58
Temp de campo	°C			+/- 7	30.4	30.4	30.4	30.4	27.8	27.8	27.8	26.0	NR	NR	NR	21.9	NR	NR	NR	23.2
Conductividad de campo	uS/cm				2000.0	2000.0	2000.0	993.0	663.9	663.9	663.9	1246.0	NR	NR	NR	752.4	NR	NR	NR	350.8
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	NA	0.05	0.05	0.05	0.87	NR	NR	NR	6.09	NR	NR	NR	5.53
Alcalinidad Total	mg/L				133	133	133	115	186	186	186	164	NR	NR	NR	106	NR	NR	NR	61
Cloruros	mg/L	250			68	68	68	68	32	32	32	4	NR	NR	NR	7	NR	NR	NR	11
Fluoruros	mg/L	4			2.7	2.7	2.7	2.8	0.7	0.7	0.7	0.8	NR	NR	NR	0.5	NR	NR	NR	0.2
Fosfatos	mg/L				0.03	0.03	0.03	0.03	0.06	0.06	0.06	<0.03	NR	NR	NR	0.06	NR	NR	NR	0.16
Cianuro Total	mg/L	0.14		1.00	<0.003	<0.003	<0.003	<0.003	0.003	0.003	0.003	<0.003	NR	NR	NR	<0.003	NR	NR	NR	<0.003
Amonio	mg/L				<0.05	<0.05	<0.05	<0.05	0.1	0.1	0.1	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
Nitratos/Nitritos como N	mg/L				0.19	0.19	0.19	<0.02	<0.02	<0.02	<0.02	<0.02	NR	NR	NR	3.42	NR	NR	NR	4.7
Nitrogeno Kjeldahl (TKN)	mg/L				<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.2	NR	NR	NR	0.1	NR	NR	NR	0.3
Sulfatos	mg/L	250.0			700.0	700.0	700.0	734	45.0	45.0	45.0	365	NR	NR	NR	213	NR	NR	NR	74
Fósforo Total	mg/L		2.00	10.00	0.06	0.06	0.06	0.01	0.02	0.02	0.02	<0.01	NR	NR	NR	0.02	NR	NR	NR	0.06
STD (TDS)	mg/L	500.00			1370	1370	1370	1290	320	320	320	692	NR	NR	NR	490	NR	NR	NR	260
SST (TSS)	mg/L		50	100	145	145	145	10	<5	<5	<5	<5	NR	NR	NR	<5	NR	NR	NR	15
ST (TS)	mg/L				1000	1000	1000	1340	300	300	300	ND	NR	NR	NR	510	NR	NR	NR	300
Aluminio Disuelto	mg/L	0.200			<0.03	<0.03	<0.03	<0.03	0.06	0.06	0.06	<0.03	NR	NR	NR	0.04	NR	NR	NR	<0.03
Antimonio Disuelto	mg/L	0.01			0.0010	0.0010	0.0010	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	NR	NR	NR	<0.0004	NR	NR	NR	<0.0004
Arsénico Disuelto	mg/L	0.01		0.1	0.0022	0.0022	0.0022	0.0028	0.0136	0.0136	0.0136	0.0117	NR	NR	NR	0.0060	NR	NR	NR	0.0013
Bario Disuelto	mg/L	1			0.033	0.033	0.033	0.037	0.125	0.125	0.125	0.118	NR	NR	NR	0.149	NR	NR	NR	0.14
Berilio Disuelto	mg/L	0.00400			<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01	NR	NR	NR	<0.01
Boro Disuelto	mg/L				0.18	0.18	0.18	0.19	0.07	0.07	0.07	0.11	NR	NR	NR	0.06	NR	NR	NR	<0.01
Cadmio Disuelto	mg/L	0.0030		0.1000	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001	NR	NR	NR	<0.0001
Calcio Disuelto	mg/L				271.0	271.0	271.0	250	47.5	47.5	47.5	116	NR	NR	NR	76.6	NR	NR	NR	36
Cobalto Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01	NR	NR	NR	<0.01
Cobre Disuelto	mg/L	1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01	NR	NR	NR	<0.01
Cromo Disuelto	mg/L	0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01	NR	NR	NR	<0.01
Hierro Disuelto	mg/L	0.3			0.21	0.21	0.21	2.73	0.05	0.05	0.05	0.03	NR	NR	NR	0.09	NR	NR	NR	<0.02
Magnesio Disuelto	mg/L				41.3	41.3	41.3	38.5	4.1	4.1	4.1	8.1	NR	NR	NR	6.6	NR	NR	NR	6.5
Manganeso Disuelto	mg/L	0.05			0.044	0.044	0.044	0.041	0.030	0.030	0.030	0.043	NR	NR	NR	0.021	NR	NR	NR	0.012
Mercurio Disuelto	mg/L	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NR	NR	NR	<0.0002	NR	NR	NR	<0.0002
Molibdeno Disuelto	mg/L				0.01	0.0	0.0	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.02	NR	NR	NR	<0.02
Níquel Disuelto	mg/L	0.61		2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	NR	NR	<0.01	NR	NR	NR	<0.01
Plata Disuelta	mg/L				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	NR	NR	NR	<0.00005	NR	NR	NR	<0.00005
Plomo Disuelto	mg/L	0.015		0.4	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	0.0002	NR	NR	NR	<0.0001
Potasio Disuelto	mg/L				5.0	5.0	5.0	4.7	2.5	2.5	2.5	2.7	NR	NR	NR	4.5	NR	NR	NR	9.2
Selenio Disuelto	mg/L	0.17			0.0006	0.0006	0.0006	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001	NR	NR	NR	<0.0001
Sodio Disuelto	mg/L				77.4	77.4	77.4	75.9	55.2	55.2	55.2	87.9	NR	NR	NR	53.8	NR	NR	NR	15.5
Zinc Disuelto	mg/L	7.4		10	0.04	0.04	0.04	<0.01	0.12	0.12	0.12	<0.01	NR	NR	NR	0.01	NR	NR	NR	0.03
Turbidez	NTU				NR	NR	NR	3.74	NR	NR	NR	0.31	NR	NR	NR	2.93	NR	NR	NR	18.4
Color Aparente	u Pt/Co				NR	NR	NR	257	NR	NR	NR	<1	NR	NR	NR	7	NR	NR	NR	81
Color Real	u Pt/Co			500	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1
Cromo Hexavalente	mg/L			0.1	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
Coliformes fecales	NMP/100 ml			<1x10 <sup>4</sup>	NR	NR	NR	<2	NR	NR	NR	<2	NR	NR	NR	<2	NR	NR	NR	49

Dónde: u.e.: unidades exponenciales; mg/L: miligramos por litro; µS/cm: microsiemens por centímetro; °C: grados centígrados; NMP/100ml: número más probable en 100ml; u Pt/Co: unidades platino cobalto.; NA: no aplica; NR = Cálculo No Realizado por falta de datos de línea base; ND = no determinado.. Fuente ACZ Laboratories Inc

La mayoría de pozos monitoreados cumplen con los límites máximos permisibles dados en el Acuerdo 236-2006 para entes generadores nuevos y los valores en general se encuentran dentro del rango estadístico de la línea base. En el Cuadro 4-7 se presentan los resultados de la calidad del agua subterránea (Pozos de Monitoreo, Producción y Artesanal) correspondientes al mes de septiembre 2013. Los resultados de laboratorio se presentan en el Anexo 11.5.2

Los valores de pH estuvieron en el rango de 6.21 a 7.72 u.e. y la temperatura en el rango de 21.9 a 30.4 °C.

Las concentraciones registradas de Cloruros y Fluoruros están por debajo de las directrices de la USEPA (250 mg/L y 4 mg/L respectivamente).

En los pozos MW2, MW3 y MW9 los valores registrados de sulfatos se encuentran dentro de los límites establecidos durante el levantamiento de línea base; para los pozos MW4, MW8 los valores registrados fueron mayores al máximo de línea base pero menores la guía establecida por la USEPA (250 mg/L); la estación HW1 y el pozo RW1 no cuentan con línea base y los valores registrados son menores a las directrices de la USEPA (250 mg/L); en los pozos MW5, MW6, MW7, MW11 y PSASR se observó un aumento en los valores registrados, los cuales se encuentran en el rango de 271 a 734 mg/L.

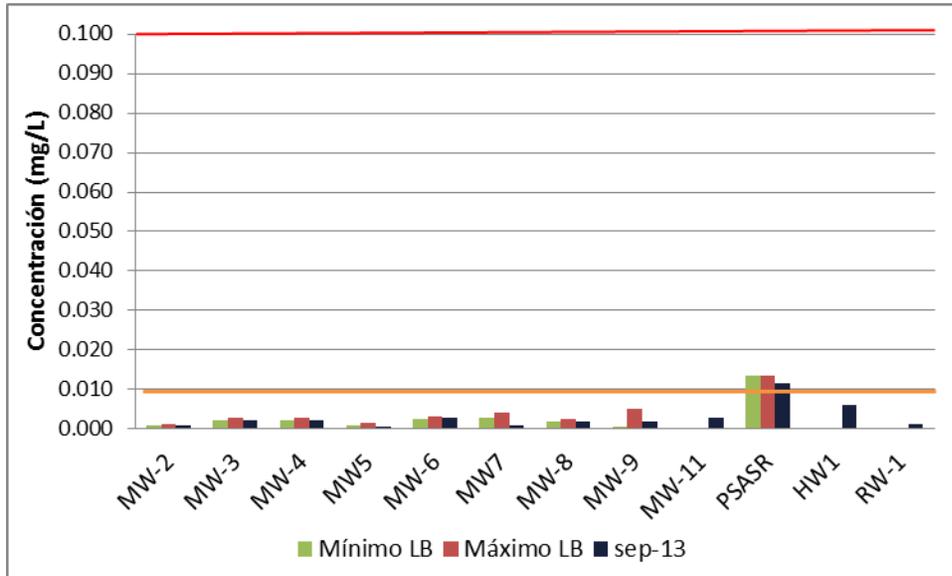
Se reportaron valores de Sólidos Suspendidos Totales (SST) en los pozos, MW5, MW7, MW9, MW11 y RW1, los cuales se encuentran debajo del límites establecidos por el Banco Mundial y el Acuerdo 236-2006 (50 y 100 mg/L respectivamente) y dentro de los rangos establecidos en la línea base.

El Cianuro, Aluminio, Berilio, Cadmio, Cobre, Cromo, Cromo Hexavalente, Mercurio, Níquel, Plata y Plomo no fueron detectados en ninguno de los pozos monitoreados.

El Antimonio se detectó en los pozos MW4, MW6, MW8, en concentraciones por debajo de la guía establecida por la USEPA (0.01 mg/L). El Bario fue detectado en todas las estaciones en concentraciones menores a la guía de la USEPA (1 mg/L).

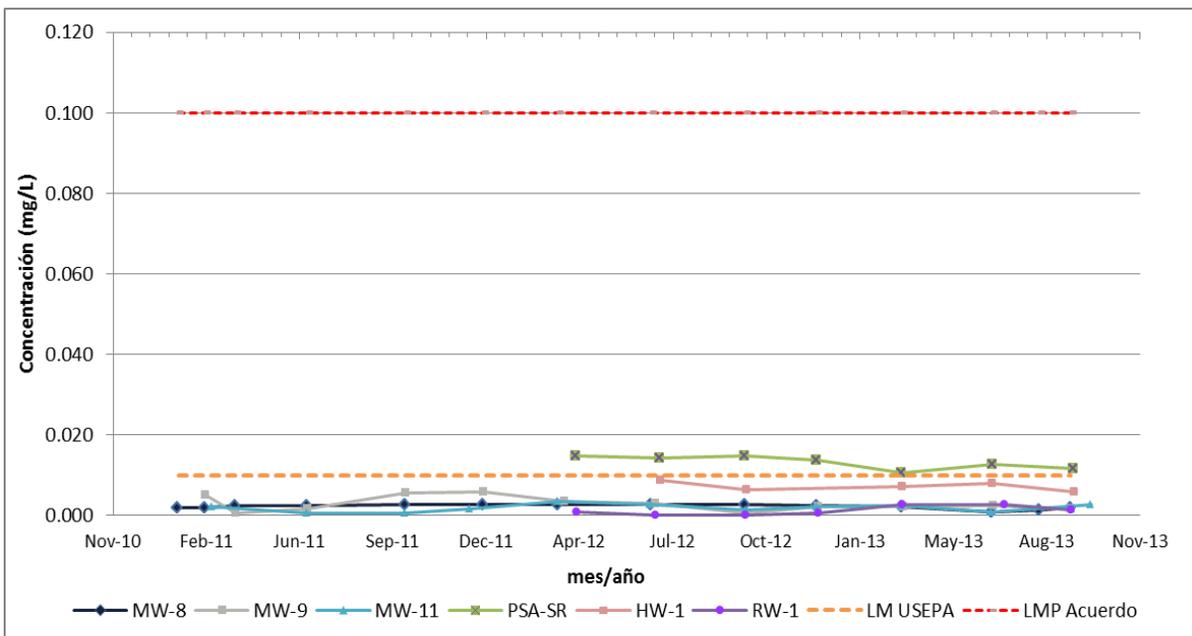
Como se observa en la Gráfica 4-12 el Arsénico fue detectado en todas las estaciones en concentraciones dentro de los mínimos y máximos establecidos en la línea base y la mayoría por debajo de la guía establecida por la USEPA (0.01mg/L). En la Gráfica 4-13 se observa las concentraciones históricas de las estaciones que no cuentan con línea base o con períodos muy corto para la construcción de la misma; en el pozo PSASR se obtuvo una concentración de 0.0117 mg/L, comportamiento observado con anterioridad, pero el agua que llega a las casas del poblado San Rafael las Flores (estación HW-1) la concentración se reduce a 0.0006 mg/L.

Gráfica 4-12. Concentración de Arsénico disuelto registrados en pozos de monitoreo y pozos de producción septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L: miligramos por litro; **naranja**: guía de la USEPA para resguardar la salud humana; **Rojo**: Límite máximo establecido por Acuerdo 236-2006.

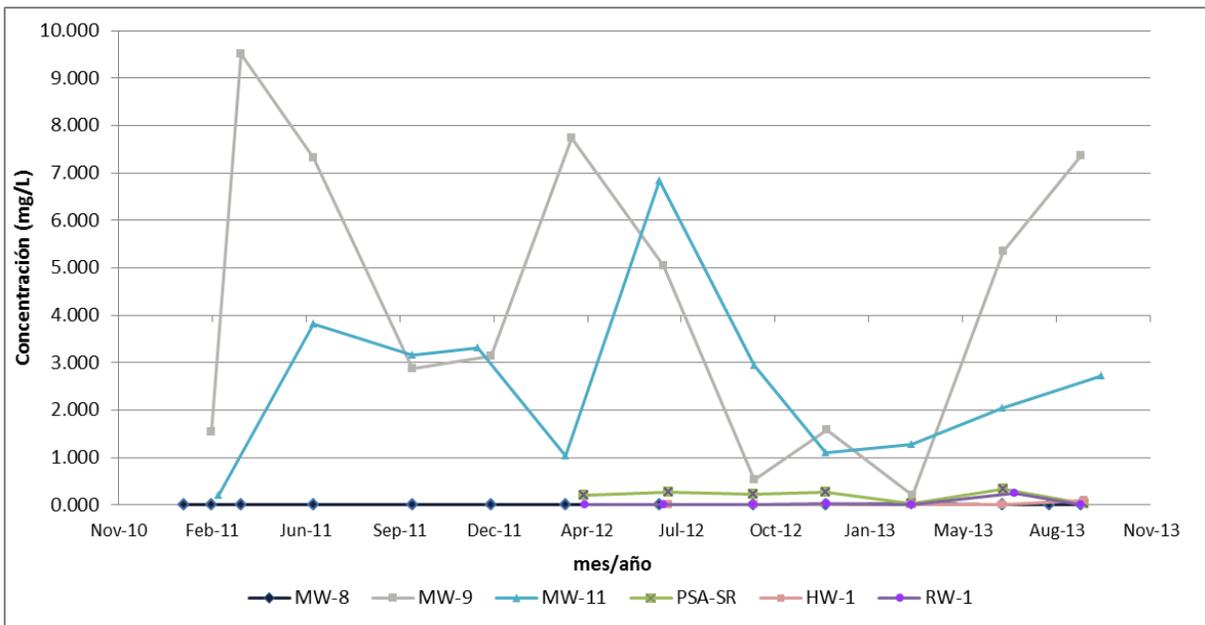
Gráfica 4-13. Concentración de Arsénico disuelto registrados en estaciones MW8, MW9, MW11, PSASR, RW1 y HW1, enero 2011 a septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L: miligramos por litro

El Hierro no fue detectado en la mayoría de los pozos; a excepción de los pozos MW2 (0.07mg/L) y PSASR (0.03mg/L) donde se detectaron concentraciones que están dentro de los límites máximos y mínimos establecidos en la línea base y menor a la guía dada por la USEPA (0.3 mg/L); en el pozo MW9 se obtuvo una concentración de 7.37mg/L y en MW11 se obtuvo una concentración de 2.73 mg/L, como se puede observar en la Gráfica 4-13 estos valores han sido observados con anterioridad en dichos pozos. Durante el trimestre anterior en el pozo PSASR se registraron valores de hierro de 0.34mg/l, durante este trimestre se registró un valor de 0.03mg/L el cual se encuentra dentro de los límites establecidos de línea base, por lo tanto se descartar que dicho aumento se debiera a las actividades realizadas dentro de la empresa.

Gráfica 4-14. Concentración de Hierro disuelto registrados en estaciones MW8, MW9, MW11, PSASR, RW1 y HW1, enero 2011 a septiembre 2013, Proyecto Minero Escobal

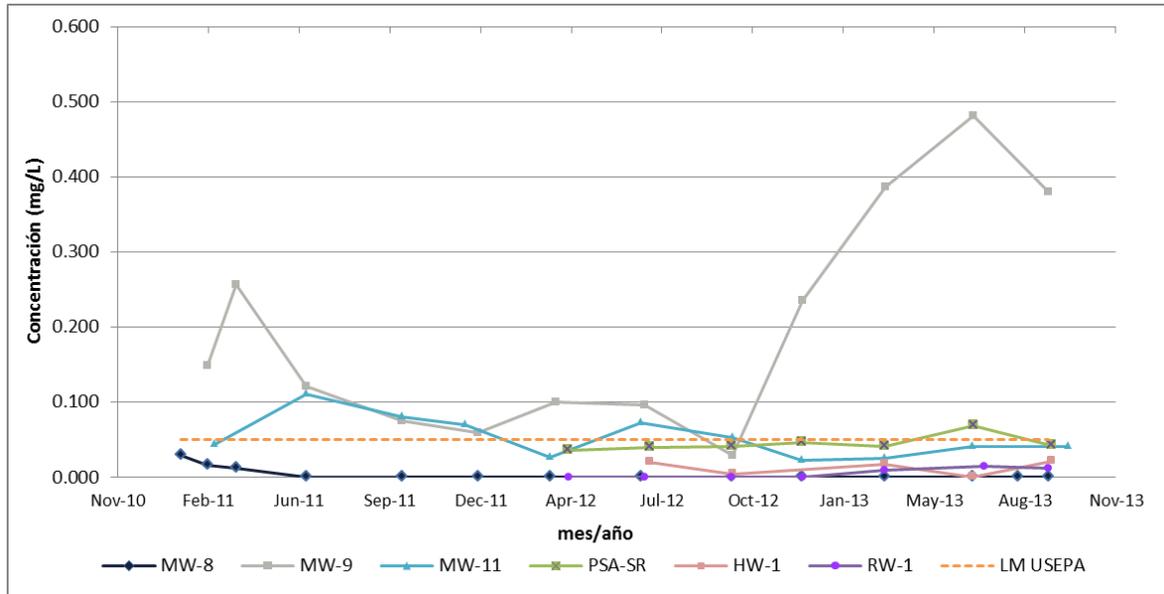


Dónde: mg/L: miligramos por litro.

El manganeso no fue detectado en la mayoría de los pozos; a excepción de los pozos MW11 (0.041mg/L), PSASR (0.043mg/L), RW1 (0.012mg/L) y la estación HW1 (0.021mg/L) en concentraciones menores a la directriz de la USEPA (0.05 mg/L). En la Gráfica 4-15 se observa que el pozo MW9 se obtuvo una concentración de 0.38 mg/L; se dará seguimiento a este parámetro en futuros muestreos, ya que debido al cambio en la bomba utilizada para la toma de muestra en pozos, se cree que los valores altos de manganeso registrados desde marzo 2013 son

consecuencia de un inadecuado purgado al tomar la muestra, basado en el volumen de columna de agua; como medida preventiva se analizará si el método de purgado en dicho pozo es el adecuado.

Gráfica 4-15. Concentración de Manganeso disuelto registrados en estaciones MW8, MW9, MW11, PSASR, RW1 y HW1, enero 2011 a septiembre 2013, Proyecto Minero Escobal



Dónde: mg/L: miligramos por litro.

En el pozo MW2 se detectaron valores de 0.348 mg/L de manganeso, de 1350 mg/L de SST, 780 unidades Pt/Co de color real y  $2 \times 10^6$  NMP/100ml de coliformes fecales; los cuales no cumplen con los límites del Banco Mundial y el Acuerdo 236-2006 (100 mg/L, 500 u Pt/Co y  $1 \times 10^4$  NMP/100ml respectivamente). El aumento en estos parámetros en el pozo MW2 es atribuido a fuentes externas al proyecto; ya que como se observa en la Fotografía 4-5 y Fotografía 4-6 el agua captada del pozo, durante y después de la purga, contenía restos de plumas de ave, gusanos y presentaba un fuerte olor a animal en descomposición; el cual pudo ser introducido en la tubería del pozo debido a que esta no contaba con protección adecuado. Como medida preventiva se instalaran cajas metálicas con candado en los pozos de monitoreo que impida el acceso de personal no autorizado. Se dará seguimiento a este parámetro en futuros muestreos para comprobar o descartar la contribución de SST.





Fotografía 4-5 agua captada en pozo MW2, septiembre 2013.



Fotografía 4-6 muestreo en MW2, septiembre 2013.



## 5. Sedimentos

### 5.1. Sitios de Monitoreo

En el Cuadro 5-1 se enlistan las estaciones de monitoreo de sedimentos de las quebradas y ríos ubicados dentro o cercanas al AI del Proyecto. Su ubicación se presenta en la Figura 5-1

Cuadro 5-1. Sitios de Monitoreo de Sedimento cercanos y dentro del AI del Proyecto.

ESTACIÓN	SISTEMA DE COORDENADAS PROYECTADAS UTM, NAD27 ZONA 15		SITIO
SED1	807053	1601682	Quebrada El Escobal, aguas arriba del proyecto.
SED2	805811	1601164	Quebrada El Escobal, en medio del proyecto.
SED2A	805295	1601230	Quebrada El Escobal, Salida de la Propiedad
SED3	805337	1602453	Río El Dorado, aguas arriba
SED4	804781	1601228	Río El Dorado, aguas abajo
SED4A	804629	1601052	Río El Dorado, por puente de acceso al Proyecto (Suandys)
SED5	810882	1603313	Río Tapalapa, aguas arriba
SED6	808391	1597689	Río Los Vados, aguas abajo
SED7	806989	1600618	Quebrada La Honda.
SED8	804054	1600834	Unión Río San Rafael y El Dorado
SED9	803772	1597635	Río Tapalapa, aguas abajo (cercano a la Ceibita)

Nota: en ninguna de las estaciones monitoreadas se cuenta con línea base de metales en sedimentos.

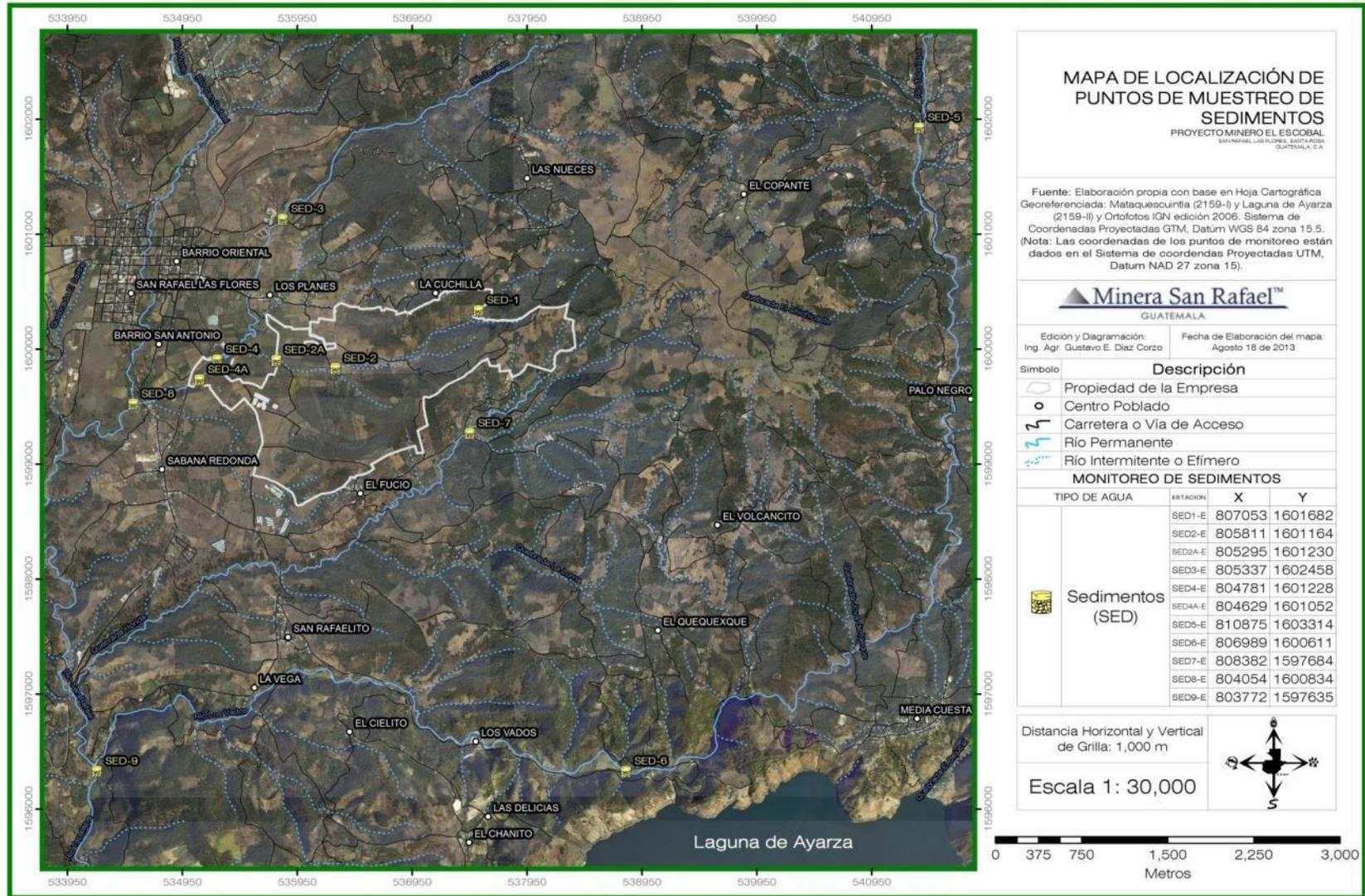


Figura 5-1 Mapa de localización de las estaciones de monitoreo de sedimentos

## 5.2. Metodología

En el Cuadro 5-2 se describe los parámetros analizados en las muestras de sedimento.

Cuadro 5-2. Parámetros analizados en sedimentos, Proyecto Minero Escobal.

PARÁMETROS ANALIZADOS	
Laboratorio	Metales Totales, Cianuro Total, Fósforo Total..

Laboratorio empleado y valores de referencia: Las muestras fueron analizadas en el laboratorio ACZ, 2773 Downhill Drive Steamboat Springs, Colorado USA, el cual se encuentra acreditado y avalado por la USEPA

## 5.3. Resultados

En el Cuadro 5-3 se presenta los resultados de metales registrados para el mes de septiembre 2013. Los resultados del laboratorio se presentan en el Anexo 12.5

El porcentaje de fósforo total se encuentra en el rango de 0.008% (SED-5 y SED-8) a 0.025% (SED-1). No se detectó cianuro en ninguna de las estaciones muestreadas,

El mercurio solo se detectó en SED-1 (0.26 mg/kg) y en SED-4 (0.06 mg/kg) en concentraciones por debajo del Límite Máximo Permisibles (25 mg/kg) para la disposición de lodos en el suelo establecidos por el Acuerdo 236-2006. Las concentraciones de Cadmio, Cromo y Plomo registradas están muy por debajo de los Límites Máximos Permisibles. Todas las estaciones muestreadas registraron concentraciones de Arsénico menor al Límite Máximo Permisible (50 mg/Kg).

No se cuenta con línea base de las concentraciones de metales en sedimento. En la Gráfica 5-1 se presentan los resultados históricos de arsénico, en la Gráfica 5-2 los de cadmio, en la Gráfica 5-3 los resultados de cromo y en Gráfica 5-4 los resultados de plomo en las estaciones SED1-E, SED2A-E, SED3-E, SED4A-ESED8-E y SED9-E; en las cuales se pudo observar que los resultados reportados han sido muy fluctuantes y no presentan una tendencia positiva que pudiera indicar alguna influencia por la actividad minera en las estaciones ubicadas aguas debajo de la mina.

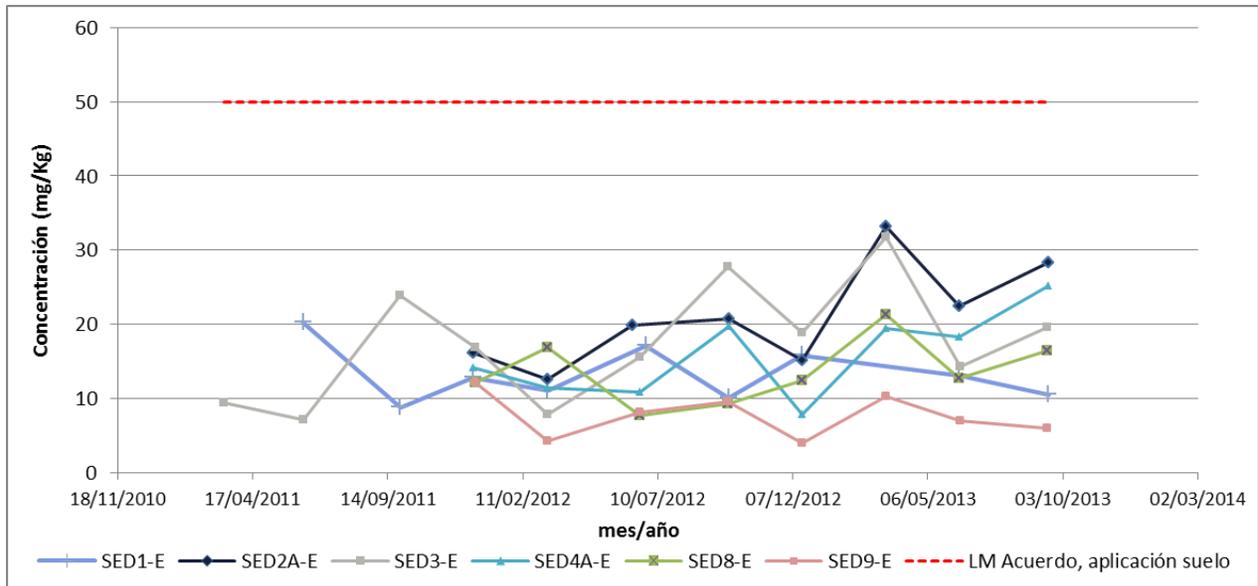
Cuadro 5-3. Resultados de sedimentos, septiembre 2013, Proyecto Minero Escobal.

Parámetro	Unidades	Acuerdo 236-2006	SED-1	SED-2	SED-2A	SED-3	SED-4	SED-4A
		Aplicación al suelo	sep-13	sep-13	sep-13	sep-13	sep-13	sep-13
Arsenico Total	mg/Kg**	50	10.5	35.4	28.3	19.6	17.9	25.2
Cadmio Total	mg/Kg**	50	0.26	0.71	1.15	0.18	0.37	0.48
Cromo Total	mg/Kg**	1500	2.7	4.2	4.6	3.4	4.3	5.6
Plomo Total	mg/Kg**	500	10.60	44.5	34.4	6.42	13	13.2
Mercurio Total	mg/Kg**	25	0.26	<0.05	<0.05	<0.05	0.06	<0.06
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.1	<0.1	<0.2	<0.1
Fósforo Total	%		0.025	0.017	0.018	0.015	0.014	0.019

Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7	SED-8	SED-9
		Aplicación al suelo	sep-13	sep-13	sep-13	sep-13	sep-13
Arsenico Total	mg/Kg**	50	17.8	6.3	4.3	16.5	6.0
Cadmio Total	mg/Kg**	50	0.15	0.14	0.20	0.24	0.22
Cromo Total	mg/Kg**	1500	0.6	7.8	1.7	3.4	3.5
Plomo Total	mg/Kg**	500	8.61	9.48	13.9	9.28	6.41
Mercurio Total	mg/Kg**	25	<0.05	<0.05	<0.05	<0.04	<0.05
Cianuro Total	mg/Kg**		<0.1	<0.2	<0.1	<0.1	<0.1
Fósforo Total	%		0.008	0.014	0.013	0.008	0.020

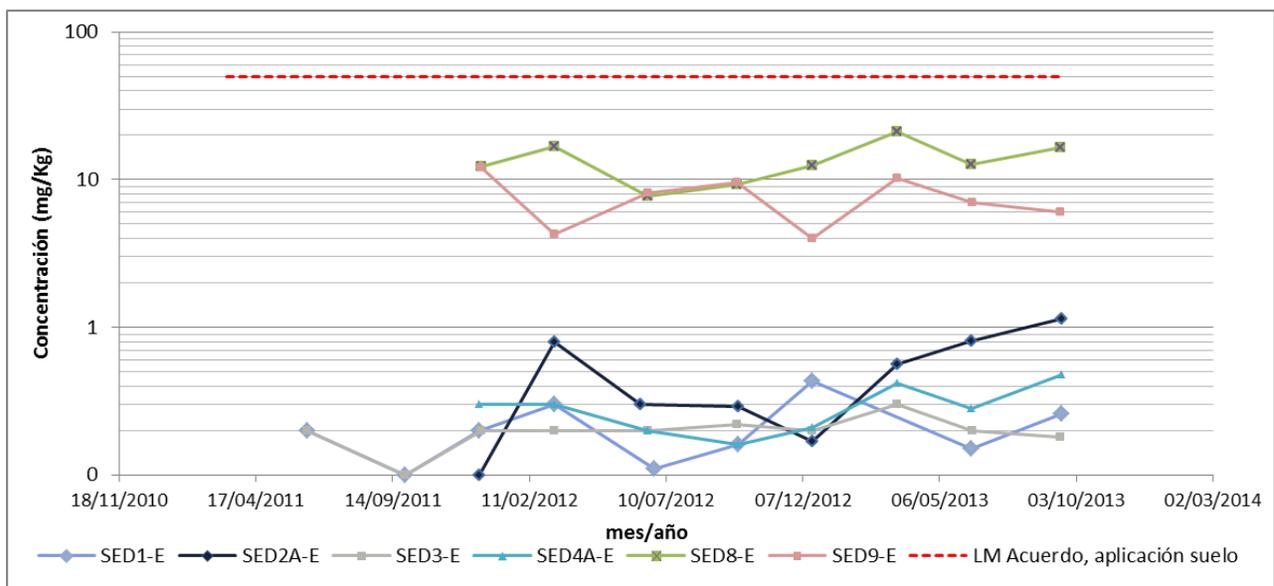
mg/Kg: miligramo por kilogramo; %: porcentaje; na: no analizado ya que en la estación no había flujo de agua. \*LMP para suelos con pH < 7 unidades, en los suelos que posean pH>7 se podrán disponer lodos hasta un 50% mayor de los valores presentados como LMP; \*\* mg/kg de materia seca a 104°C

Gráfica 5-1. Concentración de arsénico registrados en estaciones SED1-E, SED2A-E, SED3-E, SED4A-E, SED8-E y SED9-E; marzo 2011 a septiembre 2013, Proyecto Minero Escobal



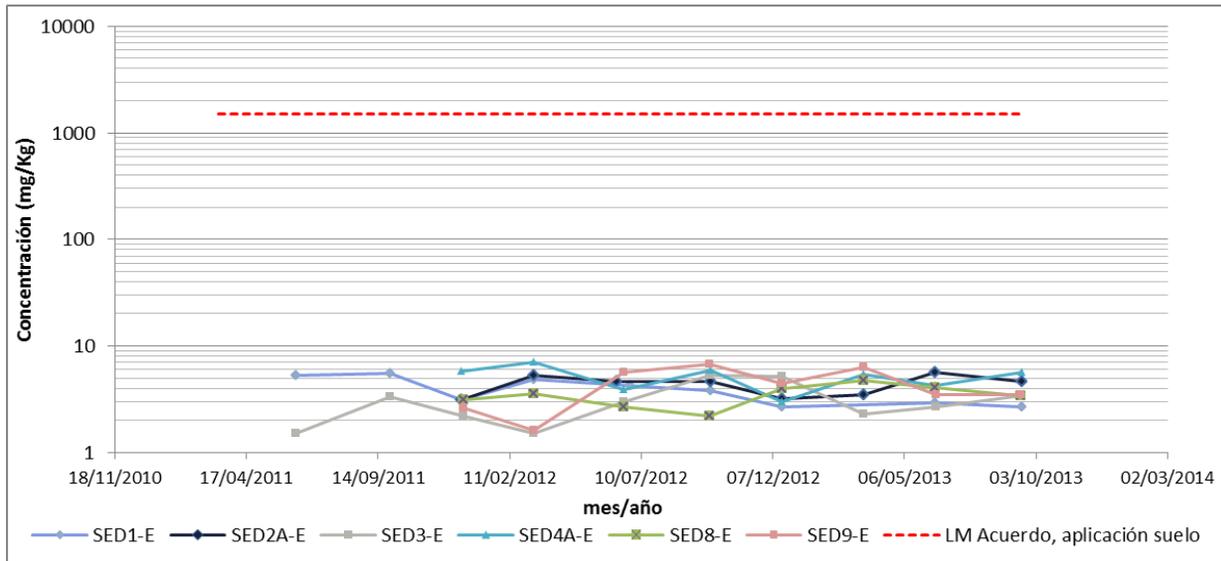
Donde mg/kg: miligramos por kilogramo de materia seca.

Gráfica 5-2. Concentración de cadmio registrados en estaciones SED1-E, SED2A-E, SED3-E, SED4A-E, SED8-E y SED9-E; marzo 2011 a septiembre 2013, Proyecto Minero Escobal



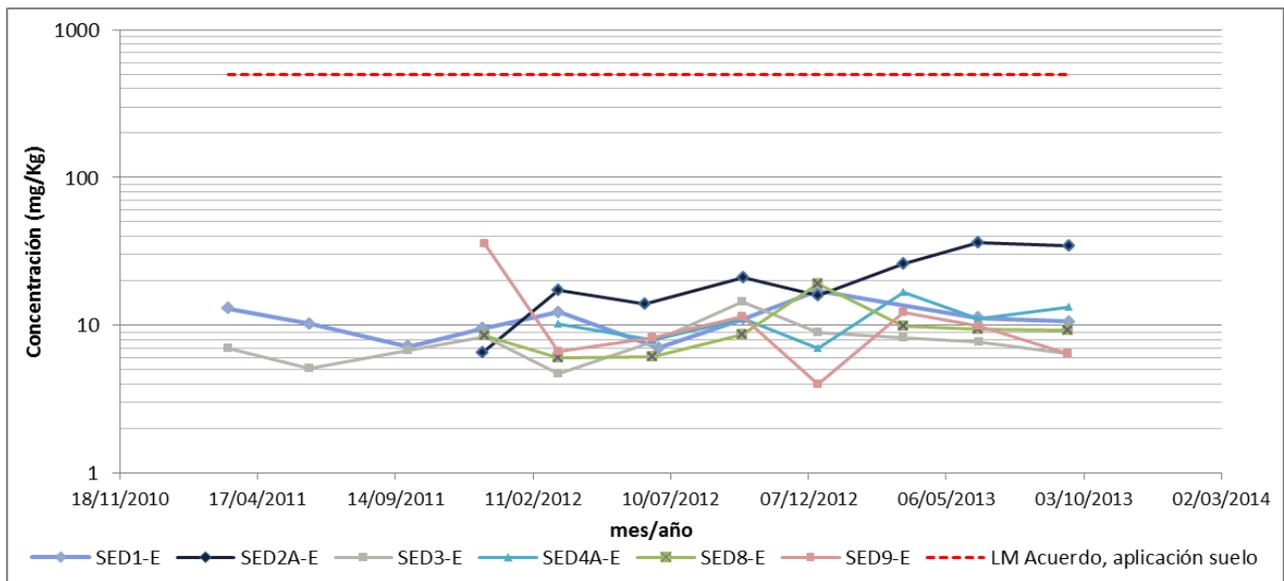
Donde mg/kg: miligramos por kilogramo de materia seca., la cual se presenta en escala logarítmica de base 10.

Gráfica 5-3. Concentración de cromo registrados en estaciones SED1-E, SED2A-E, SED3-E, SED4A-E SED8-E y SED9-E; marzo 2011 a septiembre 2013, Proyecto Minero Escobal



Donde mg/kg: miligramos por kilogramo de materia seca., la cual se presenta en escala logarítmica de base 10

Gráfica 5-4. Concentración de plomo registrados en estaciones SED1-E, SED2A-E, SED3-E, SED4A-E SED8-E y SED9-E; marzo 2011 a septiembre 2013, Proyecto Minero Escobal



Donde mg/kg: miligramos por kilogramo de materia seca., la cual se presenta en escala logarítmica de base 10.



## 6. Calidad de Efluentes

### 6.1. Sitios de Monitoreo

En el Cuadro 6-1 se describe la estación de monitoreo de los efluentes hacia la quebrada El Escobal del agua proveniente de la planta de tratamiento de aguas especiales y de la pileta de cumplimiento ambiental. Su ubicación se presenta en la Figura 6-1

Cuadro 6-1. Sitio de Monitoreo de Calidad de Agua de Efluentes de Planta de Tratamiento del Proyecto.

ESTACIÓN	SISTEMA DE COORDENADAS PROYECTADAS UTM, NAD27 ZONA 15		SITIO	OBSERVACIÓN
WW9	805467	1601111	Descarga de piletas final de planta de tratamiento	La pileta se empieza a utilizar de manera continua como parte del proceso de tratamiento desde el mes de marzo 2013.
EP-3	805322	1601251	Descarga de pileta de cumplimiento ambiental	La primera descarga se realizó el 06-07 de agosto 2013.

### 6.2. Metodología

En el Cuadro 6-2 se describe el procedimiento y equipo utilizado para la toma de muestras de agua

Cuadro 6-2 Procedimiento y equipo utilizado para medir parámetros *In Situ* de muestras de agua residual, Proyecto Minero Escobal.

PARÁMETROS ANALIZADOS	
<i>In Situ</i>	pH y temperatura
Laboratorio	Metales pesados Totales y Disueltos, Aceites y Grasas, DQO, DBO, Coliformes totales, Color, Sólidos Disueltos, Sólidos Sedimentables, Cianuro Total.
PROCEDIMIENTO	
Basado en el procedimiento de toma de muestra dado por Water Management	

Consultants y el laboratorio ACZ para el análisis de Cianuro, y en el procedimiento dado por *Standard Methods for the Examination of Water and Wastewater, part 1060 B* para los demás parámetros

#### EQUIPO UTILIZADO

Nombre	Automuestreador
Modelo	6712 Full-size con módulo integrado 701 para medición continua de pH y temperatura.
Fabricante	ISCO

Laboratorio empleado y valores de referencia: Las muestras de cianuro fueron analizadas en el laboratorio ACZ, 2773 Downhill Drive Steamboat Springs, Colorado USA, el cual se encuentra acreditado y avalado por la USEPA. Las muestras de agua residual fueron analizadas en el laboratorio Ecosistemas Proyectos Ambientales, S.A., laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados cuentan con validez internacional según OGA-LE 006-04.

### 6.3. Resultados

Durante los monitoreos correspondientes a los meses de agosto a octubre 2013, se emplearon muestras control para determinar la confiabilidad de los resultados de parámetros analizados por el laboratorio encargado del análisis de las muestras. En total se efectuaron 3 muestras blanco y una muestra duplicado; los resultados obtenidos se presentan en el Cuadro 6-3

Cuadro 6-3. Resultados de control de calidad para muestras de Efluentes de Planta de Tratamiento, agosto a octubre 2013, Proyecto Minero Escobal.

Mes	Unidades	LMP Acuerdo 236-2006	AGOSTO	SEPTIEMBRE	OCTUBRE		
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11	WW9
No. Reporte Lab.			1285-13	1432-13	1607-13	1606-13	1604-13
Grasas y Aceites	mg/L	10	<5	<5	<5	<5	<5
Materia Flotante		Ausente	Ausente	Ausente	Ausente	Ausente	Ausente
DBO	mg/L	200	<10	<10	<10	<10	<10
DQO	mg/L		<25	<25	<25	<25	<25
SST (TSS)	mg/L	100	<10	<10	<10	<10	<10
Sólidos Sedimentables	ml/L		<0.1	<0.1	<0.1	<0.1	<0.1
Nitrógeno Total	mg/L	20	<1	<1	<1	6	6
Fósforo Total	mg/L	10	0.05	<0.05	<0.05	<0.05	<0.05
Arsénico	mg/L	0.1	<0.002	<0.002	<0.002	0.004	0.004
Cadmio	mg/L	0.1	<0.02	<0.02	<0.02	<0.02	<0.02
Cobre	mg/L	3	<0.03	<0.03	<0.03	<0.03	<0.03
Cromo Hexavalente	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Cianuro Total*	mg/L	1	<0.003	<0.003	<0.003	<0.003	<0.003
Mercurio	mg/L	0.01	<0.004	<0.004	<0.004	<0.004	<0.004
Níquel	mg/L	2	<0.05	<0.05	<0.05	<0.05	<0.05
Plomo	mg/L	0.4	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc	mg/L	10	<0.01	<0.01	<0.01	<0.01	<0.01
Color Aparente	u Pt/Co	500	<1	<1	<1	5	5
Color Real			<1	<1	<1	<1	<1
Coliformes Fecales	NMP/100ml	<1x10 <sup>4</sup>	<2	<2	<2	49	<2

u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. NA: no analizado **Naranja**: resultados no cumplen con estándares de calidad de MSR. **Azul**: análisis efectuados en laboratorio ACZ.

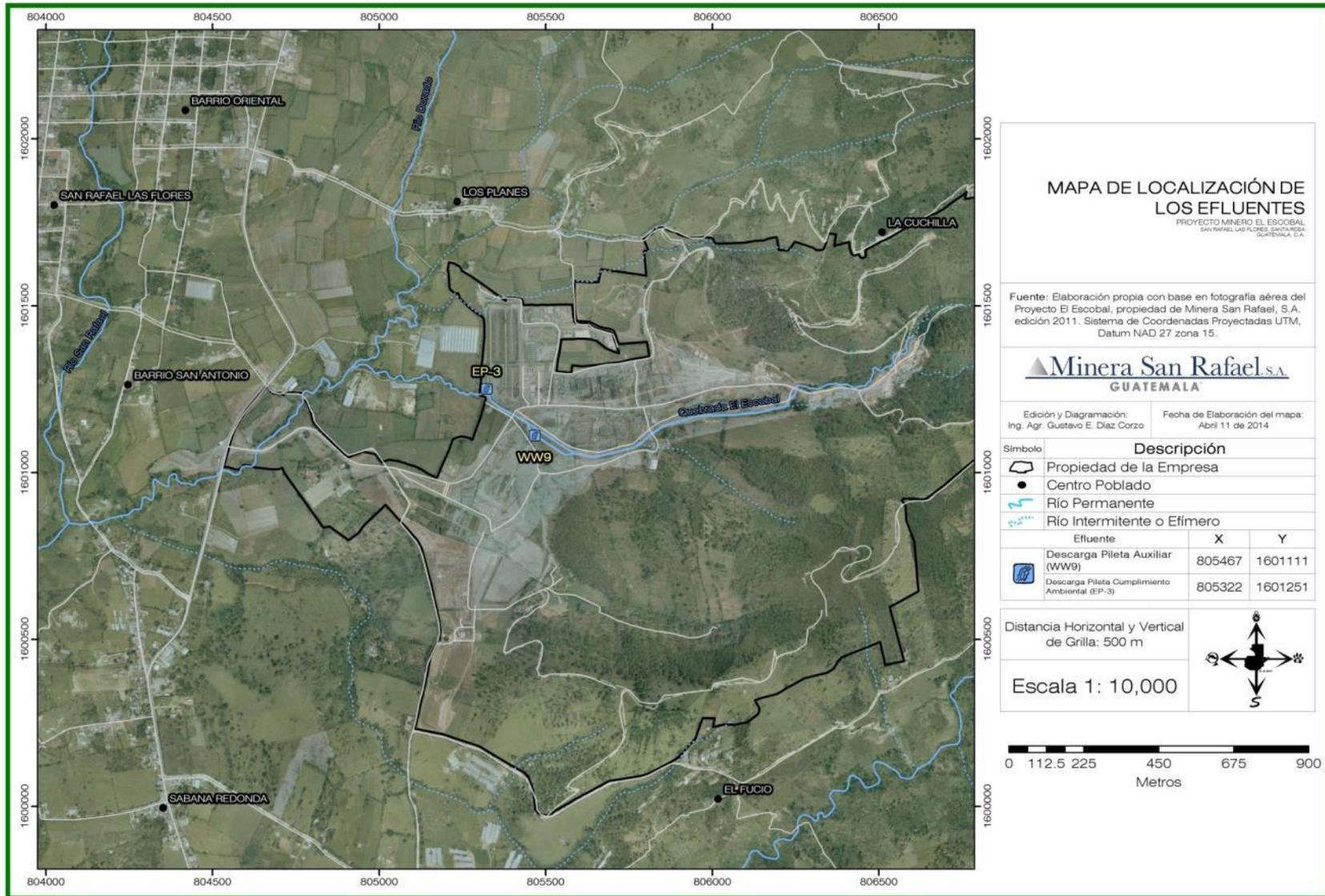


Figura 6-1 Mapa de localización de las estaciones de monitoreo de Efluentes de Planta de Tratamiento del Proyecto.

Para la preparación de blancos analíticos de los parámetros fisicoquímicos, y metales se utilizó agua desmineralizada, para los parámetros microbiológicos se utilizó agua salvavidas embotellada.

Todos los parámetros analizados por los dos laboratorios son confiables en manipulación de las muestras y precisión del análisis.

En el Cuadro 6-4 se pueden observar los resultados de la calidad del efluente de la planta de tratamiento del Proyecto Minero Escobal. Los resultados de laboratorio se presentan en el Anexo 11.6.

Los valores de pH se encontraron en el rango de 8.13 a 8.99 u.e., cumpliendo con el rango establecido en el Acuerdo 6.0-9.0 u.e.

La concentración de Cianuro Total, Grasas y Aceites, Demanda Bioquímica de Oxígeno (DBO), Demanda Química de Oxígeno (DQO), sólidos sedimentables, Cadmio Total, Cobre Total, Cromo Hexavalente, Mercurio Total, Níquel Total y Plomo Total están por debajo del límite de detección del método empleado en el laboratorio en todos los muestreos efectuados en las dos estaciones.

Los Sólidos Suspendedos Totales no fueron detectados en WW9, y estuvieron en el rango de 12 a 17 mg/L en EP-3 muy por debajo de los límites establecidos en el Acuerdo, Banco Mundial y EPA (100, 50 y 30 mg/l respectivamente).

El Zinc Total únicamente se detectó en WW9 en el mes de septiembre (0.02 mg/L), muy por debajo de los límites establecidos en el Acuerdo, Banco Mundial y EPA (10, 0.5 y 1.5 mg/L respectivamente).

El color aparente en la estación WW9 se encontró en el rango de 5 a 23 unidades Pt/Co, y en la estación EP-3 en el rango de 114 a 385 unidades Pt/Co, presentando una tonalidad café atribuible a los sólidos suspendidos de escorrentía (suelos).

Según los resultados obtenidos durante los meses de agosto a octubre 2013 las descargas de la planta de tratamiento y de la pileta de cumplimiento ambiental cumplieron con todos los límites máximos permisibles dados por el Acuerdo Gubernativo 236-2006 para entes generadores nuevos, Banco Mundial para el sector minero y la EPA.

Cuadro 6-4. Calidad del Efluente de la Planta de Tratamiento durante los meses de agosto a octubre 2013, Proyecto Minero Escobal

Mes	Unidades	LMP Acuerdo 236-2006 <sup>1</sup>	Banco Mundial <sup>2</sup>	LMP EPA <sup>3</sup>	AGOSTO		SEPTIEMBRE		OCTUBRE	
Fecha Muestreo					26-Aug-13	7-Aug-13	12-Sep-13	12-Sep-13	9-Oct-13	9-Oct-13
ID Muestra					WW9	EP-3	WW9	EP-3	WW9	EP-3
No. Reporte Lab.					1331-13	1235-13	1431-13	1430-13	1604-13	1601-13
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	8.33	8.18	8.33	8.13	8.2	8.47
Temp de campo	°C	+/- 7	+/- 3		26.6	25.2	26.7	22.9	26.3	25.25
Temp. Quebrada El Escobal	°C				20.7	SF	18.1	18.1	19.2	19.2
Grasas y Aceites	mg/L	10	10		<5	<5	<5	<5	<5	<5
Materia Flotante		Ausente			Ausente	Ausente	Ausente	Ausente	Ausente	ausente
DBO	mg/L	200	50		<10	<10	<10	<10	<10	< 10
DQO	mg/L		150		<25	<25	<25	<25	<25	< 25
SST (TSS)	mg/L	100	50	30	<10	13	<10	17	<10	12
Sólidos Sedimentables	ml/L				<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1
Nitrógeno Total	mg/L	20	10		4.3	1.9	3.4	<1	6	2.1
Fósforo Total	mg/L	10	2		0.06	0.11	0.06	0.08	<0.05	<0.05
Arsénico	mg/L	0.1	0.1		0.004	<0.002	0.005	<0.002	0.004	0.002
Cadmio	mg/L	0.1	0.05		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

<sup>1</sup> Límites establecidos en el artículo No. 21, para entes generadores nuevos que descargan aguas residuales a cuerpos receptores.

<sup>2</sup> Límites establecidos por el Banco Mundial para el Sector Minero, aplica a los vertidos directos de efluentes tratados a aguas superficiales de uso general

<sup>3</sup> Límite Máximos para cualquier día, establecidos por la EPA en CFR 440, Subparte J, 440.102 (a). concentraciones de contaminantes que se descargan en el drenaje de minas de cielo abierto o subterráneas donde se obtengan cobre, plomo, zinc, oro, plata o cualquier combinación de estos minerales.

Mes	Unidades	LMP Acuerdo 236-2006 <sup>1</sup>	Banco Mundial <sup>2</sup>	LMP EPA <sup>3</sup>	AGOSTO		SEPTIEMBRE		OCTUBRE	
Fecha Muestreo					26-Aug-13	7-Aug-13	12-Sep-13	12-Sep-13	9-Oct-13	9-Oct-13
ID Muestra					WW9	EP-3	WW9	EP-3	WW9	EP-3
No. Reporte Lab.					1331-13	1235-13	1431-13	1430-13	1604-13	1601-13
Cobre	mg/L	3	0.3	0.3	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Cromo Hexavalente	mg/L	0.1	0.1		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cianuro Total*	mg/L	1	1		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercurio	mg/L	0.01	0.002	0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Níquel	mg/L	2	0.5		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Plomo	mg/L	0.4	0.2	0.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc	mg/L	10	0.5	1.5	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Color Aparente	u Pt/Co	500			11	385	23	320	5	114
Color Real					<1	39	<1	21	<1	<1
Coliformes Fecales	NMP/100ml	<1x10 <sup>4</sup>	400		23	2	240	<2	<2	49

NA: no analizado. SF= sin flujo de agua. u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. \*: análisis efectuados en laboratorio ACZ.





## 7. Vibraciones

### 7.1. Sitios de Monitoreo

La Empresa, instaló tres equipos para la medición de vibraciones eXPeak Seismograph modelo eXAD-8 de la empresa Physical Measurement Technologies, Inc. Estos equipos son automatizados y registran la velocidad (mm/seg) y la frecuencia (Hz) de forma constante. La ubicación de las estaciones de monitoreo se presenta en el Cuadro 7-1 y en la Figura 7-1.

Cuadro 7-1: Estaciones de monitoreo de vibraciones, Proyecto Minero Escobal

ESTACIÓN	SISTEMA DE COORDENADAS PROYECTADAS UTM, NAD27 ZONA 15		SITIO
BS-1	806424.11	1601608.4	Colindancia con Aldea La Cuchilla
BS-2	806366.07	1601291.1	Entre ambos portales
BS-3	805798.17	1601563.8	Depósito de Suelo

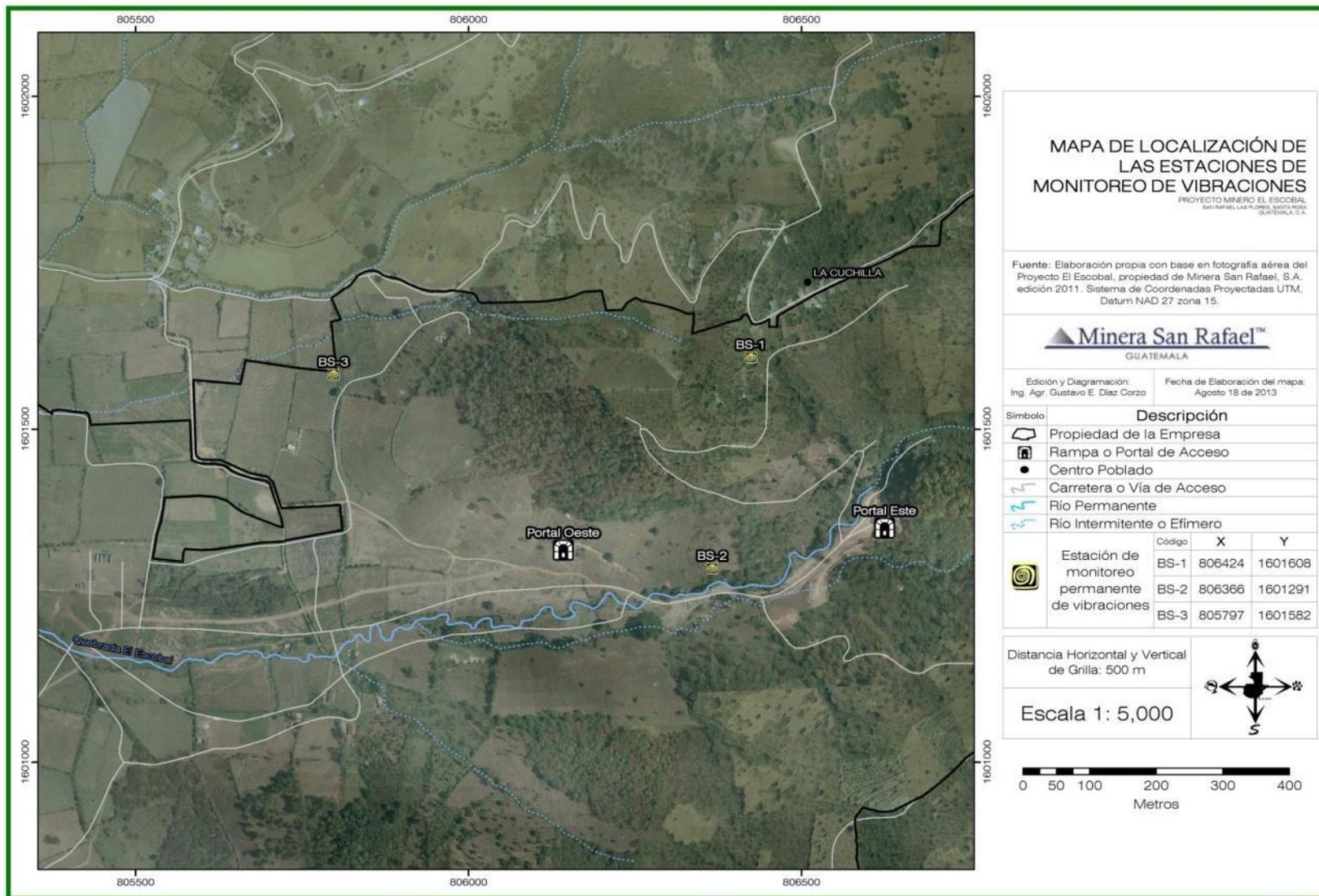


Figura 7-1 Mapa de localización de las estaciones de monitoreo de vibraciones

## 7.2. Metodología

En el Cuadro 7-2 se describe el procedimiento y equipo utilizado para el registro de vibraciones

Cuadro 7-2. Procedimiento y equipo utilizado para medir vibraciones. Proyecto Minero Escobal

PARAMETROS ANALIZADOS	
Velocidad	Velocidad de partícula
PROCEDIMIENTO	
Se registraron todas las voladuras realizadas en ambos portales durante los meses de mayo a julio 2013. Y se enlistan las velocidades de partículas registrados por los equipos de vibraciones.	
EQUIPO UTILIZADO	
Equipo	eXPeak Seismograph modelo eXAD-8
Fabricante	Physical Measurement Technologies, Inc.

## 7.3. Resultados

Como se observa en el Cuadro 7-3, todas las mediciones de las voladuras registradas en los instrumentos, dieron resultados por debajo del límite de detección del equipo (1.3 mm/s) y según la norma del United States Bureau of Mines, el límite a partir del cual, las vibraciones inducidas por una voladura pueden ocasionar daños a estructuras, es de 50.8 mm/s. Por lo que se puede determinar que las mismas no son sensibles y por lo tanto no representan un impacto para el medio ambiente.

Cuadro 7-3 Resultados de medición de vibraciones durante los meses de agosto a octubre 20113,  
 Proyecto Minero Escobal.

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1290- VENTILACION	1	06:00	<1.3
	6920-1265	1	06:05	<1.3
	RAMPA PRINCIPAL ESTE	1	06:10	<1.3
	W RAMPA PRINCIPAL	1	17:30	<1.3
	1265-6680	1	17:35	<1.3
	1290-7000	1	17:40	<1.3
	1315 W	2	05:55	<1.3
	1315 E desbanque	2	06:00	<1.3
	1265-6940	2	06:05	<1.3
	Principal ESTE	2	06:10	<1.3
	1265-6640	2	06:15	<1.3
	principal OESTE	2	18:00	<1.3
	6840-1290 OESTE	2	18:05	<1.3
	6520-1290 OESTE	2	18:10	<1.3
	C/F ESTE 1265 ESTE	2	18:15	<1.3
	6680-1290 ESTE	2	18:20	<1.3
	DUMAS CHIMINEA	2	15:30	<1.3
	1265-6680	3	05:30	<1.3
	1265-6980 desguinche	3	05:35	<1.3
	w acc 1215	3	05:40	<1.3
	1230 Deskinche p/porton	3	17:30	<1.3
	1290-7000	3	17:35	<1.3
	1315 W C/F W	3	17:40	<1.3
	1315-6480	3	17:45	<1.3
	1315 E C/F E	3	17:50	<1.3
	1265-6360	4	05:30	<1.3
1290-7000	4	05:35	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	E 1315 C/F E	4	05:40	<1.3
	1315 W C/F E	4	17:30	<1.3
	Rampa Principal Este	4	17:35	<1.3
	Requema 1265 ventilacion E	4	17:40	<1.3
	Requema 1315 W C/F W	4	17:45	<1.3
	W 1315 C/F w	7	05:30	<1.3
	1265-6360	7	05:35	<1.3
	1265-6920	7	05:40	<1.3
	E 1315-6720 DESGUINCHE	7	05:45	<1.3
	1215 Acceso Oeste	7	17:30	<1.3
	1265-6600	7	17:35	<1.3
	1290-6600	7	17:40	<1.3
	1290-6760	7	17:45	<1.3
	1290-6920	7	17:50	<1.3
	Desbanke 1315 E C/F E	7	17:55	<1.3
	1290-7000	8	05:30	<1.3
	1386 REQUEMA	8	05:35	<1.3
	W RAMPA PRINCIPAL	8	05:40	<1.3
	W 1215 ACC	8	05:45	<1.3
	1265-6640	8	17:30	<1.3
	1290-6640	8	17:35	<1.3
	1290-6720	8	17:40	<1.3
	1315 E C/F W	8	17:45	<1.3
	1315-6700 E	8	17:50	<1.3
	1315 W C/F E	8	17:55	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1290 VENTILACION	9	17:30	<1.3
	1290-6920	9	17:35	<1.3
	1290-6920	10	05:00	<1.3
	1290-6600	10	05:10	<1.3
	1315 OESTE	10	17:30	<1.3
	1315 OESTE	10	17:35	<1.3
	Este Principal	11	05:00	<1.3
	1265 C/F E	11	05:05	<1.3
	1265-6720	11	05:10	<1.3
	1290 Vent. Ascendente	11	05:15	<1.3
	1315 E C/F W	11	05:20	<1.3
	6640-1290	11	17:30	<1.3
	1265-6920	12	05:00	<1.3
	1265-6600	12	05:05	<1.3
	1290-6720	12	05:10	<1.3
	1315 E C/F E	12	05:15	<1.3
	6600-1290	12	17:30	<1.3
	7000*1290	12	17:30	<1.3
	1215-OESTE	12	17:45	<1.3
	6700-1315 ESTE	12	18:00	<1.3
	1265-7000 deskinche	13	05:00	<1.3
	1265-6600	13	05:05	<1.3
	1290-7000	13	05:10	<1.3
	1315 E C/F W	13	05:15	<1.3
	1315 W C/F E	13	05:20	<1.3
	1315-oeste	13	17:30	<1.3
	1315- este	13	17:30	<1.3
	1215-OESTE esguinche	13	17:45	<1.3
	1215 W Sumidero	14	05:00	<1.3
	1265-6980	14	05:05	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1315 E C/F E	14	05:10	<1.3
	1315 WC/F W	14	05:15	<1.3
	1215 ESTE	14	17:30	<1.3
	6760 -1290	14	17:30	<1.3
	6640-1265	14	17:45	<1.3
	6600-1290	14	18:00	<1.3
	1215 oeste desgunche	16	05:00	<1.3
	1265-6720 esgunche	16	05:05	<1.3
	1290-6720 esguinche	16	05:10	<1.3
	1265-6680	16	17:30	<1.3
	1265-6600 DESGUINCHE	16	17:35	<1.3
	1290-6840	16	17:40	<1.3
	E 1215 ACC	16	17:45	<1.3
	CHIMENEA	16	16:00	<1.3
	1265-6640	19	05:00	<1.3
	1290-6640	19	05:05	<1.3
	1315-ESTE	19	05:10	<1.3
	1315-oeste	20	05:00	<1.3
	1315 este	20	05:05	<1.3
	1215 rampa oeste	20	05:10	<1.3
	ESTE RAMPA PRINCIPAL	20	17:30	<1.3
	1265-6680	20	17:35	<1.3
	1290-6600 DESGUINCHE	20	17:40	<1.3
	1215-oeste	22	05:00	<1.3
	1315 oeste	22	05:05	<1.3
	6720 este	22	05:10	<1.3
	6400-1265	22	05:20	<1.3
	6840-1290	22	05:40	<1.3
	E 1315 C/F ESTE	22	17:30	<1.3
	1265-6360	22	17:35	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1290-6720	22	17:40	<1.3
	E 1315-6680	23	05:25	<1.3
	1290-6520	23	05:30	<1.3
	1290-6640 DESGUINCHE	23	05:35	<1.3
	1265-6400	23	05:40	<1.3
	1265-6600	23	05:45	<1.3
	1265-7000	23	05:50	<1.3
	CHIMENEA	23	13:10	<1.3
	1215 ACCESO ESTE	23	17:35	<1.3
	1265-6720	23	17:40	<1.3
	1265-6520	23	17:45	<1.3
	1290-6400	23	17:50	<1.3
	1315 E C/F W	23	17:55	<1.3
	W 1315 C/F ESTE	24	05:25	<1.3
	1290-6840	24	05:30	<1.3
	1265-6440	24	05:35	<1.3
	E 1265 C/F ESTE	24	05:40	<1.3
	1215 W Sub-estacion	24	17:30	<1.3
	1290-6600	24	17:35	<1.3
	1290-6720	24	17:40	<1.3
	1290-6480 Tiro Largo	24	17:45	<1.3
	W 1315-6500	24	17:50	<1.3
	W 1315-6460 Deskinche	24	17:55	<1.3
	OESTE RAMPA PRINCIPAL	25	05:25	<1.3
	1265-6400	25	05:30	<1.3
	1290-6520	25	05:35	<1.3
	1290-6640	25	05:40	<1.3
	1290-6720	25	05:45	<1.3
	CHIMENEA	25	13:30	<1.3
	RAMPA ESTE	25	17:35	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1265--6520	25	17:40	<1.3
	1265-6600	25	17:45	<1.3
	1265-6600	25	17:50	<1.3
	1265-6720	25	17:55	<1.3
	1290-6400	25	18:00	<1.3
	1290-6440	26	05:25	<1.3
	ESTE 1315 C/F W	26	05:30	<1.3
	1265-6680	26	05:35	<1.3
	1215 W Sub-estación	26	17:35	<1.3
	1290-6480 Tiro Largo	26	17:40	<1.3
	1315-6680 E	26	17:45	<1.3
	1315-6740 E Deskinche	26	17:50	<1.3
	1315-6500 W	26	17:55	<1.3
	1315-6460 W	26	18:00	<1.3
	1290-6400	27	05:25	<1.3
	1290-6760	27	05:30	<1.3
	E 1215 acc	27	05:35	<1.3
	1265-6840	27	17:30	<1.3
	1265-6400	27	17:40	<1.3
	1290-6680	27	17:45	<1.3
	1315-6520 W Deskinche	27	17:50	<1.3
	1265-6400	29	05:25	<1.3
	1265-6760	29	05:30	<1.3
	1290-6400	29	05:35	<1.3
	1290-6440	29	05:40	<1.3
	E 1315-	29	05:45	<1.3
	chimenea	29	05:50	<1.3
	Chimenea	29	13:30	<1.3
	West Principal	29	17:40	<1.3
	1265-7000	29	17:45	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1290-6520	29	17:50	<1.3
	1315-6460 W	29	17:55	<1.3
	1290-6480 Tiro Largo	29	18:00	<1.3
	1265-6320	30	05:00	<1.3
	1265-7000	30	05:05	<1.3
	1290-6680	30	05:10	<1.3
	1290-6400	30	05:15	<1.3
	1315-6460 W	30	05:20	<1.3
	1315-cfrente oeste del W	30	17:30	<1.3
	1315- C/FRENTE este DEL OESTE	30	17:35	<1.3
	1315- CONTRA FRENTE ESTE DEL ESTE	30	17:40	<1.3
	ESQUINCHE EN LA 1315 ESTE	30	17:40	<1.3
	6680-1265	30	17:40	<1.3
	6440-1265	30	17:45	<1.3
	Septiembre	1265-7000	1	05:00
1298-6840		1	05:05	<1.3
1290-6520		1	05:10	<1.3
1290-6440		1	05:15	<1.3
1290-6400		1	05:00	<1.3
1298-6840		1	05:20	<1.3
1315-oeste		1	17:30	<1.3
6320-1265		1	17:35	<1.3
principal oeste		1	17:40	<1.3
6760-1265		1	17:45	<1.3
6480-1290 tiro largo		4	17:30	<1.3
6320-1265		4	17:35	<1.3
1315-oeste		4	17:40	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1315-este	4	17:45	<1.3
	1315 E C/F W	4	05:00	<1.3
	1315 W C/F E	4	05:05	<1.3
	1315-6520 W	4	05:10	<1.3
	CHIMENEA	5	05:00	<1.3
	1265-6980	5	05:05	<1.3
	1265-6440	5	05:10	<1.3
	1290-6440	5	05:15	<1.3
	1315 E C/F E	5	05:20	<1.3
	1315-OESTE	5	05:20	<1.3
	1315 ESTE	5	17:30	<1.3
	6400-1290	5	17:35	<1.3
	6760-1290	5	17:40	<1.3
	6640-1290	6	05:00	<1.3
	6640-1315	6	05:05	<1.3
	6520-1265	6	05:10	<1.3
	6840-1265	6	05:15	<1.3
	1315 E C/F E	6	05:20	<1.3
	ESTE 1315 C/F W	6	17:30	<1.3
	1290-6720	6	17:35	<1.3
	1265-6320	6	17:40	<1.3
	1265 C/F ESTE	6	17:45	<1.3
	TL 1290-6800 CHIMENEA	6	17:50	<1.3
	6520-1265	7	05:00	<1.3
	PRINCIPAL OESTE	7	05:05	<1.3
	C/F ESTE 1265	7	05:10	<1.3
	PRINCIPAL ESTE	7	05:15	<1.3
	E 1315-6740	7	17:30	<1.3
	1290-6520	7	17:35	<1.3
	W 1315-6480	7	17:40	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	W 1315 C/F E	7	17:45	<1.3
	1265-6640	7	17:30	<1.3
	1265-6320	7	17:35	<1.3
	1290-6840	7	17:40	<1.3
	TL 1290-6800 CHIMENEA	7	17:45	<1.3
	1290-6440	8	05:00	<1.3
	E 1215 ACC	8	05:05	<1.3
	W 1315-6440	8	05:10	<1.3
	6520-1265	8	05:00	<1.3
	PRINCIPAL OESTE	8	05:05	<1.3
	C/F ESTE 1265	8	05:10	<1.3
	PRINCIPAL ESTE	8	05:15	<1.3
	E 1315-6740	8	17:30	<1.3
	1290-6520	8	17:35	<1.3
	W 1315-6480	8	17:40	<1.3
	W 1315 C/F E	8	17:45	<1.3
	6520-1265	10	05:00	<1.3
	PRINCIPAL OESTE	10	05:05	<1.3
	C/F ESTE 1265	10	05:10	<1.3
	PRINCIPAL ESTE	10	05:15	<1.3
	E 1315-6740	10	17:30	<1.3
	1290-6520	10	17:35	<1.3
	W 1315-6480	10	17:40	<1.3
	W 1315 C/F E	10	17:45	<1.3
	6520-1265	11	05:00	<1.3
	PRINCIPAL OESTE	11	05:05	<1.3
	C/F ESTE 1265	11	05:10	<1.3
	PRINCIPAL ESTE	11	05:15	<1.3
1290-6880	11	17:30	<1.3	
1290-6520	11	17:35	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1265-6520	11	17:40	<1.3
	w 1315-6480	11	17:45	<1.3
	6520-1265	12	05:00	<1.3
	6520-1290 esgunche	12	05:05	<1.3
	1315-cf oeste del oeste	12	05:10	<1.3
	1315- este 6440	12	05:15	<1.3
	1265-6400	12	17:30	<1.3
	1265 C/F E	12	17:35	<1.3
	E 1315 C/F W	12	17:40	<1.3
	W 1315 C/F E	12	17:45	<1.3
	TL 1290-6880	12	17:50	<1.3
	1265-6760	13	05:30	<1.3
	E 1315-6720	13	05:35	<1.3
	E SUM 1265 DESGUINCHE	13	05:40	<1.3
	1290-6440	13	05:45	<1.3
	1265-6440	13	17:30	<1.3
	1265-6640	13	17:35	<1.3
	1265-6640 Deskinche	13	17:40	<1.3
	1290-6400 Deskinche	13	17:45	<1.3
	1290-6840	13	17:50	<1.3
	E 1215 ACC	14	05:30	<1.3
	1265-6320	14	05:35	<1.3
	W 1315 C/ F W	14	05:40	<1.3
	Chimenea	14	17:30	<1.3
	1265 C/F E	14	17:35	<1.3
	1265-6520	14	17:40	<1.3
	1265-6360	14	17:45	<1.3
	1315 Servicios W Deskinche	14	17:50	<1.3
1315-6640 Deskinche	14	18:00	<1.3	
1290-6880 Tiro Largo	14	18:10	<1.3	



Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	W RAMPA PRINCIPAL	16	05:30	<1.3
	E 1315-6720	16	05:35	<1.3
	1265-6320	16	05:40	<1.3
	CHIMENEA	16	02:00	<1.3
	1315-6480 oeste	16	17:30	<1.3
	6360-1290	16	17:35	<1.3
	6560-1290 produccion	16	17:40	<1.3
	E 1215 ACC	17	05:30	<1.3
	E 1315 C/F E	17	05:35	<1.3
	1265-6440	17	05:40	<1.3
	W 1315 C/F E	17	02:00	<1.3
	1315-6480 oeste	17	17:30	<1.3
	1315-C/F ESTE DEL W	17	17:35	<1.3
	1315-6440 ESTE	17	17:40	<1.3
	R/PRINCIPAL ESTE	17	17:45	<1.3
	REQUEMA 6800-1265	17	17:50	<1.3
	1290-6400	18	05:30	<1.3
	1265-6440	18	05:35	<1.3
	1315 C/F. este R/este	18	17:30	<1.3
	1315W /servicio R/oeste	18	17:35	<1.3
	1290-6440 R/ oese	18	17:40	<1.3
	Chiminea R/W DUMAS	18	17:50	<1.3
	1315-servicios OESTE	19	05:30	<1.3
	1265-6440	19	05:35	<1.3
	C/F ESTE 1315 ESTE	19	05:40	<1.3
	C/F ESTE -1265 ESTE	19	05:40	<1.3
	Chim.1290-6560 R/W	19	17:30	<1.3
	1265-6400 R/W	19	17:35	<1.3
1215 R/Principal R/W	19	17:40	<1.3	
1315-6720 R/E	19	17:45	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1215 R/principal R/E	19	17:50	<1.3
	6440-1290	20	05:30	<1.3
	1315-6720 este	20	05:35	<1.3
	1290-6400	20	05:40	<1.3
	1315-sevicios oeste	20	05:40	<1.3
	chiminea DUMAS	20	05:30	<1.3
	1265-6920 R/E.	20	17:30	<1.3
	1315-6460 R/W.	20	17:35	<1.3
	1265-6400 RW.	20	17:40	<1.3
	R/P ESTE	21	05:30	<1.3
	R/P OESTE	21	05:35	<1.3
	6320-1265	21	05:40	<1.3
	1315/CF ESTE OESTE	21	05:40	<1.3
	6600-1290	21	04:30	<1.3
	1265-6920 R/E.	21	17:30	<1.3
	1315-6460 R/W.	21	17:35	<1.3
	1265-6400 RW.	21	17:40	<1.3
	1315-este C/F ESTE	22	05:30	<1.3
	1315 este C/F ESTE	22	05:35	<1.3
	6400-1290	22	05:40	<1.3
	6440-1265	22	05:40	<1.3
	1215- RAMPA ESTE	22	04:30	<1.3
	1265-6920 R/E.	22	17:30	<1.3
	1315-6460 R/W.	22	17:35	<1.3
	1265-6400 RW.	22	17:40	<1.3
	1290-6560 R/W.produccion	22	17:55	<1.3
	1265-6960	23	05:30	<1.3
	1290-6360	23	05:35	<1.3
6400-1265	23	05:40	<1.3	
1315-6720 este	23	05:40	<1.3	

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Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1290-6440 R/E.	23	17:30	<1.3
	1265 C/F. E. R/E	23	17:35	<1.3
	R/ Principal R/W.	23	17:40	<1.3
	1315-C/F. W. R/W.	23	17:55	<1.3
	1315-C/F ESTE DEL ESTE	24	05:30	<1.3
	1265-6920	24	05:35	<1.3
	RAMPA PRINCIPAL OESTE	24	05:40	<1.3
	1265-6400	24	05:40	<1.3
	R/ Principal R/E.	24	17:30	<1.3
	1315 C/F.E. R/W.	24	17:35	<1.3
	1290-6480, Produccion.	24	17:40	<1.3
	1290-6400	25	05:30	<1.3
	1265-6440	25	05:35	<1.3
	1315-C/F ESTE RAMPA ESTE	25	05:40	<1.3
	1290-6960	25	05:40	<1.3
	1315-EST.SERVICIO R/W	25	17:30	<1.3
	1315-C/F.E. R/W	25	17:35	<1.3
	1990-6440 R/W	25	17:40	<1.3
	1292-6560, PRODUCCION	25	17:50	<1.3
	R/Principal R/W.	26	05:30	<1.3
	1290-6680 R/W.	26	05:35	<1.3
	1315-C/F.W. R/W.	26	05:40	<1.3
	1290-6840 R/E.	26	05:45	<1.3
	1315-6720 R/E.	26	05:55	<1.3
	1265-6680	26	17:30	<1.3
	1265 c/f este	26	17:35	<1.3
	este rampa principal	26	17:40	<1.3
	1315/Servicio R/W.	27	05:30	<1.3
	1265-6680 R/W.	27	05:35	<1.3
	1315- C/F. W. R/E.	27	05:40	<1.3
1315-6640 R/E.	27	05:45	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	w 1315-6480	27	17:30	<1.3
	1290-6440	27	17:35	<1.3
	W 1315 C/F E	27	17:40	<1.3
	1290-6960	27	17:45	<1.3
	E 1315 C/F E	27	17:50	<1.3
	1315-6480 R/W.	28	05:30	<1.3
	1315 - R/E. Desguinche	28	05:35	<1.3
	1215 R/E. Desg. Ac. Sumidero	28	05:40	<1.3
	1265-6960	28	17:30	<1.3
	E 1315-6720	28	17:35	<1.3
	1290-6680	28	17:40	<1.3
	W 1315-6540	28	17:45	<1.3
	CHIMENEA	28	17:50	<1.3
	1315-servicio R/W.	29	05:30	<1.3
	1290-6680 R/W..Desguinche	29	05:35	<1.3
	1315-6720 R/E.	29	05:40	<1.3
	1265-6960 R/E.	29	05:50	<1.3
	w rampa principal	29	17:30	<1.3
	1290-6440	29	17:35	<1.3
	1265-6680	29	17:40	<1.3
	e 1315 c/f w	29	17:45	<1.3
	1215 sumidero ESTE	30	05:30	<1.3
	6680-1265	30	05:35	<1.3
	6720-1315 ESTE	30	05:40	<1.3
	E. rampa principal, Desb.	30	17:30	<1.3
	1386 R/E. Desb.	30	17:35	<1.3
	1315-6760 R/E.	30	17:40	<1.3
	1315-6540 R/W.	30	17:45	<1.3
	1315- C/F. W R/W.	30	17:55	<1.3
	1315-Servicio R/W.	30	12:00	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	Requema			
	e 1315-6720	1	05:30	<1.3
	e 1265-6960	1	05:35	<1.3
	w 1315-6560	1	05:40	<1.3
	1315 C/F. E. R/E.	1	17:30	<1.3
	1315 C/F. W. R/E.	1	17:35	<1.3
	Rampa Principal R/W.	1	17:40	<1.3
	1265-6840 R/W. Desguinche	1	17:45	<1.3
	1386 R/E. Desbanque	1	05:55	<1.3
	RAMPA PRINCIPAL OESTE	3	17:30	<1.3
	1315-6420 ESGUINCHE OESTE	3	17:35	<1.3
	1315-C/F ESTE OESTE	3	17:40	<1.3
	1315-6760 ESTE	3	17:40	<1.3
	1265-7020 ESTE	3	17:40	<1.3
	1290-6960	4	01:30	<1.3
	1265-6800	4	05:35	<1.3
	princ. Este	4	05:40	<1.3
	1315-6760	4	05:50	<1.3
	RAMPA PRINCIPAL OESTE	4	17:30	<1.3
	1315-6420 ESGUINCHE OESTE	4	17:35	<1.3
	1315-C/F ESTE OESTE	4	17:40	<1.3
	1315-6760 ESTE	4	17:40	<1.3
	1265-7020 ESTE	4	17:40	<1.3
	1315-6560 OESTE	5	01:30	<1.3
	1315 OESTE SERVICIOS	5	05:35	<1.3
	1290-6680 ESTE	5	05:40	<1.3
	1315-6420 OESTE	5	05:50	<1.3
	1290-6840 ESTE	5	05:55	<1.3
1315-c/frente este ESTE	5	17:30	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	RPRINCIPAL ESTE	5	17:35	<1.3
	6440-1315 OESTE	5	17:40	<1.3
	DUMAS CHIMINEA	6	01:30	<1.3
	RP OESTE	6	05:35	<1.3
	RP ESTE	6	05:40	<1.3
	1315-6720	6	05:50	<1.3
	6480-1290 PRODUCCION	6	17:30	<1.3
	1315 C/FRENTE OESTE ESTE	6	17:35	<1.3
	1315-6760 OESTE	6	17:40	<1.3
	1386- RAPMA ESTE	6	17:40	<1.3
	1265-6960 OESTE	7	01:30	<1.3
	1215 RAMPA PRINCIPAL ESTE	7	05:35	<1.3
	1215 ACC. R.PRINCIPAL ESTE	7	05:40	<1.3
	1290-6840 ESTE	7	05:50	<1.3
	6480-1290 PRODUCCION	7	17:30	<1.3
	1315 C/FRENTE OESTE ESTE	7	17:35	<1.3
	1315-6760 OESTE	7	17:40	<1.3
	1386- RAPMA ESTE	7	17:40	<1.3
	1315 CONTRAFRENTE ESTE	8	05:40	<1.3
	1315-6680 ESTE	8	05:50	<1.3
	315-6420 OESTE	8	05:55	<1.3
	DUMAS CHIMINEA	8	17:30	<1.3
	1290-6680	8	17:35	<1.3
	1265-6840	8	17:40	<1.3
	1265-6680	8	17:40	<1.3
	1315-CFRENTE ESTE DEL ESTE	8	17:40	<1.3
	CHIMENEA DUMAS	9	00:30	<1.3
	1215-R.OESTE	9	01:30	<1.3
	1290-6840 ESTE	9	05:35	<1.3

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Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1315-6760 ESTE	9	05:40	<1.3
	1215-R. ESTE	9	05:50	<1.3
	1265-6840 ESTE	9	05:55	<1.3
	1265-6680	9	17:30	<1.3
	1265-7020	9	17:35	<1.3
	1315-6640 ESTE	10	00:30	<1.3
	1315-C.FRENTE ESTE	10	01:30	<1.3
	1315-6560 OESTE	10	05:35	<1.3
	1315 C.FRENTE OESTE	10	05:40	<1.3
	1290-6680	10	17:30	<1.3
	1315-6440 ESTE	10	17:35	<1.3
	1315-6480 OESTE	10	17:40	<1.3
	1315-6420 OESTE	10	17:40	<1.3
	Chimenea	11	01:10	<1.3
	1290-6520 W	11	05:00	<1.3
	1290-6600 W	11	05:05	<1.3
	1265-6680 W	11	05:10	<1.3
	1315 Sumidero	11	05:10	<1.3
	requema Rampa Principal W	11	05:15	<1.3
	R/PRNCIPAL OESTE	11	18:00	<1.3
	6600-1265 OESTE	11	18:05	<1.3
	R/PRINCIPAL ESTE	11	18:05	<1.3
	6720-1265 ESTE	11	18:05	<1.3
	C/FRENTE ESTE 1290 ESTE	11	18:05	<1.3
	1265-6960	12	00:30	<1.3
	1315-cfrente este oeste	12	01:30	<1.3
	1315-6460 este	12	05:35	<1.3
	1315-6460 este	12	05:40	<1.3
	1365-6920 R/E.	12	17:30	<1.3
	dumas chiminea	13	00:30	<1.3
1265-6920	13	01:30	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	R.P ESTE	13	05:35	<1.3
	R P. OESTE	13	05:40	<1.3
	1290-6840 R/E.	13	17:30	<1.3
	Chimenea alimak (DUMAS)	13	17:35	<1.3
	dumas chiminea	14	00:30	<1.3
	1215- ESTE	14	01:30	<1.3
	1290-6840	14	05:35	<1.3
	1265-6760	14	05:40	<1.3
	1290-6800 PRODUCCION	14	18:15	<1.3
	1265-6760 R/E.	14	18:15	<1.3
	1265-7020 R/E.	14	18:30	<1.3
	1290-6760 R/W.	14	18:35	<1.3
	1340-R/E.	14	18:40	<1.3
	1215- este	15	00:30	<1.3
	r/principal este	15	01:30	<1.3
	1265-6760 esguinche	15	05:35	<1.3
	1265-6920 R/E.	15	18:15	<1.3
	Chimenea, Dumas	23	03:20	<1.3
	1290-6960 R/E.	23	05:20	<1.3
	1315-6680 R/E..	23	05:30	<1.3
	1315-6640 R/E.	23	05:35	<1.3
	1315 C/F. E. R/E.	23	05:40	<1.3
	1340-C/E	23	17:30	<1.3
	1315-C/O	23	17:35	<1.3
	1315-6760	23	17:40	<1.3
	1290-6920	23	17:45	<1.3
	OESTE PRINCIPAL	23	17:50	<1.3
	OESTE 1315-C/O	24	03:20	<1.3
	OESTE 1315-6420	24	05:20	<1.3
	ESTE 1265-7020	24	05:30	<1.3
ESTE 1340-C/O	24	05:35	<1.3	
ESTE 1386	24	05:40	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1340-ESTE C/F ESTE	24	17:30	<1.3
	1340-OESTE	24	17:35	<1.3
	1315-6780	24	17:40	<1.3
	1215-CF/ ESTE R ESTE	24	17:45	<1.3
	1386- RAMPA ESTE	24	17:50	<1.3
	1340-C/E	25	03:20	<1.3
	1290/6920	25	05:20	<1.3
	1315/CO	25	05:30	<1.3
	1315-6740	25	05:35	<1.3
	CHIMENEA ANIMAK	25	05:40	<1.3
	1315-6760	25	17:30	<1.3
	1315-6600	25	17:35	<1.3
	1290-6360	25	17:40	<1.3
	r/p este	25	17:45	<1.3
	1315-6400	26	03:20	<1.3
	1315-6600	26	05:20	<1.3
	1265-6740	26	05:30	<1.3
	1290-6780	26	05:35	<1.3
	OESTE PRINCIPAL	26	05:40	<1.3
	6640-1315	26	17:30	<1.3
	1215-este	26	17:35	<1.3
	6660-1315	26	17:40	<1.3
	1340 esguinche	26	17:45	<1.3
	ESTE 1340-6640	27	03:20	<1.3
	ESTE 1265-7040	27	05:20	<1.3
	OESTE 1315-C/E	27	05:30	<1.3
	OESTE 1315-6740	27	05:35	<1.3
	1340 OESTE	27	17:30	<1.3
	6760-1315	27	17:35	<1.3
	6780-1315	27	17:40	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	OESTE 1315-6620	28	03:20	<1.3
	ESTE 1290-6960	28	05:20	<1.3
	ESTE ACCESO-1386	28	05:30	<1.3
	1340 C/E RAMPA ESTE	28	17:30	<1.3
	6760-1315	28	17:35	<1.3
	DUMAS	28	17:40	<1.3
	FIORY CON CEMENTO FUNDIDO	28	12:30	<1.3
	OESTE 1340-C/O	30	03:20	<1.3
	1290-6960	30	05:20	<1.3
	1315-6620	30	05:30	<1.3
	1315-CO	30	05:35	<1.3
	CHIMENEA ANIMAK	30	05:20	<1.3
	1340-c/f este del ESTE	30	17:30	<1.3
	1315-6560	30	17:35	<1.3
	1315-6520	30	17:40	<1.3
	1315-9940	31	05:20	<1.3
	1315-6680	31	05:30	<1.3
	1340c/f este del este	31	05:35	<1.3
	1340 c/f este del OESTE	31	05:20	<1.3
	1386- RAMPA ESTE	31	05:30	<1.3
	R/Principal R/W.	31	17:50	<1.3
	1315-6560 R/E.	31	18:00	<1.3
	1315-6760 R/E.	31	18:10	<1.3
	1315-6760 R/E.	31	18:20	<1.3
	1265-7040 R/E.	31	18:30	<1.3
	1290-Ventana B Chimenea	31	18:40	<1.3
	1340-C/f.E. R/E.	31	18:45	<1.3

Donde mm/s: milímetros por segundo; NR: no registrado  
 Fuente: Base de datos Departamento de Ambiente, Minera San Rafael, S.A



## 8. Geoquímica de Roca Estéril

### 8.1. Sitios de Monitoreo

En el cuadro Cuadro 8-1 se enlistan las muestras analizadas de material extraído de los túneles del proyecto, rampa oeste y rampa este, durante los meses de agosto a octubre 2013. Su ubicación se presenta en la Figura 8-1, Figura 8-2, Figura 8-3 y Figura 8-4

Cuadro 8-1: Sitios de Material Extraído de los Túneles, agosto a octubre 2013,  
Proyecto Minero Escobal

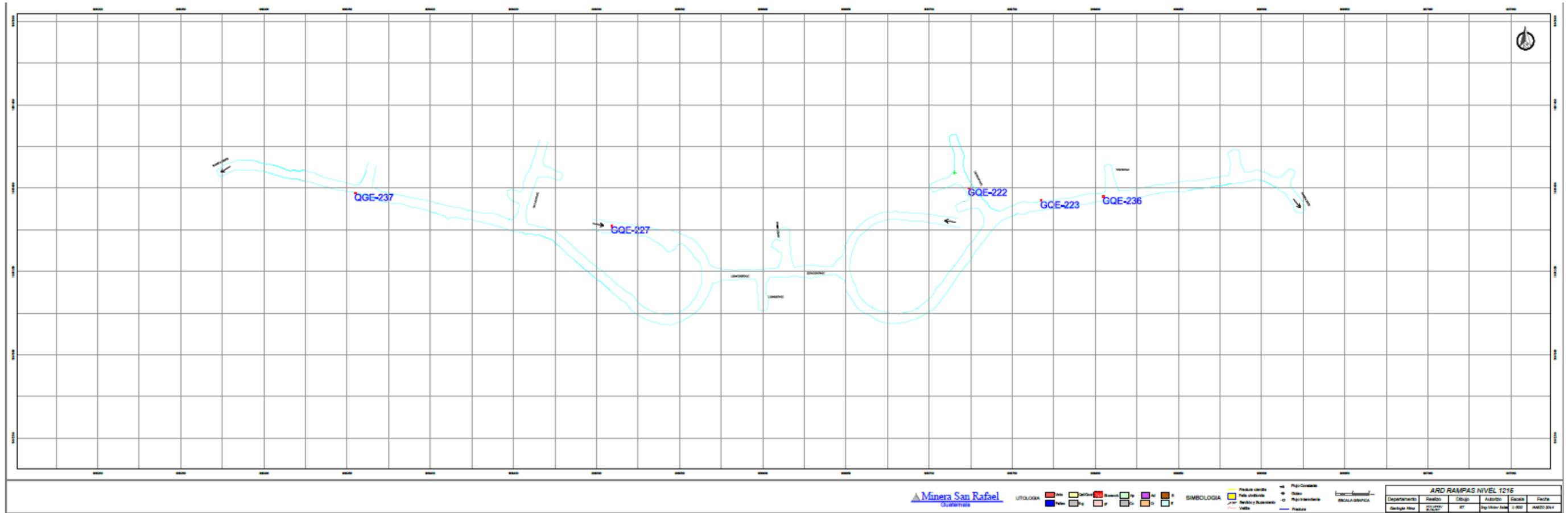
Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-208	1315-CFTO-OC	806435.50	1601422.00	1315
GQE-209	1315-6480-OC	806480.00	1601424.00	1315
GQE-210	1265-VENT-EC	806996.00	1601411.00	1265
GQE-211	1265-6960-EC	806961.00	1601445.00	1265
GQE-212	1315-6700-EC	806697.50	1601386.50	1317
GQE-213	1315-CFTO-EC	806670.00	1601364.00	1315
GQE-214	1265-6980-EC	806982.00	1601444.50	1265
GQE-215	1315-CFTE-OC	806538.00	1601390.00	1315
GQE-216	1290-CFE-EC	807113.00	1601460.00	1292
GQE-217	1265-7000-EC	806994.00	1601448.00	1267
GQE-218	1315-6460-OC	806458.00	1601434.00	1315
GQE-219	1315-6520-OC	806521.00	1601416.00	1315
GQE-220	1315-6500-OC	806500.00	1601423.00	1315
GQE-221	1265-6320-OC	806320.00	1601474.00	1265
GQE-222	1215-ACC-EC	806724.00	1601400.00	1216
GQE-223	1215-REC	806767.50	1601392.50	1212
GQE-224	1265-CFW-OC	806265.00	1601467.00	1267
GQE-225	1315-6680-EC	806682.00	1601383.00	1316.50
GQE-226	1315-6740-EC	806743.00	1601390.00	1316.50
GQE-227	Rampa Oeste principal	806509.24	1601377.42	1217
GQE-228	1315-6640-EC	806640.50	1601375.50	1315
GQE-229	1315-6660-EC	806660.50	1601381.50	1315

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-230	1290-7040-EC	807040.23	1601446.64	1292
GQE-231	1315-6440-OC	806440.00	1601439.00	1316
GQE-232	1315-6760-EC	806761.00	1601391.00	1316
GQE-233	1315-6420-OC	806417.50	1601438.00	1316.00
GQE-234	1315-6560-OC	806557.50	1601394.00	1316.00
GQE-235	1315-6540-OC	806539.00	1601407.00	1317
GQE-236	1215-REC	806805.00	1601395.00	1207
GQE-237	1215-ROC	806355.00	1601397.50	1200
GQE-238	1265-7020-EC	806717.50	1601451.50	1266
GQE-239	1315-6780-EC	806778.00	1601387.50	1317
GQE-240	1315-6400-OC	806399.25	1601439.25	1317
GQE-241	1315-6600-EC	806598.15	1601282.62	1317

Fuente: Departamento de Geología de Mina, Minera San Rafael

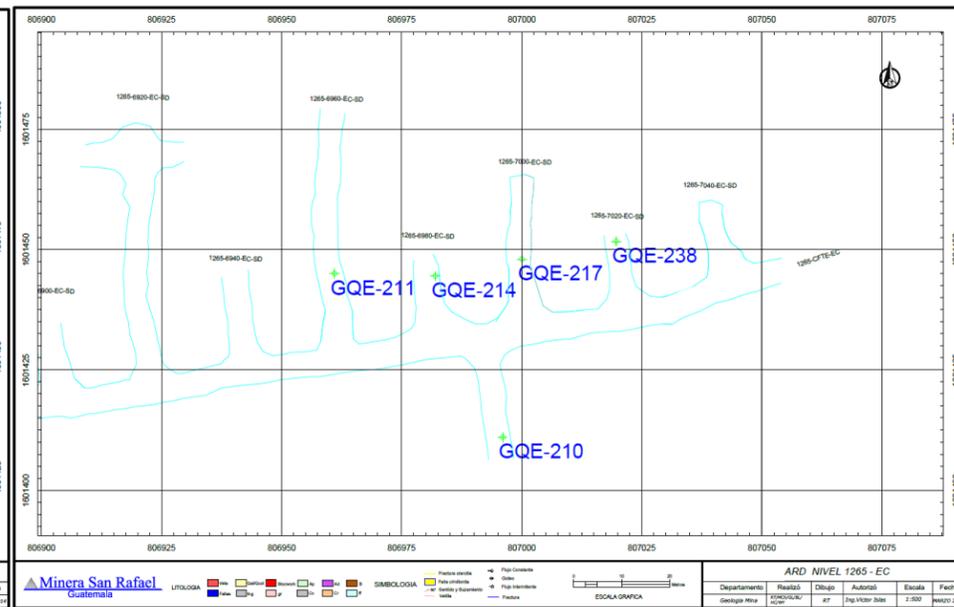
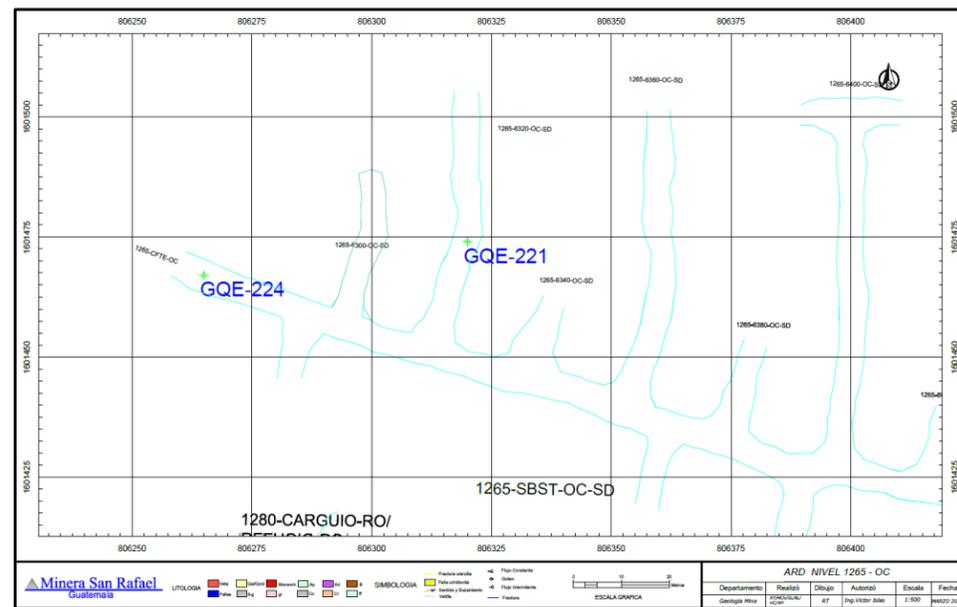
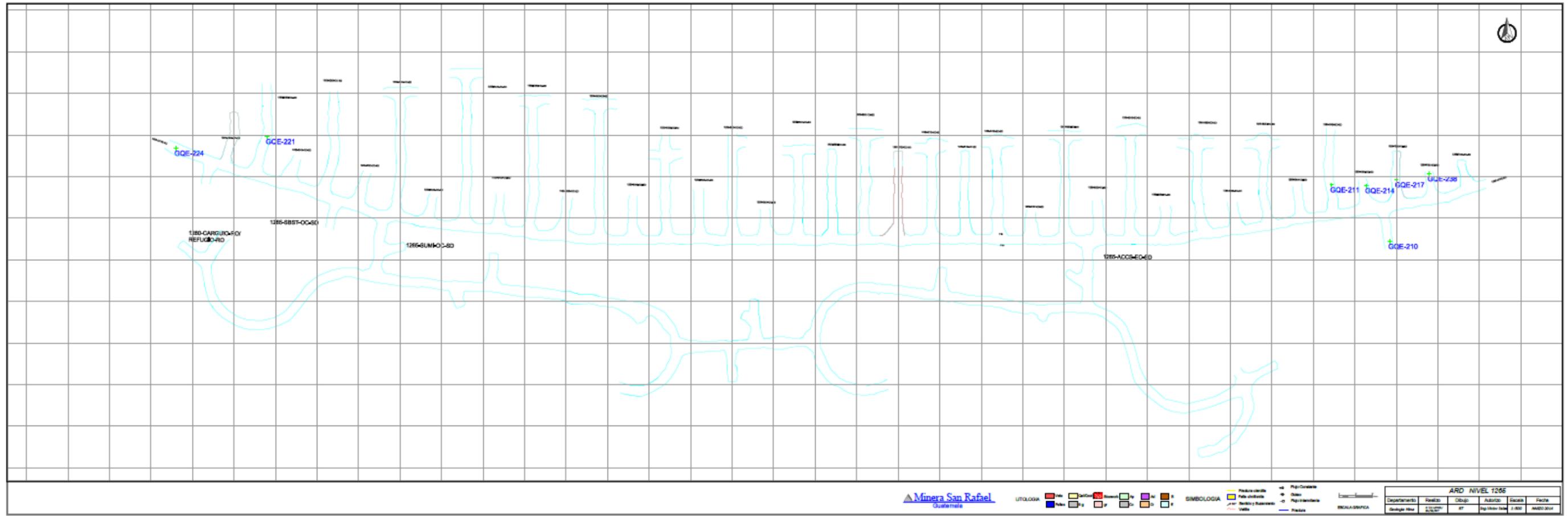


Figura 8-1 Mapa de localización de Sitios de Material Extraído de los Túneles, nivel 1215, Proyecto Minero Escobal 2013



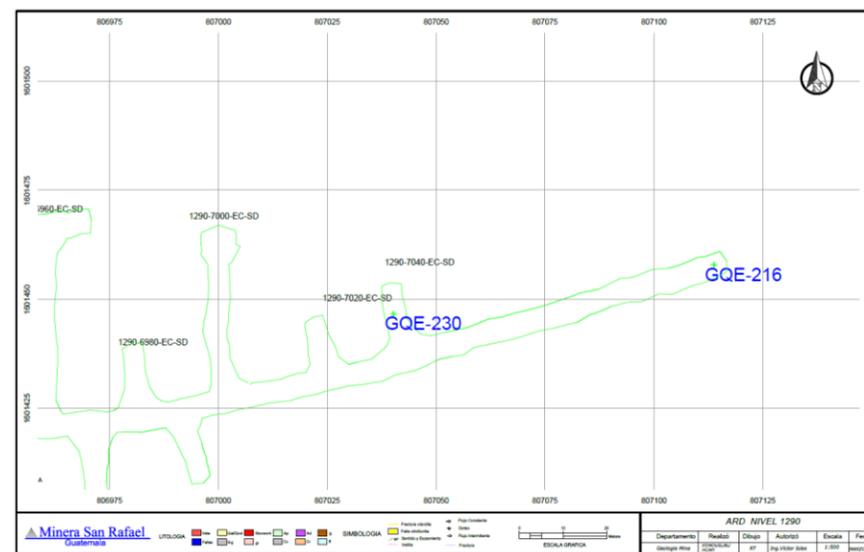
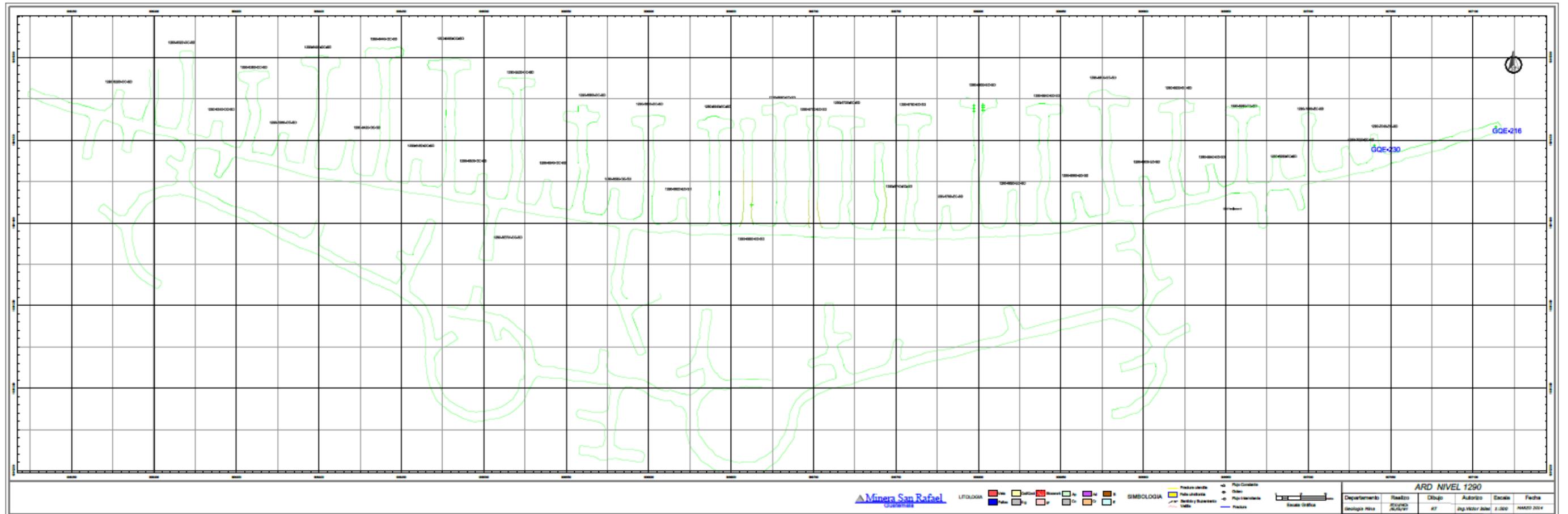
Fuente: Departamento de Geología de Mina, Minera San Rafael

Figura 8-2 Mapa de localización de Sitios de Material Extraído de los Túneles, nivel 1265, Proyecto Minero Escobal 2013



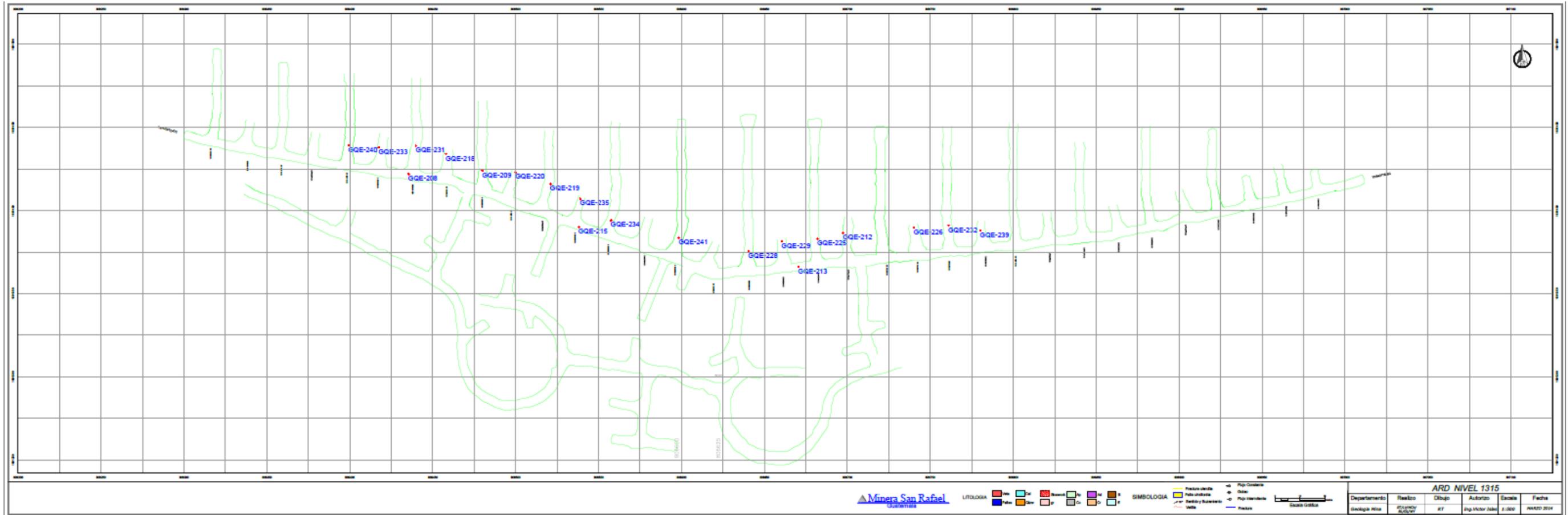
Fuente: Departamento de Geología de Mina, Minera San Rafael.

Figura 8-3 Mapa de localización de Sitios de Material Extraído de los Túneles, nivel 1290, Proyecto Minero Escobal 2013



Fuente: Departamento de Geología de Mina, Minera San Rafael.

Figura 8-4 Mapa de localización de Sitios de Material Extraído de los Túneles, nivel 1315, Proyecto Minero Escobal 2013



Fuente: Departamento de Geología de Mina, Minera San Rafael.

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## 8.2. Metodología

Cuadro 8-2. Procedimiento y equipo utilizado para monitorear de pH en pasta de material extraído de los túneles. Proyecto Minero Escobal

PARÁMETROS ANALIZADOS	
pH	pH en pasta.
PROCEDIMIENTO	
<p>Basados en el método ASTM D4972-01(2007) Standard Test Method for pH of Soils. Se determinó el pH en suspensión de Roca-Agua 1:1 p/v: esto se logró tomando 50 gramos de roca pulverizada y agregándole 50 ml de agua desmineralizada, se agita por 10 minutos y se deja reposar por 10 minutos más, luego se hace lectura directa de pH sobre la suspensión con la ayuda de un potenciómetro previamente calibrado.</p>	
EQUIPO UTILIZADO	
Nombre	Potenciómetro pH & EC
Modelo	H-series H170G
Fabricante	HACH

## 8.3. Resultados

Los resultados de pH en pasta se presentan en el Cuadro 8-3. Los valores de pH se encontraron en el rango de 8.3 a 9.8 u.e. los cuales no dieron indicios de un potencial de generación ácida, por lo que no fue necesario realizar pruebas de laboratorio para el cálculo de ácido base modificado (ABA por sus siglas en inglés) para descartar o confirmar resultados.

Cuadro 8-3 Resultados de pH en Pasta en muestras de material extraído de Túneles, agosto a octubre 2013, Proyecto Minero Escobal.

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-208	10/08/2013	14/08/2013	9.53	24.2
GQE-209	10/08/2013	14/08/2013	9.46	23.7
GQE-210	10/08/2013	14/08/2013	9.71	24.3
GQE-211	10/08/2013	14/08/2013	9.07	24.3
GQE-212	14/08/2013	30/08/2013	8.95	23.5
GQE-213	24/08/2013	30/08/2013	8.98	23.4
GQE-214	25/08/2013	30/08/2013	8.91	22.9
GQE-215	26/08/2013	30/08/2013	8.7	22.0
GQE-216	27/08/2013	30/08/2013	8.64	21.8
GQE-217	27/08/2013	30/08/2013	8.33	21.6
GQE-218	06/09/2013	11/09/2013	9.05	21.5
GQE-219	06/09/2013	11/09/2013	9.03	21.7
GQE-220	06/09/2013	11/09/2013	9.26	23.6
GQE-221	07/09/2013	11/09/2013	8.83	23.2
GQE-222	16/09/2013	28/09/2013	8.67	27.7
GQE-223	16/09/2013	28/09/2013	8.96	27.3
GQE-224	16/09/2013	28/09/2013	9.16	24.6
GQE-225	17/09/2013	28/09/2013	9.25	23.1
GQE-226	17/09/2013	28/09/2013	9.56	21.8
GQE-227	01/10/2013	15/10/2013	9.4	21.8
GQE-228	04/10/2013	15/10/2013	9.54	20.5
GQE-229	04/10/2013	15/10/2013	9.8	20.7
GQE-230	04/10/2013	15/10/2013	9.44	21.8
GQE-231	04/10/2013	15/10/2013	9.73	23
GQE-232	10/10/2013	22/10/2013	8.86	23.5
GQE-233	14/10/2013	22/10/2013	8.89	23.2
GQE-234	14/10/2013	22/10/2013	8.75	22.8
GQE-235	15/10/2013	22/10/2013	9.01	22.5
GQE-236	24/10/2013	30/10/2013	9.1	26.3
GQE-237	24/10/2013	30/10/2013	9.25	26.3
GQE-238	24/10/2013	30/10/2013	8.36	27
GQE-239	26/10/2013	30/10/2013	9.05	25.9
GQE-240	28/10/2013	30/10/2013	9.16	25.9
GQE-241	28/10/2013	30/10/2013	9.42	25.4

Fuente: registros departamento de medio ambiente, Minera San Rafael.

## 9. Mediciones de Seguridad Industrial y Salud Ocupacional

### 9.1. Presión Sonora

Para los periodos de medición del II Trimestre (agosto, septiembre, octubre 2013) , en lo que refiere a presión sonora, nuevamente se han tomado en cuenta los puntos de monitoreo aledaños al área de construcción en Superficie, por contar con gran cantidad de personal, especialmente contratistas, en los puntos ER1, ER2, según muestra la Figura 9-1 que corresponden a las áreas aledañas a los portales, la cantidad de personal que estuvo laborando en tales zonas, son mayormente contratistas, iniciando con cerca de 746 en agosto, continuando con 786 en septiembre y terminando con cerca de 831 en octubre.

Los resultados de la presión sonora se muestran en la Cuadro 9-1, con lo cual indica que estamos haciendo comparaciones base con la norma OSHA, también se hicieron monitoreos mediante el uso de dosímetros portables. Los cuadros muestran, que se está dentro de parámetros aceptables OSHA en los puntos evaluados, debemos considerar que el Leq está acumulado para periodo de 24 horas y es de considerarse que implica una mayor dosis recibida por efecto de acumulación, a pesar de ello se está dentro de parámetros aceptables, lo que indica que si con 24 horas de exposición es aceptable, con mayor razón estaría para un periodo menor, también muestran los cuadros los resultados de evaluaciones hechos al interior de la Mina.

Para este trimestre también se han incluido mediciones realizadas al interior de la Mina bajo un método puntual, las cuales se muestran en el Cuadro 9-2Cuadro 9-3 donde los resultados fueron satisfactorios, donde se encontró que la dosis recibida para los trabajadores con uso del protector auditivo, está dentro de niveles aceptables.

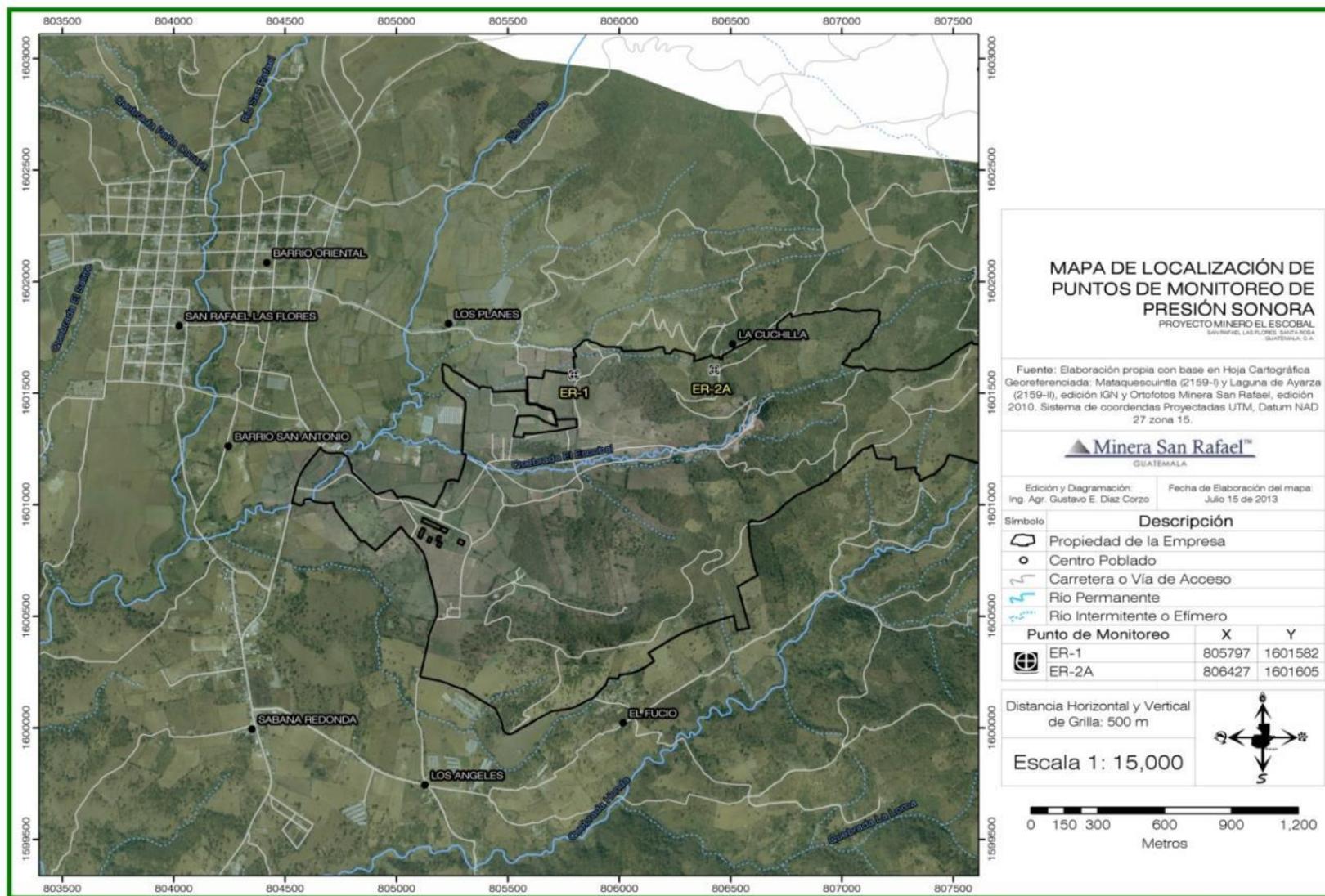


Figura 9-1 Mapa Localización Puntos Monitoreo Presión Sonora de Salud Ocupacional



Cuadro 9-1. Resultados de Presión Sonora durante los meses de agosto a octubre 2013, Salud Ocupacional. Proyecto Minero Escobal.

ER - 1 Coordenadas UTM: X 805801 m, Y 1601417 m. 2013				ER - 2 Coordenadas UTM: X 806425 m, Y 1601616 m. 2013			
Trimestre	III			Trimestre	III		
Mes	Ago	Sep	Oct	Mes	Ago	Sep	Oct
Fecha	08/08/2013	13/09/2013	12/10/2013	Fecha	08/08/2013	13/09/2013	12/10/2013
Hora Inicio	11:49	15:22	16:40	Hora Inicio	11:49	15:22	16:40
Duración	24h	24h	24h	Duración	24h	24h	24h
Lmax dBA	73	84.5	76.2	Lmax dBA	76.5	75.1	78.7
Lmin dBA	44	38.5	38.3	Lmin dBA	41.7	39.6	40.1
Prom. Diurno dBA	49.3	45.1	47.2	Prom. Diurno dBA	50.6	48.8	50.8
Prom. Nocturno dBA	46.2	46.2	47.7	Prom. Nocturno dBA	48.8	47.6	51.9
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 24 horas (24.3 horas y 21.1 horas)*	82	82	82	Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 24 horas (24.3 horas y 21.1 horas)*	82	82	82
Duración de Referencia OSHA	24.3h	24.3h	24.3h	Duración de Referencia OSHA	24.3h	24.3h	24.3h
Leq	48.4	45.5	47.3	Leq	50.0	48.3	51.9
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Puesto de Operador de Scoop 2013				Puesto de Operador de Jumbo 2013			
Trimestre	III			Trimestre	III		
Mes	Ago	Sep	Oct	Mes	Agosto	Septiembre	Octubre
Fecha	08/08/2013	13/09/2013	12/10/2013	Fecha	08/08/2013	13/09/2013	12/10/2013
Hora Inicio	7:00	7:00	19:00	Hora Inicio	7:00	7:00	19:00
Duración	12 hrs	12 hrs	12 hrs	Duración	12hrs	12 hrs	12hrs
Lmax dBA	144.1	142.2	131.61	Lmax dBA	140.8	142.2	144.5
Lmin dBA	60	60	60	Lmin dBA	60	60	60
Prom. Diurno dBA	-	92.9	-	Prom. Diurno dBA	94.7	95.3	-
Prom. Nocturno dBA	94.7	-	87.8	Prom. Nocturno dBA	-	-	97.3
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 24 horas (24.3 horas y 21.1 horas)*	82	82	82	Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 24 horas (24.3 horas y 21.1 horas)*	82	82	82
Duración de Referencia OSHA	24.3h	24.3h	24.3h	Duración de Referencia OSHA	24.3h	24.3h	24.3h
Leq (Normal sin uso de EPP)	89	90	85	Leq (Normal sin uso de EPP)	94.7	93.8	94.4
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	74.5	75.5	70.5	Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	80.2	79.3	79.9
Observación/Comentario	Si EPP sobrepasaría la dosis, considerando que el tiempo efectivo del turno es < 10.6 hrs.			Si EPP sobrepasaría la dosis, considerando que el tiempo efectivo del turno es < 10.6 hrs.			Si EPP sobrepasaría la dosis, considerando que el tiempo efectivo del turno es < 10.6 hrs.
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Puesto de Supervisor de Servicios Mina 2013			Puesto de Operador de Boltec 2013		
Trimestre	III		Trimestre	III	
Mes	Agosto	Octubre	Mes	Agosto	Octubre
Fecha	08/08/2013	12/10/2013	Fecha	08/08/2013	12/10/2013
Hora Inicio	7:00	19:00	Hora Inicio	19:00	7:00
Duración	12 hrs	12 hrs	Duración	12 hrs	12 hrs
Lmax dBA	136.3	131.3	Lmax dBA	140.2	143.2
Lmin dBA	60	60	Lmin dBA	60	60
Prom. Diurno dBA	86.7	-	Prom. Diurno dBA	-	92.2
Prom. Nocturno dBA	-	87.8	Prom. Nocturno dBA	90.9	-
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 24 horas (24.3 horas y 21.1 horas)*	82	82	Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 24 horas (24.3 horas y 21.1 horas)*	82	82
Duración de Referencia OSHA	24.3h	24.3h	Duración de Referencia OSHA	24.3h	24.3h
Leq (Normal sin uso de EPP)	83.8	84.8	Leq (Normal sin uso de EPP)	90	89.3
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	69.3	70.3	Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	75.5	74.8
Observación/Comentario	Si EPP sobrepasaría la dosis, considerando que el tiempo efectivo del turno es < 10.6 hrs.		Si EPP sobrepasaría la dosis, considerando que el tiempo efectivo del turno es < 10.6 hrs.		
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable

Fuente: Departamento de Seguridad Industrial, Minera San Rafael, S.A

Cuadro 9-2. Resultados de Mediciones de Presión Sonora en Mina Subterránea para los meses agosto a octubre 2013. Proyecto Minero Escobal

Ciclo	PASO BÁSICO DEL CICLO	CICLO DE MINADO	Tiempo de exposición al nivel de ruido en horas = C	Nivel máximo permitido 12.1 horas OSHA dbA (T1)	Nivel máximo permitido 10.6 horas OSHA dbA (T2)	Nivel de Ruido en dbA en Fast/Hi	Nivel de Ruido dbA en Slow/Low	Exposición		Promedio del Tiempo de exposición máximo permisible OSHA en el nivel de ruido promedio para E1 en horas = T1 sin EPP	Promedio del Tiempo de exposición máximo permisible OSHA en el nivel de ruido promedio para E2 en horas = T2 con EPP	d = % de la dosis permitida sin epp (C/T1)	% Dosis diaria acumulada sin EPP	d = % de la dosis permitida con epp (C/T2)	% Dosis diaria acumulada con EPP
								Exposición Promedio Sin epp= E1 dbA Medido en modo Lento/Bajo	Exposición Promedio con epp (50% atenuación proyectada del NRR 29dbA = 14.5						
	Variable	Variable	Medido	Fijo	Fijo	Variable	Variable	Medido	Fórmula	Tabla	Tabla	Fórmula	Fórmula	Fórmula	Fórmula
Trimestre III (Agosto, Septiembre y Octubre)	1	Rezagado/Acarreo	1,5	87	88	90	88	88	73,5	10,6	32	14,15%	14,15%	4,69%	4,69%
	2	Fortificación/Sostenie	2,5	87	88	89	88	88	73,5	10,6	32	23,58%	37,74%	7,81%	12,50%
	3	Lanzado	3	87	88	81	80	80	65,5	32	32	9,38%	47,11%	9,38%	21,88%
	4	Perforando	3	87	88	92	90	90	75,5	8	32	37,50%	84,61%	9,38%	31,25%
	5	Cargando	1	87	88	88	85	85	70,5	16	32	6,25%	90,86%	3,13%	34,38%
<b>TOTALES</b>			11	Horas de ciclo óptimo calculado								<b>D1= 91%</b>	<b>D2= 34%</b>		
<b>EQUIPO UTILIZADO:</b>			SOUND LEVEL METER												
<b>MARCA:</b>			RadioShack Technology PLUS												
<b>MODELO:</b>			3300099												
<b>SERIAL</b>			03A12												
<b>CALIBRADOR:</b>			ACOUSTIC CALIBRATOR CLASS 1												
<b>MARCA:</b>			3M QUEST												
<b>MODELO:</b>			AC-300												
<b>SERIAL</b>			AC-300001349												
<b>CLASE Y REFERENCIA:</b>			IEC 60942 2003, ANSI S1.40 (R2011), 114db - 1kHz, 250 Hz												
<b>CONCLUSIÓN:</b>			De acuerdo a cálculos y estudios, se concluye que con el uso de EPP tapon auditivo que tiene atenuación de 29dbA y una efectividad proyectada de NRR 14.5 dbA. Aun sin la atenuación del epp no se alcanza a recibir el 100% de la dosis marcada por OSHA.												

D1 ≥ 1 Entonces aplicar controles, máquinas, medio ambiente, EPP.

D2 ≥ 1 Fuera de norma. D2 < 1 Aceptable

RESULTADO FINAL: D2 < 1 **ACEPTABLE**

Fuente: Departamento de Seguridad Industrial, Minera San Rafael, S.A

## 9.2. Mediciones de Partículas Respirables

Para hacer estos estudios, se han realizado con un monitor de polvo sedimentable respirable en los mismos puntos renombrados EA-1A y EA-2A según muestra la Figura 9-2 que al igual que en la medición de Presión Sonora, se ha optado por tomar como referencia las áreas donde se encuentra mayor personal. Los resultados de medición para el Trimestre III (agosto, septiembre, octubre 2013) se muestran en el Cuadro 9-3. En este trimestre, también se hicieron mediciones en Mina Subterránea, los resultados fueron satisfactorios como puede apreciarse también en dichos cuadros, y se está dentro de parámetros aceptables, en algunos casos de manera normal y otros después de la aplicación del factor de compensación por homologación de EPP, se está dentro de rango y en ningún momento se excede el límite normal, que es el parámetro que refiere el fabricante para el respirador usado en las áreas de monitoreo, marca 3M código 8210 N95 Homologación NIOSH.

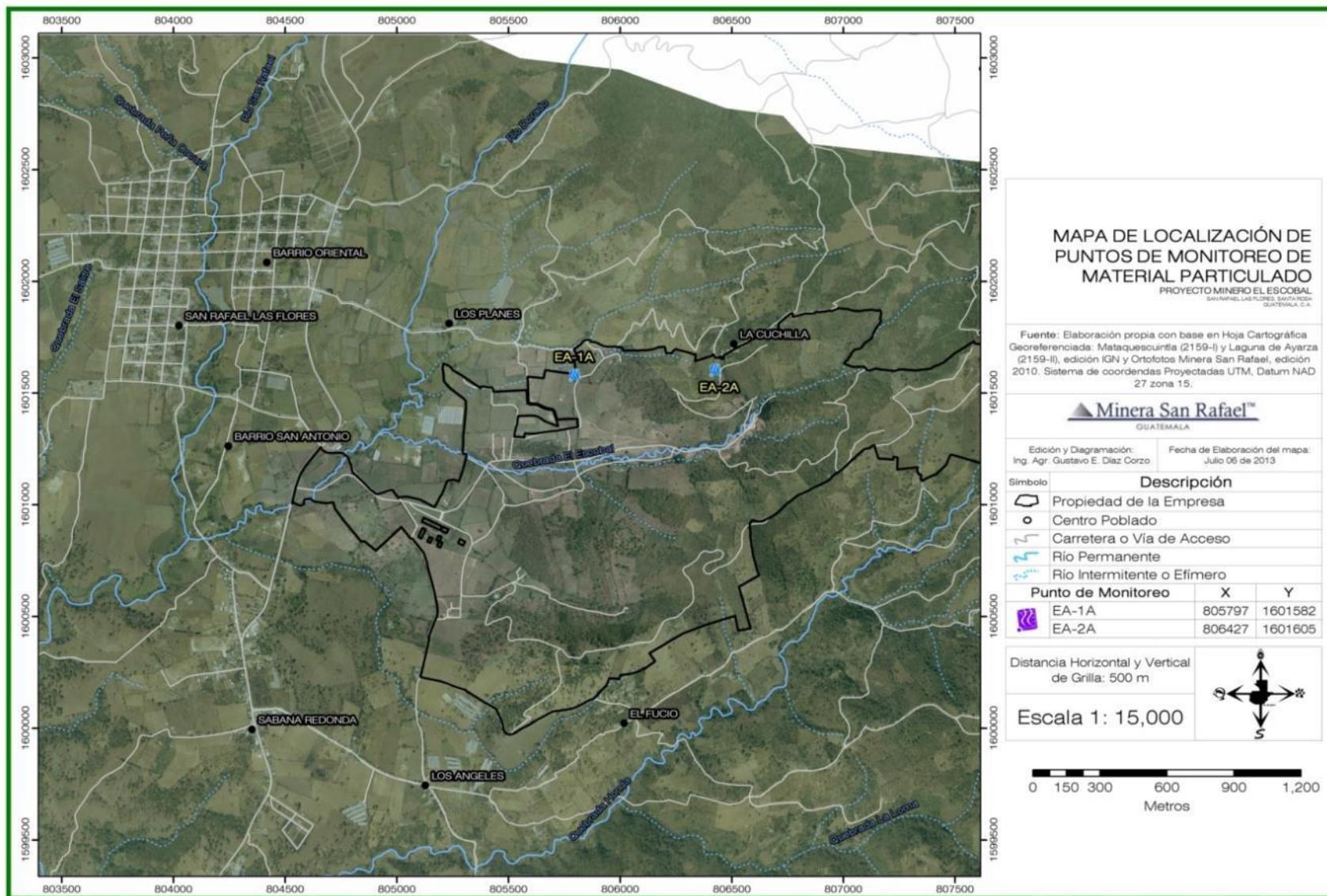


Figura 9-2 Mapa Localización Puntos Monitoreo Partículas Respirables, Salud Ocupacional

Cuadro 9-3. Resultados de Material Particulado durante los meses de agosto a octubre 2013, Salud Ocupacional. Proyecto Minero Escobal.

EA - 1A Coordenadas UTM: X 806418 m, Y 1601233 m.							2013			
Trimestre							III			
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL RESPIRADOR N95 3M 8210 A 95% DE EFICIENCIA MINIMA, CON EPP	NORMA*	GUÍA*		Agost	Sept	Oct	
Fecha					USEPA <sup>1</sup>	BANCO MUNDIAL <sup>2</sup>	OMS <sup>3</sup>	13/08/2013	13/09/2013	13/10/2013
Hora Inicio								11:42	14:40	10:50
Duración								23:59	23:59	23:59
OSHA Fracción Respirable PM <sub>4</sub>					mg/m <sup>3</sup>	5	100	150	150	50
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	300	150	150	50	0,01149	0,01522	0,0164	
EA - 2A Coordenadas UTM: X 806396 m, 1601558 m.							2013			
Trimestre							III			
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL RESPIRADOR N95 3M 8210 A 95% DE EFICIENCIA MINIMA, CON EPP	NORMA µg/m <sup>3</sup>	GUÍA µg/m <sup>3</sup>		Agost	Sept	Oct	
Fecha					USEPA <sup>1</sup>	BANCO MUNDIAL <sup>2</sup>	OMS <sup>3</sup>	13/08/2013	13/09/2013	13/10/2013
Hora Inicio								11:40	17:28	15:05
Duración								23:59	23:59	23:59
OSHA Fracción Respirable PM <sub>4</sub>					mg/m <sup>3</sup>	5	100	150	150	50
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	300	150	150	50	0,01307	0,01029	0,00933	
Interior Mina General							2013			
Trimestre							III			
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MINIMA) CON EPP	NORMA µg/m <sup>3</sup>	GUÍA µg/m <sup>3</sup>		Agost	Oct		
Fecha					USEPA <sup>1</sup>	BANCO MUNDIAL <sup>2</sup>	OMS <sup>3</sup>	24/8/14	23/10/13	
Hora Inicio								9:32	15:15	
Duración								01:12hrs	1:29hrs	
OSHA Fracción Respirable PM <sub>4</sub>					mg/m <sup>3</sup>	5	16667	150	150	50
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	50000	150	150	50	0,988	1,523		
<p><b>Nota:</b> OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de él (ajustando con la norma OSHA) del respirador mismo, ajuste recomendado por el fabricante, estamos dentro de parámetros, es decir que si comparamos aún la norma para fracción respirable con el resultado de Polvo Total, estamos mas que seguros de estar dentro de norma.</p>										

Fuente: Departamento de Seguridad Industrial, Minera San Rafael, S.A.

### 9.3. Mediciones de Gas

Las mediciones de Gas, se hacen en forma rutinaria, turno a turno, y debido a que no se ha rebasado los límites permisibles cuando se encuentra maquinaria presente trabajando en las áreas según norma OSHA (Tabla Z1 1910.100 Límites para aires contaminados), es la razón por la que se ha mantenido los sistemas de ventilación de manera normal, como se puede apreciar en Cuadro 9-4, como se mencionó en el reporte del Trimestre II 2013 dada la no presencia de Ácido Sulphídrico - Sulfuro de Hidrógeno (H<sub>2</sub>S) se siguió monitoreando y para efectos de informe se omitirá hasta detectar la primera vez. De igual forma, para efectos de publicación de informes, se seleccionará la primer etapa del ciclo que aparezca en las mediciones rutinarias, por lo que en dichos cuadro, como se mencionó desde el II Trimestre, se ha colocado como mínimo 3 turnos de alguno de los meses del trimestre, a fin de tener información más compacta y sistematizada.

Cuadro 9-4. Extracto de las mediciones de del III trimestre 2013, acorde a procedimiento de tomar la primera etapa del ciclo que aparezca.

MEDICIONES DE CALIDAD DE AIRE Y TEMPERATURA EN INTERIOR MINA 2013							
FECHA	Lugar	Maquinaria	Etapas de Ciclo	CO (PPM)	Hora	Turno	Reportado por
				Límite Máximo Turno 25ppm, Exposición Breve 50 ppm			
<b>Lecturas a inicio de turno</b>							
01-oct-13	Este 1215 suridero	Ninguna	Pegado turno anterior	0	6:30	Diurno	Rene Rivera/Antonio Sapón
	este 1315 6720	Ninguna	Pegado turno anterior	2,2	6:35		
	Oeste 1265 6666	Ninguna	Pegado turno anterior	2	6:45		
	Este 1265 CFE	Tripode topográfico	Marcando puntos para digitalización	14	9:48		
	Este 1265 ventilación	LM-75	Sondeo UG	16	10:00		
	Este 1265 6960	RB-06	Sosteniendo	15	10:20		
	Este 1265 6840	JD-01	Perforando	11	10:45		
Oeste CFO	JD-06	Perforando	4	11:00			
1230 conexión	LM-55	Sondeo UG	9	11:15			
<b>Lecturas a inicio de turno</b>							
03-oct-13	1315 CF TO	-	voladura	10	18:40	Nocturno	Dennis Sazo
	1315 CF TE	-	voladura	11	18:40		
	1386	-	voladura	0	18:40		
	1215 E O	-	voladura	0	18:40		
	1265 6840	-	voladura	0	18:40		
	1290 6800	-	voladura	0	18:40		
	1290 6400	LH-01	Perforando	0	1:18		
	1290 6640	LH-03	Perforando	4	1:28		
	1315 CFE O	AT-02	Cargando	0	1:42		
	1290 CFE	LM-55	Sondeo	16	1:58		
	1230 EC CFE	LM-55	Sondeo	6	2:16		
1230 Conex	TLR-02	Servicios	7	2:23			
<b>Lecturas a inicio de turno</b>							
02-oct-13	1265 6960	-	voladura	42	6:30	Diurno	Augusto Santizo/Antonio Sapón
	1315 6720	-	voladura	29	6:35		
	1315 6560	-	voladura	18	6:45		
	Este 1386	Ninguna	Analizando terreno para colocar marcos	9	10:20		
	Este 1265 6840	RB02	Fortificando	7	11:32		
	Este 1265 7000	LM 75	Prueba de reflex	15	12:00		
	Este 1265 6960	TL 03	Adelantando manga ventilación	8	12:20		
Oeste 1315 6560	RB05	Fortificando	0	13:45			
Oeste 1315 6420	AT02 y Bomba sueltes	Colocación de superueltes	0	16:05			
<b>Lecturas a inicio de turno</b>							
02-oct-13	1315 67 E	-	voladura	10	19:00	Nocturno	Dennis Sazo
	1315 servicios O	-	voladura	0	18:35		
	1315 CFO O	-	voladura	0	18:43		
	1265 6380	AT-02	Cortando mallas sueltas	4	22:50		
	1265 7000	LM-75	Prueba de reflex	9	23:03		
	1265 6960	RB-01	Fortificando	8	23:13		
	1290 CF TE	LM-55	Sacando nucleos	9	23:22		
1230 EC CFE	LM-55	Sacando nucleos	7	23:42			
Fronte Principal Oeste	ST-02	Lanzando	0	23:52			
<b>Lecturas a inicio de turno</b>							
03-oct-13	Este 1315 CF TO	-	voladura	27	6:30	Diurno	Augusto Santizo/Antonio Sapón
	Este 1315 6720	-	voladura	35	6:35		
	Oeste 1315 6540	-	voladura	25	6:45		
	Este 1386	JD01	Perforando para luego cargar	11	10:40		
	Este 1215	ST01	Lanzando	9	11:20		
	Conexión 1230	LM55	Sacando nucleos	1	13:45		
	Este 1265 6980	LM75	Sondeo	9	13:00		
Este 1265 7000	AT	Instalación de super sueltes	11	12:10			
CFE 1296	LM55	Sondeo y cementado	7	12:15			
<b>Lecturas a inicio de turno</b>							
03-oct-13	1315 6420	-	voladura	0	18:34	Nocturno	Dennis Sazo
	1315 CFE O	-	voladura	8	18:37		
	Fronte Principal Oeste	-	voladura	0	18:46		
	1265 7020	-	voladura	32	18:52		
	1315 6760 E	-	voladura	17	19:00		
	1290 CF TE E	LM-55	extrayendo nucleos	9	23:28		
	1290 6840	ST-01	Lanzando	20	23:39		
	1290 6720	LH-03	perforando	11	23:53		
	1290 6440	LH-02	perforando	8	0:09		
	1265 SJUM	TLR0-02	colocando bomba	9	0:35		
Fronte Principal Oeste	JD-02	perforando	7	0:58			
<b>Lecturas a inicio de turno</b>							
04-oct-13	1315 6720	-	voladura	14	6:30	Diurno	Juan C. Fernandez
	1315 SERV OC	-	voladura	10	6:30		
	1265 6960	-	voladura	72	6:40		
	ACC 1386 RE	Ninguna	RYVE COCINI	9	9:50		
	1290 7080	LM55	ESTACION SONDEO	15	10:20		
	1265 6480	LL31	Rezagando	18	10:45		
	1215 RC	TL 02	SERVICIOS	10	13:45		
	1230 CONX	LM55	ESTACION SONDEO	9	14:08		
	1215 E/C	Bomba BIA	Forando	6	14:38		
	1315 6540 O	-	voladura	0	18:33		
1215 Rampa Este	-	voladura	0	18:41			
1315 CF TO	-	voladura	18	18:47			
1315 CF TE	-	voladura	8	18:52			
1290 6440	LH-02	perforando	6	23:36			
1290 6680	JD-01	perforando	9	23:42			
1290 6720	LH-03	perforando	10	23:51			
1290 6840	JD-02	perforando	11	23:56			
1290 6920	FT-01	Fortificando	18	0:07			
Fronte Principal Oeste	RB-01	Fortificando	8	0:31			
<b>Lecturas a inicio de turno</b>							
05-oct-13	1290 6840 EC	-	-	39	6:30	Diurno	Jose Carrillo/ Alvaro Tan.
	1290 6840 EC	-	-	27	6:35		
	1315 6560	-	-	20	6:45		
	1315 6420	-	-	18	6:50		
	1315 OE Servicios	-	-	20	6:59		
	1265 Ventilación EC	DE-04	Sondeo	17	9:14		
	1265 6840 EC	JD-08	Perforando	23	9:40		
	1265 6920	LH-01	Perforando	17	10:14		
	1265 6800	LL-31	Acara	23	10:35		
	1315-CFE	JD-01	Perforando	20	11:10		
1315-CFE	RB-01	Fortificación	20	12:05			
1215 EC	JD-05	Perforando	18	13:45			
1290 6840	RB-05	Fortificación	12	14:50			
<b>Lecturas a inicio de turno</b>							
05-oct-13	1315 6520 OC	-	voladura	1	18:35	Nocturno	Dennis Sazo
	1265 6960	-	voladura	10	18:42		
	1215 EC	-	voladura	0	18:49		
	1315 CFE EC	-	voladura	11	19:02		
	1290 6640	LH-02	perforando	2	23:55		
	1290 CF TE	LM-55	extrayendo nucleos	11	0:12		
	1290 6840	RB-06 y FK-01	mantenimiento	14	0:22		
	1290 6720	RB-01	fortificando	13	0:29		
	Fronte Principal Este	ST-01 y CM-03	lanzando	6	0:53		
	Fronte Principal Oeste	JD-06	perforando	5	1:06		
<b>Lecturas a inicio de turno</b>							
06-oct-13	1265-7020	-	-	350	6:30	Diurno	Jose Carrillo/ Alvaro Tan.
	1315-6720	-	-	20	6:35		
	1315 CFO	-	-	13	6:45		
	1215 Rampa	-	-	15	6:50		
	6840 EC 1265	ST-02	Zarpeo	13	10:45		
	6920 EC 1265	JD-06	Perforando	23	11:15		
	1265 Ventilación	DD-04	Sondeo	43	11:45		
	6840 1290	LH-01	Perforado	4	12:25		
	1290 6480	-	Carga Explosivo	7	12:50		
	1290 6680	RB-01	Fortificación	7	13:35		
	1290 CFE	DD-03	Sondeo	14	14:15		
	Rampa Principal EC	JD-01	Perforación	8	15:50		
	1315 6720	JD-02	Perforación	14	16:15		

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Fuente: Departamento de Seguridad Industrial, Minera San Rafael, S.A





## 10. Conclusiones

- Los valores de  $PM_{10}$  registrados durante los meses de agosto a octubre 2013 fueron menores a las concentraciones establecidas por la EPA y el Banco Mundial ( $150 \mu\text{g}/\text{m}^3$ ) para las estaciones monitoreadas; y todas se encuentran dentro de los valores mínimos y máximos registrados durante el establecimiento de la línea base.
- No se detectó dióxido de azufre en las siete estaciones de calidad de aire muestreadas durante el mes de septiembre 2013, y dióxido de nitrógeno se detectó las estaciones de San Rafael, El Fucío, Portón de los Ángeles, Sabana Redonda y La Cuchilla en concentraciones muy cercanas al límite de detección del método.
- Los promedios diurnos y nocturnos de niveles de presión sonora registrados durante los meses de agosto a octubre 2013 cumplen con los límites para promedios diurnos y nocturnos dados por la USEPA (55 dBa) en la mayoría de estaciones monitoreadas, y ninguna superó los promedios diurnos y nocturnos dados por el Banco Mundial para zonas industriales (70 dBa). Todos los valores registrados se encuentran dentro de los valores mínimos y máximos registrados durante el establecimiento de la línea base.
- Se verificó que los resultados proporcionados por los laboratorios Ecosistemas Proyectos Ambientales y ACZ Laboratory son confiables tanto en manipulación como en precisión, según el análisis de aseguramiento de calidad efectuado con los resultados de las muestras blanco y duplicados.
- Las estaciones de monitoreo de agua superficial cumplieron con los límites máximos permisibles de parámetros fisicoquímicos dados por el Acuerdo Gubernativo 236-2006 para entes generadores nuevos; presentaron un pH levemente alcalino y en ninguna estación se detectaron concentraciones de Aceites y Grasas, Cianuro Total, DBO, Cromo Hexavalente, Berilio, Cromo,

Mercurio y Níquel. La concentración de Cloruros, Fluoruros, Antimonio, Cadmio, Cobre, Bario, Plomo y Selenio fueron detectados en concentraciones menores a los límites máximos registrados durante el levantamiento de línea base y menores a las directrices establecidas por la USEPA para la salud humana, y el Fósforo total y por debajo de los límites establecidos por el Acuerdo 236-2006. El Arsénico y el Aluminio se detectaron en concentraciones dentro de las concentraciones mínimas y máximas en el establecimiento de línea base en todas las estaciones.

- En general los parámetros analizados para los nacimientos GW-1A, GW-2, GW-3, GW-4 y GW-5 cumplen con el Acuerdo 236-2006 y los valores en general se encuentran dentro del rango estadístico de la línea base. El Arsénico, Hierro y Aluminio disuelto se detectaron por debajo de los límites establecidos en la línea base; no se detectó Cianuro Total, Berilio, Boro, Cobalto, Cobre, Cromo Hexavalente, Mercurio, Molibdeno, Níquel y Planta.
- La mayoría de pozos de monitoreo cumplen con los límites máximos permisibles dados en el Acuerdo 236-2006 para entes generadores nuevos y los valores en general se encuentran dentro del rango estadístico de la línea base, la excepción se da en el pozo MW2 que debido a fuentes externas al proyecto presentó una concentración de Sólidos Suspendidos Totales, Coliformes Fecales y color por arriba de los límites dados en el Acuerdo.
- El efluente de la planta de tratamiento de agua del túnel, y la pileta de cumplimiento ambiental (EP-3) del proyecto Escobal cumplieron con los límites máximos permisibles dados por el Acuerdo Gubernativo 236-2006 para entes generadores nuevos; según los resultados de laboratorios obtenidos durante los muestreos efectuados en los meses de agosto a octubre 2013.
- Todas vibración inducidas por las voladuras registradas durante los meses de agosto a octubre 2013 están por debajo del límite de detección del equipo empleado (1.3 mm/s), el cual es menor al límite a partir del cual las vibraciones inducidas por una voladura puede ocasionar daños (50.8 mm/s) según la norma del United States Bureau of Mines.

- Los valores de pH en Pasta obtenidos de las muestras de material extraído de los túneles durante los meses de agosto a octubre 2013 no dieron indicios de un potencial de generación ácida.
- Se está por debajo del Límite de Nivel de Sonido ponderado A acorde a OSHA para 24 horas (82-83 dBa) en los puntos evaluados. Según los datos obtenidos de presión sonora de salud ocupacional en los meses de agosto a octubre 2013.
- No se excede el límite normal de polvo sedimentable respirable en las estaciones monitoreadas durante los meses de agosto a octubre 2013; que es el parámetro que refiere el fabricante para el respirador usado en las áreas de monitoreo, marca 3M código 8210 N95 Homologación NIOSH.



## 11. Anexos

### 11.1. Caudal Bombeado de Túneles a Planta de Tratamiento y su Descarga Hacia la Quebrada El Escobal

En las siguientes tablas se presentan las lecturas diarias realizadas a los flujómetros instalados en las cuatro tuberías provenientes de los portales (2 tuberías por portal) y el flujómetro instalado en el clarificador de la Planta de tratamiento de aguas residuales especiales, así como los cálculos del volumen bombeado durante el día de medición y el caudal proyectado por día en cada una de estas tuberías.

El volumen bombeado por día se determinó restando el volumen acumulado del día anterior al volumen acumulado de ese día. El caudal proyectado se determinó suponiendo que el bombeo de agua es constante durante las 24 horas del día (caudal = volumen/tiempo).

Los flujómetros instalados son de tipo ultrasónicos o de efecto Doppler, los cuales tienen la característica de medir el flujo en dos direcciones. Las bombas empleadas para descargar agua procedente de los sumideros ubicados en los portales trabajan a nivel, por tanto se descartan las lecturas de caudal instantáneo ya que los flujómetros instalados registran tanto el caudal instantáneo de ida (signo positivo) como el caudal instantáneo de retorno (signo negativo), lo que conllevaría a reportar caudales menores a los observados en campo.

AGOSTO 2013																															
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<b>LECTURA FLUJÓMETRO (m<sup>3</sup>)</b>																															
Portal Este (tubería 6")	132628	132857	132955	133186	133609	133984	135180	136722	138134	139952	140909	142261	143598	144800	146129	147482	149001	150803	151675	153509	155777	157747	159964	161839	163285	165304	167390	168340	168592	168724	168935
Total Este (tubería 8")	4934	5275	5563	5838	6193	6576	6693	6693	6693	6693	6694	6694	6694	6694	6694	6696	6698	6699	6699	6699	6699	6699	6699	6700	6701	6701	6701	6850	7296	8153	8977
Portal Oeste (tubería 6")	194964	195263	195755	195862	196152	196163	196169	196237	196401	196577	196715	196898	197237	197465	197503	197642	197671	197995	198025	198289	198273	198507	198756	199006	199096	199126	199191	199305	199558	199649	199579
Portal Oeste (tubería 8")	723381	725224	726883	728634	730656	732566	734528	736341	738146	740482	741814	743881	745765	747557	749478	751117	753028	755168	756550	758141	759718	761430	763185	765022	766717	768263	769836	771988	773767	775992	777992
Clarificador	1510629	1512692	1515124	1518279	1521665	1524132	1527514	1530810	1534005	1537145	1540269	1543548	1546395	1549217	1552525	1555549	1559350	1563839	1565715	1569374	1573696	1578016	1581841	1584989	1588649	1592254	1595511	1599640	1603871	1607809	1612485
<b>VOLUMEN BOMBEADO (m<sup>3</sup>)</b>																															
Portal Este (tubería 6")	43	229	98	231	423	375	1196	1542	1412	1818	957	1352	1337	1202	1329	1353	1519	1802	872	1834	2268	1970	2217	1875	1446	2019	2086	950	252	132	211
Total Este (tubería 8")	281	341	288	275	355	383	117	0	0	0	0	1	0	0	0	2	2	1	0	0	0	0	0	1	1	0	0	148	447	856	824
Portal Oeste (tubería 6")	27	299	492	107	290	11	6	68	164	176	138	183	339	228	38	139	29	324	30	264	-16	234	249	250	90	30	65	114	253	91	-70
Portal Oeste (tubería 8")	2012	1843	1659	1751	2022	1910	1962	1813	1805	2336	1332	2067	1884	1792	1921	1639	1911	2140	1382	1591	1577	1712	1755	1837	1695	1546	1573	2152	1779	2225	2000
Clarificador	2092	2063	2432	3155	3386	2467	3382	3296	3195	3140	3124	3279	2847	2822	3308	3024	3801	4489	1876	3659	4322	4320	3825	3148	3660	3605	3257	4129	4231	3938	4676
<b>CAUDAL PROYECTADO (gpm)</b>																															
Portal Este (tubería 6")	16	84	36	85	155	138	439	565	518	667	351	496	490	441	487	496	557	661	320	672	832	722	813	688	530	740	765	348	92	48	77
Total Este (tubería 8")	103	125	106	101	130	140	43	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	54	164	314	302
Portal Oeste (tubería 6")	10	110	180	39	106	4	2	25	60	65	51	67	124	84	14	51	11	119	11	97	-6	86	91	92	33	11	24	42	93	33	-26
Portal Oeste (tubería 8")	738	676	608	642	741	700	719	665	662	857	488	758	691	657	704	601	701	785	507	583	578	628	644	674	622	567	577	789	652	816	733
Clarificador	767	756	892	1157	1242	905	1240	1209	1172	1151	1145	1202	1044	1035	1213	1109	1394	1646	688	1342	1585	1584	1403	1154	1342	1322	1194	1514	1551	1444	1715

m<sup>3</sup>: metro cúbico; gpm: galones por minuto; gris: datos descartados por reinicio en flujómetros. NL: no hay lectura

Fuente: Registros de Campo de Volumen Acumulado Bombeada de Túneles y cálculos de caudal proyectado, Departamento de Ambiente, Minera San Rafael, S.A

SEPTIEMBRE 2013																														
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>LECTURA FLUJÓMETRO (m<sup>3</sup>)</b>																														
Portal Este (tubería 6" )	169274	169536	170099	170567	171182	171853	172564	173476	174127	175190	177844	177844	177844	178032	178404	180136	181020	181651	182141	182391	182985	183331	183810	184236	184914	185430	185903	186764	187245	187356
Total Este (tubería 8")	10107	11162	11965	12512	12636	13355	13654	14052	14391	15131	15548	18966	22312	25636	29170	32726	36145	41386	45681	48659	52188	53075	53324	53677	55624	55628	55660	58461	60851	63075
Portal Oeste (tubería 6" )	199986	200269	200367	200502	200801	201025	201142	201497	201712	201780	201821	202173	202149	202679	202803	201493	201603	201560	201992	201787	202024	202178	202221	202360	202458	202452	203114	203293	203931	204983
Portal Oeste (tubería 8" )	779880	781931	783986	786114	788427	790548	792663	795040	796350	798265	799996	802142	804728	807208	809540	811491	814500	818429	821366	823278	826790	830221	833137	836479	839488	842541	845205	848213	850626	852622
Clarificador	1616384	1620797	1625271	1629582	1634431	1639023	1643221	1647874	1650325	1654143	1657587	1661660	1665225	1668711	1672887	1677239	1681722	1686604	1690951	1693280	1697398	1700940	1704216	1707991	1711827	1714622	1717771	1721653	1724690	1728368
<b>VOLUMEN BOMBEADO (m<sup>3</sup>)</b>																														
Portal Este (tubería 6" )	43	262	563	468	615	671	711	912	651	1063	2654	0	0	188	372	1732	884	631	490	250	594	346	479	426	678	516	473	861	481	111
Total Este (tubería 8")	281	1055	803	547	124	719	299	398	339	740	418	3418	3346	3324	3533	3556	3419	5242	4295	2978	3529	887	249	353	1947	4	32	2801	2391	2224
Portal Oeste (tubería 6" )	27	283	98	135	299	224	117	355	215	68	41	352	-24	530	124	-1310	110	-43	432	-205	237	154	43	139	98	-6	662	179	638	1052
Portal Oeste (tubería 8" )	2012	2051	2055	2128	2313	2121	2115	2377	1310	1915	1731	2146	2586	2480	2332	1951	3009	3929	2937	1912	3512	3431	2916	3342	3009	3053	2664	3008	2413	1996
Clarificador	2092	4413	4474	4311	4849	4592	4198	4653	2451	3818	3444	4073	3565	3486	4176	4352	4483	4882	4347	2329	4118	3542	3276	3775	3836	2795	3149	3882	3037	3678
<b>CAUDAL PROYECTADO (gpm)</b>																														
Portal Este (tubería 6" )	16	96	206	172	226	246	261	334	239	390	973	0	0	69	136	635	324	231	180	92	218	127	176	156	249	189	173	316	176	41
Total Este (tubería 8")	103	387	294	200	46	264	110	146	124	271	153	1253	1227	1219	1296	1304	1254	1922	1575	1092	1294	325	91	129	714	1	12	1027	877	815
Portal Oeste (tubería 6" )	10	104	36	50	110	82	43	130	79	25	15	129	-9	194	45	-480	40	-16	158	-75	87	56	16	51	36	-2	243	66	234	386
Portal Oeste (tubería 8" )	738	752	754	780	848	778	776	872	480	702	635	787	948	909	855	715	1103	1441	1077	701	1288	1258	1069	1225	1103	1119	977	1103	885	732
Clarificador	767	1618	1640	1581	1778	1684	1539	1706	899	1400	1263	1493	1307	1278	1531	1596	1644	1790	1594	854	1510	1299	1201	1384	1407	1025	1155	1423	1114	1349

OCTUBRE 2013																															
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<b>LECTURA FLUJÓMETRO (m<sup>3</sup>)</b>																															
Portal Este (tubería 6" )	187642	188556	189345	190305	191149	191787	192525	193296	194090	194844	196038	196758	197490	198282	199733	201270	202412	204040	205668	207276	208347	209380	210727	211998	213384	214655	216046	216989	218074	218699	219499
Total Este (tubería 8")	64017	65989	66022	66326	66705	67295	68014	68650	69236	69879	70518	71131	71737	72368	72961	73576	74109	74709	75296	75897	76604	76706	76828	76966	76989	77013	77279	77789	78286	78774	79323
Portal Oeste (tubería 6" )	205940	202543	202514	202487	202538	202857	203039	203119	202448	202555	202636	202723	202767	202827	202866	202907	202525	202560	202606	202654	202448	202496	202700	202737	202755	202778	202795	202944	202962	202999	203054
Portal Oeste (tubería 8" )	854444	856792	858676	860868	863744	865604	867859	870642	872883	875506	877514	879808	881905	883689	885258	886662	888293	889480	890668	892268	893220	894623	895601	896618	897761	898805	899805	901247	902120	903612	905095
Clarificador	1731810	1735201	1738594	1741858	1745474	1747229	1749323	1752700	1755960	1758611	1761649	1763774	1766064	1768494	1771125	1772954	1774884	1776809	1778360	1780342	1781699	1783042	1784885	1786163	1788033	1789465	1790153	1791404	1792578	1793527	1794659
<b>VOLUMEN BOMBEADO (m<sup>3</sup>)</b>																															
Portal Este (tubería 6" )	43	914	789	960	844	638	738	771	794	754	1194	720	732	792	1451	1537	1142	1628	1628	1608	1071	1033	1347	1271	1386	1271	1391	943	1085	625	800
Total Este (tubería 8")	281	1972	33	304	379	590	719	636	586	643	639	613	606	632	593	615	533	600	587	601	707	102	123	138	23	24	266	510	497	488	549
Portal Oeste (tubería 6" )	27	-3397	-29	-27	51	319	182	80	-671	107	81	87	44	60	39	41	-382	35	46	48	-206	48	204	37	18	23	17	149	18	37	55
Portal Oeste (tubería 8" )	2012	2348	1884	2192	2876	1860	2255	2783	2241	2623	2008	2294	2097	1784	1569	1404	1631	1187	1188	1600	952	1403	978	1017	1143	1044	1000	1442	873	1492	1483
Clarificador	2092	3391	3393	3264	3616	1755	2094	3377	3260	2651	3038	2125	2290	2430	2631	1829	1930	1925	1551	1982	1357	1343	1843	1278	1870	1432	688	1251	1174	949	1132
<b>CAUDAL PROYECTADO (gpm)</b>																															
Portal Este (tubería 6" )	16	335	289	352	309	234	271	283	291	276	438	264	268	290	532	564	419	597	597	590	393	379	494	466	508	466	510	346	398	229	293
Total Este (tubería 8")	103	723	12	111	139	216	264	233	215	236	234	225	222	232	217	225	195	220	215	220	259	37	45	51	8	9	97	187	182	179	201
Portal Oeste (tubería 6" )	10	-1246	-11	-10	19	117	67	29	-246	39	30	32	16	22	14	15	-140	13	17	18	-76	18	75	14	7	8	6	55	7	14	20
Portal Oeste (tubería 8" )	738	861	691	804	1055	682	827	1020	822	962	736	841	769	654	575	515	598	435	436	587	349	514	359	373	419	383	367	529	320	547	544
Clarificador	767	1243	1244	1197	1326	644	768	1238	1195	972	1114	779	840	891	965	671	708	706	569	727	498	492	676	469	686	525	252	459	430	348	415

m<sup>3</sup>: metro cúbico; gpm: galones por minuto; gris: datos descartados por reinicio en flujómetros de un día a otro. NL: no hay lectura

Fuente: Registros de Campo de Volumen Acumulado Bombeada de Túneles y cálculos de caudal proyectado, Departamento de Ambiente, Minera San Rafael, S.A

**11.2. Análisis In Situ y Kit de Cianuro (CN) en Efluentes**

AGOSTO 2013																																
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<b>Efluente Planta de Tratamiento Agua de Túnes (WW9)</b>																																
pH	u.e.	7.03	9.4	7.02	8.31	7.99	7.61	7.85	8.52	8.05	7.56	10.49	7.73	7.85	7.96	8.11	8.6	8.18	7.72	8.24	7.95	7.67	8.22	7.47	8.06	7.92	7.63	7.75	7.92	7.73	8.42	7.41
Temperatura	°C	25.4	25.4	25.5	24	27.6	26.6	28	25.9	23.3	24.7	25.2	25	24.3	26.3	25.8	25.5	25.8	27.9	27.2	24.8	25.3	25.4	24.8	25.9	25.5	26.3	25.5	24.5	25.1	26.2	24.6
Conductividad	uS/cm	1554	1554	1628	1443	1592	nf	1423	1375	1320	1306	1488	1306	1335	1433	1434	1335	1296	1322	1406	1377	1224	1243	1315	1325	1391	1699	1351	1280	1240	1184	1288
Turbidez	NTU	2.93	2.93	3.2	4.36	1.65	2.35	1.87	10.9	1.66	5.16	14.15	3.08	1.45	1.79	1.72	4.65	2.5	5.25	7.19	3.38	2.1	5.36	2.47	4.75	3.79	1.28	2.11	2.41	0.85	3.19	1.18
CN Total	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<0.003	nd	nd	nd	nd	nd
<b>Pileta de Cumplimiento Ambiental (EP-3 ó pileta 3)</b>																																
pH	u.e.	8.56	8.09	8.25	8.29	8.36	7.77	8.18	8.68	8.33	8.15	8.28	8.43	8.26	8.8	8.25	8.37	8.1	7.57	8.58	8.17	7.82	7.43	7.57	8.02	8.26	6.74	7.98	7.8	8.09	8.09	7.18
Temperatura	°C	21.9	23.5	23.5	20.4	20.4	20.4	25.2	18.8	22.8	21.9	22.2	21.7	21.1	25.1	24.3	22.2	23.6	24.1	23	21.6	24.3	21.1	22.6	21.1	24.5	23.1	25.3	22.1	23.8	23	22
Conductividad	uS/cm	159.6	149.4	131.8	126.1	154	nd	120.1	114.6	146.5	143.9	162.5	128.6	253	152.6	133.5	117.8	173.3	101	157.5	150.5	101.3	137.5	122	125.6	123.9	108.6	98.59	123.2	112.3	121.3	100.4
Turbidez	NTU	70.3	60.6	61.1	166	64.4	84.3	63.9	153	52.9	60.3	61.0	98.3	73.2	64.4	94.1	163	77.2	95	74.2	69.2	69.9	61.6	64.7	64.1	55.2	68	54.8	54.9	52.1	59.6	63.5
CN Total	mg/L	<0.003	nd	nd	nd	<0.003	nd	<0.003	nd	nd	nd	nd	<0.003	nd	nd	<0.003	nd	nd	nd	<0.003	nd	<0.003	nd	nd	nd	nd	<0.003	nd	nd	<0.003	nd	nd

Dónde: **u.e.**: unidades exponenciales; **mg/L**: miligramos por litro; **µS/cm**: microsiemens por centímetro; **°C**: grados centígrados; **NTU**: unidades naftalométricas de turbidez; **nd**: no determinado.

Fuente: Registro MA-RE-003 y base de datos calidad de agua. Departamento de Ambiente, Minera San Rafael, S.A.

SEPTIEMBRE 2013																															
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>Efluente Planta de Tratamiento Agua de Túnes (WW9)</b>																															
pH	u.e.	8.86	8.49	8.41	8.24	8.31	8.44	8.54	8.82	7.03	8.17	7.58	7.75	7.5	7.11	9.12	7.93	8.16	9.2	9.67	8.32	8.38	8.13	8.8	9.34	8.92	9.25	7.44	7.6	7.58	10.74
Temperatura	°C	26.1	27.1	26.5	25.7	24.4	27	27	23.7	26.3	27.1	26.4	26.5	25.8	27.3	28.2	26.3	27.5	27.9	26.6	26.4	26.2	23.5	27.5	27.5	27.3	26	25.7	27.5	25.8	27.3
Conductividad	uS/cm	680.5	1269	1269	1761	1434	1486	1503	1712	1398	1782	1730	1909	1916	1942	2257	1879	1787	1916	1721	1957	1827	1542	1639	1645	1657	1770	1785	2022	1983	2277
Turbidez	NTU	6.21	4.45	1.47	2.05	0.68	6.85	0.89	1.69	1.35	1.7	2.55	4.03	1.24	3.2	3.62	3.48	2.13	3.46	2.74	3.17	3.04	4.5	1.91	4.1	4.34	2.57	5.76	3.03	4.00	4.66
kit CN	mg/L	nd	nd	nd	nd	nd	nd	0.000	0.000	ND	0.000	0.003	0.005	0.008	0.01	0.008	nd	nd	nd	0.012	0.008	nd	nd	nd	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CN Total	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
<b>Pileta de Cumplimiento Ambiental (EP-3 ó pileta 3)</b>																															
pH	u.e.	8.09	8.81	8.74	8.84	8.69	nd	8.44	8.61	8.81	8.36	7.12	8.13	8.25	8.42	8.21	8.28	8.22	8.26	8.14	8.68	8.32	8.04	8.61	8.54	7.84	7.32	7.77	8.3	8.04	8.75
Temperatura	°C	26.1	24	27.2	23	25	nd	26.6	24.7	27.5	26.4	24.6	22.9	23.5	24.6	27.1	21.9	25.5	23.3	23.1	23.4	24.2	22.6	24.1	25.3	24.4	24.2	23.8	26.1	24.2	24.4
Conductividad	uS/cm	197.8	136.5	96.05	102.3	91.72	nd	99.62	147	57.55	103.8	103.6	156.8	214	395	368.8	195.7	285.8	287.6	292.4	423.5	318.1	351	322.9	317.6	366.4	344.9	191.9	389.2	353	357.6
Turbidez	NTU	55.6	175.1	60.3	59.2	62.7	nd	57.2	43.7	44.4	42	41.1	43.7	47.8	48.8	49.5	38.8	36.1	35.9	38.3	35	34.6	58.3	49	19.6	37.1	23.9	22.3	18.3	22.5	15.9
Kit CN	mg/L	0.003	0.003	0.003	0.003	0.003	nd	0.003	0.003	0.003	0.003	0.0	0.008	0.008	0.008	0.009	0.003	0.008	0.008	0.008	0.008	0.009	0.003	0.003	0.003	0.003	0.003	0.000	0.003	0.003	0.003
CN Total	mg/L	nd	<0.003	nd	<0.003	nd	nd	nd	nd	<0.003	nd	nd	<0.003	nd	nd	nd	<0.003	nd	nd	<0.003	nd	nd	nd	<0.003	nd	<0.003	nd	nd	nd	nd	<0.003

Dónde: **u.e.**: unidades exponenciales; **mg/L**: miligramos por litro; **µS/cm**: microsiemens por centímetro; **°C**: grados centígrados; **NTU**: unidades naftalométricas de turbidez; **nd**: no determinado.

Fuente: Registro MA-RE-003 y base de datos calidad de agua. Departamento de Ambiente, Minera San Rafael, S.A.

OCTUBRE 2013

Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																		
<b>Efluente Planta de Tratamiento Agua de Túnes (WW9)</b>																																																		
pH	u.e.	7.14	7.67	7.83	6.74	Sin descarga										7.1	8.46	8.20	7.71	10.5	7.08	9.22	7.13	7.83	Sin descarga										7.64	7.99	7.48	7.59	8.31	8.16	9.13	8.42	7.74	7.36	8.51	8.49	9.58	8.37	9.93	
Temperatura	°C	27.3	26.2	26.2	26.5											25.8	27.95	26.3	26.55	25.36	24.32	25.73	27.3	26.7											26.7	25.8	27.7	24.1	27.7	25.9	27.2	26.9	24.9	26.8	25.9	27.1	25.8	26.2	26.2	
Conductividad	uS/cm	983	987	1014	1003											1752	1524	1441	1487	1641	1334	1549	1638	1775											1526	1927	1416	1475	1388	1450	1383	1335	1490	1478	1430	1362	1460	1577	1544	
Turbidez	NTU	1.79	3.28	4.34	2.43											4.95	4.34	3.19	3.43	3.94	6.69	3.88	4.25	4.86											1.14	1.49	1.83	4.43	3.54	5.15	4.1	4.98	3.36	2.8	2.56	9.8	2.26	2.18	5.8	
kit CN	mg/L	0.003	0.003	0.003	0.003											0.003	0.003	0.003	0.005	0.000	0.000	0.000	0.000	0.000											0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.005	0.002	0.004	0.003	0.002	0.003	0.001	0.007
CN Total	mg/L	nd	nd	nd	nd											nd	nd	<0.003	nd	nd	nd	nd	nd	nd											nd	nd	nd	nd	nd	nd	nd	nd	nd	<0.003	nd	nd	nd	nd	nd	nd
<b>Pileta de Cumplimiento Ambiental (EP-3 ó pileta 3)</b>																																																		
pH	u.e.	7.61	7.66	8.9	8.75	7.98	7.13	8.12	8.58	8.47	8.38	8.52	8.35	8.52	8.93	8.57	8.79	7.51	8.14	8.76	8.77	8.89	8.83	8.75	8.72	8.39	8.34	8.51	8.56	8.53	8.28	8.49																		
Temperatura	°C	25.9	26.1	25.2	22.5	25.8	25.2	25.2	23.6	25.25	24.73	24.78	25.6	23.58	24.8	23.9	23.8	24.6	23.1	29.6	24.4	27	24.1	26.2	25.4	23.6	24.2	23.1	23.8	23.4	24.6	22.2																		
Conductividad	uS/cm	191	212	189	181	309	275	288	283	292	287	294	300	284	292	291	291	291	366	327	375	343	348	353	349	354	357	354	358	372	384	370																		
Turbidez	NTU	16	8.55	5.81	11.8	9.68	8.76	16.1	9.35	19.3	20.9	17.3	16	15	15.9	8.55	7.21	4.82	3.72	5.81	3.55	23.7	6.01	4.84	5.41	3.49	3.77	3.98	9.46	2.52	4.38	1.76																		
Kit CN	mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.008	0.003	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.037	0.039	0.036	0.036	0.037	0.041	0.034	0.039	0.032	0.035	0.026	0.040																	
CN Total	mg/L	nd	nd	<0.003	nd	nd	nd	nd	<0.003	<0.003	nd	nd	nd	nd	<0.003	nd	nd	<0.003	nd	<0.003	nd	<0.003	nd	nd	<0.003	nd	nd	nd	<0.003	nd	nd	<0.003																		

Dónde: **u.e.**: unidades exponenciales; **mg/L**: miligramos por litro; **µS/cm**: microsiemens por centímetro; **°C**: grados centígrados; **NTU**: unidades naftalométricas de turbidez; **nd**: no determinado.

Fuente: Registro MA-RE-003 y base de datos calidad de agua. Departamento de Ambiente, Minera San Rafael, S.A.

Con el objetivo de verificar si los resultados obtenidos con el método colorimétrico empleado para la determinación rápida de Cianuro (kit de CN), a partir del mes de octubre se enviaron varias muestras duplicado al laboratorio ACZ para realizar análisis de Cianuro Total.

Según los resultados obtenidos, con el kit colorimétrico se obtienen resultados no confiables debido a que presentan una gran desviación positiva con respecto a los resultados obtenidos en el laboratorio acreditado. Como medida correctiva se investigarán las fuentes de dicha desviación; entre las cuales se contemplan la contaminación cruzada, sustancias contenidas en las aguas analizadas que puedan interferir en el análisis, error humano al realizar el análisis, etc.; y se realizarán los cambios necesarios para obtener resultados más confiables.



### 11.3. Resultados crudos de calidad de aire

#### 11.3.1. Material Particulado (PM<sub>10</sub>)

BGI PQ200 Air Sampling System				Downloaded August 2013			
<b>Job Details:</b> Job Name: EA-1A Version: PQ200 Serial No: 1.00 Pump Time: Flags: NA				<b>Job Code:</b> EA-1A <b>Site Name:</b> Los Planes (Top Soil Deposit) <b>Station Code:</b> Operators: SA User1: NA User2: NA			
BP	Max	Min	Avg	Units	<b>Timer Information:</b>		<b>Mass Concentration Data:</b> Filter ID: <b>2188-0303</b> Final Wt: 139.740 mg Initial Wt: 139.530 mg Delta Wt: 0.210 mg Total Vol: 18.28 m <sup>3</sup>
TA	647	644	645	mmHg	Date	Time	
Q	27.1	15.3	20.4	°C	dd-mmm	hh:mm:ss	
QCV				NA	%	Start: 22-Aug-13 11:42:00	ET: 21:09:00
Max overheat				NA	°C	Stop: 23-Aug-13 11:42:00	
Notes 1: Depósito de Suelos, Proyecto El Escobal Notes 2: Minera San Rafael, S.A.							
<b>BGI PQ200 Air Sampling System</b>				<b>Downloaded August 2013</b>			
<b>Job Details:</b> Job Name: EA-2A Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA				<b>Job Code:</b> EA-2A <b>Site Name:</b> La Cuchilla. <b>Station Code:</b> Operators: FB User1: NA User2: NA			
BP	Max	Min	Avg	Units	<b>Timer Information:</b>		<b>Mass Concentration Data:</b> Filter ID: <b>2215-0404</b> Final Wt: 140.820 mg Initial Wt: 140.610 mg Delta Wt: 0.210 mg Total Vol: 20.40 m <sup>3</sup>
TA	631	628	629	mmHg	Date	Time	
Q	26.7	15.1	17.9	°C	dd-mmm	hh:mm:ss	
QCV				NA	%	Start: 30-Aug-13 17:28:00	ET: 23:59:00
Max overheat				NA	°C	Stop: 31-Aug-13 17:28:00	
Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael, S.A.							
<b>BGI PQ200 Air Sampling System</b>				<b>Downloaded August 2013</b>			
<b>Job Details:</b> Job Name: EA-3 Version: PQ200 Serial No: 1.00 Pump Time: Flags: NA				<b>Job Code:</b> EA-3 <b>Site Name:</b> El Fucio, zona este. <b>Station Code:</b> Operators: FB User1: NA User2: NA			
BP	Max	Min	Avg	Units	<b>Timer Information:</b>		<b>Mass Concentration Data:</b> Filter ID: <b>2192-0707</b> Final Wt: 141.030 mg Initial Wt: 140.800 mg Delta Wt: 0.230 mg Total Vol: 17.45 m <sup>3</sup>
TA	625	622	623	mmHg	Date	Time	
Q	23.2	15.6	17.3	°C	dd-mmm	hh:mm:ss	
QCV				NA	%	Start: 29-Aug-13 10:55:00	ET: 20:41:00
Max overheat				NA	°C	Stop: 30-Aug-13 10:55:00	
Notes 1: Aldea El Fucio, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael, S.A.							

BGI PQ200 Air Sampling System				Downloaded August 2013			
<b>Job Details:</b> Job Name: EA-4A Version: PQ200 Serial No: 3.00 Pump Time: Flags: NA				<b>Job Code:</b> EA-4A <b>Site Name:</b> Aldea Los Ángeles <b>Station Code:</b> Operators: FB User1: NA User2: NA			
BP	Max	Min	Avg	Units	<b>Timer Information:</b>		<b>Mass Concentration Data:</b> Filter ID: <b>2179-0551</b> Final Wt: 143.070 mg Initial Wt: 141.200 mg Delta Wt: 1.870 mg Total Vol: 20.82 m <sup>3</sup>
TA	651	648	649	mmHg	Date	Time	
Q	26.7	17.2	21.1	°C	dd-mmm	hh:mm:ss	
QCV				NA	%	Start: 5-Aug-13 11:15:00	ET: 23:59:00
Max overheat				NA	°C	Stop: 6-Aug-13 11:15:00	
Notes 1: Caserío El Portón de los Ángeles, San Rafael Las Flores, Santa Rosa Notes 2: Minera San Rafael, S.A.							
<b>BGI PQ200 Air Sampling System</b>				<b>Downloaded August 2013</b>			
<b>Job Details:</b> Job Name: EA-5A Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA				<b>Job Code:</b> EA-5A <b>Site Name:</b> Sabana Redonda <b>Station Code:</b> Operators: FB User1: NA User2: NA			
BP	Max	Min	Avg	Units	<b>Timer Information:</b>		<b>Mass Concentration Data:</b> Filter ID: <b>2187-0220</b> Final Wt: 141.550 mg Initial Wt: 141.130 mg Delta Wt: 0.420 mg Total Vol: 20.84 m <sup>3</sup>
TA	651	647	648	mmHg	Date	Time	
Q	27.1	15.7	20.4	°C	dd-mmm	hh:mm:ss	
QCV				NA	%	Start: 15-Aug-13 08:55:00	ET: 23:59:00
Max overheat				NA	°C	Stop: 16-Aug-13 08:55:00	
Notes 1: Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa Notes 2: Minera San Rafael, S.A.							
<b>BGI PQ200 Air Sampling System</b>				<b>Downloaded August 2013</b>			
<b>Job Details:</b> Job Name: EA-6 Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA				<b>Job Code:</b> EA-6 <b>Site Name:</b> Carretera a Mataquesquinta <b>Station Code:</b> Operators: FB User1: NA User2: NA			
BP	Max	Min	Avg	Units	<b>Timer Information:</b>		<b>Mass Concentration Data:</b> Filter ID: <b>2181-0775</b> Final Wt: 143.200 mg Initial Wt: 141.710 mg Delta Wt: 1.490 mg Total Vol: 20.60 m <sup>3</sup>
TA	643	639	641	mmHg	Date	Time	
Q	27.2	17.7	20.6	°C	dd-mmm	hh:mm:ss	
QCV				NA	%	Start: 5-Aug-13 12:00:00	ET: 23:59:00
Max overheat				NA	°C	Stop: 6-Aug-13 12:00:00	
Notes 1: Carretera a Mataquesquinta, al norte del Proyecto, San Rafael Las Flores Santa Rosa Notes 2: Minera San Rafael, S.A.							

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BGI PQ200 Air Sampling System			Downloaded August 2013
<b>Job Details:</b> Job Name: EA-7A Version: PQ200 Serial No: 3.00 Pump Time: Flags: NA		<b>Job Code:</b> EA-7A <b>Site Name:</b> Los Planes <b>Station Code:</b> <b>Operators:</b> SA User1: NA User2: NA	
BP TA Q	Max 649 26.6 ---	Min 647 16.4 ---	Avg 648 20.8 16.71
<b>Timer Information:</b> Date dd-mmm Time hh:mm:ss Start: 22-Aug-13 12:20:00 Stop: 23-Aug-13 12:20:00 ET: 22:01:00		<b>Mass Concentration Data:</b> Filter ID: 2189-0404 Final Wt: 139.830 mg Initial Wt: 139.590 mg Delta Wt: 0.240 mg Total Vol: 19.09 m <sup>3</sup> Mass Conc: 12.57 µg/m <sup>3</sup>	
QCV NA % Max overheat NA °C occured NA		Notes 1: Aldea Los Planes, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael, S.A.	

BGI PQ200 Air Sampling System			Downloaded August 2013
<b>Job Details:</b> Job Name: EA-1B Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA		<b>Job Code:</b> EA-1B <b>Site Name:</b> San Rafael Las Flores <b>Station Code:</b> <b>Operators:</b> FB/SA User1: NA User2: NA	
BP TA Q	Max 649 28.8 ---	Min 646 14.5 ---	Avg 648 20.4 16.71
<b>Timer Information:</b> Date dd-mmm Time hh:mm:ss Start: 19-Aug-13 10:45:00 Stop: 20-Aug-13 10:45:00 ET: 23:59:00		<b>Mass Concentration Data:</b> Filter ID: 2191-0639 Final Wt: 142.490 mg Initial Wt: 141.830 mg Delta Wt: 0.660 mg Total Vol: 20.84 m <sup>3</sup> Mass Conc: 31.67 µg/m <sup>3</sup>	
QCV NA % Max overheat NA °C occured NA		Notes 1: San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael, S.A.	

BGI PQ200 Air Sampling System			Downloaded August 2013
<b>Job Details:</b> Job Name: EA-3A Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA		<b>Job Code:</b> EA-3A <b>Site Name:</b> Aldea El Fucío <b>Station Code:</b> <b>Operators:</b> FB/SA User1: NA User2: NA	
BP TA Q	Max 644 28.5 ---	Min 641 15.5 ---	Avg 640 19.4 16.71
<b>Timer Information:</b> Date dd-mmm Time hh:mm:ss Start: 12-Aug-13 09:00:00 Stop: 13-Aug-13 09:00:00 ET: 23:59:00		<b>Mass Concentration Data:</b> Filter ID: 2186-0113 Final Wt: 141.120 mg Initial Wt: 140.750 mg Delta Wt: 0.370 mg Total Vol: 20.65 m <sup>3</sup> Mass Conc: 17.92 µg/m <sup>3</sup>	
QCV NA % Max overheat NA °C occured NA		Notes 1: Aldea El Fucío, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael, S.A.	

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**Reporte Analítico**  
**RA-13-11069**



**Cliente:** Minera San Rafael  
**Dirección:** Km 8.6 carretera antigua a El Salvador, Muxbal, Centro Corporativo Muxbal, Torre Oeste, Oficinas 503 y 504  
**Proyecto:** 178-031 (El Escobal)  
**Análisis de muestras:** Septiembre, 05-06 de 2013  
**Emisión del reporte:** Septiembre, 09 de 2013

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**Tipo de muestra:** Filtros de cuarzo utilizados para colección de material particulado en aire.  
**Análisis:** Gravimetría de partículas en filtro de calidad del aire.  
**Método analítico:** 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM10 in the Atmosphere.  
 Acreditado ISO 17025 según resolución OGA-LE-050-12.

No.	Identificación de la muestra	Código del filtro <sup>1</sup>	Peso inicial <sup>1</sup> (gramos)	Peso final (gramos)
1	EA-1A	2188-0303	0.13953	0.13974
2	EA-1B	2191-0639	0.14183	0.14249
3	EA-2A	2215-0404	0.14061	0.14082
4	EA-3	2192-0707	0.14080	0.14103
5	EA-3A	2186-0113	0.14075	0.14112
6	EA-4A	2179-0551	0.14120	0.14307
7	EA-5A	2187-0220	0.14113	0.14155
8	EA-6	2181-0775	0.14171	0.14320
9	EA-7A	2189-0404	0.13959	0.13983

<sup>1</sup>: Código asignado por Laboratorio Ambiental, S.A. <sup>2</sup>: Corresponde a los pesos iniciales indicados en los reportes analíticos RA-13-11024, RA-13-11033, RA-13-11044.

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**Reporte Analítico**  
**RA-13-11069**



**Anexos:**

Anexo 1. Cadena de Custodia R-02-000270

Este Reporte Analítico ha sido elaborado para uso confidencial y exclusivo del cliente; se prohíbe su reproducción, sin la aprobación escrita del Laboratorio. Los resultados aquí expresados representan el mejor juicio del Laboratorio y son válidos únicamente para la porción de muestra presentada a éste. Laboratorio Ambiental, S.A. no asume ninguna responsabilidad ni garantiza la utilización final que se le dé a la información aquí presentada. Laboratorio Ambiental, S.A. no se responsabiliza por el proceso de muestreo.

Inga Vivian Salazar  
 Ingeniera Química, Encargado Químico  
 Colegiado 1849

MSc. BSc. Ana Gabriela Juárez  
 Especialista ambiental, Director de Laboratorio

<b>Redacción:</b>	<b>Fecha:</b>	<b>Revisión y aprobación:</b>	<b>Fecha:</b>	<b>Versión Cliente:</b>
V.S.	Septiembre, 09/13	A.G.J.	Septiembre, 09/13	01

RA-13-11069\_090913

Tronco 1, sector E, lote 14, El Encinal, Z.7 Mixco  
 Tel.: 2431-8187, 2431-8102 ext. 113, 116.

Página 2-2

BGI PQ200 Air Sampling System		Downloaded September 2013
<b>Job Details:</b> Job Name: EA-1A Version: PQ200 Serial No: 1.00 Pump Time: Flags: NA		Job Code: EA-1A Site Name: Los Planes (Top Soil Deposit) Station Code: Operators: LB User1: NA User2: NA
BP Max 649 Min 643 Avg 646 Units mmHg TA 27.3 16.2 20.0 °C Q --- --- 16.71 Lpm	<b>Timer Information:</b> Date Time dd-mmm hh:mm:ss Start: 23-Sep-13 14:40:00 Stop: 24-Sep-13 14:07:00	<b>Mass Concentration Data:</b> Filter ID: 2213-0222 Final Wt: 141.000 mg Initial Wt: 140.690 mg Delta Wt: 0.310 mg Total Vol: 20.37 m³
QCV NA % Max overheat NA °C occurred NA	ET: 23:33:00	Mass Conc: 15.22 µg/m³
Notes 1: Depósito de Suelos, Proyecto El Escobal Notes 2: Minera San Rafael		

BGI PQ200 Air Sampling System		Downloaded September 2013
<b>Job Details:</b> Job Name: EA-2A Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA		Job Code: EA-2A Site Name: La Cuchilla. Station Code: Operators: LB User1: NA User2: NA
BP Max 631 Min 626 Avg 629 Units mmHg TA 25.3 15.3 18.5 °C Q --- --- 16.71 Lpm	<b>Timer Information:</b> Date Time dd-mmm hh:mm:ss Start: 23-Sep-13 15:05:00 Stop: 23-Sep-13 15:05:00	<b>Mass Concentration Data:</b> Filter ID: 2214-0327 Final Wt: 140.200 mg Initial Wt: 140.010 mg Delta Wt: 0.190 mg Total Vol: 20.36 m³
QCV NA % Max overheat NA °C occurred NA	ET: 23:59:00	Mass Conc: 9.33 µg/m³
Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael		

BGI PQ200 Air Sampling System		Downloaded September 2013
<b>Job Details:</b> Job Name: EA-3 Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA		Job Code: EA-3 Site Name: El Fucio, zona este. Station Code: Operators: SA User1: NA User2: NA
BP Max 624 Min 621 Avg 622 Units mmHg TA 25.2 14.9 18.4 °C Q --- --- 16.71 Lpm	<b>Timer Information:</b> Date Time dd-mmm hh:mm:ss Start: 30-Sep-13 00:00:00 Stop: 30-Sep-13 23:59:00	<b>Mass Concentration Data:</b> Filter ID: 2216-0505 Final Wt: 139.730 mg Initial Wt: 139.490 mg Delta Wt: 0.240 mg Total Vol: 20.14 m³
QCV NA % Max overheat NA °C occurred NA	ET: 23:59:00	Mass Conc: 11.92 µg/m³
Notes 1: Aldea El Fucio, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael		

BGI PQ200 Air Sampling System		Downloaded September 2013
<b>Job Details:</b> Job Name: EA-7A Version: PQ200 Serial No: 3.00 Pump Time: Flags: NA		Job Code: EA-7A Site Name: Los Planes Station Code: Operators: FB User1: NA User2: NA
BP Max 651 Min 646 Avg 649 Units mmHg TA 26.2 16.2 19.0 °C Q --- --- 16.71 Lpm	<b>Timer Information:</b> Date Time dd-mmm hh:mm:ss Start: 23-Sep-13 14:00:00 Stop: 24-Sep-13 14:00:00	<b>Mass Concentration Data:</b> Filter ID: 2212-0118 Final Wt: 140.390 mg Initial Wt: 140.150 mg Delta Wt: 0.240 mg Total Vol: 17.48 m³
QCV NA % Max overheat NA °C occurred NA	ET: 19:56:00	Mass Conc: 13.73 µg/m³
Notes 1: NE piletas aua de proceso, aledaño a Aldea Los Planes, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael		

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**Reporte Analítico**  
**RA-13-11087**



**Cliente:** Minera San Rafael  
**Dirección:** Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV  
**Proyecto:** 178-031 (El Escobal)  
**Análisis de muestras:** Octubre, 07-08 de 2013  
**Emisión del reporte:** Octubre, 09 de 2013

**Tipo de muestra:** Filtros de cuarzo utilizados para colección de material particulado en aire.  
**Análisis:** Gravimetría de partículas en filtro de calidad del aire.  
**Método analítico:** 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM10 in the Atmosphere.  
**Acreditado ISO 17025 según resolución OGA-LE-050-12.**

No.	Identificación de la muestra	Código del filtro <sup>1</sup>	Peso inicial* (gramos)	Peso final (gramos)
1	EA-1A	2213-0222	0.14069	0.14100
2	EA-2A	2214-0327	0.14001	0.14020
3	EA-3	2216-0505	0.13949	0.13973
4	EA-7A	2212-0118	0.14015	0.14039

<sup>1</sup>: Código asignado por Laboratorio Ambiental, S.A. \*: Corresponde a los pesos iniciales indicados en el reporte analítico RA-13-11044.

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**Reporte Analítico**  
**RA-13-11087**



**Anexos:**

Anexo 1. Cadena de Custodia R-02-000329

Este Reporte Analítico ha sido elaborado para uso confidencial y exclusivo del cliente; se prohíbe su reproducción, sin la aprobación escrita del Laboratorio. Los resultados aquí expresados representan el mejor juicio del Laboratorio y son válidos únicamente para la porción de muestra presentada a éste. Laboratorio Ambiental, S.A. no asume ninguna responsabilidad ni garantiza la utilización final que se le dé a la información aquí presentada. Laboratorio Ambiental, S.A. no se responsabiliza por el proceso de muestreo.

Inga. Vivian Salazar  
 Ingeniera Química, Encargado Químico  
 Colegiado 1849

MSc. BSc. Ana Gabriela Juárez  
 Especialista ambiental, Director de Laboratorio

Redacción:	Fecha:	Revisión y aprobación:	Fecha:	Versión Cliente:
V.S.	Octubre, 09/13	A.G.J.	Octubre, 09/13	01

BGI PQ200 Air Sampling System			Downloaded October 2013		
<b>Job Details:</b> Job Name: EA-1A Version: PQ200 Serial No: 1.00 Pump Time: Flags: NA			<b>Job Code:</b> EA-1A <b>Site Name:</b> Los Planes (Top Soil Deposit) <b>Station Code:</b> <b>Operators:</b> LFB User1: NA User2: NA		
BP TA Q	Max 648 27.3 ---	Min 644 15.6 ---	Avg 646 19.5 16.71	Units mmHg °C Lpm	<b>Timer Information:</b> Date dd-mmm hh:mm:ss Start: 24-Oct-13 10:50:00 Stop: 25-Oct-13 10:50:00 ET: 21:46:00
<b>QCV</b> NA % Max overheat NA °C occured NA			<b>Mass Concentration Data:</b> Filter ID: 2217-0506 Final Wt: 139.690 mg Initial Wt: 139.380 mg Delta Wt: 0.310 mg Total Vol: 18.90 m³ Mass Conc: 16.40 µg/m³		
Notes 1: Depósito de Suelos, Proyecto El Escobal Notes 2: Minera San Rafael					
BGI PQ200 Air Sampling System			Downloaded October 2013		
<b>Job Details:</b> Job Name: EA-2A Version: PQ200 Serial No: 1.00 Pump Time: Flags: NA			<b>Job Code:</b> EA-2A <b>Site Name:</b> La Cuchilla. <b>Station Code:</b> <b>Operators:</b> LFB User1: NA User2: NA		
BP TA Q	Max 631 26.5 ---	Min 627 15.1 ---	Avg 629 18.3 16.71	Units mmHg °C Lpm	<b>Timer Information:</b> Date dd-mmm hh:mm:ss Start: 15-Oct-13 11:10:00 Stop: 16-Oct-13 11:10:00 ET: 21:17:00
<b>QCV</b> NA % Max overheat NA °C occured NA			<b>Mass Concentration Data:</b> Filter ID: 2219-0883 Final Wt: 140.010 mg Initial Wt: 139.770 mg Delta Wt: 0.240 mg Total Vol: 18.07 m³ Mass Conc: 13.28 µg/m³		
Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael					
BGI PQ200 Air Sampling System			Downloaded October 2013		
<b>Job Details:</b> Job Name: EA-3 Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA			<b>Job Code:</b> EA-3 <b>Site Name:</b> El Fucio, zona este. <b>Station Code:</b> <b>Operators:</b> LFB User1: NA User2: NA		
BP TA Q	Max 624 24.5 ---	Min 621 15.1 ---	Avg 623 18.2 16.71	Units mmHg °C Lpm	<b>Timer Information:</b> Date dd-mmm hh:mm:ss Start: 15-Oct-13 12:05:00 Stop: 16-Oct-13 12:05:00 ET: 23:59:00
<b>QCV</b> NA % Max overheat NA °C occured NA			<b>Mass Concentration Data:</b> Filter ID: 2218-0778 Final Wt: 140.960 mg Initial Wt: 140.600 mg Delta Wt: 0.360 mg Total Vol: 20.19 m³ Mass Conc: 17.83 µg/m³		
Notes 1: Aldea El Fucio, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael					
BGI PQ200 Air Sampling System			Downloaded October 2013		
<b>Job Details:</b> Job Name: EA-7A Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA			<b>Job Code:</b> EA-7A <b>Site Name:</b> Los Planes <b>Station Code:</b> <b>Operators:</b> LFB User1: NA User2: NA		
BP TA Q	Max 650 25.5 ---	Min 645 16.3 ---	Avg 647 19.8 16.71	Units mmHg °C Lpm	<b>Timer Information:</b> Date dd-mmm hh:mm:ss Start: 24-Oct-13 12:05:00 Stop: 24-Sep-13 12:05:00 ET: 23:59:00
<b>QCV</b> NA % Max overheat NA °C occured NA			<b>Mass Concentration Data:</b> Filter ID: 2231-0915 Final Wt: 161.750 mg Initial Wt: 161.350 mg Delta Wt: 0.400 mg Total Vol: 20.85 m³ Mass Conc: 19.19 µg/m³		
Notes 1: NE piletas aua de proceso, aledaño a Aldea Los Planes, San Rafael Las Flores, Santa Rosa. Notes 2: Minera San Rafael					

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Reporte Analítico  
RA-13-11105



**Cliente:** Minera San Rafael  
**Dirección:** Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV  
**Proyecto:** 178-031 (El Escobal)  
**Análisis de muestras:** Noviembre, 05-06 de 2013  
**Emisión del reporte:** Noviembre, 07 de 2013

**Tipo de muestra:** Filtros de cuarzo utilizados para colección de material particulado en aire.  
**Análisis:** Gravimetría de partículas en filtro de calidad de aire.  
**Método analítico:** 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM10 in the Atmosphere.  
Acreditado ISO 17025 según resolución OGA-LE-050-12.

No.	Identificación de la muestra	Código del filtro <sup>1</sup>	Peso inicial <sup>1</sup> (gramos)	Peso final (gramos)	LDM (gramos)
1	EA-1A	2217-0606	0.13938	0.13969	0.00017
2	EA-2A	2219-0883	0.13977	0.14001	
3	EA-3	2218-0778	0.14060	0.14096	
4	EA-7A	2231-0915	0.16135	0.16175	

<sup>1</sup>: Código asignado por Laboratorio Ambiental, S.A. <sup>2</sup>: Corresponde a los pesos iniciales indicados en los reportes analíticos RA-13-11044 y RA-13-11059. LDM: límite de detección del método.

[www.laboratorio-ambiental.com](http://www.laboratorio-ambiental.com)  
[enquire@laboratorio-ambiental.com](mailto:enquire@laboratorio-ambiental.com)

**Reporte Analítico**  
**RA-13-11105**



**Anexos:**

Anexo 1. Cadena de Custodia R-02-000332

Este Reporte Analítico ha sido elaborado para uso confidencial y exclusivo del cliente; se prohíbe su reproducción, sin la aprobación escrita del Laboratorio. Los resultados aquí expresados representan el mejor juicio del Laboratorio y son válidos únicamente para la porción de muestra presentada a éste. Laboratorio Ambiental, S.A. no asume ninguna responsabilidad ni garantiza la utilización final que se le dé a la información aquí presentada. Laboratorio Ambiental, S.A. no se responsabiliza por el proceso de muestreo.

Inga. Vivian Salazar  
 Ingeniera Química, Encargado Químico  
 Colegiado 1849

MSc. BSc. Ana Gabriela Juárez  
 Especialista ambiental, Director de Laboratorio

<b>Redacción:</b>	<b>Fecha:</b>	<b>Revisión y aprobación:</b>	<b>Fecha:</b>	<b>Versión Cliente:</b>
V.S.	Noviembre, 07/13	A.G.J.	Noviembre, 07/13	01

**11.3.2. Informe de Metales en PM<sub>10</sub>**

[www.laboratorio-ambiental.com](http://www.laboratorio-ambiental.com)  
[enquire@laboratorio-ambiental.com](mailto:enquire@laboratorio-ambiental.com)

**Reporte Analítico**  
**RA-13-11073**



**Cliete:** Minera San Rafael  
**Dirección:** Km 8.6 carretera antigua a El Salvador, Muxbal, Centro Corporativo Muxbal, Torre Oeste, Oficinas 503 y 504  
**Proyecto:** 178-032 (El Escobal)  
**Análisis de muestras:** Septiembre, 10-12 de 2013  
**Emisión del reporte:** Septiembre, 19 de 2013

**Tipo de muestras:** Filtros de cuarzo utilizados para colección de material particulado en aire.

**Análisis:**

1. Gravimetría de partículas en filtro de calidad del aire (blanco).
2. Caracterización de metales, no metales y metaloides en filtros de calidad del aire.

**Métodos analíticos:**

1. 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM<sub>10</sub> in the Atmosphere. \*Acreditado ISO 17025 según resolución OGA-LE-050-12.
2. EPA Total Metals 6010Bmod y Total Metals on Small Filter 6020mod. ICP Masas.

**Peso inicial y final del filtro (blanco)**

Código del filtro <sup>1</sup>	Peso inicial* (gramos)	Peso final* (gramos)
2264-0101	0.15770	0.15774

<sup>1</sup>: Código asignado por Laboratorio Ambiental, S.A. para el blanco analítico. La determinación de los pesos inicial y final se realizó el 20 de agosto y 06 de septiembre de 2013, respectivamente.

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Reporte Analítico  
 RA-13-11073



Metales, no metales y metaloides en filtros<sup>2</sup>

Elemento (µg)	LD	Código de los filtros							
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A	BLANCO
		2191-0639	2215-0404	2186-0113	2179-0551	2187-0220	2181-0775	2189-0404	2264-0101
Aluminio (Al)	5.0	7.6	< 5.0	< 5.0	36.2	< 5.0	34.5	< 5.0	< 5.0
Antimonio (Sb)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsénico (As)	0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
Azufre (S)	2.5	11.3	9.9	6.1	22.2	8.5	20.0	8.2	< 2.5
Bario (Ba)	0.10	0.19	< 0.10	0.11	0.66	0.25	0.64	0.14	1.85
Berilio (Be)	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Bismuto (Bi)	0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
Boro (B)	0.60	0.88	< 0.60	0.67	< 0.60	0.78	0.65	0.70	< 0.60
Cadmio (Cd)	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Calcio (Ca)	5.0	37.2	15.0	15.3	57.4	16.2	57.2	15.1	5.9
Cromo (Cr)	0.50	1.08	1.13	1.10	1.25	1.24	1.02	1.26	2.18
Cobalto (Co)	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cobre (Cu)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Estaño (Sn)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Estroncio (Sr)	0.10	< 0.10	< 0.10	< 0.10	0.34	< 0.10	0.32	< 0.10	< 0.10
Fósforo (P)	2.5	24.6	21.9	23.8	25.8	23.8	24.6	23.1	7.1
Hierro (Fe)	5.0	6.5	< 5.0	< 5.0	46.3	< 5.0	42.8	< 5.0	< 5.0
Magnesio (Mg)	5.0	< 5.0	< 5.0	< 5.0	20.1	< 5.0	21.0	< 5.0	< 5.0
Manganeso (Mn)	0.10	0.22	< 0.10	0.14	1.13	0.19	0.85	< 0.10	< 0.10
Molibdeno (Mo)	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Niquel (Ni)	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Plata (Ag)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Plomo (Pb)	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Potasio (K)	10	< 10	< 10	< 10	14	< 10	11	< 10	< 10
Selenio (Se)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Silicio (Si)	1.0	10.5	5.9	8.0	18.7	8.5	21.1	7.2	5.9
Sodio (Na)	5.0	57.4	49.7	51.8	78.9	53.8	76.3	54.3	24.6
Talio (Tl)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanio (Ti)	0.10	0.29	< 0.10	0.15	1.06	0.12	0.86	< 0.10	< 0.10
Uranio (U)	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Vanadio (V)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Zinc (Zn)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.66
Zirconio (Zr)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

<sup>2</sup>Análisis realizados por laboratorio subcontratado. LD = Límite de detección.

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Reporte Analítico  
 RA-13-11073



Anexos:

Anexo 1. Cadena de Custodia R-02-000270

Este Reporte Analítico ha sido elaborado para uso confidencial y exclusivo del cliente; se prohíbe su reproducción, sin la aprobación escrita del Laboratorio. Los resultados aquí expresados representan el mejor juicio del Laboratorio y son válidos únicamente para la porción de muestra presentada a éste. Laboratorio Ambiental S.A. no asume ninguna responsabilidad ni garantiza la utilización final que se le dé a la información aquí presentada. Laboratorio Ambiental, S.A. no se responsabiliza por el proceso de muestreo.

Inga. Vivian Salazar  
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 Colegiado 1849

MSc. BSc. Ana Gabriela Juárez  
 Especialista ambiental, Director de Laboratorio

Redacción:	Fecha:	Revisión y aprobación:	Fecha:	Versión Cliente:
V.S.	Septiembre, 19/13	A.G.J.	Septiembre, 20/13	01

### 11.3.3. Informe sobre PST y Gases de Combustión.



Este resumen presenta los resultados del monitoreo de calidad del aire realizado para el proyecto minero El Escobal (**el Proyecto**). El monitoreo fue realizado por Consultoría y Tecnología Ambiental, S.A. (CTA) del 16 al 19 de septiembre para gases de combustión y del 19 de septiembre al 18 de octubre para PST, en San Rafael Las Flores, Santa Rosa, donde se ubica el Proyecto. El propósito del monitoreo fue determinar la calidad de aire ambiental en comunidades aledañas mediante la medición de la concentración de:

- Gases de combustión (**SO<sub>2</sub>** y **NO<sub>2</sub>**); y
- Partículas Sedimentables Totales (**PST**).

Las estaciones de medición se presentan en el Cuadro 1 y la metodología utilizada en el Cuadro 2.

Cuadro 1: Estaciones de monitoreo de SO<sub>2</sub> y NO<sub>2</sub> y PST

Marzo y Abril 2013		
Estación	Ubicación	Coordenadas
EA-1C	Frente a Escuela San Rafael	E (m): 803,887 N (m): 1,601,801
EA-2B	Aldea La Cuchilla	E (m): 806,470 N (m): 1,601,796
EA-3B	Aldea El Fucío	E (m): 806,538 N (m): 1,600,367
EA-4A	Aldea La Puerta de Los Ángeles	E (m): 805,142 N (m): 1,599,903
EA-5A	Aldea Sabana Redonda	E (m): 804,342 N (m): 1,600,404
EA-6	Norte del proyecto, ruta a Mataquesuintla	E (m): 805,168 N (m): 1,603,247
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	E (m): 805,425 N (m): 1,601,523

Coordenadas en metros (m). Datum: WGS84 UTM zona 16 N. Fuente: CTA, 2013.



Cuadro 2: Metodologías utilizadas para SO<sub>2</sub> y NO<sub>2</sub> y PST

Gases de Combustión	SO <sub>2</sub> : Se utilizó el análisis espectrofotométrico, descrito en el Título 40, Parte 50, Apéndice A de la USEPA. NO <sub>2</sub> : Se utilizó el análisis espectrofotométrico. Método de referencia designado por la USEPA: No. EQN-1277-026.
PST	ASTM D 1739-98 (re-aprobación 2004).

Fuente: CTA, 2013.

Los resultados obtenidos para los gases de combustión se compararon con los valores guía reportados en: Calidad de Aire Ambiental: Guías del Banco Mundial (**el Banco**)<sup>1</sup> para SO<sub>2</sub> y NO<sub>2</sub>, tomadas de International Finance Corporation (IFC) Industry Sector Guidelines for Mining, December 10, 2007 y General Environment Health and Safety Guidelines, December 19/2008.

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en septiembre de 2013; y en el Cuadro 4 se presentan los resultados de la medición de PST para el período de 30 días de septiembre a octubre 2013.

Cuadro 3: Resultados de la medición de gases de combustión en µg/m<sup>3</sup>

Estaciones de Muestreo	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guías del Banco
SO <sub>2</sub>	<13	<13	<13	<13	<13	<13	<13	20 µg/m <sup>3</sup>
NO <sub>2</sub>	9	<9	10	9	14	<9	10	*40µg/m <sup>3</sup>

SO<sub>2</sub>: dióxido de azufre. NO<sub>2</sub>: dióxido de nitrógeno. \*: Promedio anual. Fuente: Laboratorio Ambiental, S. A., 2013.

Cuadro 4: Resultados de la medición de PST (g/m<sup>2</sup> x 30 días)

Estaciones de Muestreo	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A
Sólidos Insolubles	3.26	1.14	1.32	2.09	10.99	0.18	1.54
Sólidos Solubles	2.09	1.62	2.24	2.26	33.86	0.62	2.26
Sólidos Totales	5.34	2.76	3.55	4.35	44.85	0.80	3.81

Fuente: Laboratorio Ambiental, S. A., 2013.

<sup>1</sup> Guías del Banco Mundial: [www.ifc.org/ifcext/EnvironmentalGuidelines](http://www.ifc.org/ifcext/EnvironmentalGuidelines)





**Gases de Combustión**

Como se puede apreciar en el Cuadro 3 el SO<sub>2</sub> se presentó por debajo del límite de detección del método analítico utilizado en todas las estaciones monitoreadas. Mientras que el NO<sub>2</sub> se presentó por debajo del límite de detección del método analítico en las estaciones EA-2B y EA-6. Las estaciones que presentaron lecturas detectables de NO<sub>2</sub> fueron la EA-1C (9 µg/m<sup>3</sup>), EA-3B (10 µg/m<sup>3</sup>), EA-4A (9 µg/m<sup>3</sup>), EA-5A (14 µg/m<sup>3</sup>) y EA-7A (10 µg/m<sup>3</sup>), todas por debajo del valor sugerido por la guía de referencia utilizada para comparación.

**Partículas Sedimentables Totales**

La estación que presentó la mayor concentración de partículas sedimentables totales fue la EA-5A (44.85 g/m<sup>2</sup> x 30 días). Se pudo observar en esta estación que durante el período de monitoreo se comenzó la construcción de una vivienda en el área donde se colocó el equipo, lo cual pudo influir en el resultado obtenido. La estación que presentó la menor concentración de PST durante el período de monitoreo fue la EA-6 (0.80 g/m<sup>2</sup> x 30 días).

**Anexos**

**11.3.4. Presión Sonora**

**ER-1**

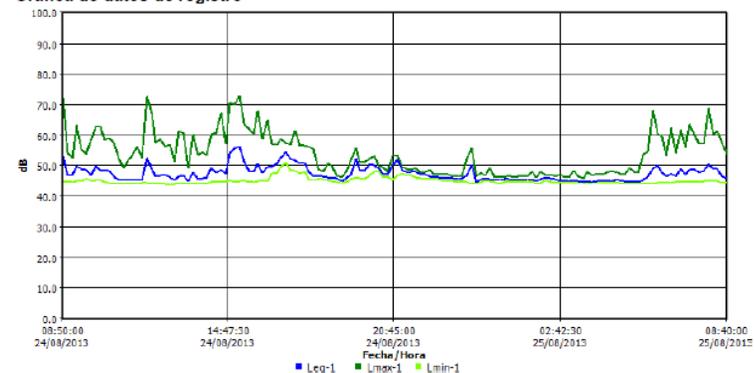
**Panel de información**

Ubicación Depósito de Suelos, Proyecto Minero Escobal  
 Nombre ER-1  
 Sesión padre S112  
 Hora de inicio Sábado, 24 de Agosto de 2013 08:40:00  
 Hora de paro Domingo, 25 de Agosto de 2013 08:40:00  
 Nombre del usuario Inga. Susana Aroche

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	44 dB	Lmax	1	73 dB
Lpk	1	102.7 dB	Leq	1	48.4 dB

**Gráfica de datos de registro**



### ER-1A

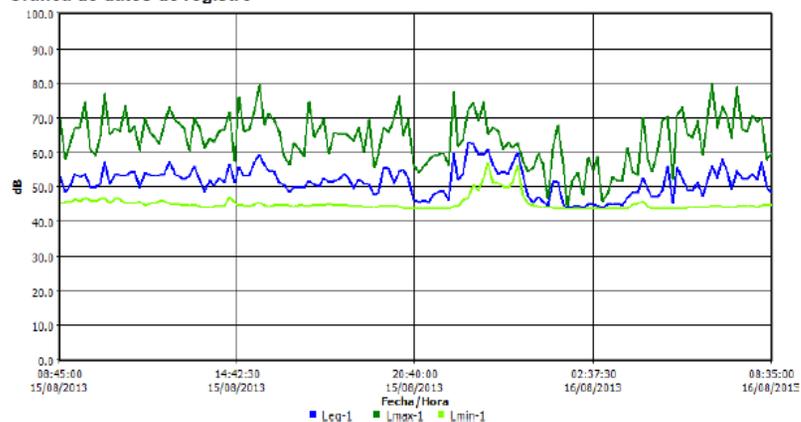
#### Panel de información

Ubicación San Rafael Las Flores  
 Nombre ER-1A  
 Sesión padre S109  
 Hora de inicio Jueves, 15 de Agosto de 2013 08:35:00  
 Hora de paro Viernes, 16 de Agosto de 2013 08:35:00  
 Nombre del usuario Inga. Luisa Fernanda Barrios

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	43.8 dB	Lmax	1	80.4 dB
Lpk	1	101.6 dB	Leq	1	53.7 dB

#### Gráfica de datos de registro



### ER-2

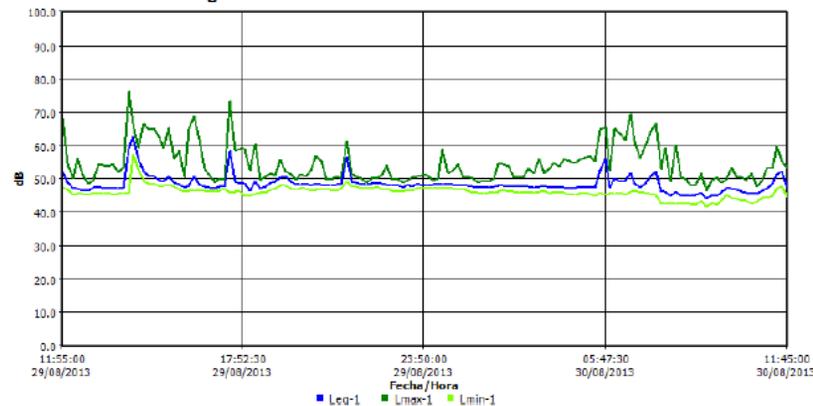
#### Panel de información

Ubicación Aldea La Cuchilla  
 Nombre ER-2  
 Sesión padre S105  
 Hora de inicio Jueves, 29 de Agosto de 2013 11:45:00  
 Hora de paro Viernes, 30 de Agosto de 2013 11:45:00  
 Nombre del usuario Inga. Luisa Fernanda Barrios

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	41.7 dB	Lmax	1	76.5 dB
Lpk	1	97.3 dB	Leq	1	50 dB

#### Gráfica de datos de registro



### ER-3

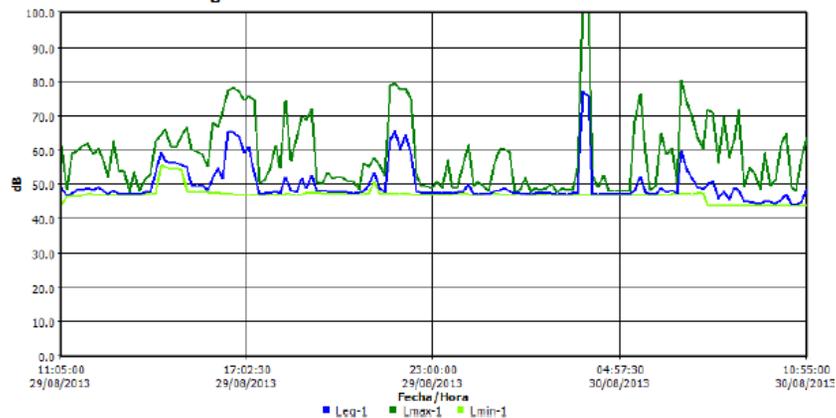
#### Panel de información

Ubicación: Zona Este, Proyecto Miner Escobal  
 Nombre: ER-3  
 Sesión padre: S114  
 Hora de inicio: Jueves, 29 de Agosto de 2013 10:55:00  
 Hora de paro: Viernes, 30 de Agosto de 2013 10:55:00  
 Nombre del usuario: Inga. Luisa Fernanda Barrios

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	43.8 dB	Lmax	1	103.6 dB
Lpk	1	137.5 dB	Leq	1	59.5 dB

#### Gráfica de datos de registro



### ER-3A

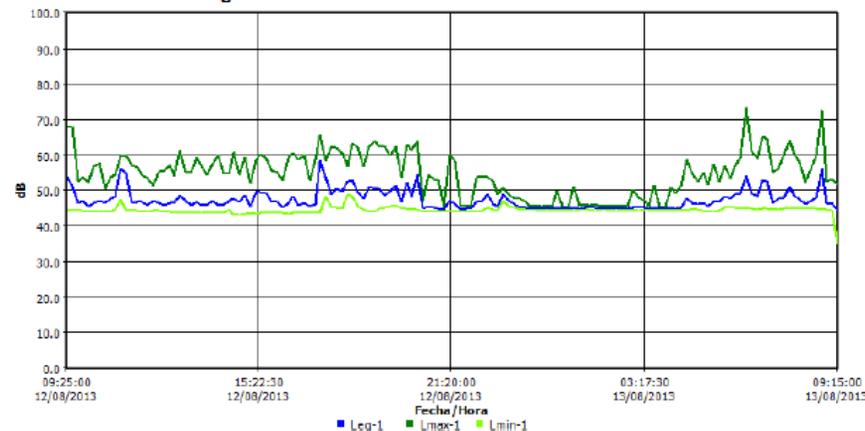
#### Panel de información

Ubicación: Aldea El Fucío  
 Nombre: ER-3A  
 Sesión padre: S100  
 Hora de inicio: Lunes, 12 de Agosto de 2013 09:15:00  
 Hora de paro: Martes, 13 de Agosto de 2013 09:15:00  
 Nombre del usuario: Inga. Susana Aroche

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	34.9 dB	Lmax	1	73.4 dB
Lpk	1	98.4 dB	Leq	1	48.7 dB

#### Gráfica de datos de registro



### ER-5A

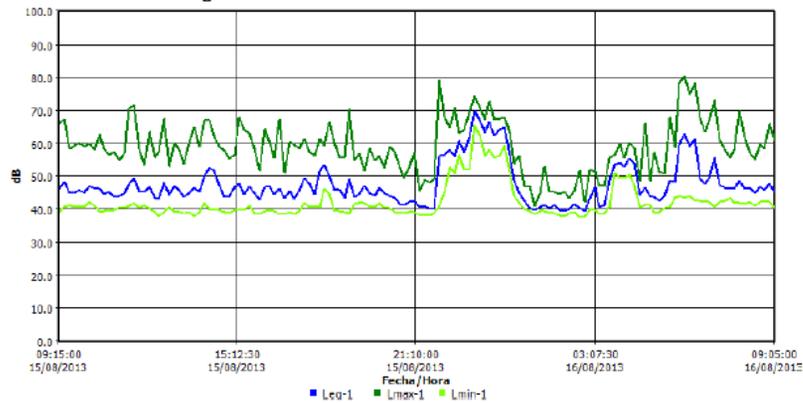
**Panel de información**

Ubicación: Aldea Sabana Redonda  
 Nombre: ER-5A  
 Sesión padre: S101  
 Hora de inicio: Jueves, 15 de Agosto de 2013 09:05:00  
 Hora de paro: Viernes, 16 de Agosto de 2013 09:05:00  
 Nombre del usuario: Inga. Luisa Fernanda Barrios

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	37.7 dB	Lmax	1	80.5 dB
Lpk	1	101.8 dB	Leq	1	55.2 dB

**Gráfica de datos de registro**



### ER-6

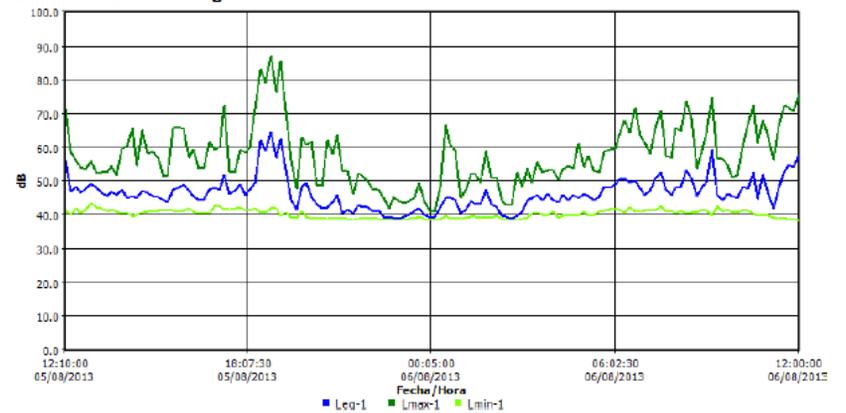
**Panel de información**

Ubicación: Al norte del Proyecto, ruta a Mataquescuintla  
 Nombre: ER-6  
 Sesión padre: S098  
 Hora de inicio: Lunes, 05 de Agosto de 2013 12:00:00  
 Hora de paro: Martes, 06 de Agosto de 2013 12:00:00  
 Nombre del usuario: Inga. Luisa Fernanda Barrios

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.5 dB	Lmax	1	87.2 dB
Lpk	1	110.4 dB	Leq	1	50.6 dB

**Gráfica de datos de registro**



### ER-7A

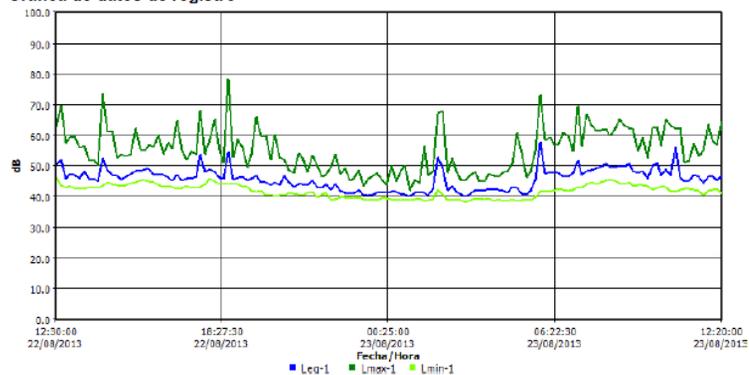
#### Panel de información

Ubicación Aldea Los Planes  
 Nombre ER-7A  
 Sesión padre S103  
 Hora de inicio Jueves, 22 de Agosto de 2013 12:20:00  
 Hora de paro Viernes, 23 de Agosto de 2013 12:20:00  
 Nombre del usuario Inga. Susana Aroche

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.5 dB	Lmax	1	78.3 dB
Lpk	1	95.3 dB	Leq	1	47.4 dB

#### Gráfica de datos de registro



### ER-1. septiembre 2013

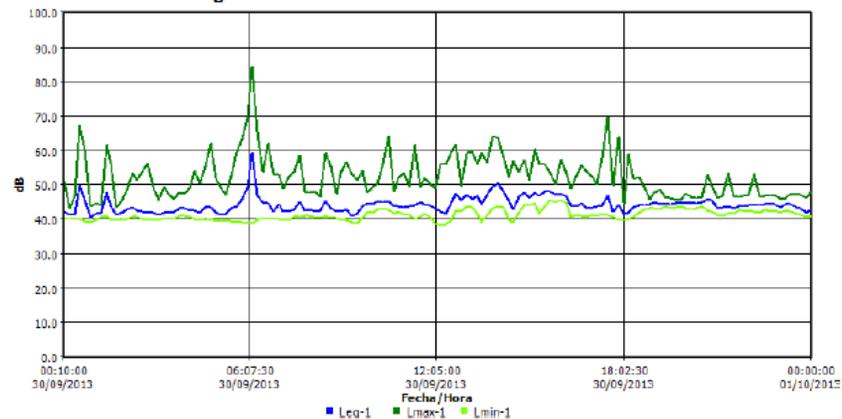
#### Panel de información

Ubicación Deposito de Suelos Norte  
 Nombre ER-1  
 Sesión padre S001  
 Hora de inicio Lunes, 30 de Septiembre de 2013 00:00:00  
 Hora de paro Martes, 01 de Octubre de 2013 00:00:00  
 Nombre del usuario Susana Aroche

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.5 dB	Lmax	1	84.5 dB
Lpk	1	114.2 dB	Leq	1	45.5 dB

#### Gráfica de datos de registro



### ER-2, Septiembre 2013

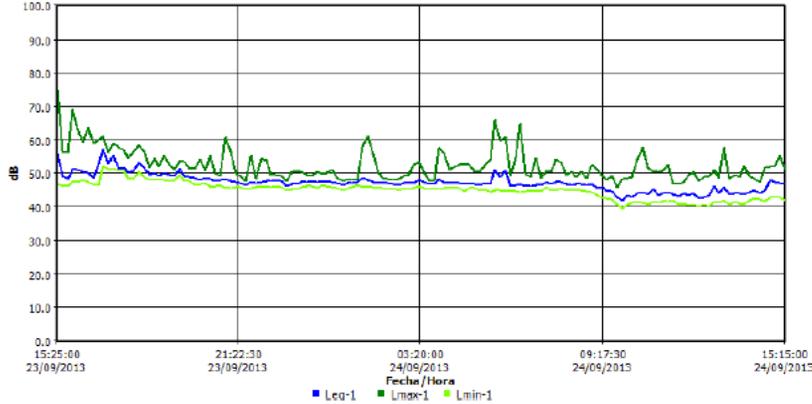
**Panel de información**

Ubicación Aledania Aldea La Cuchilla  
 Nombre ER-2  
 Sesión padre S107  
 Hora de inicio Lunes, 23 de Septiembre de 2013 15:15:00  
 Hora de paro Martes, 24 de Septiembre de 2013 15:15:00  
 Nombre del usuario Fernanda Barrios

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	39.6 dB	Lmax	1	75.1 dB
Lpk	1	105.6 dB	Leq	1	48.3 dB

**Gráfica de datos de registro**



### ER-3

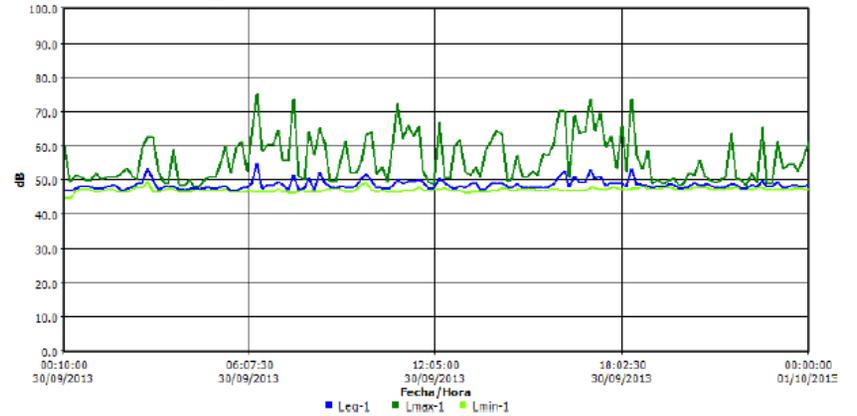
**Panel de información**

Ubicación Zona Este, Aledania Aldea El Fucio  
 Nombre ER-3  
 Sesión padre S116  
 Hora de inicio Lunes, 30 de Septiembre de 2013 00:00:00  
 Hora de paro Martes, 01 de Octubre de 2013 00:00:00  
 Nombre del usuario

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	44.8 dB	Lmax	1	75.3 dB
Lpk	1	101.5 dB	Leq	1	49 dB

**Gráfica de datos de registro**



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### ER-7A. Septiembre 2013

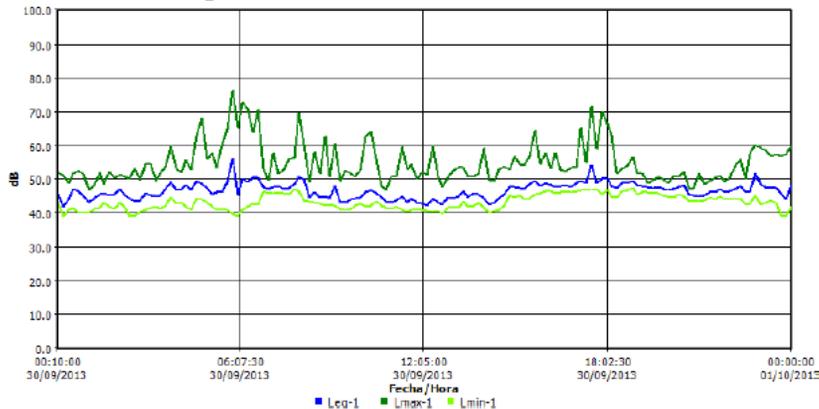
**Panel de información**

Ubicación Aledania Aldea Los Planes  
 Nombre ER-7A  
 Sesión padre S108  
 Hora de inicio Lunes, 30 de Septiembre de 2013 00:00:00  
 Hora de paro Martes, 01 de Octubre de 2013 00:00:00  
 Nombre del usuario Susana Aroche

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Indice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	39.2 dB	Lmax	1	76.7 dB
Lpk	1	106.1 dB	Leq	1	47.4 dB

**Gráfica de datos de registro**



### ER-1

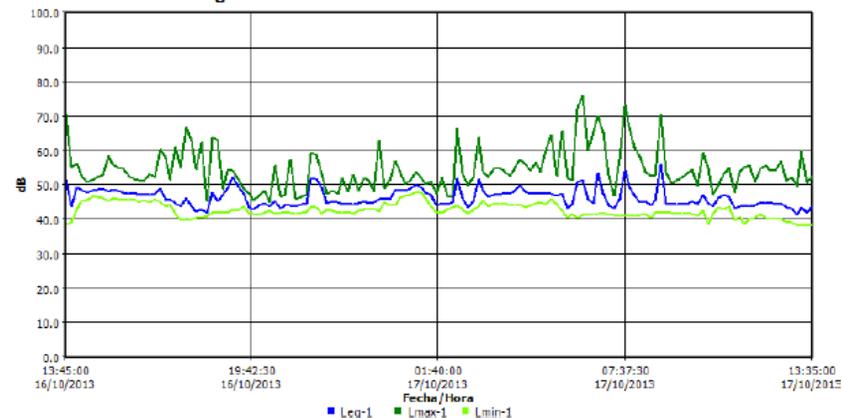
**Panel de información**

Ubicación Depósito de Suelos Norte  
 Nombre ER-1  
 Sesión padre S112  
 Hora de inicio Miércoles, 16 de Octubre de 2013 13:35:00  
 Hora de paro Jueves, 17 de Octubre de 2013 13:35:00  
 Nombre del usuario Inga. Susana Aroche

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Indice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.3 dB	Lmax	1	76.2 dB
Lpk	1	98.2 dB	Leq	1	47.3 dB

**Gráfica de datos de registro**



**ER-2**

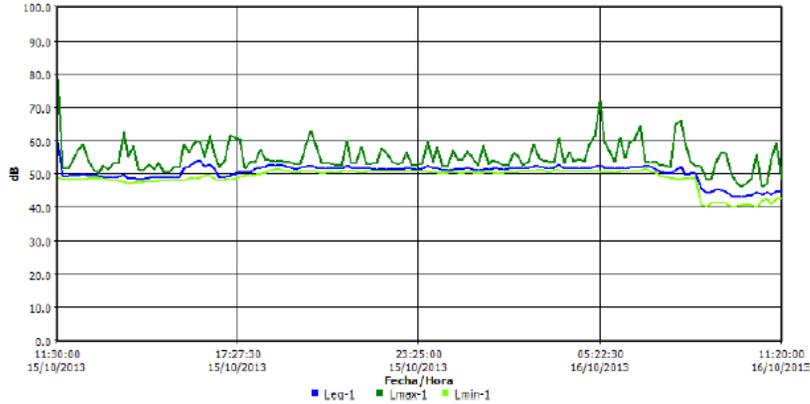
**Panel de información**

Ubicación Aldea La Cuchilla  
 Nombre ER-2  
 Sesión padre S111  
 Hora de inicio Martes, 15 de Octubre de 2013 11:20:00  
 Hora de paro Miércoles, 16 de Octubre de 2013 11:20:00  
 Nombre del usuario Inga. Fernanda Barrios

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	40.1 dB	Lmax	1	78.7 dB
Lpk	1	104.3 dB	Leq	1	51.2 dB

**Gráfica de datos de registro**



**ER-3**

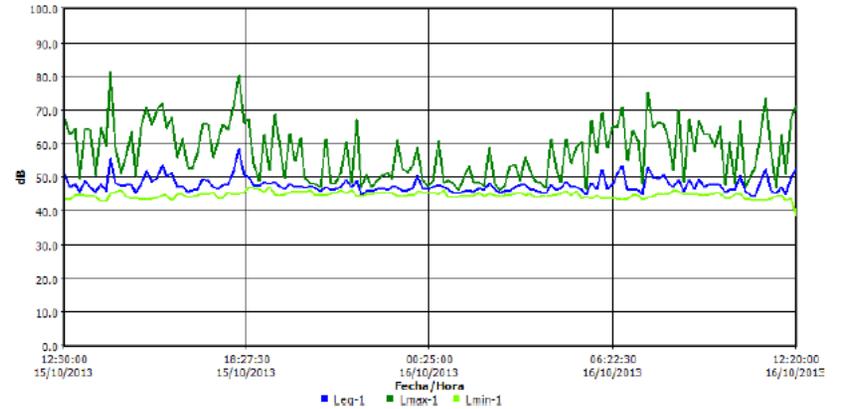
**Panel de información**

Ubicación Zona Este, Aldea El Fucio  
 Nombre ER-3  
 Sesión padre S003  
 Hora de inicio Martes, 15 de Octubre de 2013 12:20:00  
 Hora de paro Miércoles, 16 de Octubre de 2013 12:20:00  
 Nombre del usuario Inga. Fernanda Barrios

**Panel general de datos**

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.8 dB	Lmax	1	81.5 dB
Lpk	1	108 dB	Leq	1	48.5 dB

**Gráfica de datos de registro**



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### ER-4A

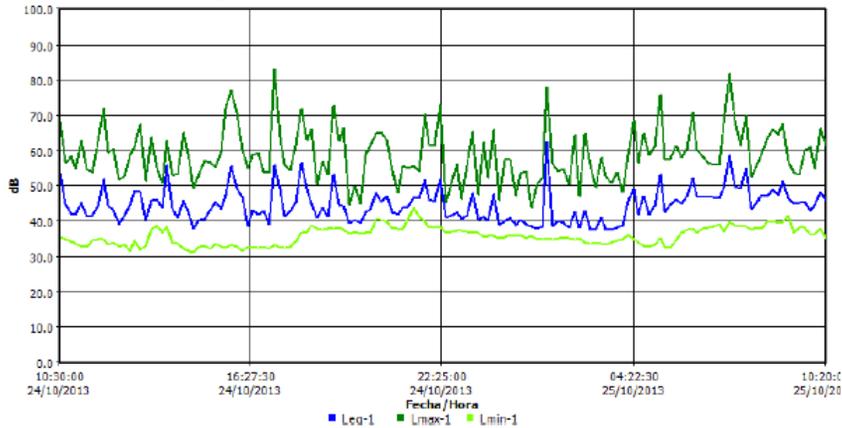
#### Panel de información

Ubicación: Aldea Portón de los Ángeles  
 Nombre: ER-4A  
 Sesión padre: S005  
 Hora de inicio: Jueves, 24 de Octubre de 2013 10:20:00  
 Hora de paro: Viernes, 25 de Octubre de 2013 10:20:00  
 Nombre del usuario: Inga. Fernanda Barrios

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	31.4 dB	Lmax	1	83.2 dB
Lpk	1	101.5 dB	Leq	1	48.3 dB

#### Gráfica de datos de registro



### ER-7A

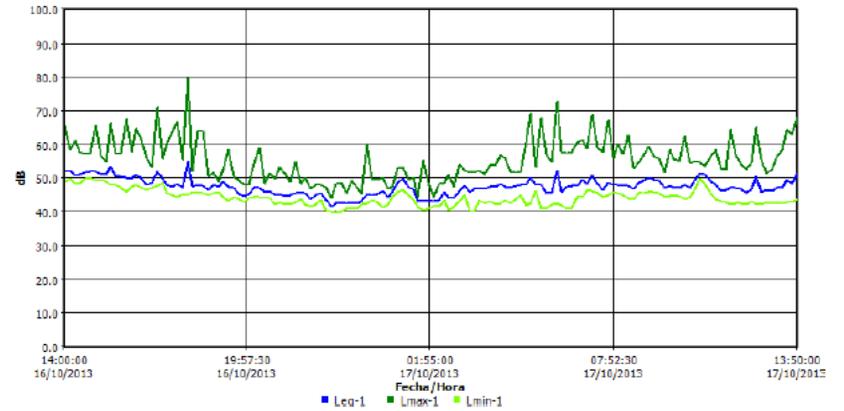
#### Panel de información

Ubicación: Aldea Los Planes  
 Nombre: ER-7A  
 Sesión padre: S004  
 Hora de inicio: Miércoles, 16 de Octubre de 2013 13:50:00  
 Hora de paro: Jueves, 17 de Octubre de 2013 13:50:00  
 Nombre del usuario: Inga. Fernanda Barrios

#### Panel general de datos

Descripción	Medidor/Sensor	Valor	Descripción	Medidor/Sensor	Valor
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	39.9 dB	Lmax	1	80.1 dB
Lpk	1	101.1 dB	Leq	1	48.3 dB

#### Gráfica de datos de registro



### 11.4. Certificados de verificación de los equipos utilizados

#### 11.4.1. Material Particulado (PM<sub>10</sub>)

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**Minera San Rafael**  
GUATEMALA **REGISTRO** **R-13**  
Verificación Equipo PQ200

<b>Información del Equipo:</b>					
No. Equipo	AIR-001	N/S	0938	Fecha	02/08/2013
Calibrador	Tetracal	N/S	508	Hora	17:47
<b>Caudal (Lpm)</b>					
Equipo	16.72	%dif	2.14%	%dif Permitido = 4%	
Calibrador	16.37	Pasa	✓	Falla	
<b>Temperatura Ambiental (°C)</b>					
Equipo	26.6	Diferencia	0.4	Diferencia Permitido = ± 2 °C	
Calibrador	26.2	Pasa	✓	Falla	
<b>Presión Barométrica (mm de Hg)</b>					
Equipo	648	Diferencia	0	Diferencia Permitida= ±10mm	
Calibrador	648.0	Pasa	✓	Falla	
Nombre y Firma de Responsable <b>Fernanda Barrios</b>					

<b>Información del Equipo:</b>					
No. Equipo	AIR-002	N/S	0877	Fecha	02/08/2013
Calibrador	Tetracal	N/S	508	Hora	18:02
<b>Caudal (Lpm)</b>					
Equipo	16.72	%dif	0.30%	%dif Permitido = 4%	
Calibrador	16.67	Pasa	✓	Falla	
<b>Temperatura Ambiental (°C)</b>					
Equipo	25.8	Diferencia	0.9	Diferencia Permitido = ± 2 °C	
Calibrador	26.7	Pasa	✓	Falla	
<b>Presión Barométrica (mm de Hg)</b>					
Equipo	648	Diferencia	0.5	Diferencia Permitida= ±10mm	
Calibrador	648.5	Pasa	✓	Falla	
Nombre y Firma de Responsable <b>Fernanda Barrios</b>					

<b>Información del Equipo:</b>					
No. Equipo	AIR-003	N/S	1053	Fecha	02/08/2013
Calibrador	Tetracal	N/S	508	Hora	18:32
<b>Caudal (Lpm)</b>					
Equipo	16.72	%dif	0.12%	%dif Permitido = 4%	
Calibrador	16.74	Pasa	✓	Falla	
<b>Temperatura Ambiental (°C)</b>					
Equipo	26.1	Diferencia	0.1	Diferencia Permitido = ± 2 °C	
Calibrador	26.2	Pasa	✓	Falla	
<b>Presión Barométrica (mm de Hg)</b>					
Equipo	650	Diferencia	1	Diferencia Permitida= ±10mm	
Calibrador	649.0	Pasa	✓	Falla	
Nombre y Firma de Responsable <b>Fernanda Barrios</b>					

%dif. = [(calibrador - equipo)/calibrador] x 100

**Minera San Rafael**  
GUATEMALA **REGISTRO** **R-13**  
Verificación Equipo PQ200

<b>Información del Equipo:</b>					
No. Equipo	AIR-001	N/S	0938	Fecha	23/09/13
Calibrador	Tetracal	N/S	508	Hora	
<b>Caudal (Lpm)</b>					
Equipo	16.72	%dif	2.64	%dif Permitido = 4%	
Calibrador	16.29	Pasa	✓	Falla	
<b>Temperatura Ambiental (°C)</b>					
Equipo	23.0	Diferencia	0.3	Diferencia Permitido = ± 2 °C	
Calibrador	22.7	Pasa	✓	Falla	
<b>Presión Barométrica (mm de Hg)</b>					
Equipo	648	Diferencia	0	Diferencia Permitida= ±10mm	
Calibrador	648.0	Pasa	✓	Falla	
Nombre y Firma de Responsable <b>Inga. L. Fernanda Barrios</b>					

<b>Información del Equipo:</b>					
No. Equipo	AIR-002	N/S	0877	Fecha	23/09/13
Calibrador	Tetracal	N/S	508	Hora	
<b>Caudal (Lpm)</b>					
Equipo	16.70	%dif	0.48	%dif Permitido = 4%	
Calibrador	16.78	Pasa	✓	Falla	
<b>Temperatura Ambiental (°C)</b>					
Equipo	23.3	Diferencia	0.3	Diferencia Permitido = ± 2 °C	
Calibrador	23.6	Pasa	✓	Falla	
<b>Presión Barométrica (mm de Hg)</b>					
Equipo	647	Diferencia	1	Diferencia Permitida= ±10mm	
Calibrador	648.0	Pasa	✓	Falla	
Nombre y Firma de Responsable <b>Inga. L. Fernanda Barrios</b>					

<b>Información del Equipo:</b>					
No. Equipo	AIR-003	N/S	1053	Fecha	09/23/13
Calibrador	Tetracal	N/S	508	Hora	
<b>Caudal (Lpm)</b>					
Equipo	16.70	%dif	0.42	%dif Permitido = 4%	
Calibrador	16.63	Pasa	✓	Falla	
<b>Temperatura Ambiental (°C)</b>					
Equipo	23.4	Diferencia	0.6	Diferencia Permitido = ± 2 °C	
Calibrador	24.0	Pasa	✓	Falla	
<b>Presión Barométrica (mm de Hg)</b>					
Equipo	648	Diferencia	0	Diferencia Permitida= ±10mm	
Calibrador	648.0	Pasa	✓	Falla	
Nombre y Firma de Responsable <b>Inga. L. Fernanda Barrios</b>					

%dif. = [(calibrador - equipo)/calibrador] x 100



REGISTRO

R-13

Verificación Equipo PQ200

Información del Equipo:					
No. Equipo	A12-001	N/S	0938	Fecha	15/10/13
Calibrador	TetraCal	N/S	508	Hora	09:20
Caudal (Lpm)					
Equipo	16.70	%dif	1.38	%dif Permitido = 4%	
Calibrador	16.44	Pasa	✓	Falla	
Temperatura Ambiental (°C)					
Equipo	20.6	Diferencia	0.4	Diferencia Permitido = ± 2 °C	
Calibrador	21.0	Pasa	✓	Falla	
Presión Barométrica (mm de Hg)					
Equipo	649	Diferencia	0	Diferencia Permitida = ±10mm	
Calibrador	649.0	Pasa	✓	Falla	
Nombre y Firma de Responsable <u>Inga. L. Fernanda Barrios</u>					

Información del Equipo:					
No. Equipo	A12-002	N/S	0877	Fecha	15/10/13
Calibrador	TetraCal	N/S	508	Hora	09:43
Caudal (Lpm)					
Equipo	16.80	%dif	0.12	%dif Permitido = 4%	
Calibrador	16.78	Pasa	✓	Falla	
Temperatura Ambiental (°C)					
Equipo	20.0	Diferencia	1.0	Diferencia Permitido = ± 2 °C	
Calibrador	21.0	Pasa	✓	Falla	
Presión Barométrica (mm de Hg)					
Equipo	649	Diferencia	0.5	Diferencia Permitida = ±10mm	
Calibrador	648.5	Pasa	✓	Falla	
Nombre y Firma de Responsable <u>Inga. L. Fernanda Barrios</u>					

Información del Equipo:					
No. Equipo		N/S		Fecha	
Calibrador		N/S		Hora	
Caudal (Lpm)					
Equipo		%dif		%dif Permitido = 4%	
Calibrador		Pasa		Falla	
Temperatura Ambiental (°C)					
Equipo		Diferencia		Diferencia Permitido = ± 2 °C	
Calibrador		Pasa		Falla	
Presión Barométrica (mm de Hg)					
Equipo		Diferencia		Diferencia Permitida = ±10mm	
Calibrador		Pasa		Falla	
Nombre y Firma de Responsable					

%dif. = [(calibrador – equipo)/calibrador] x 100

BGI INCORPORATED 58 GUINAN STREET WALTHAM, MA 02451  
NIST Traceable Calibration Facility, ISO 9001:2008 Registered



CERTIFICATE OF CALIBRATION - NIST TRACEABILITY

(Refer to instruction manual for further details of calibration)

tetraCal Serial Number: 508 DATE: 4-Dec-12

Calibration Operator: Brian DeVoe Jr.

**Critical Venturi Flow Meter:** Max Uncertainty = 0.346%  
Serial Number: 1 CEESI NVLAP NIST Data File 04BG1151  
Serial Number: 2 CEESI NVLAP NIST Data File 04BG1152  
Serial Number: 3 CEESI NVLAP NIST Data File 04BG1153

**Room Temperature:** Uncertainty=0.071% Room Temperature: 21.6 C

Brand: Ever-Safe Serial Number: 016076  
NIST Traceability No. 516837

tetraCal:  
Ambient Temperature (set): 21.6 C  
Aux (filter) Temperature (set): C

**Barometric Pressure and Absolute Pressure**  
Vaisala Model PTB330(50-1100) Digital Accuracy: 0.03371%

S/N D4310002  
NIST Traceable (Princo Primary Standard Model 453 S/N W12537) Certificate No. P-7485

tetraCal:  
Barometric pressure (set): 766 mm of Hg

**Results of Venturi Calibration**

Flow Rate (Q) vs. Pressure Drop (ΔP). Where: Q=Lpm, ΔP= Cm of H2O

- No. 1 Q = 5.84257 ΔP ^ 0.52112
- No. 2 Q = 1.14339 ΔP ^ 0.52595
- No. 3 Q = 0.33920 ΔP ^ 0.55170

Overall Uncertainty: 0.35%

Date Placed In Service

(To be filled in by operator upon receipt)

Recommended Recalibration Date

(12 months from date placed in service)

Revised: July 2012

11.4.2. Presión Sonora

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3M Occupational Health and Environmental Safety Division  
 Quest Technologies, Inc.  
 1060 Corporate Center Drive  
 Oconomowoc, WI 53066-4828  
 www.3M.com/detection  
 262.567.9157 800.245.0779  
 262.567.4047 Fax

**QUEST TECHNOLOGIES**  
 now part of 3M

Page 1 of

**Certificate of Calibration**  
 Certificate No: 1100263QII010006

Submitted By: MINERA SAN RAFAEL GUATEMALA  
 C.C. MUXBAL  
 CIUDAD GUATEMALA, GUATEMALA

Serial Number: QII010006 Date Received: 12/19/2012  
 Customer ID: Date Issued: 12/28/2012  
 Model: QC-10 CALIBRATOR Valid Until: 12/28/2013

Test Conditions: Model Conditions:  
 Temperature: 18°C to 29°C As Found: IN TOLERANCE  
 Humidity: 20% to 80% As Left: IN TOLERANCE  
 Barometric Pressure: 890 mbar to 1050 mbar

SubAssemblies:  
 Description: Serial Number:

Calibration Procedure: 56V981

Reference Standard(s):

I.D. Number	Device	Last Calibration	Calibration Due
ET0000556	B&K ENSEMBLE	12/8/2012	1/13/2013
T00230	FLUKE 45 MULTIMETER	2/2/2012	2/2/2014

Measurement Uncertainty:  
 +/- 1.1% ACOUSTIC (0.1dB) +/- 1.4% VAC +/- 0.012% HE  
 Estimated at 95% Confidence Level (k=2)

Calibrated By: Bethany Johnson 12/28/2012  
 BETHANY JOHNSON Service Technician

Reviewed/Approved By: [Signature] 12/28/2012  
 Technical Manager/Deputy

This report certifies that all calibration equipment used in the test is traceable to NIST or other NMI, and applies only to the unit identified under equipment above. This report must not be reproduced except in its entirety without the written approval of Quest Technologies.

098-393 Rev. B An ISO 9001 Registered Company  
 ISO 17025 Accredited Calibration Laboratory

**ACCREDITED**  
 Calibration Laboratory  
 QI010006

## 11.5. Informe Original de los Resultados Analíticos Obtenidos de Muestras de Agua del Laboratorio ACZ Laboratories, INC. Correspondiente al Monitoreo de Septiembre 2013.

### 11.5.1. Muestras de Agua Superficial (SW)

**ACZ** Laboratories, Inc.  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical  
Report

April 03, 2013

Report to:  
Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste Apto 503y504 Guatemala, GT

Bill to:  
Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11241

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 22, 2013. This project has been assigned to ACZ's project number, L11241. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11241. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 03, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

  
Tony Antalek has reviewed and approved this report.



REPAD.01.06.05.02



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**ACZ** Laboratories, Inc.  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Case  
Narrative

Tahoe Resources, Inc.

April 03, 2013

Project ID: Escobal  
ACZ Project ID: L11241

#### Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 2 miscellaneous samples from Tahoe Resources, Inc. on March 22, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11241. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

#### Holding Times

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

#### Sample Analysis

These samples were analyzed for inorganic and organic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

REPAD.03.06.05.01

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L11241-01**  
Date Sampled: 03/20/13 09:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/01/13 11:17	bsu
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 13:31	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor							04/01/13 11:34	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:54	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/29/13 10:34	tod
Total Hot Plate Digestion	M200.2 ICP							03/28/13 9:43	aeb
Total Hot Plate Digestion	M200.2 ICP-MS							03/26/13 17:36	scp

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L11241-01**  
Date Sampled: 03/20/13 09:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.04	B		mg/L	0.03	0.2	03/26/13 1:53	aeb
Aluminum, total	M200.7 ICP	0.08	B		mg/L	0.03	0.2	03/29/13 11:42	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0034			mg/L	0.0004	0.002	04/02/13 1:43	msh
Antimony, total	M200.8 ICP-MS	0.0032			mg/L	0.0004	0.002	04/01/13 21:30	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0062			mg/L	0.0002	0.001	04/02/13 1:43	msh
Arsenic, total	M200.8 ICP-MS	0.0062			mg/L	0.0002	0.001	04/01/13 21:30	msh
Barium, dissolved	M200.7 ICP	0.091			mg/L	0.003	0.02	03/26/13 1:53	aeb
Barium, total	M200.7 ICP	0.091			mg/L	0.003	0.02	03/29/13 11:42	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 1:53	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:42	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/26/13 1:53	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	03/29/13 11:42	aeb
Boron, dissolved	M200.7 ICP	0.09			mg/L	0.01	0.05	03/26/13 1:53	aeb
Boron, total	M200.7 ICP	0.11			mg/L	0.01	0.05	03/29/13 11:42	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 1:43	msh
Cadmium, total	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	04/01/13 21:30	msh
Calcium, dissolved	M200.7 ICP	275			mg/L	0.2	1	03/26/13 1:53	aeb
Calcium, total	M200.7 ICP	282			mg/L	0.2	1	03/29/13 11:42	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 1:53	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:42	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 1:53	aeb
Cobalt, total	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/29/13 11:42	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 1:53	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:42	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 1:53	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	03/29/13 11:42	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/26/13 1:53	aeb
Iron, total	M200.7 ICP	0.04	B		mg/L	0.02	0.05	03/29/13 11:42	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 1:43	msh
Lead, total	M200.8 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	04/01/13 21:30	msh
Lithium, dissolved	M200.7 ICP	0.06	B		mg/L	0.02	0.1	03/26/13 1:53	aeb
Lithium, total	M200.7 ICP	0.07	B		mg/L	0.02	0.1	03/29/13 11:42	aeb
Magnesium, dissolved	M200.7 ICP	24.4			mg/L	0.2	1	03/26/13 1:53	aeb
Magnesium, total	M200.7 ICP	24.8			mg/L	0.2	1	03/29/13 11:42	aeb
Manganese, dissolved	M200.7 ICP	0.116			mg/L	0.005	0.03	03/26/13 1:53	aeb
Manganese, total	M200.7 ICP	0.118			mg/L	0.005	0.03	03/29/13 11:42	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 15:31	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 12:46	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/26/13 1:53	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	03/29/13 11:42	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 1:53	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:42	aeb
Potassium, dissolved	M200.7 ICP	6.7			mg/L	0.3	2	03/26/13 1:53	aeb

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L11241-01**  
Date Sampled: 03/20/13 09:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Parameter	Method	Result	Units	MDL	PQL	Date	Analyst
Potassium, total	M200.7 ICP	8.6	mg/L	0.3	2	03/29/13 11:42	aeb
Scandium, dissolved	M200.7 ICP		mg/L	0.1	0.5	03/26/13 1:53	aeb
Scandium, total	M200.7 ICP		mg/L	0.1	0.5	03/29/13 11:42	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0004	mg/L	0.0001	0.0003	04/01/13 21:30	msh
Selenium, total	M200.8 ICP-MS	0.0001	B				
Silver, dissolved	M200.8 ICP-MS		mg/L	0.00005	0.0003	04/02/13 1:43	msh
Silver, total	M200.8 ICP-MS		mg/L	0.00005	0.0003	04/01/13 21:30	msh
Sodium, dissolved	M200.7 ICP	53.6	mg/L	0.3	2	03/26/13 1:53	aeb
Sodium, total	M200.7 ICP	52.9	mg/L	0.3	2	03/29/13 11:42	aeb
Strontium, dissolved	M200.7 ICP	2.79	mg/L	0.01	0.05	03/26/13 1:53	aeb
Strontium, total	M200.7 ICP	2.68	mg/L	0.01	0.05	03/29/13 11:42	aeb
Thallium, dissolved	M200.8 ICP-MS	0.0001	B				
Thallium, total	M200.8 ICP-MS	0.0003	B				
Tin, dissolved	M200.7 ICP		mg/L	0.1	0.5	03/26/13 1:53	aeb
Tin, total	M200.7 ICP		mg/L	0.1	0.5	03/29/13 11:42	aeb
Titanium, dissolved	M200.7 ICP	0.007	B				
Titanium, total	M200.7 ICP	0.010	B				
Uranium, dissolved	M200.8 ICP-MS	0.0004	B				
Uranium, total	M200.8 ICP-MS	0.0005	B				
Vanadium, dissolved	M200.7 ICP		mg/L	0.005	0.03	03/26/13 1:53	aeb
Vanadium, total	M200.7 ICP	0.006	B				
Zinc, dissolved	M200.7 ICP	0.01	B				
Zinc, total	M200.7 ICP	0.02	B				

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L11241-01**  
Date Sampled: 03/20/13 09:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
<b>Wet Chemistry</b>									
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		112		*	mg/L	2	20	03/23/13 0:00	abm
Carbonate as CaCO3				U	mg/L	2	20	03/23/13 0:00	abm
Hydroxide as CaCO3				U	mg/L	2	20	03/23/13 0:00	abm
Total Alkalinity		112		*	mg/L	2	20	03/23/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-0.3			%			04/03/13 0:00	calc
Sum of Anions		18.5			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		18.4			meq/L	0.1	0.5	04/03/13 0:00	calc
Chemical Oxygen Demand	M410.4			U	mg/L	10	20	04/01/13 12:04	abm
Chloride	SM4500Cl-E			*	mg/L	1	5	03/29/13 12:08	mpb
Conductivity @25C	SM2510B	1550		*	umhos/cm	1	10	03/23/13 3:52	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation			U	mg/L	0.003	0.01	04/01/13 15:46	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation			U	mg/L	0.003	0.01	04/01/13 16:20	tod
Fluoride	SM4500F-C	0.9		*	mg/L	0.1	0.5	03/30/13 13:03	ljr
Hardness as CaCO3	SM2340B - Calculation	788			mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M363.2 - H2SO4 preserved	1.47		*	mg/L	0.02	0.1	03/29/13 23:09	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.05		B	mg/L	0.05	0.5	03/29/13 14:18	lhb
Nitrogen, total Kjeldahl	M361.2 - TKN by Block Digester	0.4		B	mg/L	0.1	0.5	04/02/13 15:27	mpb
pH (lab)	SM4500H+ B								
pH		8.3		H	units	0.1	0.1	03/23/13 0:00	abm
pH measured at		21.0		*	C	0.1	0.1	03/23/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.16			mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.05		*	mg/L	0.01	0.05	03/27/13 22:43	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.06		H	mg/L	0.01	0.05	03/22/13 21:54	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.06		*	mg/L	0.01	0.05	03/30/13 13:44	pjb
Residue, Filterable (TDS) @180C	SM2540C	1270		*	mg/L	10	20	03/22/13 15:18	ljr
Residue, Non-Filterable (TSS) @105C	SM2540D			U	mg/L	5	20	03/27/13 12:18	khw
Residue, Total (TS) @105C	SM2540B	1280		*	mg/L	10	20	03/27/13 14:03	ljr
Sulfate	D516-02 - Turbidimetric	730		*	mg/L	30	200	03/28/13 14:47	lhb
Sulfide as S	SM4500S2-D			U	mg/L	0.02	0.1	03/26/13 16:17	ljr
TDS (calculated)	Calculation	1190			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.07						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW11

ACZ Sample ID: **L11241-02**  
Date Sampled: 03/20/13 09:20  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/01/13 11:25	bsu
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 13:37	bsu
Nitrogen, total Kjeldahl	M361.2 - Block Digestor							04/01/13 11:45	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:08	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/29/13 10:34	tod
Total Hot Plate Digestion	M200.2 ICP							03/28/13 9:54	aeb
Total Hot Plate Digestion	M200.2 ICP-MS							03/28/13 17:48	scp

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW11

ACZ Sample ID: **L11241-02**  
Date Sampled: 03/20/13 09:20  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP				mg/L	0.03	0.2	03/28/13 1:56	aeb
Aluminum, total	M200.7 ICP	0.08		B	mg/L	0.03	0.2	03/28/13 11:45	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0033			mg/L	0.0004	0.002	04/02/13 1:47	msh
Antimony, total	M200.8 ICP-MS	0.0032			mg/L	0.0004	0.002	04/01/13 21:40	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0061			mg/L	0.0002	0.001	04/02/13 1:47	msh
Arsenic, total	M200.8 ICP-MS	0.0065			mg/L	0.0002	0.001	04/01/13 21:40	msh
Barium, dissolved	M200.7 ICP	0.091			mg/L	0.003	0.02	03/28/13 1:56	aeb
Barium, total	M200.7 ICP	0.091			mg/L	0.003	0.02	03/28/13 11:45	aeb
Beryllium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 1:56	aeb
Beryllium, total	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 11:45	aeb
Bismuth, dissolved	M200.7 ICP			U *	mg/L	0.04	0.2	03/28/13 1:56	aeb
Bismuth, total	M200.7 ICP			U *	mg/L	0.04	0.2	03/28/13 11:45	aeb
Boron, dissolved	M200.7 ICP	0.09			mg/L	0.01	0.05	03/28/13 1:56	aeb
Boron, total	M200.7 ICP	0.10			mg/L	0.01	0.05	03/28/13 11:45	aeb
Cadmium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	04/02/13 1:47	msh
Cadmium, total	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	04/01/13 21:40	msh
Calcium, dissolved	M200.7 ICP	280			mg/L	0.2	1	03/28/13 1:56	aeb
Calcium, total	M200.7 ICP	281			mg/L	0.2	1	03/28/13 11:45	aeb
Chromium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 1:56	aeb
Chromium, total	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 11:45	aeb
Cobalt, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 1:56	aeb
Cobalt, total	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 11:45	aeb
Copper, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 1:56	aeb
Copper, total	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 11:45	aeb
Gallium, dissolved	M200.7 ICP			U *	mg/L	0.1	0.5	03/28/13 1:56	aeb
Gallium, total	M200.7 ICP			U *	mg/L	0.1	0.5	03/28/13 11:45	aeb
Iron, dissolved	M200.7 ICP			U	mg/L	0.02	0.05	03/28/13 1:56	aeb
Iron, total	M200.7 ICP	0.04		B	mg/L	0.02	0.05	03/28/13 11:45	aeb
Lead, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	04/02/13 1:47	msh
Lead, total	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	04/01/13 21:40	msh
Lithium, dissolved	M200.7 ICP	0.07		B	mg/L	0.02	0.1	03/28/13 1:56	aeb
Lithium, total	M200.7 ICP	0.07		B	mg/L	0.02	0.1	03/28/13 11:45	aeb
Magnesium, dissolved	M200.7 ICP	24.6			mg/L	0.2	1	03/28/13 1:56	aeb
Magnesium, total	M200.7 ICP	24.7			mg/L	0.2	1	03/28/13 11:45	aeb
Manganese, dissolved	M200.7 ICP	0.118			mg/L	0.005	0.03	03/28/13 1:56	aeb
Manganese, total	M200.7 ICP	0.116			mg/L	0.005	0.03	03/28/13 11:45	aeb
Mercury, dissolved	M245.1 CVAA			U	mg/L	0.0002	0.001	03/28/13 15:33	mfm
Mercury, total	M245.1 CVAA			U	mg/L	0.0002	0.001	03/28/13 12:49	mfm
Molybdenum, dissolved	M200.7 ICP			U	mg/L	0.02	0.1	03/28/13 1:56	aeb
Molybdenum, total	M200.7 ICP			U	mg/L	0.02	0.1	03/28/13 11:45	aeb
Nickel, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 1:56	aeb
Nickel, total	M200.7 ICP			U	mg/L	0.01	0.05	03/28/13 11:45	aeb
Potassium, dissolved	M200.7 ICP	6.7			mg/L	0.3	2	03/28/13 1:56	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW11

ACZ Sample ID: **L11241-02**  
Date Sampled: 03/20/13 09:20  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Parameter	Method	Result	Units	MDL	PQL	Date	Analyst
Potassium, total	M200.7 ICP	6.5	mg/L	0.3	2	03/29/13 11:45	aeb
Scandium, dissolved	M200.7 ICP		mg/L	0.1	0.5	03/26/13 1:56	aeb
Scandium, total	M200.7 ICP		mg/L	0.1	0.5	03/29/13 11:45	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0002	mg/L	0.0001	0.0003	04/02/13 1:47	msh
Selenium, total	M200.8 ICP-MS	0.0001	mg/L	0.0001	0.0003	04/01/13 21:40	msh
Silver, dissolved	M200.8 ICP-MS		mg/L	0.00005	0.0003	04/02/13 1:47	msh
Silver, total	M200.8 ICP-MS		mg/L	0.00005	0.0003	04/01/13 21:40	msh
Sodium, dissolved	M200.7 ICP	53.8	mg/L	0.3	2	03/26/13 1:56	aeb
Sodium, total	M200.7 ICP	52.6	mg/L	0.3	2	03/29/13 11:45	aeb
Strontium, dissolved	M200.7 ICP	2.80	mg/L	0.01	0.05	03/26/13 1:56	aeb
Strontium, total	M200.7 ICP	2.67	mg/L	0.01	0.05	03/29/13 11:45	aeb
Thallium, dissolved	M200.8 ICP-MS		mg/L	0.0001	0.0005	04/02/13 1:47	msh
Thallium, total	M200.8 ICP-MS		mg/L	0.0001	0.0005	04/01/13 21:40	msh
Tin, dissolved	M200.7 ICP		mg/L	0.1	0.5	03/26/13 1:56	aeb
Tin, total	M200.7 ICP		mg/L	0.1	0.5	03/29/13 11:45	aeb
Titanium, dissolved	M200.7 ICP	0.008	mg/L	0.005	0.03	03/26/13 1:56	aeb
Titanium, total	M200.7 ICP	0.009	mg/L	0.005	0.03	03/29/13 11:45	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0003	mg/L	0.0001	0.0005	04/02/13 1:47	msh
Uranium, total	M200.8 ICP-MS	0.0003	mg/L	0.0001	0.0005	04/01/13 21:40	msh
Vanadium, dissolved	M200.7 ICP		mg/L	0.005	0.03	03/26/13 1:56	aeb
Vanadium, total	M200.7 ICP		mg/L	0.005	0.03	03/29/13 11:45	aeb
Zinc, dissolved	M200.7 ICP		mg/L	0.01	0.05	03/26/13 1:56	aeb
Zinc, total	M200.7 ICP		mg/L	0.01	0.05	03/29/13 11:45	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW11

ACZ Sample ID: **L11241-02**  
Date Sampled: 03/20/13 09:20  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		114		*	mg/L	2	20	03/23/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Total Alkalinity		114		*	mg/L	2	20	03/23/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-0.5			%			04/03/13 0:00	calc
Sum of Anions		18.8			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		18.6			meq/L	0.1	0.5	04/03/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 12:13	abm
Chloride	SM4500Cl-E	32		*	mg/L	1	5	03/29/13 12:08	mpb
Conductivity @25C	SM2510B	1540		*	umhos/cm	1	10	03/23/13 4:00	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 15:46	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:21	tod
Fluoride	SM4500F-C	0.9		*	mg/L	0.1	0.5	03/30/13 13:06	ljr
Hardness as CaCO3	SM2340B - Calculation	801			mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1.48		*	mg/L	0.02	0.1	03/29/13 23:10	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.07	B	*	mg/L	0.05	0.5	03/29/13 14:19	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.4	B	*	mg/L	0.1	0.5	04/02/13 15:30	mpb
pH (lab)	SM4500H+ B								
pH		8.3	H	*	units	0.1	0.1	03/23/13 0:00	abm
pH measured at		21.0		*	C	0.1	0.1	03/23/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.19			mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M385.1 - Auto Ascorbic Acid (digest)	0.06		*	mg/L	0.01	0.05	03/27/13 22:45	pjb
Phosphorus, ortho dissolved	M385.1 - Automated Ascorbic Acid	0.06	H	*	mg/L	0.01	0.05	03/22/13 21:55	pjb
Phosphorus, total	M385.1 - Auto Ascorbic Acid (digest)	0.06		*	mg/L	0.01	0.05	03/30/13 13:45	pjb
Residue, Filterable (TDS) @180C	SM2540C	1270		*	mg/L	10	20	03/22/13 15:19	ljr
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/27/13 12:20	khw
Residue, Total (TS) @105C	SM2540B	1290		*	mg/L	10	20	03/27/13 14:04	ljr
Sulfate	D516-02 - Turbidimetric	740		*	mg/L	30	200	03/28/13 14:47	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/26/13 18:20	ljr
TDS (calculated)	Calculation	1210			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.05						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of Interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of Interest

**QC Sample Types**

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSSD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

**QC Sample Type Explanations**

<i>Blanks</i>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<i>Control Samples</i>	Verifies the accuracy of the method, including the prep procedure.
<i>Duplicates</i>	Verifies the precision of the instrument and/or method.
<i>Spikes/Fortified Matrix</i>	Determines sample matrix interferences, if any.
<i>Standard</i>	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

<i>B</i>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<i>H</i>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<i>L</i>	Target analyte response was below the laboratory defined negative threshold.
<i>U</i>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/submit/extendedlist.asp>

REP001.09.12.01

Tahoe Resources, Inc.

ACZ Project ID: **L11241**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11241-01	WG340991	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340929	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration SM2320B - Titration	Q6 Q6	Sample was received above recommended temperature.
	WG341340	Chemical Oxygen Demand	M410.4 M410.4	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341292	Chloride	SM4500C-E	Q6	Sample was received above recommended temperature.
	WG340929	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341366	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation	M2 Q6	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Sample was received above recommended temperature.
	WG341319	Fluoride	SM4500F-C SM4500F-C	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341315	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG341299	Nitrogen, ammonia	M350.1 - Automated Phenate M350.1 - Automated Phenate	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester M351.2 - TKN by Block Digester M351.2 - TKN by Block Digester	M2 Q6 RA	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	pH	SM4500H+ B SM4500H+ B	Q6 Q6	Sample was received above recommended temperature. Sample was received above recommended temperature.
	WG341194	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340958	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid M365.1 - Automated Ascorbic Acid	H3 Q6	Sample was received and analyzed past holding time. Sample was received above recommended temperature.
	WG341321	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	M3 Q6	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable. Sample was received above recommended temperature.
	WG340925	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG341152	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

REPAD.15.06.05.01

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Tahoe Resources, Inc.

ACZ Project ID: **L11241**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG341165		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG341249		Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG341096		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340929		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11241**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11241-02	WG340991	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340929	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341340	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341292	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG340929	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341366	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341319	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341315	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG341299	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341194	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340958	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
	WG341321	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340926	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG341152	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11241**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG341165		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG341249		Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG341096		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340929		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Sample ID: **L11241-01**

Project ID: Escobal

Date Sampled: 03/20/13 9:05

Sample ID: SW4A-E

Date Received: 03/22/13

Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: **WG341223**

Analyst: **itk**

Extract Date: 03/26/13 13:05

Analysis Date: 03/28/13 14:16

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.7		1	*	%	70	130

**ACZ** Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L11241-01**  
Date Sampled: 03/20/13 9:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: 1664A - Gravimetric  
Extract Method:

Workgroup: WG341328  
Analyst: dhc  
Extract Date:  
Analysis Date: 04/01/13 9:33

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		U		1.01	*	mg/L	2.02	10.1

**ACZ** Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW11

ACZ Sample ID: **L11241-02**  
Date Sampled: 03/20/13 9:20  
Date Received: 03/22/13  
Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: M8015D GC/FID  
Extract Method: M3520

Workgroup: WG341223  
Analyst: itk  
Extract Date: 03/26/13 13:06  
Analysis Date: 03/28/13 14:42

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		U		1	*	mg/L	0.1	0.5
Surrogate Recoveries		CAS	% Recovery	Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	79.3		1	*	%	70	130

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW11

ACZ Sample ID: **L11241-02**  
Date Sampled: 03/20/13 9:20  
Date Received: 03/22/13  
Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: 1664A - Gravimetric  
Extract Method:

Workgroup: WG341328  
Analyst: dhc  
Extract Date:  
Analysis Date: 04/01/13 9:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2.02	10.1

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**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of Interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCW/SCW</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of Interest

**QC Sample Types**

<i>SURR</i>	Surrogate	<i>LFM</i>	Laboratory Fortified Matrix
<i>INTS</i>	Internal Standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>FBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>FBW</i>	Prep Blank - Water

**QC Sample Type Explanations**

<b>Blanks</b>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<b>Control Samples</b>	Verifies the accuracy of the method, including the prep procedure.
<b>Duplicates</b>	Verifies the precision of the instrument and/or method.
<b>Spikes/Fortified Matrix</b>	Determines sample matrix interferences, if any.

**ACZ Qualifiers (Qual)**

<b>B</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>O</b>	Analyte concentration is estimated due to result exceeding calibration range.
<b>H</b>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<b>J</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>L</b>	Target analyte response was below the laboratory defined negative threshold.
<b>U</b>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/4-90/020. Methods for the Determination of Organic Compounds in Drinking Water (I), July 1990.
- (3) EPA 600/R-92/129. Methods for the Determination of Organic Compounds in Drinking Water (II), July 1990.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Excluding Oil & Grease, solid & biological matrices for organic analyses are reported on a wet weight basis.
- (3) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (4) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/publications/qualifiers>

Tahoe Resources, Inc.

ACZ Project ID: **L11241**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11241-01	WG341223	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L11241-02	WG341223	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG341089	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L11241**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Bismuth, total	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Gallium, total	M200.7 ICP
Scandium, dissolved	M200.7 ICP
Scandium, total	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
--------------	------------

**Sample Receipt**

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L11241  
Date Received: 03/22/2013 10:03  
Received By: ksj  
Date Printed: 3/22/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3219	8.7	12	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

**ACZ Laboratories, Inc.** L11241  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Miguel Burganza  
Company: Tahoe Resources Inc.  
E-mail: MBurganza@sanrafael.com.gt

Address: Km 8.6 carretera antigua a El Salvador  
Centro Cooperativo Muxbal, Teme Dept. APto San Y  
Telephone: (+502) 5951 5248

Name: Charlie Muehloff  
Company: Tahoe Resources Inc.  
E-mail: cmuehloff@tahoeresourcesinc.com  
Telephone:

Name: Miguel Burganza  
Company: Tahoe Resources Inc.  
E-mail: MBurganza@sanrafael.com.gt

Address: Km 8.6 carretera antigua a El Salvador  
Centro Cooperativo Muxbal, Teme Dept. APto San Y  
Telephone: (+502) 5951 5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?  
YES  NO

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is suspect, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes  No

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Remada Bani  
Sampler's site information: State: Zip code: Time Zone:

Quote #: Water Quality  
Project/PO #: Escobal  
Reporting state for compliance testing:  
Check box if samples include NRC licensed material?

Sample ID	Date	Time	SW	# of Containers
SW4A-E	2013/03	09:05	SW	10
SWA1	2013/03	09:20	SW	10

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Miguel Burganza 2013 15:58 Emilio Escobal 2013/03 15:57  
ESB

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**ACZ** Laboratories, Inc.  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Analytical Report**

April 03, 2013

Guatemala March 20th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

**Miguel Berganza**  
 Environment Department.  
 Proyecto Escobal, S. A.

Report to: Miguel Berganza  
 Tahoe Resources, Inc.  
 Km 8.6 carretera Antigua a El Salvador Centro cor  
 Torre Oeste.Apto 503y504 Guatemala, GT

Bill to: Miguel Berganza  
 Tahoe Resources, Inc.  
 5190 Neil Road #310  
 Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
 ACZ Project ID: L11242

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 22, 2013. This project has been assigned to ACZ's project number, L11242. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11242. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 03, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

  
 Tony Antalek has reviewed and approved this report.

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Tahoe Resources, Inc.

April 03, 2013

Project ID: Escobal  
ACZ Project ID: L11242

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on March 22, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11242. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic and organic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

Tahoe Resources, Inc.

ACZ Sample ID: **L11242-01**

Project ID: Escobal

Date Sampled: 03/20/13 07:30

Sample ID: SW2-E

Date Received: 03/22/13

Sample Matrix: Surface Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/01/13 11:33	bsu
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 13:44	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 11:55	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:15	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/29/13 10:34	tod
Total Hot Plate Digestion	M200.2 ICP-MS							03/28/13 18:24	scp
Total Hot Plate Digestion	M200.2 ICP							03/28/13 10:06	aeb



**Inorganic Analytical Results**

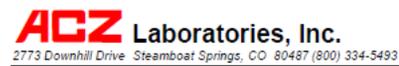
Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2-E

ACZ Sample ID: **L11242-01**  
 Date Sampled: 03/20/13 07:30  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.04	B		mg/L	0.03	0.2	03/26/13 2:06	aeb
Aluminum, total	M200.7 ICP	0.07	B		mg/L	0.03	0.2	03/29/13 11:48	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0011	B		mg/L	0.0004	0.002	04/02/13 1:57	msh
Antimony, total	M200.8 ICP-MS	0.0015	B		mg/L	0.0004	0.002	04/01/13 21:50	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0133			mg/L	0.0002	0.001	04/02/13 1:57	msh
Arsenic, total	M200.8 ICP-MS	0.0190			mg/L	0.0002	0.001	04/01/13 21:50	msh
Barium, dissolved	M200.7 ICP	0.061			mg/L	0.003	0.02	03/26/13 2:06	aeb
Barium, total	M200.7 ICP	0.064			mg/L	0.003	0.02	03/29/13 11:48	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:06	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:48	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/26/13 2:06	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	03/29/13 11:48	aeb
Boron, dissolved	M200.7 ICP	0.24			mg/L	0.01	0.05	03/26/13 2:06	aeb
Boron, total	M200.7 ICP	0.25			mg/L	0.01	0.05	03/29/13 11:48	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 1:57	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 21:50	msh
Calcium, dissolved	M200.7 ICP	418			mg/L	0.2	1	03/26/13 2:06	aeb
Calcium, total	M200.7 ICP	435			mg/L	0.2	1	03/29/13 11:48	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:06	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:48	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:06	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:48	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:06	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:48	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:06	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	03/29/13 11:48	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/26/13 2:06	aeb
Iron, total	M200.7 ICP	2.19			mg/L	0.02	0.05	03/29/13 11:48	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 1:57	msh
Lead, total	M200.8 ICP-MS	0.0005			mg/L	0.0001	0.0005	04/01/13 21:50	msh
Lithium, dissolved	M200.7 ICP	0.11			mg/L	0.02	0.1	03/26/13 2:06	aeb
Lithium, total	M200.7 ICP	0.11			mg/L	0.02	0.1	03/29/13 11:48	aeb
Magnesium, dissolved	M200.7 ICP	31.7			mg/L	0.2	1	03/26/13 2:06	aeb
Magnesium, total	M200.7 ICP	32.5			mg/L	0.2	1	03/29/13 11:48	aeb
Manganese, dissolved	M200.7 ICP	0.692			mg/L	0.005	0.03	03/26/13 2:06	aeb
Manganese, total	M200.7 ICP	0.735			mg/L	0.005	0.03	03/29/13 11:48	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 15:36	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 12:51	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/26/13 2:06	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	03/29/13 11:48	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:06	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:48	aeb
Potassium, dissolved	M200.7 ICP	5.0			mg/L	0.3	2	03/26/13 2:06	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2-E

ACZ Sample ID: **L11242-01**  
 Date Sampled: 03/20/13 07:30  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	4.9			mg/L	0.3	2	03/29/13 11:48	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:06	aeb
Scandium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	03/29/13 11:48	aeb
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	04/02/13 1:57	msh
Selenium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	04/01/13 21:50	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/02/13 1:57	msh
Silver, total	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/01/13 21:50	msh
Sodium, dissolved	M200.7 ICP	85.9			mg/L	0.3	2	03/26/13 2:06	aeb
Sodium, total	M200.7 ICP	85.4			mg/L	0.3	2	03/29/13 11:48	aeb
Strontium, dissolved	M200.7 ICP	4.75		*	mg/L	0.01	0.05	03/26/13 2:06	aeb
Strontium, total	M200.7 ICP	4.55			mg/L	0.01	0.05	03/29/13 11:48	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 1:57	msh
Thallium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 21:50	msh
Tin, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:06	aeb
Tin, total	M200.7 ICP		U		mg/L	0.1	0.5	03/29/13 11:48	aeb
Titanium, dissolved	M200.7 ICP	0.007	B		mg/L	0.005	0.03	03/26/13 2:06	aeb
Titanium, total	M200.7 ICP	0.008	B		mg/L	0.005	0.03	03/29/13 11:48	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	04/02/13 1:57	msh
Uranium, total	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	04/01/13 21:50	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/26/13 2:06	aeb
Vanadium, total	M200.7 ICP		U		mg/L	0.005	0.03	03/29/13 11:48	aeb
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:06	aeb
Zinc, total	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/29/13 11:48	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2-E

ACZ Sample ID: **L11242-01**  
Date Sampled: 03/20/13 07:30  
Date Received: 03/22/13  
Sample Matrix: Surface Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		112		*	mg/L	2	20	03/23/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Total Alkalinity		112		*	mg/L	2	20	03/23/13 0:00	abm
Cation-Anion Balance	Calculation				%			04/03/13 0:00	calc
Cation-Anion Balance		-0.7							
Sum of Anions		28.0			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		27.8			meq/L	0.1	0.5	04/03/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 12:37	abm
Chloride	SM4500Cl-E	70		*	mg/L	1	5	03/29/13 12:08	mpb
Conductivity @25C	SM2510B	2170		*	umhos/cm	1	10	03/23/13 4:09	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 15:49	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:22	tod
Fluoride	SM4500F-C	1.8		*	mg/L	0.1	0.5	03/30/13 13:09	ljr
Hardness as CaCO3	SM2340B - Calculation	1180			mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved		U	*	mg/L	0.02	0.1	03/30/13 0:46	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/29/13 14:20	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.3	B	*	mg/L	0.1	0.5	04/02/13 15:32	mpb
pH (lab)	SM4500H+ B								
pH		8.2	H	*	units	0.1	0.1	03/23/13 0:00	abm
pH measured at		21.0		*	C	0.1	0.1	03/23/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/27/13 22:47	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/22/13 21:59	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.01	B	*	mg/L	0.01	0.05	03/30/13 13:46	pjb
Residue, Filterable (TDS) @180C	SM2540C	1800		*	mg/L	10	20	03/22/13 15:20	ljr
Residue, Non-Filterable (TSS) @105C	SM2540D	11	B	*	mg/L	5	20	03/27/13 12:22	khw
Residue, Total (TS) @105C	SM2540B	1920		*	mg/L	10	20	03/27/13 14:05	ljr
Sulfate	D516-02 - Turbidimetric	1130		*	mg/L	50	300	03/28/13 14:47	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/26/13 16:24	ljr
TDS (calculated)	Calculation	1820			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.04						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW8-E

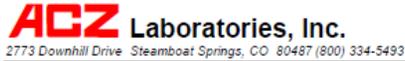
ACZ Sample ID: **L11242-02**  
Date Sampled: 03/20/13 10:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/01/13 11:40	bsu
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 13:51	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 12:06	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:23	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/29/13 10:34	tod
Total Hot Plate Digestion	M200.2 ICP-MS							03/26/13 18:36	scp
Total Hot Plate Digestion	M200.2 ICP							03/28/13 10:41	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

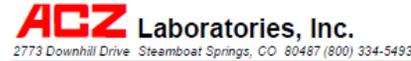
Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW8-E

ACZ Sample ID: **L11242-02**  
 Date Sampled: 03/20/13 10:05  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/26/13 2:09	aeb
Aluminum, total	M200.7 ICP	0.10	B		mg/L	0.03	0.2	03/29/13 11:58	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0026			mg/L	0.0004	0.002	04/02/13 2:00	msh
Antimony, total	M200.8 ICP-MS	0.0026			mg/L	0.0004	0.002	04/01/13 21:53	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0051			mg/L	0.0002	0.001	04/02/13 2:00	msh
Arsenic, total	M200.8 ICP-MS	0.0057			mg/L	0.0002	0.001	04/01/13 21:53	msh
Barium, dissolved	M200.7 ICP	0.095			mg/L	0.003	0.02	03/26/13 2:09	aeb
Barium, total	M200.7 ICP	0.098			mg/L	0.003	0.02	03/29/13 11:58	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:09	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:58	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/26/13 2:09	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	03/29/13 11:58	aeb
Boron, dissolved	M200.7 ICP	0.07			mg/L	0.01	0.05	03/26/13 2:09	aeb
Boron, total	M200.7 ICP	0.07			mg/L	0.01	0.05	03/29/13 11:58	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 2:00	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 21:53	msh
Calcium, dissolved	M200.7 ICP	203			mg/L	0.2	1	03/26/13 2:09	aeb
Calcium, total	M200.7 ICP	219			mg/L	0.2	1	03/29/13 11:58	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:09	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:58	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:09	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:58	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:09	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:58	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:09	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	03/29/13 11:58	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/26/13 2:09	aeb
Iron, total	M200.7 ICP	0.05	B		mg/L	0.02	0.05	03/29/13 11:58	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 2:00	msh
Lead, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 21:53	msh
Lithium, dissolved	M200.7 ICP	0.05	B		mg/L	0.02	0.1	03/26/13 2:09	aeb
Lithium, total	M200.7 ICP	0.05	B		mg/L	0.02	0.1	03/29/13 11:58	aeb
Magnesium, dissolved	M200.7 ICP	18.7			mg/L	0.2	1	03/26/13 2:09	aeb
Magnesium, total	M200.7 ICP	20.0			mg/L	0.2	1	03/29/13 11:58	aeb
Manganese, dissolved	M200.7 ICP	0.057			mg/L	0.005	0.03	03/26/13 2:09	aeb
Manganese, total	M200.7 ICP	0.070			mg/L	0.005	0.03	03/29/13 11:58	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 15:38	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 12:53	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/26/13 2:09	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	03/29/13 11:58	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:09	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:58	aeb
Potassium, dissolved	M200.7 ICP	6.7			mg/L	0.3	2	03/26/13 2:09	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW8-E

ACZ Sample ID: **L11242-02**  
 Date Sampled: 03/20/13 10:05  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	6.7			mg/L	0.3	2	03/29/13 11:58	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:09	aeb
Scandium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	03/29/13 11:58	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0003	04/02/13 2:00	msh
Selenium, total	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0003	04/01/13 21:53	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/02/13 2:00	msh
Silver, total	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/01/13 21:53	msh
Sodium, dissolved	M200.7 ICP	42.9			mg/L	0.3	2	03/26/13 2:09	aeb
Sodium, total	M200.7 ICP	44.1			mg/L	0.3	2	03/29/13 11:58	aeb
Strontium, dissolved	M200.7 ICP	2.05		*	mg/L	0.01	0.05	03/26/13 2:09	aeb
Strontium, total	M200.7 ICP	2.08			mg/L	0.01	0.05	03/29/13 11:58	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 2:00	msh
Thallium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 21:53	msh
Tin, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:09	aeb
Tin, total	M200.7 ICP		U		mg/L	0.1	0.5	03/29/13 11:58	aeb
Titanium, dissolved	M200.7 ICP	0.006	B		mg/L	0.005	0.03	03/26/13 2:09	aeb
Titanium, total	M200.7 ICP	0.010	B		mg/L	0.005	0.03	03/29/13 11:58	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	04/02/13 2:00	msh
Uranium, total	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	04/01/13 21:53	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/26/13 2:09	aeb
Vanadium, total	M200.7 ICP		U		mg/L	0.005	0.03	03/29/13 11:58	aeb
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:09	aeb
Zinc, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 11:58	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW8-E

ACZ Sample ID: **L11242-02**  
Date Sampled: 03/20/13 10:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		117		*	mg/L	2	20	03/23/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Total Alkalinity		117		*	mg/L	2	20	03/23/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.8			%			04/03/13 0:00	calc
Sum of Anions		14.6			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		13.8			meq/L	0.1	0.5	04/03/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 12:46	abm
Chloride	SM4500Cl-E	25		*	mg/L	1	5	03/29/13 12:08	mpb
Conductivity @25C	SM2510B	1260		*	umhos/cm	1	10	03/23/13 4:19	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 15:50	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:24	tod
Fluoride	SM4500F-C	0.7		*	mg/L	0.1	0.5	03/30/13 13:12	ljr
Hardness as CaCO3	SM2340B - Calculation	584			mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2.58		*	mg/L	0.02	0.1	03/30/13 0:48	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/29/13 14:21	lhb
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester	0.5		*	mg/L	0.1	0.5	04/02/13 15:33	mpb
pH	SM4500H+ B	8.2	H	*	units	0.1	0.1	03/23/13 0:00	abm
pH measured at		22.0		*	C	0.1	0.1	03/23/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.25			mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.08		*	mg/L	0.01	0.05	03/27/13 22:50	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.05	BH	*	mg/L	0.01	0.05	03/22/13 22:00	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.09		*	mg/L	0.01	0.05	03/30/13 13:47	pjb
Residue, Filterable (TDS) @ 180C	SM2540C	990		*	mg/L	10	20	03/22/13 15:21	ljr
Residue, Non-Filterable (TSS) @ 105C	SM2540D		U	*	mg/L	5	20	03/27/13 12:24	khw
Residue, Total (TS) @ 105C	SM2540B	1030		*	mg/L	10	20	03/27/13 14:06	ljr
Sulfate	D518-02 - Turbidimetric	550		*	mg/L	20	100	03/28/13 14:47	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/28/13 16:28	ljr
TDS (calculated)	Calculation	919			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.08						04/03/13 0:00	calc

REPIN 02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW2A-E

ACZ Sample ID: **L11242-03**  
Date Sampled: 03/20/13 08:33  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/01/13 11:48	bsu
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 13:57	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 12:16	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:30	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/29/13 10:35	tod
Total Hot Plate Digestion	M200.2 ICP-MS							03/26/13 18:48	sop
Total Hot Plate Digestion	M200.2 ICP							03/28/13 10:52	aeb

REPIN 02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2A-E

ACZ Sample ID: **L11242-03**  
 Date Sampled: 03/20/13 08:33  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.03	B		mg/L	0.03	0.2	03/26/13 2:12	aeb
Aluminum, total	M200.7 ICP	0.15	B		mg/L	0.03	0.2	03/29/13 12:01	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0049			mg/L	0.0004	0.002	04/02/13 2:03	msh
Antimony, total	M200.8 ICP-MS	0.0047			mg/L	0.0004	0.002	04/01/13 21:57	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0065			mg/L	0.0002	0.001	04/02/13 2:03	msh
Arsenic, total	M200.8 ICP-MS	0.0079			mg/L	0.0002	0.001	04/01/13 21:57	msh
Barium, dissolved	M200.7 ICP	0.062			mg/L	0.003	0.02	03/26/13 2:12	aeb
Barium, total	M200.7 ICP	0.064			mg/L	0.003	0.02	03/29/13 12:01	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:12	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 12:01	aeb
Bismuth, dissolved	M200.7 ICP	0.09	B	*	mg/L	0.04	0.2	03/26/13 2:12	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	03/29/13 12:01	aeb
Boron, dissolved	M200.7 ICP	0.12			mg/L	0.01	0.05	03/26/13 2:12	aeb
Boron, total	M200.7 ICP	0.12			mg/L	0.01	0.05	03/29/13 12:01	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 2:03	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 21:57	msh
Calcium, dissolved	M200.7 ICP	329			mg/L	0.2	1	03/26/13 2:12	aeb
Calcium, total	M200.7 ICP	347			mg/L	0.2	1	03/29/13 12:01	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:12	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 12:01	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:12	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 12:01	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:12	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 12:01	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:12	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	03/29/13 12:01	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/26/13 2:12	aeb
Iron, total	M200.7 ICP	0.05			mg/L	0.02	0.05	03/29/13 12:01	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 2:03	msh
Lead, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 21:57	msh
Lithium, dissolved	M200.7 ICP	0.09	B		mg/L	0.02	0.1	03/26/13 2:12	aeb
Lithium, total	M200.7 ICP	0.09	B		mg/L	0.02	0.1	03/29/13 12:01	aeb
Magnesium, dissolved	M200.7 ICP	25.8			mg/L	0.2	1	03/26/13 2:12	aeb
Magnesium, total	M200.7 ICP	26.6			mg/L	0.2	1	03/29/13 12:01	aeb
Manganese, dissolved	M200.7 ICP	0.305			mg/L	0.005	0.03	03/26/13 2:12	aeb
Manganese, total	M200.7 ICP	0.318			mg/L	0.005	0.03	03/29/13 12:01	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 15:44	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/26/13 12:55	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/26/13 2:12	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	03/29/13 12:01	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:12	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	03/29/13 12:01	aeb
Potassium, dissolved	M200.7 ICP	6.4			mg/L	0.3	2	03/26/13 2:12	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2A-E

ACZ Sample ID: **L11242-03**  
 Date Sampled: 03/20/13 08:33  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	6.3			mg/L	0.3	2	03/26/13 12:01	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:12	aeb
Scandium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	03/29/13 12:01	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	04/02/13 2:03	msh
Selenium, total	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	04/01/13 21:57	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/02/13 2:03	msh
Silver, total	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/01/13 21:57	msh
Sodium, dissolved	M200.7 ICP	64.7			mg/L	0.3	2	03/26/13 2:12	aeb
Sodium, total	M200.7 ICP	64.7			mg/L	0.3	2	03/29/13 12:01	aeb
Strontium, dissolved	M200.7 ICP	3.60		*	mg/L	0.01	0.05	03/26/13 2:12	aeb
Strontium, total	M200.7 ICP	3.54			mg/L	0.01	0.05	03/29/13 12:01	aeb
Thallium, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	04/02/13 2:03	msh
Thallium, total	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	04/01/13 21:57	msh
Tin, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/26/13 2:12	aeb
Tin, total	M200.7 ICP		U		mg/L	0.1	0.5	03/29/13 12:01	aeb
Titanium, dissolved	M200.7 ICP	0.007	B		mg/L	0.005	0.03	03/26/13 2:12	aeb
Titanium, total	M200.7 ICP	0.009	B		mg/L	0.005	0.03	03/29/13 12:01	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	04/02/13 2:03	msh
Uranium, total	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	04/01/13 21:57	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/26/13 2:12	aeb
Vanadium, total	M200.7 ICP		U		mg/L	0.005	0.03	03/29/13 12:01	aeb
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/26/13 2:12	aeb
Zinc, total	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/29/13 12:01	aeb

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\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW2A-E

ACZ Sample ID: **L11242-03**  
Date Sampled: 03/20/13 08:33  
Date Received: 03/22/13  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		104		*	mg/L	2	20	03/23/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/23/13 0:00	abm
Total Alkalinity		104		*	mg/L	2	20	03/23/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.5			%			04/03/13 0:00	calc
Sum of Anions		21.5			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		21.7			meq/L	0.1	0.5	04/03/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 13:11	abm
Chloride	SM4500Cl-E	38		*	mg/L	1	5	03/29/13 12:08	mpb
Conductivity @25C	SM2510B	1780		*	umhos/cm	1	10	03/23/13 4:27	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 15:51	tcd
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:25	tcd
Fluoride	SM4500F-C	1.2		*	mg/L	0.1	0.5	03/30/13 13:26	ljr
Hardness as CaCO3	SM2340B - Calculation	929		*	mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1.36		*	mg/L	0.02	0.1	03/30/13 0:50	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.55		*	mg/L	0.05	0.5	03/29/13 14:24	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.9		*	mg/L	0.1	0.5	04/02/13 15:34	mpb
pH (lab)	SM4500H+ B								
pH		8.2	H	*	units	0.1	0.1	03/23/13 0:00	abm
pH measured at		22.0		*	C	0.1	0.1	03/23/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus		U	*	mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/27/13 22:51	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/22/13 22:01	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/30/13 13:48	pjb
Residue, Filterable (TDS) @180C	SM2540C	1520		*	mg/L	10	20	03/22/13 15:22	ljr
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/27/13 12:27	khw
Residue, Total (TS) @ 105C	SM2540B	1520		*	mg/L	10	20	03/27/13 14:07	ljr
Sulfate	D516-02 - Turbidimetric	870		*	mg/L	50	300	03/28/13 14:50	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/26/13 16:31	ljr
TDS (calculated)	Calculation	1400			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.09						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of Interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of Interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	LCSWD	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	LFB	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	LFM	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	LFMD	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	LRB	Laboratory Reagent Blank
ICB	Initial Calibration Blank	MS	Matrix Spike
ICV	Initial Calibration Verification standard	MSD	Matrix Spike Duplicate
ICSSAB	Inter-element Correction Standard - A plus B solutions	PBS	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	PBW	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	PQV	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	SDL	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extlist.pdf>

REP001.09.12.01



**Inorganic Extended  
Qualifier Report**

Tahoe Resources, Inc.

ACZ Project ID: **L11242**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11242-01	WG340991	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Tin, dissolved	M200.7 ICP	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [- MDL].
	WG340929	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341340	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341292	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG340929	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341366	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341319	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341318	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG341299	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341194	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340958	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
	WG341321	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340925	Residue, Filterable (TDS) @180C	SM2540D	Q6	Sample was received above recommended temperature.
	WG341152	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data

REPAD.15.06.05.01

**Inorganic Extended  
Qualifier Report**

Tahoe Resources, Inc.

ACZ Project ID: **L11242**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG341165	Residue, Total (TS) @ 105C	SM2540B	Q6	validation because the sample concentration is too low for accurate evaluation (< 10x MDL). Sample was received above recommended temperature.
	WG341249	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG341096	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11242**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11242-02	WG340991	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Tin, dissolved	M200.7 ICP	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [- MDL].
WG340929		Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG341340		Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341292		Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
WG340929		Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
WG341366		Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341371		Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341319		Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340929		Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG341318		Nitrate/Nitrite as N	M363.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
WG341299		Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341432		Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340929		pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
WG341194		Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340958		Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to Item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
WG341321		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG340925		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11242**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG341152	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341165		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG341249		Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG341096		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340929		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11242**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11242-03	WG340991	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Tin, dissolved	M200.7 ICP	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample (< MDL).
	WG340929	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341340	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341292	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG340929	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341366	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341319	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	Hydroxide as CaO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341318	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG341299	Nitrogen, ammonia	M360.1 - Automated Phenate	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M360.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M360.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341194	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340958	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
	WG341321	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340925	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11242**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG341152	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341165	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341249	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG341096	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340929	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2-E

ACZ Sample ID: **L11242-01**  
 Date Sampled: 03/20/13 7:30  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: M8015D GC/FID  
 Extract Method: M3520

Workgroup: WG341223  
 Analyst: itk  
 Extract Date: 03/26/13 13:07  
 Analysis Date: 03/28/13 15:08

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries		CAS	% Recovery	Dilution	XQ	Units	LCL	UCL
OTP	84-15-1		82	1	*	%	70	130

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2-E

ACZ Sample ID: **L11242-01**  
 Date Sampled: 03/20/13 7:30  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: 1664A - Gravimetric  
 Extract Method:

Workgroup: WG341328  
 Analyst: dhc  
 Extract Date:  
 Analysis Date: 04/01/13 9:35

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2.02	10.1

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**ACZ Laboratories, Inc.**

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW8-E

ACZ Sample ID: **L11242-02**  
Date Sampled: 03/20/13 10:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520**

Workgroup: WG341223  
Analyst: itk  
Extract Date: 03/26/13 13:08  
Analysis Date: 03/28/13 15:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.7		1	*	%	70	130

**ACZ Laboratories, Inc.**

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW8-E

ACZ Sample ID: **L11242-02**  
Date Sampled: 03/20/13 10:05  
Date Received: 03/22/13  
Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: **1664A - Gravimetric**  
Extract Method:

Workgroup: WG341328  
Analyst: dhc  
Extract Date: 04/01/13 9:36  
Analysis Date:

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2.02	10.1

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Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2A-E

ACZ Sample ID: **L11242-03**  
 Date Sampled: 03/20/13 8:33  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: **M8015D GC/FID**  
 Extract Method: **M3520**

Workgroup: **WG341223**  
 Analyst: itk  
 Extract Date: 03/26/13 13:09  
 Analysis Date: 03/28/13 16:01

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		.2	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	79.7		1	*	%	70	130

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2A-E

ACZ Sample ID: **L11242-03**  
 Date Sampled: 03/20/13 8:33  
 Date Received: 03/22/13  
 Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: **1664A - Gravimetric**  
 Extract Method:

Workgroup: **WG341328**  
 Analyst: dhc  
 Extract Date: 04/01/13 9:37

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		U		1.01	*	mg/L	2.02	10.1

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of Interest
<i>Limit</i>	Upper limit for RPD, in %
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of Interest

QC Sample Types

<i>SURR</i>	Surrogate	<i>LFM</i>	Laboratory Fortified Matrix
<i>INTS</i>	Internal Standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

<b>Blanks</b>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<b>Control Samples</b>	Verifies the accuracy of the method, including the prep procedure.
<b>Duplicates</b>	Verifies the precision of the instrument and/or method.
<b>Spikes/Fortified Matrix</b>	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

<b>B</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>O</b>	Analyte concentration is estimated due to result exceeding calibration range.
<b>H</b>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<b>J</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>L</b>	Target analyte response was below the laboratory defined negative threshold.
<b>U</b>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/4-90/020. Methods for the Determination of Organic Compounds in Drinking Water (I), July 1990.
- (3) EPA 600/R-92/129. Methods for the Determination of Organic Compounds in Drinking Water (II), July 1990.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Excluding Oil & Grease, solid & biological matrices for organic analyses are reported on a wet weight basis.
- (3) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (4) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extendedlist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: L11242

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11242-01	WG341223	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L11242-02	WG341089	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
		WG341223	*All Compounds*	M8015D GC/FID	Q6
	WG341328	Oil and Grease	1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L11242-03	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
		*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
	WG341089	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

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Tahoe Resources, Inc.

ACZ Project ID: **L11242**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Bismuth, total	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Gallium, total	M200.7 ICP
Scandium, dissolved	M200.7 ICP
Scandium, total	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L11242  
 Date Received: 03/22/2013 10:04  
 Received By: ksj  
 Date Printed: 3/22/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3615	12.7	15	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.



**ACZ** Laboratories, Inc. **11242** **CLARIFIED**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5793

Name: Miguel Berganza  
 Company: Talvoe Resources Inc.  
 E-mail: mberganza@sanrafael.com.gt  
 Address: Km 8.6 carretera antigua a El Salvador  
 Centro Corporativo Muxtal, Torre Oeste, Apto 5024  
 Telephone: (+502) 5951 5248

Name: Charlie Muerhoff  
 Company: Talvoe Resources Inc.  
 E-mail: cmuerhoff@talvoeresourcesinc.com  
 Telephone:

Name: Miguel Berganza  
 Company: Talvoe Resources Inc.  
 E-mail: mberganza@sanrafael.com.gt  
 Address: Km 8.6 carretera antigua a El Salvador  
 Centro Corporativo Muxtal, Torre Oeste, Apto 5024  
 Telephone: (+502) 5951 5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?  
 YES  NO

Are samples for SDWA Compliance Monitoring? Yes  No

Sampler's Name: Remedios Sampler's site information State Zip code Time Zone

Quote #: Water Quality  
 Project/PO#: Escobal  
 Reporting state for compliance testing:  
 Check box if samples include NRC licensed material?

Sample ID	Date	Time	Matrix	Containers	Analysis
SW2-E	2013/03	07:30	SW	10	✓
SW8-E	2013/03	10:05	SW	10	✓
SW2A-E	2013/03	08:33	SW	10	✓

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Miguel Berganza 2013 10-98 Erick Sicalaga 2013 15-57  
 ECE BOD-BIC:04

Guatemala March 20th, 2013

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To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

Miguel Berganza  
 Environment Department.  
 Proyecto Escobal, S. A.

11242 Chain of Custody

April 05, 2013

Report to: Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste Apto 503y504 Guatemala, GT

Bill to: Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11290

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 27, 2013. This project has been assigned to ACZ's project number, L11290. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11290. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 05, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Tony Antalek has reviewed and approved this report.



REPAD.01.06.05.02



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Tahoe Resources, Inc.

April 05, 2013

Project ID: Escobal  
ACZ Project ID: L11290

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on March 27, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11290. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

Sample Analysis

These samples were analyzed for inorganic and organic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

REPAD.03.06.05.01

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**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW9-E

ACZ Sample ID: **L11290-01**  
Date Sampled: 03/21/13 09:20  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Inorganic Prep									
Cyanide, total	M335.4 - Manual Distillation							04/02/13 15:40	lhb
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 14:30	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 15:15	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 13:06	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 15:12	lhb
Total Hot Plate Digestion	M200.2 ICP							04/01/13 18:13	jjc
Total Hot Plate Digestion	M200.2 ICP-MS							04/01/13 13:33	scp

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW9-E

ACZ Sample ID: **L11290-01**  
Date Sampled: 03/21/13 09:20  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Metals Analysis									
Aluminum, dissolved	M200.7 ICP	0.09	B		mg/L	0.03	0.2	03/28/13 12:09	aeb
Aluminum, total	M200.7 ICP	0.18	B	*	mg/L	0.03	0.2	04/04/13 11:08	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0011	B		mg/L	0.0004	0.002	04/02/13 3:07	msh
Antimony, total	M200.8 ICP-MS	0.0012	B		mg/L	0.0004	0.002	04/01/13 20:02	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0047			mg/L	0.0002	0.001	04/02/13 3:07	msh
Arsenic, total	M200.8 ICP-MS	0.0050			mg/L	0.0002	0.001	04/01/13 20:02	msh
Barium, dissolved	M200.7 ICP	0.128			mg/L	0.003	0.02	03/28/13 12:09	aeb
Barium, total	M200.7 ICP	0.132			mg/L	0.003	0.02	04/04/13 11:08	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:09	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:08	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/28/13 12:09	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	04/04/13 11:08	aeb
Boron, dissolved	M200.7 ICP	0.10			mg/L	0.01	0.05	03/28/13 12:09	aeb
Boron, total	M200.7 ICP	0.10			mg/L	0.01	0.05	04/05/13 11:53	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 3:07	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:02	msh
Calcium, dissolved	M200.7 ICP	113			mg/L	0.2	1	03/28/13 12:09	aeb
Calcium, total	M200.7 ICP	120			mg/L	0.2	1	04/04/13 11:08	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:09	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:08	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:09	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:08	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:09	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:08	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:09	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:08	aeb
Iron, dissolved	M200.7 ICP	0.05			mg/L	0.02	0.05	03/28/13 12:09	aeb
Iron, total	M200.7 ICP	0.18			mg/L	0.02	0.05	04/04/13 11:08	aeb
Lead, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	04/02/13 3:07	msh
Lead, total	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	04/01/13 20:02	msh
Lithium, dissolved	M200.7 ICP	0.04	B		mg/L	0.02	0.1	03/28/13 12:09	aeb
Lithium, total	M200.7 ICP	0.03	B		mg/L	0.02	0.1	04/04/13 11:08	aeb
Magnesium, dissolved	M200.7 ICP	14.3			mg/L	0.2	1	03/28/13 12:09	aeb
Magnesium, total	M200.7 ICP	15.3			mg/L	0.2	1	04/04/13 11:08	aeb
Manganese, dissolved	M200.7 ICP	0.053			mg/L	0.005	0.03	03/28/13 12:09	aeb
Manganese, total	M200.7 ICP	0.077			mg/L	0.005	0.03	04/04/13 11:08	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/29/13 12:47	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/28/13 15:30	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:09	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	04/04/13 11:08	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:09	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:08	aeb
Potassium, dissolved	M200.7 ICP	6.2			mg/L	0.3	2	03/28/13 12:09	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW9-E

ACZ Sample ID: **L11290-01**  
 Date Sampled: 03/21/13 09:20  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

Parameter	Method	Result	Units	MDL	PQL	Date	Analyst
Potassium, total	M200.7 ICP	6.5	mg/L	0.3	2	04/04/13 19:11	aeb
Scandium, dissolved	M200.7 ICP		mg/L	0.1	0.5	03/28/13 12:09	aeb
Scandium, total	M200.7 ICP		mg/L	0.1	0.5	04/04/13 11:08	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0001	B mg/L	0.0001	0.0003	04/02/13 3:07	msh
Selenium, total	M200.8 ICP-MS	0.0001	B mg/L	0.0001	0.0003	04/01/13 20:02	msh
Silver, dissolved	M200.8 ICP-MS		mg/L	0.00005	0.0003	04/02/13 3:07	msh
Silver, total	M200.8 ICP-MS		mg/L	0.00005	0.0003	04/01/13 20:02	msh
Sodium, dissolved	M200.7 ICP	33.9	mg/L	0.3	2	03/28/13 12:09	aeb
Sodium, total	M200.7 ICP	35.0	mg/L	0.3	2	04/04/13 11:08	aeb
Strontium, dissolved	M200.7 ICP	1.05	mg/L	0.01	0.05	03/28/13 12:09	aeb
Strontium, total	M200.7 ICP	1.08	mg/L	0.01	0.05	04/04/13 11:08	aeb
Thallium, dissolved	M200.8 ICP-MS		mg/L	0.0001	0.0005	04/02/13 3:07	msh
Thallium, total	M200.8 ICP-MS		mg/L	0.0001	0.0005	04/01/13 20:02	msh
Tin, dissolved	M200.7 ICP		mg/L	0.1	0.5	03/28/13 12:09	aeb
Tin, total	M200.7 ICP		mg/L	0.1	0.5	04/04/13 11:08	aeb
Titanium, dissolved	M200.7 ICP	0.008	B mg/L	0.005	0.03	03/28/13 12:09	aeb
Titanium, total	M200.7 ICP	0.007	B mg/L	0.005	0.03	04/04/13 11:08	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0002	B mg/L	0.0001	0.0005	04/02/13 3:07	msh
Uranium, total	M200.8 ICP-MS	0.0002	B mg/L	0.0001	0.0005	04/01/13 20:02	msh
Vanadium, dissolved	M200.7 ICP		mg/L	0.005	0.03	03/28/13 12:09	aeb
Vanadium, total	M200.7 ICP	0.011	B mg/L	0.005	0.03	04/04/13 11:08	aeb
Zinc, dissolved	M200.7 ICP	0.01	B mg/L	0.01	0.05	03/28/13 12:09	aeb
Zinc, total	M200.7 ICP		mg/L	0.01	0.05	04/04/13 11:08	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW9-E

ACZ Sample ID: **L11290-01**  
 Date Sampled: 03/21/13 09:20  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
<b>Wet Chemistry</b>									
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		98		*	mg/L	2	20	03/29/13 0:00	ljr
Carbonate as CaCO3		3	B	*	mg/L	2	20	03/29/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/29/13 0:00	ljr
Total Alkalinity		101		*	mg/L	2	20	03/29/13 0:00	ljr
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.7			%			04/05/13 0:00	calc
Sum of Anions		8.8			meq/L	0.1	0.5	04/05/13 0:00	calc
Sum of Cations		8.5			meq/L	0.1	0.5	04/05/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 13:19	abm
Chloride	SM4500Cl-E	24		*	mg/L	1	5	04/03/13 13:39	bsu
Conductivity @25C	SM2510B	837		*	umhos/cm	1	10	03/29/13 7:30	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/02/13 23:44	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:29	tod
Fluoride	SM4500F-C	0.4	B	*	mg/L	0.1	0.5	04/02/13 17:11	ljr
Hardness as CaCO3	SM2340B - Calculation	341			mg/L	1	7	04/05/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1.32		*	mg/L	0.02	0.1	04/04/13 0:20	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	04/02/13 16:39	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.4	B	*	mg/L	0.1	0.5	04/02/13 16:43	mpb
pH (lab)	SM4500H+ B								
pH		8.3	H	*	units	0.1	0.1	03/29/13 0:00	ljr
pH measured at		22.0		*	C	0.1	0.1	03/29/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.28			mg/L	0.03	0.15	04/05/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.09		*	mg/L	0.01	0.05	04/04/13 10:24	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.09	H	*	mg/L	0.01	0.05	03/27/13 21:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.10		*	mg/L	0.01	0.05	04/04/13 12:24	bsu
Residue, Filterable (TDS) @180C	SM2540C	640		*	mg/L	10	20	03/27/13 20:23	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	6	B	*	mg/L	5	20	03/28/13 11:34	khw
Residue, Total (TS) @105C	SM2540B	650		*	mg/L	10	20	03/27/13 14:08	ljr
Sulfate	D518-02 - Turbidimetric	290		*	mg/L	20	100	04/01/13 12:23	mpb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/27/13 16:25	ljr
TDS (calculated)	Calculation	544			mg/L	10	50	04/05/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.18						04/05/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW10-E

ACZ Sample ID: **L11290-02**  
 Date Sampled: 03/21/13 11:00  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation	-						04/02/13 15:46	lhb
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 14:43	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 15:36	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 13:33	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 15:26	lhb
Total Hot Plate Digestion	M200.2 ICP							04/01/13 18:25	jjc
Total Hot Plate Digestion	M200.2 ICP-MS							04/01/13 13:48	scp

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW10-E

ACZ Sample ID: **L11290-02**  
 Date Sampled: 03/21/13 11:00  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/28/13 12:12	aeb
Aluminum, total	M200.7 ICP		U	*	mg/L	0.03	0.2	04/04/13 11:11	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	04/02/13 3:11	msh
Antimony, total	M200.8 ICP-MS		U		mg/L	0.0004	0.002	04/01/13 20:06	msh
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0002	0.001	04/02/13 3:11	msh
Arsenic, total	M200.8 ICP-MS		U		mg/L	0.0002	0.001	04/01/13 20:06	msh
Barium, dissolved	M200.7 ICP		U		mg/L	0.003	0.02	03/28/13 12:12	aeb
Barium, total	M200.7 ICP		U		mg/L	0.003	0.02	04/04/13 11:11	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:12	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:11	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/28/13 12:12	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	04/04/13 11:11	aeb
Boron, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:12	aeb
Boron, total	M200.7 ICP		U		mg/L	0.01	0.05	04/05/13 11:56	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 3:11	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:06	msh
Calcium, dissolved	M200.7 ICP	0.2	B		mg/L	0.2	1	03/28/13 12:12	aeb
Calcium, total	M200.7 ICP		U		mg/L	0.2	1	04/04/13 11:11	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:12	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:11	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:12	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:11	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:12	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:11	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:12	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:11	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/28/13 12:12	aeb
Iron, total	M200.7 ICP		U		mg/L	0.02	0.05	04/04/13 11:11	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 3:11	msh
Lead, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:06	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:12	aeb
Lithium, total	M200.7 ICP		U		mg/L	0.02	0.1	04/04/13 11:11	aeb
Magnesium, dissolved	M200.7 ICP		U		mg/L	0.2	1	03/28/13 12:12	aeb
Magnesium, total	M200.7 ICP		U		mg/L	0.2	1	04/04/13 11:11	aeb
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/28/13 12:12	aeb
Manganese, total	M200.7 ICP		U		mg/L	0.005	0.03	04/04/13 11:11	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/29/13 12:49	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/28/13 15:41	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:12	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	04/04/13 11:11	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:12	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:11	aeb
Potassium, dissolved	M200.7 ICP		U		mg/L	0.3	2	03/28/13 12:12	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L11290-02**  
Date Sampled: 03/21/13 11:00  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Parameter	Method	U	mg/L	0.3	2	04/04/13 19:14	aeb
Potassium, total	M200.7 ICP	U	mg/L	0.1	0.5	03/28/13 12:12	aeb
Scandium, dissolved	M200.7 ICP	U *	mg/L	0.1	0.5	04/04/13 11:11	aeb
Scandium, total	M200.7 ICP	U *	mg/L	0.1	0.5	04/04/13 11:11	aeb
Selenium, dissolved	M200.8 ICP-MS	U	mg/L	0.0001	0.0003	04/02/13 3:11	msh
Selenium, total	M200.8 ICP-MS	U	mg/L	0.0001	0.0003	04/01/13 20:06	msh
Silver, dissolved	M200.8 ICP-MS	U	mg/L	0.00005	0.0003	04/02/13 3:11	msh
Silver, total	M200.8 ICP-MS	U	mg/L	0.00005	0.0003	04/01/13 20:06	msh
Sodium, dissolved	M200.7 ICP	U	mg/L	0.3	2	03/28/13 12:12	aeb
Sodium, total	M200.7 ICP	U	mg/L	0.3	2	04/04/13 11:11	aeb
Strontium, dissolved	M200.7 ICP	U	mg/L	0.01	0.05	03/28/13 12:12	aeb
Strontium, total	M200.7 ICP	U	mg/L	0.01	0.05	04/04/13 11:11	aeb
Thallium, dissolved	M200.8 ICP-MS	U	mg/L	0.0001	0.0005	04/02/13 3:11	msh
Thallium, total	M200.8 ICP-MS	U	mg/L	0.0001	0.0005	04/01/13 20:06	msh
Tin, dissolved	M200.7 ICP	U	mg/L	0.1	0.5	03/28/13 12:12	aeb
Tin, total	M200.7 ICP	U	mg/L	0.1	0.5	04/04/13 11:11	aeb
Titanium, dissolved	M200.7 ICP	U	mg/L	0.005	0.03	03/28/13 12:12	aeb
Titanium, total	M200.7 ICP	U	mg/L	0.005	0.03	04/04/13 11:11	aeb
Uranium, dissolved	M200.8 ICP-MS	U	mg/L	0.0001	0.0005	04/02/13 3:11	msh
Uranium, total	M200.8 ICP-MS	U	mg/L	0.0001	0.0005	04/01/13 20:06	msh
Vanadium, dissolved	M200.7 ICP	U	mg/L	0.005	0.03	03/28/13 12:12	aeb
Vanadium, total	M200.7 ICP	U	mg/L	0.005	0.03	04/04/13 11:11	aeb
Zinc, dissolved	M200.7 ICP	U	mg/L	0.01	0.05	03/28/13 12:12	aeb
Zinc, total	M200.7 ICP	U	mg/L	0.01	0.05	04/04/13 11:11	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L11290-02**  
Date Sampled: 03/21/13 11:00  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
<b>Wet Chemistry</b>									
Alkalinity as CaCO3	SM2320B - Titration	2	B	*	mg/L	2	20	03/28/13 0:00	ljr
Bicarbonate as CaCO3					mg/L	2	20	03/28/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/28/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/28/13 0:00	ljr
Total Alkalinity		2	B	*	mg/L	2	20	03/28/13 0:00	ljr
Cation-Anion Balance	Calculation				%			04/05/13 0:00	calc
Cation-Anion Balance		n/a						04/05/13 0:00	calc
Sum of Anions			U		meq/L	0.1	0.5	04/05/13 0:00	calc
Sum of Cations			U		meq/L	0.1	0.5	04/05/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 13:27	abm
Chloride	SM4500Cl-E		U	*	mg/L	1	5	04/03/13 13:39	bsu
Conductivity @25C	SM2510B	1	B	*	umhos/cm	1	10	03/28/13 7:36	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/02/13 23:46	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 18:31	tod
Fluoride	SM4500F-C		U	*	mg/L	0.1	0.5	04/02/13 17:18	ljr
Hardness as CaCO3	SM2340B - Calculation	1	B		mg/L	1	7	04/05/13 0:00	calc
Nitrate/Nitrite as N	M363.2 - H2SO4 preserved		U	*	mg/L	0.02	0.1	04/04/13 0:21	pjb
Nitrogen, ammonia	M360.1 - Automated Phenate		U	*	mg/L	0.05	0.5	04/02/13 16:43	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	04/02/13 16:45	mpb
pH (lab)	SM4500H+ B				units	0.1	0.1	03/29/13 0:00	ljr
pH		6.7	H	*	units	0.1	0.1	03/29/13 0:00	ljr
pH measured at		22.0		*	C	0.1	0.1	03/28/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	04/05/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	04/04/13 10:25	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/27/13 21:44	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	04/04/13 12:26	bsu
Residue, Filterable (TDS) @180C	SM2540C		U	*	mg/L	10	20	03/27/13 20:23	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/28/13 11:36	khw
Residue, Total (TS) @105C	SM2540B		U	*	mg/L	10	20	03/27/13 14:09	ljr
Sulfate	D516-02 - Turbidimetric	1	B	*	mg/L	1	5	04/01/13 12:11	mpb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/27/13 16:28	ljr
TDS (calculated)	Calculation		U		mg/L	10	50	04/05/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	n/a						04/05/13 0:00	calc

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\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW1

ACZ Sample ID: **L11290-03**  
Date Sampled: 03/23/13 10:00  
Date Received: 03/27/13  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/02/13 15:52	lhb
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 14:50	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 15:47	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 14:00	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 15:40	lhb

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/28/13 12:15	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	04/02/13 3:14	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0040			mg/L	0.0002	0.001	04/02/13 3:14	msh
Barium, dissolved	M200.7 ICP	0.135			mg/L	0.003	0.02	03/28/13 12:15	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:15	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/28/13 12:15	aeb
Boron, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/28/13 12:15	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 3:14	msh
Calcium, dissolved	M200.7 ICP	20.5			mg/L	0.2	1	03/28/13 12:15	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:15	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:15	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:15	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:15	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/28/13 12:15	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 3:14	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:15	aeb
Magnesium, dissolved	M200.7 ICP	8.9			mg/L	0.2	1	03/28/13 12:15	aeb
Manganese, dissolved	M200.7 ICP	0.037			mg/L	0.005	0.03	03/28/13 12:15	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/29/13 12:51	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:15	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:15	aeb
Potassium, dissolved	M200.7 ICP	4.8			mg/L	0.3	2	03/28/13 12:15	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:15	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	04/02/13 3:14	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/02/13 3:14	msh
Sodium, dissolved	M200.7 ICP	16.0			mg/L	0.3	2	03/28/13 12:15	aeb
Strontium, dissolved	M200.7 ICP	0.13			mg/L	0.01	0.05	03/28/13 12:15	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 3:14	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/28/13 12:15	aeb
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/28/13 12:15	aeb
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 3:14	msh
Vanadium, dissolved	M200.7 ICP	0.006	B		mg/L	0.005	0.03	03/28/13 12:15	aeb
Zinc, dissolved	M200.7 ICP	0.11			mg/L	0.01	0.05	03/28/13 12:15	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW1

ACZ Sample ID: **L11290-03**  
Date Sampled: 03/23/13 10:00  
Date Received: 03/27/13  
Sample Matrix: Ground Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		56		*	mg/L	2	20	03/29/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/29/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/29/13 0:00	ljr
Total Alkalinity		56		*	mg/L	2	20	03/29/13 0:00	ljr
Cation-Anion Balance	Calculation				%			04/05/13 0:00	calc
Cation-Anion Balance		2.0							
Sum of Anions		2.5			meq/L	0.1	0.5	04/05/13 0:00	calc
Sum of Cations		2.6			meq/L	0.1	0.5	04/05/13 0:00	calc
Chloride	SM4500Cl-E	4	B	*	mg/L	1	5	04/03/13 13:39	bsu
Conductivity @25C	SM2510B	282		*	umhos/cm	1	10	03/29/13 7:44	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/02/13 23:47	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:32	tod
Fluoride	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	04/02/13 17:25	ljr
Hardness as CaCO3	SM2340B - Calculation	88			mg/L	1	7	04/05/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3.04		*	mg/L	0.02	0.1	04/04/13 0:23	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.06	B	*	mg/L	0.05	0.5	04/02/13 16:45	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.3	B	*	mg/L	0.1	0.5	04/02/13 16:46	mpb
pH (lab)	SM4500H+ B								
pH		7.9	H	*	units	0.1	0.1	03/29/13 0:00	ljr
pH measured at		22.0		*	C	0.1	0.1	03/29/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.19			mg/L	0.03	0.15	04/05/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.06		*	mg/L	0.01	0.05	04/04/13 10:26	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.07	H	*	mg/L	0.01	0.05	03/27/13 21:46	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.10		*	mg/L	0.01	0.05	04/04/13 12:27	bsu
Residue, Filterable (TDS) @180C	SM2540C	260		*	mg/L	10	20	03/27/13 20:24	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	55		*	mg/L	5	20	03/28/13 11:40	khw
Residue, Total (TS) @105C	SM2540B	330		*	mg/L	10	20	03/27/13 14:10	ljr
Sulfate	D516-02 - Turbidimetric	60		*	mg/L	5	30	04/01/13 12:16	mpb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/27/13 16:35	ljr
TDS (calculated)	Calculation	148			mg/L	10	50	04/05/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.76						04/05/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**Report Header Explanations**

<b>Batch</b>	A distinct set of samples analyzed at a specific time
<b>Found</b>	Value of the QC Type of Interest
<b>Limit</b>	Upper limit for RPD, in %.
<b>Lower</b>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<b>MDL</b>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<b>PCN/SCN</b>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<b>PQL</b>	Practical Quantitation Limit, typically 5 times the MDL
<b>QC</b>	True Value of the Control Sample or the amount added to the Spike
<b>Rec</b>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<b>RPD</b>	Relative Percent Difference, calculation used for Duplicate QC Types
<b>Upper</b>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<b>Sample</b>	Value of the Sample of Interest

**QC Sample Types**

<b>AS</b>	Analytical Spike (Post Digestion)	<b>LCSWD</b>	Laboratory Control Sample - Water Duplicate
<b>ASD</b>	Analytical Spike (Post Digestion) Duplicate	<b>LFB</b>	Laboratory Fortified Blank
<b>CCB</b>	Continuing Calibration Blank	<b>LFM</b>	Laboratory Fortified Matrix
<b>CCV</b>	Continuing Calibration Verification standard	<b>LFMD</b>	Laboratory Fortified Matrix Duplicate
<b>DUP</b>	Sample Duplicate	<b>LRB</b>	Laboratory Reagent Blank
<b>ICB</b>	Initial Calibration Blank	<b>MS</b>	Matrix Spike
<b>ICV</b>	Initial Calibration Verification standard	<b>MSD</b>	Matrix Spike Duplicate
<b>ICSSAB</b>	Inter-element Correction Standard - A plus B solutions	<b>PBS</b>	Prep Blank - Soil
<b>LCSS</b>	Laboratory Control Sample - Soil	<b>PBW</b>	Prep Blank - Water
<b>LCSSD</b>	Laboratory Control Sample - Soil Duplicate	<b>PQV</b>	Practical Quantitation Verification standard
<b>LCSW</b>	Laboratory Control Sample - Water	<b>SDL</b>	Serial Dilution

**QC Sample Type Explanations**

<b>Blanks</b>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<b>Control Samples</b>	Verifies the accuracy of the method, including the prep procedure.
<b>Duplicates</b>	Verifies the precision of the instrument and/or method.
<b>Spikes/Fortified Matrix</b>	Determines sample matrix interferences, if any.
<b>Standard</b>	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

<b>B</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>H</b>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<b>L</b>	Target analyte response was below the laboratory defined negative threshold.
<b>U</b>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extendedlist.pdf>

REP001.09.12.01

Tahoe Resources, Inc.

ACZ Project ID: **L11290**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11290-01	WG341409	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341252	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341340	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341507	Chloride	SM4500C-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500C-E	Q6	Sample was received above recommended temperature.
	WG341252	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341471	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341419	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG341252	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341527	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341430	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341252	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341536	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341192	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341554	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341189	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG341228	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01



Tahoe Resources, Inc.

ACZ Project ID: **L11290**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341165	Residue, Total (TS) @ 105C		SM2540B	Q6	Sample was received above recommended temperature.
WG341350	Sulfate		D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341169	Sulfide as S		SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341252	Total Alkalinity		SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11290**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11290-02	WG341409	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341252	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341340	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341507	Chloride	SM4500CHE	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CHE	Q6	Sample was received above recommended temperature.
	WG341252	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341471	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341419	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG341252	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341527	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341430	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341252	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341536	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341192	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341554	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341189	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG341228	Residue, Non-Filterable (TDS) @105C	SM2540D	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11290**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			SM2540B	Q6	Sample was received above recommended temperature.
	WG341165	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341350	Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341169	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341252	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11290**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11290-03	WG341252	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341507	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG341252	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG341471	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341419	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG341252	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341527	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341430	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341252	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341536	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341192	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341554	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341189	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG341228	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

REPAD.15.06.05.01

**Inorganic Extended  
Qualifier Report**

Tahoe Resources, Inc.

ACZ Project ID: **L11290**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG341165		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG341350		Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341169		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341252		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

**Organic Analytical  
Results**

Tahoe Resources, Inc.

ACZ Sample ID: **L11290-01**

Project ID: Escobal

Date Sampled: 03/21/13 9:20

Sample ID: SW9-E

Date Received: 03/27/13

Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: **WG341383**

Analyst: itk

Extract Date: 03/28/13 15:53

Analysis Date: 04/01/13 15:33

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85.4		1	*	%	70	130

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Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SW9-E

ACZ Sample ID: **L11290-01**  
Date Sampled: 03/21/13 9:20  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: 1664A - Gravimetric  
Extract Method:

Workgroup: WG341328  
Analyst: dhc  
Extract Date:  
Analysis Date: 04/01/13 9:43

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.02	*	mg/L	2.04	10.2

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Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L11290-02**  
Date Sampled: 03/21/13 11:00  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: M8015D GC/FID  
Extract Method: M3520

Workgroup: WG341383  
Analyst: itk  
Extract Date: 03/28/13 15:54  
Analysis Date: 04/01/13 15:59

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries		CAS	% Recovery	Dilution	XQ	Units	LCL	UCL
OTP	84-15-1		85.6	1	*	%	70	130

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L11290-02**  
Date Sampled: 03/21/13 11:00  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: 1664A - Gravimetric  
Extract Method:

Workgroup: WG341328  
Analyst: dhc  
Extract Date:  
Analysis Date: 04/01/13 9:44

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2.02	10.1

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of Interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCW/SCW</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of Interest

**QC Sample Types**

<i>SURR</i>	Surrogate	<i>LFM</i>	Laboratory Fortified Matrix
<i>INTS</i>	Internal Standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

**QC Sample Type Explanations**

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

**ACZ Qualifiers (Qual)**

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
O	Analyte concentration is estimated due to result exceeding calibration range.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
J	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/4-90/020. Methods for the Determination of Organic Compounds in Drinking Water (I), July 1990.
(3)	EPA 600/R-92/129. Methods for the Determination of Organic Compounds in Drinking Water (II), July 1990.
(4)	EPA SW-846. Test Methods for Evaluating Solid Waste.
(5)	Standard Methods for the Examination of Water and Wastewater.

**Comments**

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Excluding Oil & Grease, solid & biological matrices for organic analyses are reported on a wet weight basis.
(3)	An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(4)	If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extendedlist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L11290**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11290-01	WG341383	'All Compounds'	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L11290-02	WG341383	'All Compounds'	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11290**

**Metals Analysis**

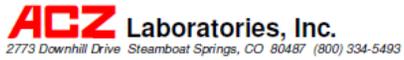
The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Bismuth, total	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Gallium, total	M200.7 ICP
Scandium, dissolved	M200.7 ICP
Scandium, total	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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**Sample Receipt**

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L11290  
Date Received: 03/27/2013 10:28  
Received By: ks  
Date Printed: 3/27/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3009	10.5	14	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

**ACZ Laboratories, Inc.** L11290  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Name:** Miguel Berganza  
**Company:** Tahoe Resources Inc.  
**E-mail:** mberganza@tahoeresources.com.gt

**Address:** Km 8 a carretera antigua a El Salvador  
**Centro Cooperativo Municipal, Torre de la, Apto. 204, 501**  
**Telephone:** (+502) 5951 5248

**Name:** Charlie Muerhoff  
**Company:** Tahoe Resources Inc.  
**E-mail:** cmuerhoff@tahoeresourcesinc.com  
**Telephone:**

**Name:** Miguel Berganza  
**Company:** Tahoe Resources Inc.  
**E-mail:** mberganza@tahoeresources.com.gt

**Address:** Km 8 a carretera antigua a El Salvador  
**Centro Cooperativo Municipal, Torre de la, Apto. 204, 501**  
**Telephone:** (+502) 5951 5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

If "NO" then ACZ will contact client for further instructions. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and this will be notified.

Are samples for SDWA Compliance Monitoring? Yes  No

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Fernando Ramos Sampler's site information: State: Zip code: Time Zone:

Quote #: Water Quality  
Project/PO #: Escobal  
Reporting state for compliance testing:  
Are any samples NRC licensable material? Yes / No

Sample ID	Date	Time	Type	# of Containers	SW	GW
SW9-E	21/03/13	09:20	SW	10	✓	
SW10-E	21/03/13	11:00	SW	10	✓	
MWA	27/03/13	10:00	GW	9		✓

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Susana Arcoche 26/03/13 11:15 Erick Salazar 27/3/13 11:15  
LCS B27-B.1C.08

L11290 Chain of Custody

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Guatemala March 25th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

Miguel Berganza  
Environment Department.  
Proyecto Escobal, S. A.

April 05, 2013

Report to:	Bill to:
Miguel Berganza	Miguel Berganza
Tahoe Resources, Inc.	Tahoe Resources, Inc.
Km 8.6 carretera Antigua a El Salvador Centro cor	5190 Neil Road #310
Torre Oeste Apto 503y504 Guatemala, GT	Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11292

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 27, 2013. This project has been assigned to ACZ's project number, L11292. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11292. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 05, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

Tony Antalek has reviewed and approved this report.



**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Case Narrative**

Tahoe Resources, Inc. April 05, 2013

Project ID: Escobal  
ACZ Project ID: L11292

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on March 27, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11292. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic and organic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc. ACZ Sample ID: **L11292-01**  
Project ID: Escobal Date Sampled: **03/21/13 08:10**  
Sample ID: SW3-E Date Received: **03/27/13**  
Sample Matrix: **Surface Water**

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/02/13 16:11	lhb
Cyanide, WAD	SM4500-CN I- distillation	-						04/01/13 14:57	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor							04/01/13 15:57	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 14:26	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 16:15	lhb
Total Hot Plate Digestion	M200.2 ICP-MS							04/01/13 14:31	scp
Total Hot Plate Digestion	M200.2 ICP							04/01/13 18:37	jjc

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L11292-01**  
Date Sampled: 03/21/13 08:10  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/28/13 12:24	aeb
Aluminum, total	M200.7 ICP	0.06	B	*	mg/L	0.03	0.2	04/04/13 11:14	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	04/02/13 13:49	msh
Antimony, total	M200.8 ICP-MS		U		mg/L	0.0004	0.002	04/01/13 20:16	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0083			mg/L	0.0002	0.001	04/02/13 13:49	msh
Arsenic, total	M200.8 ICP-MS	0.0086			mg/L	0.0002	0.001	04/01/13 20:16	msh
Barium, dissolved	M200.7 ICP	0.124			mg/L	0.003	0.02	03/28/13 12:24	aeb
Barium, total	M200.7 ICP	0.129			mg/L	0.003	0.02	04/04/13 11:14	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:24	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:14	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/28/13 12:24	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	04/04/13 11:14	aeb
Boron, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/28/13 12:24	aeb
Boron, total	M200.7 ICP	0.01	B		mg/L	0.01	0.05	04/05/13 11:59	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:49	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:16	msh
Calcium, dissolved	M200.7 ICP	41.0			mg/L	0.2	1	03/28/13 12:24	aeb
Calcium, total	M200.7 ICP	43.8			mg/L	0.2	1	04/04/13 11:14	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:24	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:14	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:24	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:14	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:24	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:14	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:24	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:14	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/28/13 12:24	aeb
Iron, total	M200.7 ICP	0.09			mg/L	0.02	0.05	04/04/13 11:14	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:49	msh
Lead, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:16	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:24	aeb
Lithium, total	M200.7 ICP		U		mg/L	0.02	0.1	04/04/13 11:14	aeb
Magnesium, dissolved	M200.7 ICP	3.3			mg/L	0.2	1	03/28/13 12:24	aeb
Magnesium, total	M200.7 ICP	3.4			mg/L	0.2	1	04/04/13 11:14	aeb
Manganese, dissolved	M200.7 ICP	0.034			mg/L	0.005	0.03	03/28/13 12:24	aeb
Manganese, total	M200.7 ICP	0.062			mg/L	0.005	0.03	04/04/13 11:14	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/29/13 12:53	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/28/13 15:43	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:24	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	04/04/13 11:14	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:24	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:14	aeb
Potassium, dissolved	M200.7 ICP	4.4			mg/L	0.3	2	03/28/13 12:24	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L11292-01**  
Date Sampled: 03/21/13 08:10  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	4.6			mg/L	0.3	2	04/04/13 19:17	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:24	aeb
Scandium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:14	aeb
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	04/02/13 13:49	msh
Selenium, total	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0003	04/01/13 20:16	msh
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.00005	0.0003	04/02/13 13:49	msh
Silver, total	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/01/13 20:16	msh
Sodium, dissolved	M200.7 ICP	14.3			mg/L	0.3	2	03/28/13 12:24	aeb
Sodium, total	M200.7 ICP	14.9			mg/L	0.3	2	04/04/13 11:14	aeb
Strontium, dissolved	M200.7 ICP	0.26			mg/L	0.01	0.05	03/28/13 12:24	aeb
Strontium, total	M200.7 ICP	0.26			mg/L	0.01	0.05	04/04/13 11:14	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:49	msh
Thallium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:16	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/28/13 12:24	aeb
Tin, total	M200.7 ICP		U		mg/L	0.1	0.5	04/04/13 11:14	aeb
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/28/13 12:24	aeb
Titanium, total	M200.7 ICP		U		mg/L	0.005	0.03	04/04/13 11:14	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	04/02/13 13:49	msh
Uranium, total	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	04/01/13 20:16	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/28/13 12:24	aeb
Vanadium, total	M200.7 ICP	0.005	B		mg/L	0.005	0.03	04/04/13 11:14	aeb
Zinc, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/28/13 12:24	aeb
Zinc, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:14	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L11292-01**  
Date Sampled: 03/21/13 08:10  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		123		*	mg/L	2	20	03/29/13 0:00	ljr
Carbonate as CaCO3		5	B	*	mg/L	2	20	03/29/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/29/13 0:00	ljr
Total Alkalinity		128		*	mg/L	2	20	03/29/13 0:00	ljr
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.6			%			04/05/13 0:00	calc
Sum of Anions		3.2			meq/L	0.1	0.5	04/05/13 0:00	calc
Sum of Cations		3.1			meq/L	0.1	0.5	04/05/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 13:35	abm
Chloride	SM4500Cl-E	3	B	*	mg/L	1	5	04/03/13 13:39	bsu
Conductivity @25C	SM2510B	301		*	umhos/cm	1	10	03/29/13 7:53	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/02/13 23:50	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:34	tod
Fluoride	SM4500F-C	0.2	B	*	mg/L	0.1	0.5	04/02/13 17:33	ljr
Hardness as CaCO3	SM2340B - Calculation	116			mg/L	1	7	04/05/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	0.05	B	*	mg/L	0.02	0.1	04/04/13 0:26	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.06	B	*	mg/L	0.05	0.5	04/02/13 16:46	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.1	B	*	mg/L	0.1	0.5	04/02/13 16:47	mpb
pH (lab)	SM4500H+ B								
pH		8.4	H	*	units	0.1	0.1	03/29/13 0:00	ljr
pH measured at		21.0		*	C	0.1	0.1	03/29/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.06	B	*	mg/L	0.03	0.15	04/05/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	04/04/13 10:29	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	BH	*	mg/L	0.01	0.05	03/27/13 21:48	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	04/04/13 12:56	bsu
Residue, Filterable (TDS) @180C	SM2540C	230		*	mg/L	10	20	03/27/13 20:25	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/28/13 11:42	khw
Residue, Total (TS) @ 105C	SM2540B	230		*	mg/L	10	20	03/27/13 14:12	ljr
Sulfate	D516-02 - Turbidimetric	25		*	mg/L	1	5	04/01/13 14:14	mpb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/27/13 16:38	ljr
TDS (calculated)	Calculation	168			mg/L	10	50	04/05/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.37						04/05/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L11292-02**  
Date Sampled: 03/21/13 07:40  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/02/13 16:17	lhb
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 15:03	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 16:08	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 14:53	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 16:28	lhb
Total Hot Plate Digestion	M200.2 ICP							04/01/13 18:48	jjc
Total Hot Plate Digestion	M200.2 ICP-MS							04/01/13 14:45	scp

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L11292-02**  
Date Sampled: 03/21/13 07:40  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.09	B		mg/L	0.03	0.2	03/28/13 12:27	aeb
Aluminum, total	M200.7 ICP		U	*	mg/L	0.03	0.2	04/04/13 11:18	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0033			mg/L	0.0004	0.002	04/02/13 13:52	msh
Antimony, total	M200.8 ICP-MS	0.0034			mg/L	0.0004	0.002	04/01/13 20:19	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0057			mg/L	0.0002	0.001	04/02/13 13:52	msh
Arsenic, total	M200.8 ICP-MS	0.0064			mg/L	0.0002	0.001	04/01/13 20:19	msh
Barium, dissolved	M200.7 ICP	0.081			mg/L	0.003	0.02	03/28/13 12:27	aeb
Barium, total	M200.7 ICP	0.081			mg/L	0.003	0.02	04/04/13 11:18	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:27	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:18	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/28/13 12:27	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	04/04/13 11:18	aeb
Boron, dissolved	M200.7 ICP	0.10			mg/L	0.01	0.05	03/28/13 12:27	aeb
Boron, total	M200.7 ICP	0.09			mg/L	0.01	0.05	04/05/13 12:02	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:52	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:19	msh
Calcium, dissolved	M200.7 ICP	258			mg/L	0.2	1	03/28/13 12:27	aeb
Calcium, total	M200.7 ICP	288			mg/L	0.2	1	04/04/13 11:18	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:27	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:18	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:27	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:18	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:27	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:18	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:27	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:18	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/28/13 12:27	aeb
Iron, total	M200.7 ICP		U		mg/L	0.02	0.05	04/04/13 11:18	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:52	msh
Lead, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:19	msh
Lithium, dissolved	M200.7 ICP	0.08	B		mg/L	0.02	0.1	03/28/13 12:27	aeb
Lithium, total	M200.7 ICP	0.08	B		mg/L	0.02	0.1	04/04/13 11:18	aeb
Magnesium, dissolved	M200.7 ICP	23.4			mg/L	0.2	1	03/28/13 12:27	aeb
Magnesium, total	M200.7 ICP	25.5			mg/L	0.2	1	04/04/13 11:18	aeb
Manganese, dissolved	M200.7 ICP	0.142			mg/L	0.005	0.03	03/28/13 12:27	aeb
Manganese, total	M200.7 ICP	0.151			mg/L	0.005	0.03	04/04/13 11:18	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/29/13 12:56	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/28/13 15:45	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:27	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	04/04/13 11:18	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:27	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:18	aeb
Potassium, dissolved	M200.7 ICP	6.0			mg/L	0.3	2	03/28/13 12:27	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L11292-02**  
Date Sampled: 03/21/13 07:40  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	6.1			mg/L	0.3	2	04/04/13 19:20	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:27	aeb
Scandium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:18	aeb
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	04/02/13 13:52	msh
Selenium, total	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	04/01/13 20:19	msh
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.00005	0.0003	04/02/13 13:52	msh
Silver, total	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/01/13 20:19	msh
Sodium, dissolved	M200.7 ICP	50.2			mg/L	0.3	2	03/28/13 12:27	aeb
Sodium, total	M200.7 ICP	50.7			mg/L	0.3	2	04/04/13 11:18	aeb
Strontium, dissolved	M200.7 ICP	2.52			mg/L	0.01	0.05	03/28/13 12:27	aeb
Strontium, total	M200.7 ICP	2.52			mg/L	0.01	0.05	04/04/13 11:18	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:52	msh
Thallium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:19	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/28/13 12:27	aeb
Tin, total	M200.7 ICP		U		mg/L	0.1	0.5	04/04/13 11:18	aeb
Titanium, dissolved	M200.7 ICP	0.008	B		mg/L	0.005	0.03	03/28/13 12:27	aeb
Titanium, total	M200.7 ICP		U		mg/L	0.005	0.03	04/04/13 11:18	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	04/02/13 13:52	msh
Uranium, total	M200.8 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	04/01/13 20:19	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/28/13 12:27	aeb
Vanadium, total	M200.7 ICP	0.012	B		mg/L	0.005	0.03	04/04/13 11:18	aeb
Zinc, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/28/13 12:27	aeb
Zinc, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:18	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L11292-02**  
Date Sampled: 03/21/13 07:40  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		130		*	mg/L	2	20	03/29/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/29/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/29/13 0:00	ljr
Total Alkalinity		130		*	mg/L	2	20	03/29/13 0:00	ljr
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.3			%			04/05/13 0:00	calc
Sum of Anions		18.1			meq/L	0.1	0.5	04/05/13 0:00	calc
Sum of Cations		17.3			meq/L	0.1	0.5	04/05/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 13:44	abm
Chloride	SM4500Cl-E	28		*	mg/L	1	5	04/03/13 13:39	bsu
Conductivity @25C	SM2510B	1480		*	umhos/cm	1	10	03/29/13 8:02	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/02/13 23:51	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:35	tod
Fluoride	SM4500F-C]	0.8		*	mg/L	0.1	0.5	04/02/13 17:36	ljr
Hardness as CaCO3	SM2340B - Calculation	741			mg/L	1	7	04/05/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1.88		*	mg/L	0.02	0.1	04/04/13 0:27	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.19	B	*	mg/L	0.05	0.5	04/02/13 16:47	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.2	B	*	mg/L	0.1	0.5	04/02/13 16:48	mpb
pH (lab)	SM4500H+ B								
pH		8.3	H	*	units	0.1	0.1	03/29/13 0:00	ljr
pH measured at		21.0		*	C	0.1	0.1	03/29/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.16			mg/L	0.03	0.15	04/05/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.05	B	*	mg/L	0.01	0.05	04/04/13 10:30	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.04	BH	*	mg/L	0.01	0.05	03/27/13 21:50	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.04	B	*	mg/L	0.01	0.05	04/04/13 12:58	bsu
Residue, Filterable (TDS) @180C	SM2540C	1210		*	mg/L	10	20	03/27/13 20:26	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/28/13 11:44	khw
Residue, Total (TS) @105C	SM2540B	1240		*	mg/L	10	20	03/27/13 14:13	ljr
Sulfate	D516-02 - Turbidimetric	700		*	mg/L	20	100	04/01/13 14:26	mpb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/27/13 16:40	ljr
TDS (calculated)	Calculation	1150			mg/L	10	50	04/05/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.05						04/05/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW6-E

ACZ Sample ID: **L11292-03**  
Date Sampled: 03/21/13 08:50  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/02/13 16:29	lhb
Cyanide, WAD	SM4500-CN I- distillation							04/01/13 15:10	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/01/13 16:18	lhb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 15:20	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/03/13 16:35	lhb
Total Hot Plate Digestion	M200.2 ICP]							04/01/13 19:00	jic
Total Hot Plate Digestion	M200.2 ICP-MS							04/01/13 15:00	scp

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW6-E

ACZ Sample ID: **L11292-03**  
Date Sampled: 03/21/13 08:50  
Date Received: 03/27/13  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/28/13 12:30	aeb
Aluminum, total	M200.7 ICP	0.03	B	*	mg/L	0.03	0.2	04/04/13 11:21	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	04/02/13 13:56	msh
Antimony, total	M200.8 ICP-MS		U		mg/L	0.0004	0.002	04/01/13 20:22	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0055			mg/L	0.0002	0.001	04/02/13 13:56	msh
Arsenic, total	M200.8 ICP-MS	0.0080			mg/L	0.0002	0.001	04/01/13 20:22	msh
Barium, dissolved	M200.7 ICP	0.086			mg/L	0.003	0.02	03/28/13 12:30	aeb
Barium, total	M200.7 ICP	0.088			mg/L	0.003	0.02	04/04/13 11:21	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:30	aeb
Beryllium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:21	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/28/13 12:30	aeb
Bismuth, total	M200.7 ICP		U	*	mg/L	0.04	0.2	04/04/13 11:21	aeb
Boron, dissolved	M200.7 ICP	0.50			mg/L	0.01	0.05	03/28/13 12:30	aeb
Boron, total	M200.7 ICP	0.53			mg/L	0.01	0.05	04/05/13 12:08	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:56	msh
Cadmium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:22	msh
Calcium, dissolved	M200.7 ICP	21.3			mg/L	0.2	1	03/28/13 12:30	aeb
Calcium, total	M200.7 ICP	22.5			mg/L	0.2	1	04/04/13 11:21	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:30	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:21	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:30	aeb
Cobalt, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:21	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:30	aeb
Copper, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:21	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:30	aeb
Gallium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:21	aeb
Iron, dissolved	M200.7 ICP	0.08			mg/L	0.02	0.05	03/28/13 12:30	aeb
Iron, total	M200.7 ICP	0.18			mg/L	0.02	0.05	04/04/13 11:21	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:56	msh
Lead, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:22	msh
Lithium, dissolved	M200.7 ICP	0.16			mg/L	0.02	0.1	03/28/13 12:30	aeb
Lithium, total	M200.7 ICP	0.16			mg/L	0.02	0.1	04/04/13 11:21	aeb
Magnesium, dissolved	M200.7 ICP	4.2			mg/L	0.2	1	03/28/13 12:30	aeb
Magnesium, total	M200.7 ICP	4.4			mg/L	0.2	1	04/04/13 11:21	aeb
Manganese, dissolved	M200.7 ICP	0.053			mg/L	0.005	0.03	03/28/13 12:30	aeb
Manganese, total	M200.7 ICP	0.059			mg/L	0.005	0.03	04/04/13 11:21	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/29/13 12:58	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	03/28/13 15:47	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/28/13 12:30	aeb
Molybdenum, total	M200.7 ICP		U		mg/L	0.02	0.1	04/04/13 11:21	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:30	aeb
Nickel, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:21	aeb
Potassium, dissolved	M200.7 ICP	4.6			mg/L	0.3	2	03/28/13 12:30	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW6-E

ACZ Sample ID: **L11292-03**  
Date Sampled: 03/21/13 08:50  
Date Received: 03/27/13  
Sample Matrix: Surface Water

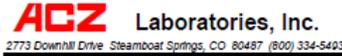
Potassium, total	M200.7 ICP	4.9			mg/L	0.3	2	04/04/13 11:21	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/28/13 12:30	aeb
Scandium, total	M200.7 ICP		U	*	mg/L	0.1	0.5	04/04/13 11:21	aeb
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	04/02/13 13:56	msh
Selenium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	04/01/13 20:22	msh
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.00005	0.0003	04/02/13 13:56	msh
Silver, total	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	04/01/13 20:22	msh
Sodium, dissolved	M200.7 ICP	42.1			mg/L	0.3	2	03/28/13 12:30	aeb
Sodium, total	M200.7 ICP	44.2			mg/L	0.3	2	04/04/13 11:21	aeb
Strontium, dissolved	M200.7 ICP	0.16			mg/L	0.01	0.05	03/28/13 12:30	aeb
Strontium, total	M200.7 ICP	0.16			mg/L	0.01	0.05	04/04/13 11:21	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:56	msh
Thallium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:22	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/28/13 12:30	aeb
Tin, total	M200.7 ICP		U		mg/L	0.1	0.5	04/04/13 11:21	aeb
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/28/13 12:30	aeb
Titanium, total	M200.7 ICP		U		mg/L	0.005	0.03	04/04/13 11:21	aeb
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/02/13 13:56	msh
Uranium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	04/01/13 20:22	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/28/13 12:30	aeb
Vanadium, total	M200.7 ICP		U		mg/L	0.005	0.03	04/04/13 11:21	aeb
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/28/13 12:30	aeb
Zinc, total	M200.7 ICP		U		mg/L	0.01	0.05	04/04/13 11:21	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**



**Inorganic Reference**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW6-E

ACZ Sample ID: **L11292-03**  
 Date Sampled: 03/21/13 08:50  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration	67		*	mg/L	2	20	03/30/13 0:00	ljr
Bicarbonate as CaCO3				*	mg/L	2	20	03/30/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/30/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/30/13 0:00	ljr
Total Alkalinity		67		*	mg/L	2	20	03/30/13 0:00	ljr
Cation-Anion Balance	Calculation				%			04/05/13 0:00	calc
Cation-Anion Balance		-4.2			%			04/05/13 0:00	calc
Sum of Anions		3.7			meq/L	0.1	0.5	04/05/13 0:00	calc
Sum of Cations		3.4			meq/L	0.1	0.5	04/05/13 0:00	calc
Chemical Oxygen Demand	M410.4		U	*	mg/L	10	20	04/01/13 13:52	abm
Chloride	SM4500Cl-E	57		*	mg/L	1	5	04/03/13 13:40	bsu
Conductivity @25C	SM2510B	373		*	umhos/cm	1	10	03/30/13 14:17	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/02/13 23:52	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/01/13 16:36	tod
Fluoride	SM4500F-C	0.2	B	*	mg/L	0.1	0.5	04/02/13 17:43	ljr
Hardness as CaCO3	SM2340B - Calculation	71			mg/L	1	7	04/05/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved		U	*	mg/L	0.02	0.1	04/04/13 0:29	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	04/02/13 16:48	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.2	B	*	mg/L	0.1	0.5	04/02/13 16:49	mpb
pH (lab)	SM4500H+ B								
pH		8.0	H	*	units	0.1	0.1	03/30/13 0:00	ljr
pH measured at		21.0		*	C	0.1	0.1	03/30/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.06	B	*	mg/L	0.03	0.15	04/05/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	04/04/13 10:31	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	BH	*	mg/L	0.01	0.05	03/27/13 21:51	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	04/04/13 12:59	bsu
Residue, Filterable (TDS) @180C	SM2540C	250		*	mg/L	10	20	03/27/13 20:27	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/28/13 11:46	khw
Residue, Total (TS) @105C	SM2540B	250		*	mg/L	10	20	03/27/13 14:14	ljr
Sulfate	D516-02 - Turbidimetric	34		*	mg/L	1	5	04/01/13 14:14	mpb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/27/13 16:43	ljr
TDS (calculated)	Calculation	204			mg/L	10	50	04/05/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.23						04/05/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**Report Header Explanations**

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of Interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of Interest

**QC Sample Types**

AS	Analytical Spike (Post Digestion)	LCSWD	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	LFB	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	LFM	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	LFMD	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	LRB	Laboratory Reagent Blank
ICB	Initial Calibration Blank	MS	Matrix Spike
ICV	Initial Calibration Verification standard	MSD	Matrix Spike Duplicate
IC/SAB	Inter-element Correction Standard - A plus B solutions	PBS	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	PBW	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	PQV	Practical Quantitation Verification standard
LCSSW	Laboratory Control Sample - Water	SDL	Serial Dilution

**QC Sample Type Explanations**

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extendedlist.pdf>

REP001.09.12.01

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Tahoe Resources, Inc.

ACZ Project ID: **L11292**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11292-01	WG341409	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341367	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
WG341252		Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG341340		Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341507		Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
WG341252		Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
WG341471		Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341371		Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341419		Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
WG341252		Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG341527		Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341430		Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341432		Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341252		pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG341536		Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341192		Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341566		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11292**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG341189		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540D	Q6	Sample was received above recommended temperature.
WG341228		Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			SM2540D	Q6	Sample was received above recommended temperature.
WG341165		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG341359		Sulfate	D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341169		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341252		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01



Tahoe Resources, Inc.

ACZ Project ID: **L11292**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11292-02	WG341409	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341367	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG341252	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration SM2320B - Titration	Q6 Q6	Sample was received above recommended temperature. Sample was received above recommended temperature.
	WG341340	Chemical Oxygen Demand	M410.4 M410.4	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341507	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341252	Conductivity @25C	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG341471	Cyanide, total	SM2510B M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	Q6 M2 Q6 RA	Sample was received above recommended temperature. Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341419	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG341252	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341527	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved M353.2 - H2SO4 preserved	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341430	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester M351.2 - TKN by Block Digester	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341252	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341536	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	M2 Q6 RA	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341192	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid M365.1 - Automated Ascorbic Acid M365.1 - Automated Ascorbic Acid	H3 Q6 RA	Sample was received and analyzed past holding time. Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341566	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11292**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG341189	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG341228	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341165	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341359	Sulfate	D516-02 - Turbidimetric D516-02 - Turbidimetric	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341169	Sulfide as S	SM4500S2-D SM4500S2-D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341252	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11292**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11292-03	WG341409	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341367	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
WG341320	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
		SM2320B - Titration	Q6	Sample was received above recommended temperature.	
WG341340	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.	
		M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341507	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		SM4500Cl-E	Q6	Sample was received above recommended temperature.	
WG341320	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.	
WG341471	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.	
		M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341371	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.	
		SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341419	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.	
WG341320	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
WG341527	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.	
		M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341430	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.	
		M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341432	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.	
		M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341320	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG341536	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341192	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.	
		M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
		M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341566	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

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Tahoe Resources, Inc.

ACZ Project ID: **L11292**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG341189	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
		SM2540D	Q6	Sample was received above recommended temperature.	
WG341228	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341165	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG341359	Sulfate	D516-D2 - Turbidimetric	Q6	Sample was received above recommended temperature.	
		D516-D2 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341169	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.	
		SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG341320	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

REPAD.15.06.05.01

**ACZ** Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW3-E

ACZ Sample ID: **L11292-01**  
 Date Sampled: 03/21/13 8:10  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: **M8015D GC/FID**  
 Extract Method: **M3520**

Workgroup: **WG341383**  
 Analyst: itk  
 Extract Date: 03/28/13 15:55  
 Analysis Date: 04/01/13 16:26

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.4		1	*	%	70	130

**ACZ** Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW3-E

ACZ Sample ID: **L11292-01**  
 Date Sampled: 03/21/13 8:10  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: **1664A - Gravimetric**  
 Extract Method:

Workgroup: **WG341328**  
 Analyst: dhc  
 Extract Date:  
 Analysis Date: 04/01/13 9:45

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2.02	10.1

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Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L11292-02**  
Date Sampled: 03/21/13 7:40  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520**

Workgroup: **WG341383**  
Analyst: itk  
Extract Date: 03/28/13 15:56  
Analysis Date: 04/01/13 16:52

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries		CAS	% Recovery	Dilution	XQ	Units	LCL	UCL
OTP	84-15-1		84.1	1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L11292-02**  
Date Sampled: 03/21/13 7:40  
Date Received: 03/27/13  
Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: **1664A - Gravimetric**  
Extract Method:

Workgroup: **WG341328**  
Analyst: dhc  
Extract Date:  
Analysis Date: 04/01/13 9:46

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2.02	10.1

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW6-E

ACZ Sample ID: **L11292-03**  
 Date Sampled: 03/21/13 8:50  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

Analysis Method: **M8015D GC/FID**  
 Extract Method: **M3520**

Workgroup: **WG341383**  
 Analyst: itk  
 Extract Date: 03/28/13 15:58  
 Analysis Date: 04/01/13 17:18

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.2		1	*	%	70	130

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Organic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW6-E

ACZ Sample ID: **L11292-03**  
 Date Sampled: 03/21/13 8:50  
 Date Received: 03/27/13  
 Sample Matrix: Surface Water

**Oil & Grease, Total Recoverable**

Analysis Method: **1664A - Gravimetric**  
 Extract Method:

Workgroup: **WG341328**  
 Analyst: dhc  
 Extract Date:  
 Analysis Date: 04/01/13 9:47

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2.02	10.1

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**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of Interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of Interest

**QC Sample Types**

<i>SURR</i>	Surrogate	<i>LFM</i>	Laboratory Fortified Matrix
<i>INTS</i>	Internal Standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

**QC Sample Type Explanations**

<i>Blanks</i>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<i>Control Samples</i>	Verifies the accuracy of the method, including the prep procedure.
<i>Duplicates</i>	Verifies the precision of the instrument and/or method.
<i>Spikes/Fortified Matrix</i>	Determines sample matrix interferences, if any.

**ACZ Qualifiers (Qual)**

<b>B</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>O</b>	Analyte concentration is estimated due to result exceeding calibration range.
<b>H</b>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<b>J</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>L</b>	Target analyte response was below the laboratory defined negative threshold.
<b>U</b>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/4-90/020. Methods for the Determination of Organic Compounds in Drinking Water (I), July 1990.
- (3) EPA 600/R-92/123. Methods for the Determination of Organic Compounds in Drinking Water (II), July 1990.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Excluding Oil & Grease, solid & biological matrices for organic analyses are reported on a wet weight basis.
- (3) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (4) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extendedlist.pdf>

**Tahoe Resources, Inc.**

ACZ Project ID: **L11292**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11292-01	WG341383	"All Compounds"	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L11292-02	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
L11292-02	WG341383	"All Compounds"	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L11292-02	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
L11292-03	WG341383	"All Compounds"	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L11292-03	WG341328	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.

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**Certification Qualifiers**

Tahoe Resources, Inc.

ACZ Project ID: **L11292**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Bismuth, total	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Gallium, total	M200.7 ICP
Scandium, dissolved	M200.7 ICP
Scandium, total	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
--------------	------------

**Sample Receipt**

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L11292

Date Received: 03/27/2013 10:30

Received By: ksj

Date Printed: 3/27/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2645	9.9	13	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

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**ACZ** Laboratories, Inc. **11290** CHAIN OF CUSTODY  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5993

Name: Miguel Berganza Address: Km 8.6 carretera antigua a El Salvador  
 Company: Tahoe Resources Inc. Centro Corporativo Muztal, Torre Oeste, Aptos 502 y 504  
 E-mail: mberganza@sanrafael.com.gt Telephone: (+502) 5951 5248

Name: Charlie Muerhoff E-mail: cmuerhoff@tahoeresourcesinc.com  
 Company: Tahoe Resources Inc. Telephone:

Name: Miguel Berganza Address: Km 8.6 carretera antigua a El Salvador  
 Company: Tahoe Resources Inc. Centro Corporativo Muztal, Torre Oeste, Aptos 502 y 504  
 E-mail: mberganza@sanrafael.com.gt Telephone: (+502) 5951 5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

If "NO" then ACZ will contact client for further instructions. If see their "YES" near "NO" is indicated, ACZ will proceed with the requested analysis, even if HT is expired, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes  No

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Escoba Centro Sampler's site information State Zip code Time Zone

Quote #: Water Quality  
 Project/PO #: Escoba  
 Reporting state for compliance testing:  
 Are any samples NRC licensable material? Yes / No

Sample ID	Date	Time	SW	10	# of Containers
SW3-E	21/03/13	08:10	SW	10	✓
SW4-E	21/03/13	07:40	SW	10	✓
SW6-E	21/03/13	08:50	SW	10	✓

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Susana Aroche 25/3/13 11:15 Erick Salazar 25/3/13  
 178 3:58 PM 10:30

11290 Chain of Custody

Guatemala March 25th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

*Miguel Berganza*  
 Miguel Berganza  
 Environment Department.  
 Proyecto Escoba, S. A.





REG 016 Resultados de Análisis

Ref 425-13  
Pág 1/1

Muestras: 5 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestras: 210313  
Fecha de análisis: 210313-040413  
Fecha de informe: 040413

Resultados:

Correlativo Ecosistemas	Identificación de la Muestra	Color Aparente (UC HZ equiv. Unid. Pt-Co)	Color Real (UC HZ equiv. Unid. Pt-Co)	Demanda Bioquímica de Oxígeno DBO <sub>5</sub> mg/L	* Demanda Química de Oxígeno DQO mg/L	Cromo Hexavalente Cr(VI) mg/L	** Coliformes Fecales (NMP/100ml)
688	SW2-E	128	< 1	< 10	< 25	N.D.	< 2
689	SW8-E	14	< 1	< 10	< 25	N.D.	1.7 x 10 <sup>3</sup>
690	SW2A-E	7	< 1	< 10	< 25	N.D.	2
691	SW4A-E	5	< 1	< 10	< 25	N.D.	3.5 x 10 <sup>3</sup>
692	SW11	5	< 1	< 10	< 25	N.D.	2.2 x 10 <sup>3</sup>

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración.  
Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.  
Fotométricos Merck. NMP: Número Mas Probable.  
N.D. No detectable. Debajo del límite de detección.  
Límites de detección: Cromo hexavalente (0.05 mg/L)  
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.  
Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
\* Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04  
\*\* Análisis referidos.

Ing. Fernando Fuentes  
Gerente Técnico

teléfono / fax: (502) 2254 6156 - 2254 8268 - 5512 1821  
laboratorio@ecosistemas.com.gt - info@ecosistemas.com.gt  
www.ecosistemas.com.gt

laboratorio ambiental e industrial  
acreditado ISO 17025 según OGA-LE 006-04

REG 016 Resultados de Análisis

Ref 426-13  
Pág 1/1

Muestras: 5 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestras: 220313  
Fecha de análisis: 220313-040413  
Fecha de informe: 040413

Resultados:

Correlativo Ecosistemas	Identificación de la Muestra	Color Aparente (UC HZ equiv. Unid. Pt-Co)	Color Real (UC HZ equiv. Unid. Pt-Co)	Demanda Bioquímica de Oxígeno DBO <sub>5</sub> mg/L	* Demanda Química de Oxígeno DQO mg/L	Cromo Hexavalente Cr(VI) mg/L	** Coliformes Fecales (NMP/100ml)
712	SW4-E	4	< 1	< 10	< 25	N.D.	94
713	SW10-E	< 1	< 1	< 10	< 25	N.D.	< 2
714	SW9-E	14	< 1	< 10	< 25	N.D.	240
715	SW3-E	8	< 1	< 10	< 25	N.D.	23
716	SW6-E	13	6	< 10	< 25	N.D.	2.4 x 10 <sup>3</sup>

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración.  
Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.  
Fotométricos Merck. NMP: Número Mas Probable.  
N.D. No detectable. Debajo del límite de detección.  
Límites de detección: Cromo hexavalente (0.05 mg/L)  
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.  
Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
\* Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04  
\*\* Análisis referidos.

Ing. Fernando Fuentes  
Gerente Técnico

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acreditado ISO 17025 según OGA-LE 006-04

## 11.5.2. Muestras de Agua Subterranea (GW), y pozos de monitoreo (MW)

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

### Analytical Report

March 28, 2013

Report to: Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste.Apto 503y504 Guatemala, GT

Bill to: Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11115

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 15, 2013. This project has been assigned to ACZ's project number, L11115. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11115. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 28, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Tony Antalek has reviewed and approved this report.



Page 1 of 22

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Case Narrative

Tahoe Resources, Inc.

March 29, 2013

Project ID: Escobal  
ACZ Project ID: L11115

#### Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 5 ground water samples from Tahoe Resources, Inc. on March 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11115. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

#### Holding Times

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

#### Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports.

REPAD.03.06.05.01

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**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: GW6

ACZ Sample ID: **L11115-01**  
 Date Sampled: 03/11/13 15:45  
 Date Received: 03/15/13  
 Sample Matrix: Ground Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/22/13 11:07	mpb
Cyanide, WAD	SM4500-CN I- distillation							03/21/13 20:53	pmc
Nitrogen, total Kjeldahl	M351.2 - Block Digestor							03/21/13 15:21	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/19/13 15:04	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 11:18	lhb
Metals Analysis									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.07	B		mg/L	0.03	0.2	03/19/13 19:24	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/23/13 0:34	msh
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0002	0.001	03/22/13 1:12	msh
Barium, dissolved	M200.7 ICP	0.044			mg/L	0.003	0.02	03/19/13 19:24	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:24	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/20/13 11:34	aeb
Boron, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/19/13 19:24	jic
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:12	msh
Calcium, dissolved	M200.7 ICP	5.1			mg/L	0.2	1	03/19/13 19:24	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:24	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:24	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:24	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:24	jic
Iron, dissolved	M200.7 ICP	0.02	B		mg/L	0.02	0.05	03/19/13 19:24	jic
Lead, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	03/23/13 0:34	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:24	jic
Magnesium, dissolved	M200.7 ICP	2.8			mg/L	0.2	1	03/19/13 19:24	jic
Manganese, dissolved	M200.7 ICP	0.014	B		mg/L	0.005	0.03	03/19/13 19:24	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 9:54	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:24	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:24	jic
Potassium, dissolved	M200.7 ICP	5.0			mg/L	0.3	2	03/19/13 19:24	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:24	jic
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/23/13 0:34	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 1:12	msh
Sodium, dissolved	M200.7 ICP	8.5			mg/L	0.3	2	03/19/13 19:24	jic
Strontium, dissolved	M200.7 ICP	0.05			mg/L	0.01	0.05	03/19/13 19:24	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:34	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 19:24	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:24	jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:12	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:24	jic
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:24	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: GW6

ACZ Sample ID: **L11115-01**  
 Date Sampled: 03/11/13 15:45  
 Date Received: 03/15/13  
 Sample Matrix: Ground Water

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		22			mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		22			mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		17.4			%			03/28/13 0:00	calc
Sum of Anions		0.704			meq/L	0.1	0.5	03/28/13 0:00	calc
Sum of Cations		1			meq/L	0.1	0.5	03/28/13 0:00	calc
Chloride	SM4500Cl-E	4	B	*	mg/L	1	5	03/25/13 13:56	lhb
Conductivity @25C	SM2510B	111			umhos/cm	1	10	03/16/13 4:03	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:52	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:17	pjb
Fluoride	SM4500F-C	0.1	B		mg/L	0.1	0.5	03/21/13 15:25	ljr
Hardness as CaCO3	SM2340B - Calculation	24			mg/L	1	7	03/28/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4.08			mg/L	0.06	0.3	03/23/13 0:33	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 15:25	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digestor		U	*	mg/L	0.1	0.5	03/22/13 17:00	tod
pH (lab)	SM4500H+ B								
pH		7.7	H		units	0.1	0.1	03/16/13 0:00	abm
pH measured at		22.0			C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	03/28/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U		mg/L	0.01	0.05	03/21/13 1:14	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	BH	*	mg/L	0.01	0.05	03/15/13 22:33	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	03/27/13 12:08	bsu
Residue, Filterable (TDS) @180C	SM2540C	160			mg/L	10	20	03/15/13 15:54	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/15/13 15:06	abm
Residue, Total (TS) @ 105C	SM2540B	180			mg/L	10	20	03/15/13 15:28	abm
Sulfate	D518-02 - Turbidimetric	7		*	mg/L	1	5	03/25/13 16:39	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.03	0.2	03/15/13 13:42	las
TDS (calculated)	Calculation	46	B		mg/L	10	50	03/28/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	3.48						03/28/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW7

ACZ Sample ID: **L11115-02**  
Date Sampled: 03/11/13 16:40  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation		U		mg/L	0.0004	0.002	03/22/13 11:20	mpb
Cyanide, WAD	SM4500-CN I- distillation		U		mg/L	0.0004	0.002	03/21/13 21:09	pmc
Nitrogen, total Kjeldahl	M351.2 - Block Digestor		U		mg/L	0.003	0.02	03/21/13 15:40	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion		U		mg/L	0.003	0.02	03/19/13 15:04	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion		U		mg/L	0.003	0.02	03/22/13 11:26	lhb

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.06	B		mg/L	0.03	0.2	03/19/13 19:33	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/23/13 0:38	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0004	B		mg/L	0.0002	0.001	03/22/13 1:16	msh
Barium, dissolved	M200.7 ICP	0.071	U		mg/L	0.003	0.02	03/19/13 19:33	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:33	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/20/13 11:43	aeb
Boron, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/19/13 19:33	jic
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:16	msh
Calcium, dissolved	M200.7 ICP	15.9	U		mg/L	0.2	1	03/19/13 19:33	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:33	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:33	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:33	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:33	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 19:33	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:38	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:33	jic
Magnesium, dissolved	M200.7 ICP	3.8	U		mg/L	0.2	1	03/19/13 19:33	jic
Manganese, dissolved	M200.7 ICP	0.028	B		mg/L	0.005	0.03	03/19/13 19:33	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 9:56	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:33	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:33	jic
Potassium, dissolved	M200.7 ICP	3.2	U		mg/L	0.3	2	03/19/13 19:33	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:33	jic
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/23/13 0:38	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 1:16	msh
Sodium, dissolved	M200.7 ICP	11.3	U		mg/L	0.3	2	03/19/13 19:33	jic
Strontium, dissolved	M200.7 ICP	0.14	U		mg/L	0.01	0.05	03/19/13 19:33	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:38	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 19:33	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:33	jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:16	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:33	jic
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:33	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW7

ACZ Sample ID: **L11115-02**  
Date Sampled: 03/11/13 16:40  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration				mg/L	2	20	03/16/13 0:00	abm
Bicarbonate as CaCO3		64			mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		64			mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation				%			03/28/13 0:00	calc
Cation-Anion Balance		0.0			%			03/28/13 0:00	calc
Sum of Anions		1.7			meq/L	0.1	0.5	03/28/13 0:00	calc
Sum of Cations		1.7			meq/L	0.1	0.5	03/28/13 0:00	calc
Chloride	SM4500Cl-E	4	B	*	mg/L	1	5	03/25/13 13:56	lhb
Conductivity @25C	SM2510B	169			umhos/cm	1	10	03/18/13 4:11	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:54	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:19	pjb
Fluoride	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	03/21/13 15:29	lir
Hardness as CaCO3	SM2340B - Calculation	55			mg/L	1	7	03/28/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	0.12			mg/L	0.02	0.1	03/23/13 0:04	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 15:26	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digestor		U	*	mg/L	0.1	0.5	03/22/13 17:01	tod
pH (lab)	SM4500H+ B				units	0.1	0.1	03/18/13 0:00	abm
pH		8.2	H		units	0.1	0.1	03/18/13 0:00	abm
pH measured at		22.0			C	0.1	0.1	03/18/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	03/28/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U		mg/L	0.01	0.05	03/21/13 1:15	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/15/13 22:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	03/27/13 11:51	bsu
Residue, Filterable (TDS) @180C	SM2540C	140			mg/L	10	20	03/15/13 15:55	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	5	B	*	mg/L	5	20	03/15/13 15:06	abm
Residue, Total (TS) @ 105C	SM2540B	160			mg/L	10	20	03/15/13 15:29	abm
Sulfate	D516-02 - Turbidimetric	14		*	mg/L	1	5	03/25/13 16:39	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.03	0.2	03/15/13 13:48	las
TDS (calculated)	Calculation	91			mg/L	10	50	03/28/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.54						03/28/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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**Inorganic Analytical Results**

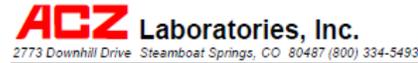
Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: GW11

ACZ Sample ID: **L11115-03**  
 Date Sampled: 03/12/13 08:25  
 Date Received: 03/15/13  
 Sample Matrix: Ground Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/22/13 11:27	mpb
Cyanide, WAD	SM4500-CN I- distillation							03/21/13 21:16	pmc
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/21/13 16:00	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/19/13 15:05	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 11:34	lhb
Metals Analysis									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 19:36	jjc
Antimony, dissolved	M200.8 ICP-MS	0.0017	B		mg/L	0.0004	0.002	03/23/13 0:41	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0073			mg/L	0.0002	0.001	03/22/13 1:19	msh
Barium, dissolved	M200.7 ICP	0.098			mg/L	0.003	0.02	03/19/13 19:36	jjc
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:36	jjc
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/20/13 11:46	aeb
Boron, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/19/13 19:36	jjc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:19	msh
Calcium, dissolved	M200.7 ICP	15.5			mg/L	0.2	1	03/19/13 19:36	jjc
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:36	jjc
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:36	jjc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:36	jjc
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:36	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 19:36	jjc
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:41	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:36	jjc
Magnesium, dissolved	M200.7 ICP	3.2			mg/L	0.2	1	03/19/13 19:36	jjc
Manganese, dissolved	M200.7 ICP	0.042			mg/L	0.005	0.03	03/19/13 19:36	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 9:58	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:36	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:36	jjc
Potassium, dissolved	M200.7 ICP	2.5			mg/L	0.3	2	03/19/13 19:36	jjc
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:36	jjc
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	03/23/13 0:41	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 1:19	msh
Sodium, dissolved	M200.7 ICP	7.9			mg/L	0.3	2	03/19/13 19:36	jjc
Strontium, dissolved	M200.7 ICP	0.12			mg/L	0.01	0.05	03/19/13 19:36	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:41	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 19:36	jjc
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:36	jjc
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:19	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:36	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:36	jjc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: GW11

ACZ Sample ID: **L11115-03**  
 Date Sampled: 03/12/13 08:25  
 Date Received: 03/15/13  
 Sample Matrix: Ground Water

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		52			mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		52			mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation				%			03/28/13 0:00	calc
Cation-Anion Balance		3.4							
Sum of Anions		1.4			meq/L	0.1	0.5	03/28/13 0:00	calc
Sum of Cations		1.5			meq/L	0.1	0.5	03/28/13 0:00	calc
Chloride	SM4500Cl-E	2	B	*	mg/L	1	5	03/25/13 13:56	lhb
Conductivity @25C	SM2510B	148			umhos/cm	1	10	03/16/13 4:27	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:55	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:20	pjb
Fluoride	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	03/21/13 15:40	ljr
Hardness as CaCO3	SM2340B - Calculation	52			mg/L	1	7	03/28/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	0.89			mg/L	0.02	0.1	03/23/13 0:05	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.06	B	*	mg/L	0.05	0.5	03/21/13 15:27	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.4	B	*	mg/L	0.1	0.5	03/22/13 17:02	tod
pH (lab)	SM4500H+ B								
pH		8.0	H		units	0.1	0.1	03/16/13 0:00	abm
pH measured at		22.0			C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.09	B		mg/L	0.03	0.15	03/28/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.03	B		mg/L	0.01	0.05	03/21/13 1:16	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	BH	*	mg/L	0.01	0.05	03/15/13 22:35	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.07		*	mg/L	0.01	0.05	03/27/13 11:53	bsu
Residue, Filterable (TDS) @180C	SM2540C	120			mg/L	10	20	03/15/13 15:57	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	15	B	*	mg/L	5	20	03/15/13 15:07	abm
Residue, Total (TS) @ 105C	SM2540B	150		*	mg/L	10	20	03/15/13 15:31	abm
Sulfate	D518-02 - Turbidimetric	14		*	mg/L	1	5	03/25/13 16:39	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 13:54	las
TDS (calculated)	Calculation	77			mg/L	10	50	03/28/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.56						03/28/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW10

ACZ Sample ID: **L11115-04**  
Date Sampled: 03/12/13 13:20  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/22/13 11:34	mpb
Cyanide, WAD	SM4500-CN I- distillation							03/21/13 21:24	pmc
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/25/13 13:24	jfi/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 9:42	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 11:49	lhb

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 19:40	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/23/13 0:44	msh
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0002	0.001	03/22/13 1:22	msh
Barium, dissolved	M200.7 ICP		U		mg/L	0.003	0.02	03/19/13 19:40	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:40	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/20/13 11:49	aeb
Boron, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/19/13 19:40	jic
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:22	msh
Calcium, dissolved	M200.7 ICP		U		mg/L	0.2	1	03/19/13 19:40	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:40	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:40	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:40	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:40	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 19:40	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:44	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:40	jic
Magnesium, dissolved	M200.7 ICP		U		mg/L	0.2	1	03/19/13 19:40	jic
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:40	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 10:05	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:40	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:40	jic
Potassium, dissolved	M200.7 ICP		U		mg/L	0.3	2	03/19/13 19:40	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:40	jic
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	03/23/13 0:44	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 1:22	msh
Sodium, dissolved	M200.7 ICP		U		mg/L	0.3	2	03/19/13 19:40	jic
Strontium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:40	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:44	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 19:40	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:40	jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:22	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:40	jic
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:40	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW10

ACZ Sample ID: **L11115-04**  
Date Sampled: 03/12/13 13:20  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3			U		mg/L	2	20	03/18/13 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	03/18/13 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	03/18/13 0:00	abm
Total Alkalinity			U		mg/L	2	20	03/18/13 0:00	abm
Cation-Anion Balance	Calculation				%			03/28/13 0:00	calc
Cation-Anion Balance		n/a							
Sum of Anions		N/A			meq/L	0.1	0.5	03/28/13 0:00	calc
Sum of Cations					meq/L	0.1	0.5	03/28/13 0:00	calc
Chloride	SM4500Cl-E		U	*	mg/L	1	5	03/25/13 13:56	lhb
Conductivity @25C	SM2510B		U		umhos/cm	1	10	03/18/13 4:33	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:56	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:21	pjb
Fluoride	SM4500F-C		U	*	mg/L	0.1	0.5	03/22/13 16:18	abm
Hardness as CaCO3	SM2340B - Calculation		U		mg/L	1	7	03/28/13 0:00	calc
Nitrate/Nitrite as N	M363.2 - H2SO4 preserved		U		mg/L	0.02	0.1	03/23/13 0:06	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 15:30	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.4	B	*	mg/L	0.1	0.5	03/28/13 22:04	pjb
pH (lab)	SM4500H+ B								
pH		6.3	H		units	0.1	0.1	03/18/13 0:00	abm
pH measured at		22.0			C	0.1	0.1	03/18/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	03/28/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/28/13 12:49	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/15/13 22:37	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/27/13 11:55	bsu
Residue, Filterable (TDS) @180C	SM2540C		U		mg/L	10	20	03/15/13 15:59	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/15/13 15:08	abm
Residue, Total (TS) @105C	SM2540B		U	*	mg/L	10	20	03/15/13 15:32	abm
Sulfate	D516-02 - Turbidimetric		U	*	mg/L	1	5	03/25/13 16:39	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 14:00	las
TDS (calculated)	Calculation		U		mg/L	10	50	03/28/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	n/a						03/28/13 0:00	calc

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\* Please refer to Qualifier Reports for details.

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**Inorganic Analytical Results**

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: PSASR

ACZ Sample ID: **L11115-05**  
Date Sampled: 03/12/13 09:45  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/22/13 11:41	mpb
Cyanide, WAD	SM4500-CN I- distillation							03/21/13 21:32	pmc
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/25/13 13:48	jif/bsu
Phosphorus, dissolved	M385.1 - Auto Ascorbic Acid Digestion							03/28/13 9:54	bsu
Phosphorus, total	M385.1 - Auto Ascorbic Acid Digestion							03/22/13 12:05	lhb

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.05	B		mg/L	0.03	0.2	03/19/13 19:43	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/23/13 0:48	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0107			mg/L	0.0002	0.001	03/22/13 1:26	msh
Barium, dissolved	M200.7 ICP	0.131			mg/L	0.003	0.02	03/19/13 19:43	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:43	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/20/13 11:52	aeb
Boron, dissolved	M200.7 ICP	0.12			mg/L	0.01	0.05	03/19/13 19:43	jic
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 1:26	msh
Calcium, dissolved	M200.7 ICP	115			mg/L	0.2	1	03/19/13 19:43	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:43	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:43	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:43	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:43	jic
Iron, dissolved	M200.7 ICP	0.04	B		mg/L	0.02	0.05	03/19/13 19:43	jic
Lead, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	03/23/13 0:48	msh
Lithium, dissolved	M200.7 ICP	0.15			mg/L	0.02	0.1	03/19/13 19:43	jic
Magnesium, dissolved	M200.7 ICP	8.7			mg/L	0.2	1	03/19/13 19:43	jic
Manganese, dissolved	M200.7 ICP	0.041			mg/L	0.005	0.03	03/19/13 19:43	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 10:07	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 19:43	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 19:43	jic
Potassium, dissolved	M200.7 ICP	2.9			mg/L	0.3	2	03/19/13 19:43	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 19:43	jic
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	03/23/13 0:48	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 1:26	msh
Sodium, dissolved	M200.7 ICP	86.7			mg/L	0.3	2	03/19/13 19:43	jic
Strontium, dissolved	M200.7 ICP	4.67			mg/L	0.01	0.05	03/19/13 19:43	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/23/13 0:48	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 19:43	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:43	jic
Uranium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	03/22/13 1:26	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 19:43	jic
Zinc, dissolved	M200.7 ICP	0.06			mg/L	0.01	0.05	03/19/13 19:43	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: PSASR

ACZ Sample ID: **L11115-05**  
Date Sampled: 03/12/13 09:45  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		181			mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		181			mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation				%				
Cation-Anion Balance		-0.9						03/28/13 0:00	calc
Sum of Anions		10.7			meq/L	0.1	0.5	03/28/13 0:00	calc
Sum of Cations		10.5			meq/L	0.1	0.5	03/28/13 0:00	calc
Chloride	SM4500Cl-E	4	B	*	mg/L	1	5	03/25/13 13:56	lhb
Conductivity @25C	SM2510B	963			umhos/cm	1	10	03/16/13 4:43	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:57	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/22/13 23:21	pjb
Fluoride	SM4500F-C	0.7			mg/L	0.1	0.5	03/22/13 16:31	abm
Hardness as CaCO3	SM2340B - Calculation	323			mg/L	1	7	03/28/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved		U		mg/L	0.02	0.1	03/23/13 0:07	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 16:08	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	03/26/13 22:06	pjb
pH (lab)	SM4500H+ B								
pH		8.2	H		units	0.1	0.1	03/16/13 0:00	abm
pH measured at		22.0			C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.03	B		mg/L	0.03	0.15	03/28/13 0:00	calc
Phosphorus, dissolved	M385.1 - Auto Ascorbic Acid (digest)	0.01	B	*	mg/L	0.01	0.05	03/28/13 12:51	bsu
Phosphorus, ortho dissolved	M385.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/15/13 22:40	pjb
Phosphorus, total	M385.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	03/27/13 11:57	bsu
Residue, Filterable (TDS) @180C	SM2540C	700			mg/L	10	20	03/15/13 16:01	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/15/13 15:09	abm
Residue, Total (TS) @105C	SM2540B	730			mg/L	10	20	03/15/13 15:33	abm
Sulfate	D516-02 - Turbidimetric	330			mg/L	20	80	03/25/13 16:57	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 14:05	las
TDS (calculated)	Calculation	661			mg/L	10	50	03/28/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.06						03/28/13 0:00	calc

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\* Please refer to Qualifier Reports for details.

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**Report Header Explanations**

<b>Batch</b>	A distinct set of samples analyzed at a specific time
<b>Found</b>	Value of the QC Type of Interest
<b>Limit</b>	Upper limit for RPD, in %.
<b>Lower</b>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<b>MDL</b>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<b>PCN/SCN</b>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<b>PQL</b>	Practical Quantitation Limit, typically 5 times the MDL
<b>QC</b>	True Value of the Control Sample or the amount added to the Spike
<b>Rec</b>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<b>RPD</b>	Relative Percent Difference, calculation used for Duplicate QC Types
<b>Upper</b>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<b>Sample</b>	Value of the Sample of Interest

**QC Sample Types**

<b>AS</b>	Analytical Spike (Post Digestion)	<b>LCSWD</b>	Laboratory Control Sample - Water Duplicate
<b>ASD</b>	Analytical Spike (Post Digestion) Duplicate	<b>LFB</b>	Laboratory Fortified Blank
<b>CCB</b>	Continuing Calibration Blank	<b>LFM</b>	Laboratory Fortified Matrix
<b>CCV</b>	Continuing Calibration Verification standard	<b>LFMD</b>	Laboratory Fortified Matrix Duplicate
<b>DUP</b>	Sample Duplicate	<b>LRB</b>	Laboratory Reagent Blank
<b>ICB</b>	Initial Calibration Blank	<b>MS</b>	Matrix Spike
<b>ICV</b>	Initial Calibration Verification standard	<b>MSD</b>	Matrix Spike Duplicate
<b>ICGAB</b>	Inter-element Correction Standard - A plus B solutions	<b>PBS</b>	Prep Blank - Soil
<b>LCSS</b>	Laboratory Control Sample - Soil	<b>PBW</b>	Prep Blank - Water
<b>LCSSD</b>	Laboratory Control Sample - Soil Duplicate	<b>PQV</b>	Practical Quantitation Verification standard
<b>LCSW</b>	Laboratory Control Sample - Water	<b>SDL</b>	Serial Dilution

**QC Sample Type Explanations**

<b>Blanks</b>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<b>Control Samples</b>	Verifies the accuracy of the method, including the prep procedure.
<b>Duplicates</b>	Verifies the precision of the instrument and/or method.
<b>Spikes/Fortified Matrix</b>	Determines sample matrix interferences, if any.
<b>Standard</b>	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

<b>B</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>H</b>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<b>L</b>	Target analyte response was below the laboratory defined negative threshold.
<b>U</b>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extendedlist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L11115**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11115-01	WG341017	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340965	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340963	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340942	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340534	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341034	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	DA	Sample required dilution due to reactivity.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).



Tahoe Resources, Inc.

ACZ Project ID: **L11115**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11115-02	WG341017	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340965	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340963	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340818	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340942	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340534	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341034	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	DA	Sample required dilution due to reactivity.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11115**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11115-03	WG341017	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340965	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340963	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340818	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340942	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340534	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340536	Residue, Total (TS) @ 105C	SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341034	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11115**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11115-04	WG341017	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340965	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340963	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341119	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341236	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340534	Residue, Non-Filterable (TSS) @ 105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340536	Residue, Total (TS) @ 105C	SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341034	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

REPAD. 15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11115**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11115-05	WG341017	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340965	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340963	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341119	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341236	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340534	Residue, Non-Filterable (TSS) @ 105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340536	Residue, Total (TS) @ 105C	SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341034	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Certification  
Qualifiers**

Tahoe Resources, Inc.

ACZ Project ID: **L11115**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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REPAD.06.06.05.01

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Sample  
Receipt**

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L11115  
 Date Received: 03/15/2013 08:45  
 Received By: ksj  
 Date Printed: 3/15/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?		X	
L11115-01 : A tan container was not received and a new container was created from the raw .			
L11115-02 : A tan container was not received and a new container was created from the raw .			
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	
Some parameters were received past hold time.			

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3797	4.7	12	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

REPAD LPII 2012-03

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**ACZ** Laboratories, Inc. **L1115** CHAIN OF CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Miguel Berganza Address: Km 8.6 carretera antigua a El Salvador  
 Company: Talene Resources Inc. Centro Corporativo Maxbal, zona Norte, Apto 513  
 E-mail: M.Berganza@sanrafael.com.gt Telephone:

Name: Charlie Murnoff E-mail: C.murnoff@taleneresourcesinc.com  
 Company: Talene Resources Inc. Telephone:

Name: Miguel Berganza Address:  
 Company: Talene Resources Inc. Telephone:  
 E-mail: M.Berganza@sanrafael.com.gt

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO   
If "NO" then ACZ will contact client for further instructions. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analysis, even if HT is expired, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes  No   
 If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Fernando Torres Sampler's site information State Zip code Time Zone

Quote #: Water Quality  
 Project/PO #: Escobal  
 Reporting state for compliance testing:  
 Check box if samples include NRC licensed material?

Quote #	Date	Time	Container	# of Containers	Matrix
GW6	11/03/13	15:45	GW	7	✓
GW7	11/03/13	16:40	GW	7	✓
GW11	12/03/13	09:25	GW	8	✓
GW10	12/03/13	13:20	GW	8	✓
PSASR	12/03/13	09:45	GW	8	✓

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

All samples Quote #: GW Profile 2013

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Erick Edgus 13/3/13 18:18  
LOO 3/5/13 8:43

Guatemala March 13th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

ORIGINAL: Paper - Copy: Portable

*X Miguel Berganza*  
 Miguel Berganza  
 Environment Department.  
 Proyecto Escobal, S. A.

Chain of Custody

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Analytical Report**

April 01, 2013

Report to: Miguel Berganza  
 Tahoe Resources, Inc.  
 Km 8.6 carretera Antigua a El Salvador Centro cor  
 Torre Oeste.Apto 503y504 Guatemala, GT

Bill to: Miguel Berganza  
 Tahoe Resources, Inc.  
 5190 Neil Road #310  
 Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
 ACZ Project ID: L11117

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 15, 2013. This project has been assigned to ACZ's project number, L11117. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11117. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 01, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

  
 Tony Antalek has reviewed and approved this report.



**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Case Narrative**

Tahoe Resources, Inc.

April 01, 2013

Project ID: Escobal  
 ACZ Project ID: L11117

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on March 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11117. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW1A

ACZ Sample ID: **L11117-01**  
Date Sampled: 03/12/13 05:15  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 12:10	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 15:31	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/25/13 17:12	jif/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 9:42	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:04	bsu

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 18:31	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.002	0.01	03/22/13 19:20	msh
Arsenic, dissolved	M200.8 ICP-MS	0.001	B		mg/L	0.001	0.005	03/22/13 4:55	msh
Barium, dissolved	M200.7 ICP	0.031			mg/L	0.003	0.02	03/19/13 18:31	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:31	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:31	jic
Boron, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/20/13 11:55	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	03/22/13 4:55	msh
Calcium, dissolved	M200.7 ICP	4.6			mg/L	0.2	1	03/19/13 18:31	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:31	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:31	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:31	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:31	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:31	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	03/22/13 19:20	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:31	jic
Magnesium, dissolved	M200.7 ICP	1.9			mg/L	0.2	1	03/19/13 18:31	jic
Manganese, dissolved	M200.7 ICP	0.025	B		mg/L	0.005	0.03	03/19/13 18:31	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:14	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:31	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:31	jic
Potassium, dissolved	M200.7 ICP	4.3			mg/L	0.3	2	03/19/13 18:31	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:31	jic
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.001	03/22/13 19:20	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.0003	0.001	03/22/13 4:55	msh
Sodium, dissolved	M200.7 ICP	8.1			mg/L	0.3	2	03/19/13 18:31	jic
Strontium, dissolved	M200.7 ICP	0.04	B	*	mg/L	0.01	0.05	03/19/13 18:31	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	03/22/13 4:55	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:31	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:31	jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	03/22/13 4:55	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:31	jic
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:31	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW1A

ACZ Sample ID: **L11117-01**  
Date Sampled: 03/12/13 05:15  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration	44			mg/L	2	20	03/20/13 0:00	abm
Bicarbonate as CaCO3									
Carbonate as CaCO3			U		mg/L	2	20	03/20/13 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	03/20/13 0:00	abm
Total Alkalinity		44			mg/L	2	20	03/20/13 0:00	abm
Cation-Anion Balance	Calculation				%				
Cation-Anion Balance		-12.4						04/01/13 0:00	calc
Sum of Anions		1.1			meq/L	0.1	0.5	04/01/13 0:00	calc
Sum of Cations		0.857			meq/L	0.1	0.5	04/01/13 0:00	calc
Chloride	SM4500CHE	4	B		mg/L	1	5	03/29/13 11:59	mpb
Conductivity @25C	SM2510B	90			umhos/cm	1	10	03/19/13 15:25	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:45	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:35	pjb
Fluoride	SM4500F-C	0.3	B	*	mg/L	0.1	0.5	03/28/13 13:53	abm
Hardness as CaCO3	SM2340B - Calculation	19			mg/L	1	7	04/01/13 0:00	calc
Nitrate/Nitrite as N	M363.2 - H2SO4 preserved	1.21			mg/L	0.02	0.1	03/23/13 13:56	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 16:50	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.8		*	mg/L	0.1	0.5	03/26/13 22:30	pjb
pH (lab)	SM4500H+ B								
pH		7.9	H		units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		20.0			C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.06	B		mg/L	0.03	0.15	04/01/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	03/28/13 13:33	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.01	BH	*	mg/L	0.01	0.05	03/15/13 22:41	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.05	B		mg/L	0.01	0.05	03/27/13 23:36	pjb
Residue, Filterable (TDS) @180C	SM2540C	150	H	*	mg/L	10	20	03/27/13 20:11	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	12	B		mg/L	5	20	03/18/13 11:18	khw
Residue, Total (TS) @105C	SM2540B	190		*	mg/L	10	20	03/15/13 15:33	abm
Sulfate	D516-02 - Turbidimetric	4	B	*	mg/L	1	5	03/28/13 14:35	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 14:11	las
TDS (calculated)	Calculation	54			mg/L	10	50	04/01/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	2.78						04/01/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc. ACZ Sample ID: **L1117-02**  
Project ID: Escobal Date Sampled: 03/12/13 08:10  
Sample ID: GW2 Date Received: 03/15/13  
Sample Matrix: Ground Water

Inorganic Prep								
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 12:18 bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 15:45 lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digestor							03/25/13 17:24 jffbsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 9:54 bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:12 bsu
Metals Analysis								
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 18:34 jic
Antimony, dissolved	M200.8 ICP-MS	0.0016	B		mg/L	0.0004	0.002	03/22/13 19:30 msh
Arsenic, dissolved	M200.8 ICP-MS	0.0071			mg/L	0.0002	0.001	03/22/13 5:05 msh
Barium, dissolved	M200.7 ICP	0.098			mg/L	0.003	0.02	03/19/13 18:34 jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:34 jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:34 jic
Boron, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/20/13 11:59 aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:05 msh
Calcium, dissolved	M200.7 ICP	15.1			mg/L	0.2	1	03/19/13 18:34 jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:34 jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:34 jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:34 jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:34 jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:34 jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 19:30 msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:34 jic
Magnesium, dissolved	M200.7 ICP	3.2			mg/L	0.2	1	03/19/13 18:34 jic
Manganese, dissolved	M200.7 ICP	0.038			mg/L	0.005	0.03	03/19/13 18:34 jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:22 mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:34 jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:34 jic
Potassium, dissolved	M200.7 ICP	2.5			mg/L	0.3	2	03/19/13 18:34 jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:34 jic
Selenium, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0003	03/22/13 19:30 msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:05 msh
Sodium, dissolved	M200.7 ICP	8.0			mg/L	0.3	2	03/19/13 18:34 jic
Strontium, dissolved	M200.7 ICP	0.12		*	mg/L	0.01	0.05	03/19/13 18:34 jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:05 msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:34 jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:34 jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:05 msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:34 jic
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:34 jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc. ACZ Sample ID: **L1117-02**  
Project ID: Escobal Date Sampled: 03/12/13 08:10  
Sample ID: GW2 Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry								
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date Analyst
Alkalinity as CaCO3	SM2320B - Titration	52			mg/L	2	20	03/20/13 0:00 abm
Bicarbonate as CaCO3			U		mg/L	2	20	03/20/13 0:00 abm
Carbonate as CaCO3			U		mg/L	2	20	03/20/13 0:00 abm
Hydroxide as CaCO3			U		mg/L	2	20	03/20/13 0:00 abm
Total Alkalinity		52			mg/L	2	20	03/20/13 0:00 abm
Cation-Anion Balance	Calculation				%			04/01/13 0:00 calc
Cation-Anion Balance		0.0						
Sum of Anions		1.4			meq/L	0.1	0.5	04/01/13 0:00 calc
Sum of Cations		1.4			meq/L	0.1	0.5	04/01/13 0:00 calc
Chloride	SM4500Cl-E	2	B	*	mg/L	1	5	03/25/13 14:00 lhb
Conductivity @25C	SM2510B	151			umhos/cm	1	10	03/19/13 23:42 ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/28/13 10:48 tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:35 pjb
Fluoride	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	03/22/13 18:07 abm
Hardness as CaCO3	SM2340B - Calculation	51			mg/L	1	7	04/01/13 0:00 calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	0.90			mg/L	0.02	0.1	03/23/13 13:57 pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.06	B	*	mg/L	0.05	0.5	03/21/13 16:53 lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digestor	0.6		*	mg/L	0.1	0.5	03/28/13 22:31 pjb
pH (lab)	SM4500H+ B							
pH		8.1	H		units	0.1	0.1	03/19/13 0:00 ljr
pH measured at		21.0			C	0.1	0.1	03/19/13 0:00 ljr
Phosphate	Calculation based on dissolved Phosphorus	0.06	B		mg/L	0.03	0.15	04/01/13 0:00 calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	03/28/13 13:36 bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	BH	*	mg/L	0.01	0.05	03/15/13 22:42 pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.05			mg/L	0.01	0.05	03/27/13 23:40 pjb
Residue, Filterable (TDS) @180C	SM2540C	120			mg/L	10	20	03/18/13 9:42 khw
Residue, Non-Filterable (TSS) @105C	SM2540D	14	B		mg/L	5	20	03/18/13 11:20 khw
Residue, Total (TS) @ 105C	SM2540B	150		*	mg/L	10	20	03/15/13 15:34 abm
Sulfate	D516-02 - Turbidimetric	15		*	mg/L	1	5	03/28/13 11:04 bsu
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 14:28 las
TDS (calculated)	Calculation	77			mg/L	10	50	04/01/13 0:00 calc
TDS (ratio - measured/calculated)	Calculation	1.58						04/01/13 0:00 calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW3

ACZ Sample ID: **L11117-03**  
Date Sampled: 03/12/13 12:25  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 12:25	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 15:59	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digestor							03/25/13 17:36	jff/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:06	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:19	bsu

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 18:37	jic
Antimony, dissolved	M200.8 ICP-MS	0.0005	B		mg/L	0.0004	0.002	03/22/13 19:34	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0026			mg/L	0.0002	0.001	03/22/13 5:08	msh
Barium, dissolved	M200.7 ICP	0.224			mg/L	0.003	0.02	03/19/13 18:37	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:37	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:37	jic
Boron, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/20/13 12:08	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:08	msh
Calcium, dissolved	M200.7 ICP	47.6			mg/L	0.2	1	03/19/13 18:37	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:37	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:37	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:37	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:37	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:37	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 19:34	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:37	jic
Magnesium, dissolved	M200.7 ICP	7.8			mg/L	0.2	1	03/19/13 18:37	jic
Manganese, dissolved	M200.7 ICP	0.375			mg/L	0.005	0.03	03/19/13 18:37	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:24	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:37	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:37	jic
Potassium, dissolved	M200.7 ICP	7.3			mg/L	0.3	2	03/19/13 18:37	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:37	jic
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	03/22/13 19:34	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:08	msh
Sodium, dissolved	M200.7 ICP	24.1			mg/L	0.3	2	03/19/13 18:37	jic
Strontium, dissolved	M200.7 ICP	0.26		*	mg/L	0.01	0.05	03/19/13 18:37	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:08	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:37	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:37	jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:08	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:37	jic
Zinc, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/19/13 18:37	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW3

ACZ Sample ID: **L11117-03**  
Date Sampled: 03/12/13 12:25  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration	103			mg/L	2	20	03/19/13 0:00	lir
Bicarbonate as CaCO3			U		mg/L	2	20	03/19/13 0:00	lir
Carbonate as CaCO3			U		mg/L	2	20	03/19/13 0:00	lir
Hydroxide as CaCO3				*	mg/L	2	20	03/19/13 0:00	lir
Total Alkalinity		103							
Cation-Anion Balance	Calculation				%			04/01/13 0:00	calc
Cation-Anion Balance		0.0							
Sum of Anions		4.3			meq/L	0.1	0.5	04/01/13 0:00	calc
Sum of Cations		4.3			meq/L	0.1	0.5	04/01/13 0:00	calc
Chloride	SM4500Cl-E	5		*	mg/L	1	5	03/25/13 14:00	lhb
Conductivity @25C	SM2510B	428			umhos/cm	1	10	03/19/13 15:34	lir
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:49	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:36	pjb
Fluoride	SM4500F-C	0.2	B	*	mg/L	0.1	0.5	03/22/13 18:10	abm
Hardness as CaCO3	SM2340B - Calculation	151			mg/L	1	7	04/01/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	0.79			mg/L	0.02	0.1	03/23/13 13:58	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 16:54	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.2	B	*	mg/L	0.1	0.5	03/26/13 22:32	pjb
pH (lab)	SM4500H+ B								
pH		7.9	H		units	0.1	0.1	03/19/13 0:00	lir
pH measured at		20.0			C	0.1	0.1	03/19/13 0:00	lir
Phosphate	Calculation based on dissolved Phosphorus	0.09	B		mg/L	0.03	0.15	04/01/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.03	B	*	mg/L	0.01	0.05	03/28/13 13:38	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.04	BH	*	mg/L	0.01	0.05	03/15/13 22:45	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02	B		mg/L	0.01	0.05	03/27/13 23:41	pjb
Residue, Filterable (TDS) @180C	SM2540C	350			mg/L	10	20	03/18/13 9:44	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U		mg/L	5	20	03/18/13 11:21	khw
Residue, Total (TS) @ 105C	SM2540B	370		*	mg/L	10	20	03/15/13 15:35	abm
Sulfate	D516-02 - Turbidimetric	99		*	mg/L	5	30	03/26/13 10:03	bsu
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 14:34	las
TDS (calculated)	Calculation	253			mg/L	10	50	04/01/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.38						04/01/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.





**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW5

ACZ Sample ID: **L11117-04**  
Date Sampled: 03/12/13 11:07  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 12:33	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 16:13	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/25/13 17:48	jif/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:12	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:26	bsu

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.06	B		mg/L	0.03	0.2	03/19/13 18:40	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/22/13 19:37	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0009	B		mg/L	0.0002	0.001	03/22/13 5:12	msh
Barium, dissolved	M200.7 ICP	0.049			mg/L	0.003	0.02	03/19/13 18:40	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:40	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:40	jic
Boron, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/20/13 12:11	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:12	msh
Calcium, dissolved	M200.7 ICP	4.2			mg/L	0.2	1	03/19/13 18:40	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:40	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:40	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:40	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:40	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:40	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 19:37	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:40	jic
Magnesium, dissolved	M200.7 ICP	2.5			mg/L	0.2	1	03/19/13 18:40	jic
Manganese, dissolved	M200.7 ICP	0.028	B		mg/L	0.005	0.03	03/19/13 18:40	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:27	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:40	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:40	jic
Potassium, dissolved	M200.7 ICP	5.9			mg/L	0.3	2	03/19/13 18:40	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:40	jic
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/22/13 19:37	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:12	msh
Sodium, dissolved	M200.7 ICP	11.9			mg/L	0.3	2	03/19/13 18:40	jic
Strontium, dissolved	M200.7 ICP	0.04	B	*	mg/L	0.01	0.05	03/19/13 18:40	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:12	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:40	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:40	jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:12	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:40	jic
Zinc, dissolved	M200.7 ICP	0.03	B		mg/L	0.01	0.05	03/19/13 18:40	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: GW5

ACZ Sample ID: **L11117-04**  
Date Sampled: 03/12/13 11:07  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration							03/19/13 0:00	lir
Bicarbonate as CaCO3		41			mg/L	2	20	03/19/13 0:00	lir
Carbonate as CaCO3			U		mg/L	2	20	03/19/13 0:00	lir
Hydroxide as CaCO3			U		mg/L	2	20	03/19/13 0:00	lir
Total Alkalinity		41		*	mg/L	2	20	03/19/13 0:00	lir
Cation-Anion Balance	Calculation	0.0			%			04/01/13 0:00	calc
Sum of Anions		1.1			meq/L	0.1	0.5	04/01/13 0:00	calc
Sum of Cations		1.1			meq/L	0.1	0.5	04/01/13 0:00	calc
Chloride	SM4500Cl-E	4	B	*	mg/L	1	5	03/25/13 14:00	lhb
Conductivity @25C	SM2510B	113			umhos/cm	1	10	03/19/13 15:42	lir
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:50	tdc
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:37	pjb
Fluoride	SM4500F-C	0.2	B	*	mg/L	0.1	0.5	03/22/13 18:15	abm
Hardness as CaCO3	SM2340B - Calculation	21			mg/L	1	7	04/01/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	0.50			mg/L	0.02	0.1	03/23/13 13:59	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 18:55	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.4	B	*	mg/L	0.1	0.5	03/26/13 22:33	pjb
pH (lab)	SM4500H+ B	7.7	H		units	0.1	0.1	03/19/13 0:00	lir
pH measured at		19.0			C	0.1	0.1	03/19/13 0:00	lir
Phosphate	Calculation based on dissolved Phosphorus	0.03	B		mg/L	0.03	0.15	04/01/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.01	B	*	mg/L	0.01	0.05	03/28/13 13:39	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	BH	*	mg/L	0.01	0.05	03/15/13 22:46	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02	B		mg/L	0.01	0.05	03/27/13 23:42	pjb
Residue, Filterable (TDS) @180C	SM2540C	170			mg/L	10	20	03/18/13 9:46	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U		mg/L	5	20	03/18/13 11:23	khw
Residue, Total (TS) @105C	SM2540B	220		*	mg/L	10	20	03/15/13 15:36	abm
Sulfate	D518-02 - Turbidimetric	9		*	mg/L	1	5	03/28/13 9:57	bsu
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 14:40	las
TDS (calculated)	Calculation	63			mg/L	10	50	04/01/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	2.70						04/01/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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**Report Header Explanations**

<b>Batch</b>	A distinct set of samples analyzed at a specific time
<b>Found</b>	Value of the QC Type of Interest
<b>Limit</b>	Upper limit for RPD, in %.
<b>Lower</b>	Lower Recovery Limit, in % (except for LCSS, mg/kg)
<b>MDL</b>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<b>PCWSCN</b>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<b>PQL</b>	Practical Quantitation Limit, typically 5 times the MDL.
<b>QC</b>	True Value of the Control Sample or the amount added to the Spike
<b>Rec</b>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/kg)
<b>RPD</b>	Relative Percent Difference, calculation used for Duplicate QC Types
<b>Upper</b>	Upper Recovery Limit, in % (except for LCSS, mg/kg)
<b>Sample</b>	Value of the Sample of Interest

**QC Sample Types**

<b>AS</b>	Analytical Spike (Post Digestion)	<b>LCSWD</b>	Laboratory Control Sample - Water Duplicate
<b>ASD</b>	Analytical Spike (Post Digestion) Duplicate	<b>LFB</b>	Laboratory Fortified Blank
<b>CCB</b>	Continuing Calibration Blank	<b>LFM</b>	Laboratory Fortified Matrix
<b>CCV</b>	Continuing Calibration Verification standard	<b>LFMD</b>	Laboratory Fortified Matrix Duplicate
<b>DUP</b>	Sample Duplicate	<b>LRB</b>	Laboratory Reagent Blank
<b>ICB</b>	Initial Calibration Blank	<b>MS</b>	Matrix Spike
<b>ICV</b>	Initial Calibration Verification standard	<b>MSD</b>	Matrix Spike Duplicate
<b>ICSAB</b>	Inter-element Correction Standard - A plus B solutions	<b>PBS</b>	Prep Blank - Soil
<b>LCSS</b>	Laboratory Control Sample - Soil	<b>PBW</b>	Prep Blank - Water
<b>LCSSD</b>	Laboratory Control Sample - Soil Duplicate	<b>PQV</b>	Practical Quantitation Verification standard
<b>LCSW</b>	Laboratory Control Sample - Water	<b>SDL</b>	Serial Dilution

**QC Sample Type Explanations**

<b>Blanks</b>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<b>Control Samples</b>	Verifies the accuracy of the method, including the prep procedure.
<b>Duplicates</b>	Verifies the precision of the instrument and/or method.
<b>Spikes/Fortified Matrix</b>	Determines sample matrix interferences, if any.
<b>Standard</b>	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

<b>B</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>H</b>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<b>L</b>	Target analyte response was below the laboratory defined negative threshold.
<b>U</b>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA-SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extendedlist.pdf>

REP001.09.12.01

Tahoe Resources, Inc.

ACZ Project ID: **L11117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11117-01	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341222	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341119	Nitrogen, total Kjeldahl	M351.2 - TKN by Blook Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341189	Residue, Filterable (TDS) @ 180C	SM2540C	H1	Sample prep or analysis performed past holding time. See case narrative.
	WG340536	Residue, Total (TS) @ 105C	SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341249	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11117-02	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341017	Chloride	SM4500Cl-E	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341119	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340536	Residue, Total (TS) @ 105C	SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341067	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11117-03	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341017	Chloride	SM4500Cl-E	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341119	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340536	Residue, Total (TS) @ 105C	SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341067	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Total Alkalinity	SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.

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Tahoe Resources, Inc.

ACZ Project ID: **L11117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11117-04	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341017	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341119	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340536	Residue, Total (TS) @ 105C	SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341067	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340514	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Total Alkalinity	SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.

REPAD.16.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11117**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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REPAD.05.06.05.01



**Sample Receipt**

Tahoe Resources, Inc. Escobal  
 ACZ Project ID: L11117  
 Date Received: 03/15/2013 08:52  
 Received By: ksj  
 Date Printed: 3/18/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time? L11117-02 Container B1312749: ID on container is "GW11", ID on COC is "GW2", logged in per COC. L11117-02 Container B1312755: ID on container is "GW11", ID on COC is "GW2", logged in per COC.		X	
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2729	6	13	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

**ACZ Laboratories, Inc. L11117**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**CHAIN OF CUSTODY**

Name: Miguel Berganza  
 Company: Tahoe Resources Inc.  
 E-mail: MBERGANZA@SARAFACEL.COM.GF  
 Address: Km 8.6 carretera Antigua a El Salvador  
 Centro Cooperativo Municipal, FONDACHE, Antigua, Guatemala  
 Telephone: (+502) 59515248

Name: Charlie Muerhoff  
 Company: Tahoe Resources Inc.  
 E-mail: CMuerhoff@tahoresourcesinc.com  
 Telephone:

Name: Miguel Berganza  
 Company: Tahoe Resources Inc.  
 E-mail: MBERGANZA@SARAFACEL.COM.GF  
 Address: Km 8.6 carretera Antigua a El Salvador  
 Centro Cooperativo Municipal, FONDACHE, Antigua, Guatemala  
 Telephone: (+502) 59515248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?  
 YES  NO

If "NO" then ACZ will contact client for further instructions. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analysis, even if HT is required, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes  No

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Bernarda Gomez Sampler's site information State Zip code Time Zone

Quote #: Water Quality  
 Project/PO #: Escobal  
 Reporting state for compliance testing:  
 Check box if samples include NRC licensed material?

Sample ID	Date	Time	Matrix	# of Containers	Analysis
GW1A	12/03/13	05:15	GW	8	✓
GW2	12/03/13	08:10	GW	8	✓
GW3	12/03/13	12:25	GW	8	✓
GW5	12/03/13	11:07	GW	8	✓

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Susana Arache 12/3/13 18:18 Erick Salazar 12/3/13 18:18

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Guatemala March 13th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

ORIGINAL: Amazon -> COPA, FileBackin

Best regards,

X *Miguel Berganza*  
Miguel Berganza  
Environment Department.  
Proyecto Escobal, S. A.

April 02, 2013

Report to: Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste.Apto 503y504 Guatemala, GT

Bill to: Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11114

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 15, 2013. This project has been assigned to ACZ's project number, L11114. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11114. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 02, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

*Tony Antalek*  
Tony Antalek has reviewed and approved this report.



**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Case Narrative**

Tahoe Resources, Inc.

April 02, 2013

Project ID: Escobal  
ACZ Project ID: L11114

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 5 ground water samples from Tahoe Resources, Inc. on March 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11114. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

- Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).
- The Total Dissolved Solids value was > the Conductivity value for sample -01. Both data points were retested and confirmed.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW2

ACZ Sample ID: **L11114-01**  
Date Sampled: 03/12/13 08:00  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 11:15	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 14:22	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/21/13 13:45	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/19/13 15:03	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 10:39	lhb
Metals Analysis									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.06	B		mg/L	0.03	0.2	03/19/13 18:09	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/21/13 22:20	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0010	B		mg/L	0.0002	0.001	03/21/13 22:20	msh
Barium, dissolved	M200.7 ICP	0.031			mg/L	0.003	0.02	03/19/13 18:09	jjc
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:09	jjc
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:09	jjc
Boron, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/20/13 11:12	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:20	msh
Calcium, dissolved	M200.7 ICP	7.7			mg/L	0.2	1	03/19/13 18:09	jjc
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:09	jjc
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:09	jjc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:09	jjc
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:09	jjc
Iron, dissolved	M200.7 ICP	0.04	B		mg/L	0.02	0.05	03/19/13 18:09	jjc
Lead, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	03/21/13 22:20	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:09	jjc
Magnesium, dissolved	M200.7 ICP	2.7			mg/L	0.2	1	03/19/13 18:09	jjc
Manganese, dissolved	M200.7 ICP	0.013	B		mg/L	0.005	0.03	03/19/13 18:09	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 8:58	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:09	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:09	jjc
Potassium, dissolved	M200.7 ICP	2.9			mg/L	0.3	2	03/19/13 18:09	jjc
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:09	jjc
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/21/13 22:20	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/21/13 22:20	msh
Sodium, dissolved	M200.7 ICP	15.3			mg/L	0.3	2	03/19/13 18:09	jjc
Strontium, dissolved	M200.7 ICP	0.06		*	mg/L	0.01	0.05	03/19/13 18:09	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:20	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:09	jjc
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:09	jjc
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:20	msh
Vanadium, dissolved	M200.7 ICP	0.006	B		mg/L	0.005	0.03	03/19/13 18:09	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:09	jjc

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW2

ACZ Sample ID: **L1114-01**  
Date Sampled: 03/12/13 08:00  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
<b>Wet Chemistry</b>									
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		44	*		mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		44	*		mg/L	2	20	03/16/13 0:00	abm
<b>Cation-Anion Balance</b>									
Cation-Anion Balance	Calculation	7.7			%			04/02/13 0:00	calc
Sum of Anions		1.2			meq/L	0.1	0.5	04/02/13 0:00	calc
Sum of Cations		1.4			meq/L	0.1	0.5	04/02/13 0:00	calc
Chloride	SM4500Cl-E	4	B	*	mg/L	1	5	03/25/13 10:43	lhb
Conductivity @25C	SM2510B	138	U	*	umhos/cm	1	10	03/16/13 3:20	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:39	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:28	pjb
Fluoride	SM4500F-C	0.4	B	*	mg/L	0.1	0.5	03/21/13 14:56	ljr
Hardness as CaCO3	SM2340B - Calculation	30			mg/L	1	7	04/02/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2.71		*	mg/L	0.06	0.3	03/23/13 0:31	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 15:17	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	03/22/13 16:52	tod
pH (lab)	SM4500H+ B								
pH		7.8	H	*	units	0.1	0.1	03/16/13 0:00	abm
pH measured at		22.0		*	C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.19			mg/L	0.03	0.15	04/02/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.06		*	mg/L	0.01	0.05	03/21/13 1:06	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.06	H	*	mg/L	0.01	0.05	03/15/13 22:25	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.09		*	mg/L	0.01	0.05	03/27/13 11:43	bsu
Residue, Filterable (TDS) @180C	SM2540C	200		*	mg/L	10	20	03/18/13 9:31	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	101		*	mg/L	5	20	03/18/13 11:10	khw
Residue, Total (TS) @ 105C	SM2540B	310		*	mg/L	10	20	03/15/13 15:24	abm
Sulfate	D516-02 - Turbidimetric	9		*	mg/L	1	5	03/25/13 16:10	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 13:53	las
TDS (calculated)	Calculation	69			mg/L	10	50	04/02/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	2.90						04/02/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW3

ACZ Sample ID: **L1114-02**  
Date Sampled: 03/13/13 11:30  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
<b>Inorganic Prep</b>									
Cyanide, total	M335.4 - Manual Distillation							03/25/13 11:31	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 14:36	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/21/13 14:04	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/19/13 15:03	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 10:47	lhb
<b>Metals Analysis</b>									
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 18:12	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/21/13 22:23	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0028			mg/L	0.0002	0.001	03/21/13 22:23	msh
Barium, dissolved	M200.7 ICP	0.027			mg/L	0.003	0.02	03/19/13 18:12	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:12	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:12	jic
Boron, dissolved	M200.7 ICP	0.06			mg/L	0.01	0.05	03/20/13 11:15	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:23	msh
Calcium, dissolved	M200.7 ICP	54.5			mg/L	0.2	1	03/19/13 18:12	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:12	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:12	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:12	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:12	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:12	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:23	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:12	jic
Magnesium, dissolved	M200.7 ICP	7.2			mg/L	0.2	1	03/19/13 18:12	jic
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:12	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:00	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:12	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:12	jic
Potassium, dissolved	M200.7 ICP	3.5			mg/L	0.3	2	03/19/13 18:12	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:12	jic
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/21/13 22:23	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/21/13 22:23	msh
Sodium, dissolved	M200.7 ICP	24.3			mg/L	0.3	2	03/19/13 18:12	jic
Strontium, dissolved	M200.7 ICP	0.54		*	mg/L	0.01	0.05	03/19/13 18:12	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:23	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:12	jic
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:12	jic
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:23	msh
Vanadium, dissolved	M200.7 ICP	0.006	B		mg/L	0.005	0.03	03/19/13 18:12	jic
Zinc, dissolved	M200.7 ICP	0.04	B		mg/L	0.01	0.05	03/19/13 18:12	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



Tahoe Resources, Inc. ACZ Sample ID: **L11114-02**  
 Project ID: Escobal Date Sampled: 03/13/13 11:30  
 Sample ID: MW3 Date Received: 03/15/13  
 Sample Matrix: Ground Water

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		78		*	mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		78		*	mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		1.1			%			04/02/13 0:00	calc
Sum of Anions		4.4			meq/L	0.1	0.5	04/02/13 0:00	calc
Sum of Cations		4.6			meq/L	0.1	0.5	04/02/13 0:00	calc
Chloride	SM4500Cl-E	12		*	mg/L	1	5	03/25/13 10:43	lhb
Conductivity @25C	SM2510B	456		*	umhos/cm	1	10	03/16/13 3:29	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:41	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:29	pjb
Fluoride	SM4500F-C	0.8		*	mg/L	0.1	0.5	03/21/13 14:59	ljr
Hardness as CaCO3	SM2340B - Calculation	166			mg/L	1	7	04/02/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2.38		*	mg/L	0.02	0.1	03/22/13 23:54	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 15:18	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	03/22/13 16:53	tod
pH (lab)	SM4500H+ B								
pH		7.8	H	*	units	0.1	0.1	03/16/13 0:00	abm
pH measured at		22.0		*	C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.25			mg/L	0.03	0.15	04/02/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.08		*	mg/L	0.01	0.05	03/21/13 1:07	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.10	H	*	mg/L	0.01	0.05	03/15/13 22:26	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.10		*	mg/L	0.01	0.05	03/27/13 11:44	bsu
Residue, Filterable (TDS) @180C	SM2540C	390		*	mg/L	10	20	03/18/13 9:33	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/18/13 11:11	khw
Residue, Total (TS) @105C	SM2540B	390		*	mg/L	10	20	03/15/13 15:25	abm
Sulfate	D516-02 - Turbidimetric	119		*	mg/L	5	30	03/25/13 16:19	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/15/13 13:58	las
TDS (calculated)	Calculation	269			mg/L	10	50	04/02/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.45						04/02/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc. ACZ Sample ID: **L11114-03**  
 Project ID: Escobal Date Sampled: 03/13/13 08:25  
 Sample ID: MW4 Date Received: 03/15/13  
 Sample Matrix: Ground Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 11:46	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 14:50	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/21/13 14:24	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/19/13 15:04	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 10:55	lhb
Metals Analysis									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 18:15	jic
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/21/13 22:27	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0025			mg/L	0.0002	0.001	03/21/13 22:27	msh
Barium, dissolved	M200.7 ICP	0.040			mg/L	0.003	0.02	03/19/13 18:15	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:15	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:15	jic
Boron, dissolved	M200.7 ICP	0.09			mg/L	0.01	0.05	03/20/13 11:18	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:27	msh
Calcium, dissolved	M200.7 ICP	88.8			mg/L	0.2	1	03/19/13 18:15	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:15	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:15	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:15	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:15	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:15	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:27	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:15	jic
Magnesium, dissolved	M200.7 ICP	10.3			mg/L	0.2	1	03/19/13 18:15	jic
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:15	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:02	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:15	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:15	jic
Potassium, dissolved	M200.7 ICP	4.5			mg/L	0.3	2	03/19/13 18:15	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:15	jic
Selenium, dissolved	M200.8 ICP-MS	0.0002		B	mg/L	0.0001	0.0003	03/21/13 22:27	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/21/13 22:27	msh
Sodium, dissolved	M200.7 ICP	30.5			mg/L	0.3	2	03/19/13 18:15	jic
Strontium, dissolved	M200.7 ICP	0.86		*	mg/L	0.01	0.05	03/19/13 18:15	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:27	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:15	jic
Titanium, dissolved	M200.7 ICP	0.006		B	mg/L	0.005	0.03	03/19/13 18:15	jic
Uranium, dissolved	M200.8 ICP-MS	0.0002		B	mg/L	0.0001	0.0005	03/21/13 22:27	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:15	jic
Zinc, dissolved	M200.7 ICP	0.02		B	mg/L	0.01	0.05	03/19/13 18:15	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW4

ACZ Sample ID: **L11114-03**  
Date Sampled: 03/13/13 08:25  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		85		*	mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		85		*	mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-0.7			%			04/02/13 0:00	calc
Sum of Anions		6.9			meq/L	0.1	0.5	04/02/13 0:00	calc
Sum of Cations		6.8			meq/L	0.1	0.5	04/02/13 0:00	calc
Chloride	SM4500Cl-E	19		*	mg/L	1	5	03/25/13 10:43	lhb
Conductivity @25C	SM2510B	667		*	umhos/cm	1	10	03/16/13 3:37	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:43	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:30	pjb
Fluoride	SM4500F-C	0.9		*	mg/L	0.1	0.5	03/21/13 15:03	ljr
Hardness as CaCO3	SM2340B - Calculation	264			mg/L	1	7	04/02/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2.14		*	mg/L	0.02	0.1	03/22/13 23:57	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 15:20	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	03/26/13 23:30	pjb
pH (lab)	SM4500H+ B								
pH		7.8	H	*	units	0.1	0.1	03/16/13 0:00	abm
pH measured at		22.0		*	C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.19			mg/L	0.03	0.15	04/02/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.06		*	mg/L	0.01	0.05	03/21/13 1:11	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.07	H	*	mg/L	0.01	0.05	03/15/13 22:27	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.07		*	mg/L	0.01	0.05	03/27/13 11:45	bsu
Residue, Filterable (TDS) @180C	SM2540C	550		*	mg/L	10	20	03/18/13 9:35	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/18/13 11:13	khw
Residue, Total (TS) @105C	SM2540B	560		*	mg/L	10	20	03/15/13 15:26	abm
Sulfate	D516-02 - Turbidimetric	220		*	mg/L	10	50	03/25/13 16:19	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/19/13 12:38	abm
TDS (calculated)	Calculation	426			mg/L	10	50	04/02/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.29						04/02/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW5

ACZ Sample ID: **L11114-04**  
Date Sampled: 03/13/13 12:45  
Date Received: 03/15/13  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 11:54	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 15:04	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/21/13 14:43	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/19/13 15:04	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 11:03	lhb

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 18:18	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/21/13 22:30	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0009	B		mg/L	0.0002	0.001	03/21/13 22:30	msh
Barium, dissolved	M200.7 ICP	0.216			mg/L	0.003	0.02	03/19/13 18:18	jjc
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:18	jjc
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:18	jjc
Boron, dissolved	M200.7 ICP	0.05	B		mg/L	0.01	0.05	03/20/13 11:21	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:30	msh
Calcium, dissolved	M200.7 ICP	94.5			mg/L	0.2	1	03/19/13 18:18	jjc
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:18	jjc
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:18	jjc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:18	jjc
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:18	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:18	jjc
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:30	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:18	jjc
Magnesium, dissolved	M200.7 ICP	14.6			mg/L	0.2	1	03/19/13 18:18	jjc
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:18	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:10	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:18	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:18	jjc
Potassium, dissolved	M200.7 ICP	7.9			mg/L	0.3	2	03/19/13 18:18	jjc
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:18	jjc
Selenium, dissolved	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0003	03/21/13 22:30	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/21/13 22:30	msh
Sodium, dissolved	M200.7 ICP	22.7			mg/L	0.3	2	03/19/13 18:18	jjc
Strontium, dissolved	M200.7 ICP	0.61		*	mg/L	0.01	0.05	03/19/13 18:18	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:30	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:18	jjc
Titanium, dissolved	M200.7 ICP	0.005	B		mg/L	0.005	0.03	03/19/13 18:18	jjc
Uranium, dissolved	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	03/21/13 22:30	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 18:18	jjc
Zinc, dissolved	M200.7 ICP	0.03	B		mg/L	0.01	0.05	03/19/13 18:18	jjc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW5

ACZ Sample ID: **L11114-04**  
Date Sampled: 03/13/13 12:45  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		83		*	mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		83		*	mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.0			%			04/02/13 0:00	calc
Sum of Anions		7.1			meq/L	0.1	0.5	04/02/13 0:00	calc
Sum of Cations		7.1			meq/L	0.1	0.5	04/02/13 0:00	calc
Chloride	SM4500Cl-E	15		*	mg/L	1	5	03/25/13 10:44	lhb
Conductivity @25C	SM2510B	702		*	umhos/cm	1	10	03/16/13 3:46	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:44	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:31	pjb
Fluoride	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	03/21/13 15:18	ljr
Hardness as CaCO3	SM2340B - Calculation	296			mg/L	1	7	04/02/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2.91		*	mg/L	0.02	0.1	03/22/13 23:58	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 15:21	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	03/22/13 16:58	tod
pH (lab)	SM4500H+ B								
pH		7.7	H	*	units	0.1	0.1	03/16/13 0:00	abm
pH measured at		21.0		*	C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.12	B		mg/L	0.03	0.15	04/02/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.04	B	*	mg/L	0.01	0.05	03/21/13 1:12	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.05	BH	*	mg/L	0.01	0.05	03/15/13 22:28	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.05		*	mg/L	0.01	0.05	03/27/13 11:48	bsu
Residue, Filterable (TDS) @180C	SM2540C	570		*	mg/L	10	20	03/18/13 9:37	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	5	B	*	mg/L	5	20	03/18/13 11:15	khw
Residue, Total (TS) @ 105C	SM2540B	590		*	mg/L	10	20	03/15/13 15:26	abm
Sulfate	D516-02 - Turbidimetric	240		*	mg/L	10	50	03/25/13 16:26	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/19/13 12:39	abm
TDS (calculated)	Calculation	445			mg/L	10	50	04/02/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.28						04/02/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: RW1

ACZ Sample ID: **L11114-05**  
Date Sampled: 03/12/13 06:35  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 12:02	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 15:18	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/21/13 15:02	tod
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/19/13 15:04	tod
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/22/13 11:10	lhb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.04		B	mg/L	0.03	0.2	03/19/13 18:28	jic
Antimony, dissolved	M200.8 ICP-MS	0.0052			mg/L	0.0004	0.002	03/21/13 22:34	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0027			mg/L	0.0002	0.001	03/21/13 22:34	msh
Barium, dissolved	M200.7 ICP	0.092			mg/L	0.003	0.02	03/19/13 18:28	jic
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:28	jic
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 18:28	jic
Boron, dissolved	M200.7 ICP	0.08			mg/L	0.01	0.05	03/20/13 11:31	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:34	msh
Calcium, dissolved	M200.7 ICP	277			mg/L	0.2	1	03/19/13 18:28	jic
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:28	jic
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:28	jic
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:28	jic
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:28	jic
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 18:28	jic
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:34	msh
Lithium, dissolved	M200.7 ICP	0.05	B		mg/L	0.02	0.1	03/19/13 18:28	jic
Magnesium, dissolved	M200.7 ICP	14.4			mg/L	0.2	1	03/19/13 18:28	jic
Manganese, dissolved	M200.7 ICP	0.010		B	mg/L	0.005	0.03	03/19/13 18:28	jic
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/22/13 9:12	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 18:28	jic
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:28	jic
Potassium, dissolved	M200.7 ICP	12.4			mg/L	0.3	2	03/19/13 18:28	jic
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 18:28	jic
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/21/13 22:34	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/21/13 22:34	msh
Sodium, dissolved	M200.7 ICP	56.3			mg/L	0.3	2	03/19/13 18:28	jic
Strontium, dissolved	M200.7 ICP	2.43		*	mg/L	0.01	0.05	03/19/13 18:28	jic
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/21/13 22:34	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 18:28	jic
Titanium, dissolved	M200.7 ICP	0.007		B	mg/L	0.005	0.03	03/19/13 18:28	jic
Uranium, dissolved	M200.8 ICP-MS	0.0006			mg/L	0.0001	0.0005	03/21/13 22:34	msh
Vanadium, dissolved	M200.7 ICP	0.011		B	mg/L	0.005	0.03	03/19/13 18:28	jic
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 18:28	jic

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: RW1

ACZ Sample ID: **L11114-05**  
Date Sampled: 03/12/13 08:35  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		41		*	mg/L	2	20	03/16/13 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	03/16/13 0:00	abm
Total Alkalinity		41		*	mg/L	2	20	03/16/13 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.3			%			04/02/13 0:00	calc
Sum of Anions		17.8			meq/L	0.1	0.5	04/02/13 0:00	calc
Sum of Cations		17.9			meq/L	0.1	0.5	04/02/13 0:00	calc
Chloride	SM4500Cl-E	28		*	mg/L	1	5	03/25/13 10:45	lhb
Conductivity @25C	SM2510B	1530		*	umhos/cm	1	10	03/16/13 3:54	abm
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:45	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:34	pjb
Fluoride	SM4500F-C	1.1		*	mg/L	0.1	0.5	03/21/13 15:21	ljr
Hardness as CaCO3	SM2340B - Calculation	752			mg/L	1	7	04/02/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2.76		*	mg/L	0.02	0.1	03/22/13 23:59	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.33	B	*	mg/L	0.05	0.5	03/21/13 15:24	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.5		*	mg/L	0.1	0.5	03/22/13 16:59	tod
pH (lab)	SM4500H+ B								
pH		8.0	H	*	units	0.1	0.1	03/16/13 0:00	abm
pH measured at		22.0		*	C	0.1	0.1	03/16/13 0:00	abm
Phosphate	Calculation based on dissolved Phosphorus	0.09	B		mg/L	0.03	0.15	04/02/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.03	B	*	mg/L	0.01	0.05	03/21/13 1:13	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.03	BH	*	mg/L	0.01	0.05	03/15/13 22:32	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.04	B	*	mg/L	0.01	0.05	03/27/13 11:49	bsu
Residue, Filterable (TDS) @180C	SM2540C	1300		*	mg/L	10	20	03/18/13 9:39	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/18/13 11:16	khw
Residue, Total (TS) @ 105C	SM2540B	1340		*	mg/L	10	20	03/15/13 15:27	abm
Sulfate	D516-02 - Turbidimetric	770		*	mg/L	50	300	03/25/13 16:22	lhb
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/19/13 12:41	abm
TDS (calculated)	Calculation	1190			mg/L	10	50	04/02/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.09						04/02/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of Interest
Limit	Upper limit for RPD, in %
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCWSCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of Interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	LCSWD	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	LFB	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	LFM	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	LFMD	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	LRB	Laboratory Reagent Blank
ICB	Initial Calibration Blank	MS	Matrix Spike
ICV	Initial Calibration Verification standard	MSD	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	PBS	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	PBW	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	PQV	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	SDL	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extendedlist.pdf>

REP001.09.12.01

Tahoe Resources, Inc.

ACZ Project ID: **L11114**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11114-01	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340526	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341001	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340818	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340526	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340964	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340942	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG340797	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
	WG340536	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341022	Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340515	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11114**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11114-02	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340526	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341001	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340818	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340526	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340964	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340942	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG340797	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item CS of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
	WG340536	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341022	Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340515	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11114**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11114-03	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340526	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341001	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340818	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340526	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340964	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341122	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG340797	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
	WG340536	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341022	Sulfate	D516-D2 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-D2 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340669	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
	WG340526	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.08.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11114**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11114-04	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340526	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341001	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340818	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340526	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340964	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340855	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340942	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG340797	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to Item CS of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
	WG340536	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341022	Sulfate	D516-D2 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-D2 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340669	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
	WG340526	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.08.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11114**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11114-05	WG340651	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340526	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341001	Chloride	SM4500CHE	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340818	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340526	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340964	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340655	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340942	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340526	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG340797	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341144	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
	WG340536	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341022	Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340669	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
	WG340526	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11114**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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REPAD.05.06.05.01







March 29, 2013

Guatemala March 13th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

OPTIONAL: Attachments -> DONA: Resguardo

X   
**Miguel Berganza**  
 Environment Department.  
 Proyecto Escobal, S. A.

Report to:  
 Miguel Berganza  
 Tahoe Resources, Inc.  
 Km 8.6 carretera Antigua a El Salvador Centro cor  
 Torre Oeste.Apto 503y504 Guatemala, GT

Bill to:  
 Miguel Berganza  
 Tahoe Resources, Inc.  
 5190 Neil Road #310  
 Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
 ACZ Project ID: L11118

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 15, 2013. This project has been assigned to ACZ's project number, L11118. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11118. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 29, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

  
 Tony Antalek has reviewed and approved this report.

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Tahoe Resources, Inc.

March 29, 2013

Project ID: Escobal

ACZ Project ID: L11118

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 9 ground water samples from Tahoe Resources, Inc. on March 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11118. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

- Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW10

ACZ Sample ID: **L11118-01**

Date Sampled: 03/13/13 12:10

Date Received: 03/15/13

Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 12:41	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 16:40	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/25/13 18:00	jfb/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:18	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:33	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 21:33	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0102			mg/L	0.0004	0.002	03/22/13 19:47	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0054			mg/L	0.0002	0.001	03/22/13 5:15	msh
Barium, dissolved	M200.7 ICP	0.102			mg/L	0.003	0.02	03/19/13 21:33	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:33	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 21:33	aeb
Boron, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:33	aeb
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:15	msh
Calcium, dissolved	M200.7 ICP	241			mg/L	0.2	1	03/19/13 21:33	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:33	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:33	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:33	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:33	aeb
Iron, dissolved	M200.7 ICP	2.99			mg/L	0.02	0.05	03/19/13 21:33	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 19:47	msh
Lithium, dissolved	M200.7 ICP	0.04	B		mg/L	0.02	0.1	03/19/13 21:33	aeb
Magnesium, dissolved	M200.7 ICP	24.2			mg/L	0.2	1	03/19/13 21:33	aeb
Manganese, dissolved	M200.7 ICP	0.830			mg/L	0.005	0.03	03/19/13 21:33	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 14:30	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:33	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:33	aeb
Potassium, dissolved	M200.7 ICP	4.0			mg/L	0.3	2	03/19/13 21:33	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:33	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/22/13 19:47	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:15	msh
Sodium, dissolved	M200.7 ICP	25.5			mg/L	0.3	2	03/19/13 21:33	aeb
Strontium, dissolved	M200.7 ICP	2.19		*	mg/L	0.01	0.05	03/19/13 21:33	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:15	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 21:33	aeb
Titanium, dissolved	M200.7 ICP	0.007	B		mg/L	0.005	0.03	03/19/13 21:33	aeb
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:15	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:33	aeb
Zinc, dissolved	M200.7 ICP	0.48			mg/L	0.01	0.05	03/19/13 21:33	aeb



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: MW10

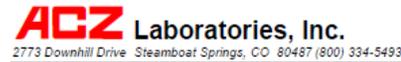
ACZ Sample ID: **L11118-01**  
 Date Sampled: 03/13/13 12:10  
 Date Received: 03/15/13  
 Sample Matrix: Ground Water

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		178		*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity		178		*	mg/L	2	20	03/19/13 0:00	ljr
Cation-Anion Balance	Calculation				%			03/29/13 0:00	calc
Cation-Anion Balance		-0.3							
Sum of Anions		15.6			meq/L	0.1	0.5	03/29/13 0:00	calc
Sum of Cations		15.5			meq/L	0.1	0.5	03/29/13 0:00	calc
Chloride	SM4500Cl-E	2	B	*	mg/L	1	5	03/25/13 14:00	lhb
Conductivity @25C	SM2510B	1280		*	umhos/cm	1	10	03/19/13 15:50	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:51	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:39	pjb
Fluoride	SM4500F-C	0.9		*	mg/L	0.1	0.5	03/22/13 18:18	abm
Hardness as CaCO3	SM2340B - Calculation	702			mg/L	1	7	03/29/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved		U	*	mg/L	0.02	0.1	03/23/13 14:00	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 16:56	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.3	B	*	mg/L	0.1	0.5	03/26/13 22:34	pjb
pH (lab)	SM4500H+B								
pH		8.1	H	*	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		20.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	03/29/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/28/13 13:40	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/15/13 22:47	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.29		*	mg/L	0.01	0.05	03/27/13 23:43	pjb
Residue, Filterable (TDS) @180C	SM2540C	1020		*	mg/L	10	20	03/18/13 9:48	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	62		*	mg/L	5	20	03/18/13 11:25	khw
Residue, Total (TS) @ 105C	SM2540B	1100		*	mg/L	10	20	03/15/13 15:37	abm
Sulfate	D516-02 - Turbidimetric	570		*	mg/L	20	100	03/26/13 11:08	bsu
Sulfide as S	SM4500S2-D	0.27		*	mg/L	0.02	0.1	03/19/13 12:46	abm
TDS (calculated)	Calculation	981			mg/L	10	50	03/29/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.04						03/29/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: MW11

ACZ Sample ID: **L11118-02**  
 Date Sampled: 03/12/13 09:45  
 Date Received: 03/15/13  
 Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 12:49	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 17:08	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/28/13 10:54	jff/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:24	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:40	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP			U	mg/L	0.03	0.2	03/19/13 21:42	aeb
Antimony, dissolved	M200.8 ICP-MS			U	mg/L	0.0004	0.002	03/22/13 19:51	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0025			mg/L	0.0002	0.001	03/22/13 5:19	msh
Barium, dissolved	M200.7 ICP	0.029			mg/L	0.003	0.02	03/19/13 21:42	aeb
Beryllium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:42	aeb
Bismuth, dissolved	M200.7 ICP	0.05		B	mg/L	0.04	0.2	03/19/13 21:42	aeb
Boron, dissolved	M200.7 ICP	0.18			mg/L	0.01	0.05	03/19/13 21:42	aeb
Cadmium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 5:19	msh
Calcium, dissolved	M200.7 ICP	283			mg/L	0.2	1	03/19/13 21:42	aeb
Chromium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:42	aeb
Cobalt, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:42	aeb
Copper, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:42	aeb
Gallium, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 21:42	aeb
Iron, dissolved	M200.7 ICP	1.28			mg/L	0.02	0.05	03/19/13 21:42	aeb
Lead, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 19:51	msh
Lithium, dissolved	M200.7 ICP	0.08		B	mg/L	0.02	0.1	03/19/13 21:42	aeb
Magnesium, dissolved	M200.7 ICP	40.0			mg/L	0.2	1	03/19/13 21:42	aeb
Manganese, dissolved	M200.7 ICP	0.025		B	mg/L	0.005	0.03	03/19/13 21:42	aeb
Mercury, dissolved	M245.1 CVAA			U	mg/L	0.0002	0.001	03/21/13 14:33	mfm
Molybdenum, dissolved	M200.7 ICP			U	mg/L	0.02	0.1	03/19/13 21:42	aeb
Nickel, dissolved	M200.7 ICP	0.01		B	mg/L	0.01	0.05	03/19/13 21:42	aeb
Potassium, dissolved	M200.7 ICP	4.9			mg/L	0.3	2	03/19/13 21:42	aeb
Scandium, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 21:42	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0002		B	mg/L	0.0001	0.0003	03/22/13 19:51	msh
Silver, dissolved	M200.8 ICP-MS			U	mg/L	0.00005	0.0003	03/22/13 5:19	msh
Sodium, dissolved	M200.7 ICP	77.4			mg/L	0.3	2	03/19/13 21:42	aeb
Strontium, dissolved	M200.7 ICP	2.44		*	mg/L	0.01	0.05	03/19/13 21:42	aeb
Thallium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 5:19	msh
Tin, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 21:42	aeb
Titanium, dissolved	M200.7 ICP	0.006		B	mg/L	0.005	0.03	03/19/13 21:42	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0005		B	mg/L	0.0001	0.0005	03/22/13 5:19	msh
Vanadium, dissolved	M200.7 ICP			U	mg/L	0.005	0.03	03/19/13 21:42	aeb
Zinc, dissolved	M200.7 ICP	0.05		B	mg/L	0.01	0.05	03/19/13 21:42	aeb

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\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW11

ACZ Sample ID: **L11118-02**  
Date Sampled: 03/12/13 09:45  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		128		*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity		128		*	mg/L	2	20	03/19/13 0:00	ljr
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.4			%			03/29/13 0:00	calc
Sum of Anions		21.1			meq/L	0.1	0.5	03/29/13 0:00	calc
Sum of Cations		20.1			meq/L	0.1	0.5	03/29/13 0:00	calc
Chloride	SM4500Cl-E	66		*	mg/L	1	5	03/25/13 14:06	lhb
Conductivity @25C	SM2510B	1670		*	umhos/cm	1	10	03/19/13 15:59	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:51	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:41	pjb
Fluoride	SM4500F-C	2.6		*	mg/L	0.1	0.5	03/22/13 18:25	abm
Hardness as CaCO3	SM2340B - Calculation	822			mg/L	1	7	03/29/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved		U	*	mg/L	0.02	0.1	03/23/13 14:01	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 16:57	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	0.2		B	mg/L	0.1	0.5	03/26/13 23:36	pjb
pH (lab)	SM4500H+ B								
pH		8.1	H	*	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		20.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	03/29/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/28/13 13:41	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/15/13 22:49	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/27/13 23:44	pjb
Residue, Filterable (TDS) @180C	SM2540C	1330		*	mg/L	10	20	03/18/13 9:51	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/18/13 11:28	khw
Residue, Total (TS) @ 105C	SM2540B	1390		*	mg/L	10	20	03/15/13 15:38	abm
Sulfate	D516-02 - Turbidimetric	790		*	mg/L	50	300	03/26/13 11:08	bsu
Sulfide as S	SM4500S2-D	0.06	B	*	mg/L	0.02	0.1	03/19/13 12:52	abm
TDS (calculated)	Calculation	1320			mg/L	10	50	03/29/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.01						03/29/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW20

ACZ Sample ID: **L11118-03**  
Date Sampled: 03/13/13 13:55  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 13:04	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 17:22	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/26/13 11:18	jif/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:30	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 17:55	bsu
Metals Analysis									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 21:45	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/22/13 19:54	msh
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0002	0.001	03/22/13 5:29	msh
Barium, dissolved	M200.7 ICP		U		mg/L	0.003	0.02	03/19/13 21:45	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:45	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 21:45	aeb
Boron, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:45	aeb
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/22/13 5:29	msh
Calcium, dissolved	M200.7 ICP		U		mg/L	0.2	1	03/19/13 21:45	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:45	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:45	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:45	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:45	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 21:45	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 19:54	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:45	aeb
Magnesium, dissolved	M200.7 ICP		U		mg/L	0.2	1	03/19/13 21:45	aeb
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:45	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 14:35	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:45	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:45	aeb
Potassium, dissolved	M200.7 ICP		U		mg/L	0.3	2	03/19/13 21:45	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:45	aeb
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	03/22/13 19:54	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:29	msh
Sodium, dissolved	M200.7 ICP		U		mg/L	0.3	2	03/19/13 21:45	aeb
Strontium, dissolved	M200.7 ICP		U	*	mg/L	0.01	0.05	03/19/13 21:45	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:29	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 21:45	aeb
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:45	aeb
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:29	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:45	aeb
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:45	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW20

ACZ Sample ID: **L11118-03**  
Date Sampled: 03/13/13 13:55  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity			U	*	mg/L	2	20	03/19/13 0:00	ljr
Cation-Anion Balance	Calculation								
Cation-Anion Balance		n/a			%			03/29/13 0:00	calc
Sum of Anions		N/A			meq/L	0.1	0.5	03/29/13 0:00	calc
Sum of Cations			U		meq/L	0.1	0.5	03/29/13 0:00	calc
Chloride	SM4500Cl-E		U	*	mg/L	1	5	03/25/13 14:06	lhb
Conductivity @25C	SM2510B	1	B	*	umhos/cm	1	10	03/19/13 18:04	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:53	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:42	pjb
Fluoride	SM4500F-C		U	*	mg/L	0.1	0.5	03/22/13 18:50	abm
Hardness as CaCO3	SM2340B - Calculation		U		mg/L	1	7	03/29/13 0:00	calc
Nitrate/Nitrite as N	M363.2 - H2SO4 preserved		U	*	mg/L	0.02	0.1	03/23/13 14:03	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 17:01	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	03/26/13 23:38	pjb
pH (lab)	SM4500H+ B								
pH		6.4	H	*	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		19.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	03/29/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/28/13 13:45	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/15/13 22:50	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/27/13 23:47	pjb
Residue, Filterable (TDS) @180C	SM2540C		U	*	mg/L	10	20	03/18/13 9:53	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/18/13 11:30	khw
Residue, Total (TS) @ 105C	SM2540B		U	*	mg/L	10	20	03/15/13 15:39	abm
Sulfate	D516-02 - Turbidimetric		U	*	mg/L	1	5	03/26/13 10:09	bsu
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/19/13 12:54	abm
TDS (calculated)	Calculation		U		mg/L	10	50	03/29/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	n/a						03/29/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW21

ACZ Sample ID: **L11118-04**  
Date Sampled: 03/13/13 10:35  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 13:20	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 17:36	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/26/13 11:42	jlf/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:36	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:09	bsu

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 21:48	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/22/13 19:57	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0019			mg/L	0.0002	0.001	03/22/13 5:32	msh
Barium, dissolved	M200.7 ICP	0.042			mg/L	0.003	0.02	03/19/13 21:48	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:48	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 21:48	aeb
Boron, dissolved	M200.7 ICP	0.06			mg/L	0.01	0.05	03/19/13 21:48	aeb
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/22/13 5:32	msh
Calcium, dissolved	M200.7 ICP	124			mg/L	0.2	1	03/19/13 21:48	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:48	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:48	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:48	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:48	aeb
Iron, dissolved	M200.7 ICP	0.22			mg/L	0.02	0.05	03/19/13 21:48	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 19:57	msh
Lithium, dissolved	M200.7 ICP	0.04	B		mg/L	0.02	0.1	03/19/13 21:48	aeb
Magnesium, dissolved	M200.7 ICP	26.7			mg/L	0.2	1	03/19/13 21:48	aeb
Manganese, dissolved	M200.7 ICP	0.383			mg/L	0.005	0.03	03/19/13 21:48	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 14:41	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:48	aeb
Nickel, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/19/13 21:48	aeb
Potassium, dissolved	M200.7 ICP	4.8			mg/L	0.3	2	03/19/13 21:48	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:48	aeb
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	03/22/13 19:57	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:32	msh
Sodium, dissolved	M200.7 ICP	40.7			mg/L	0.3	2	03/19/13 21:48	aeb
Strontium, dissolved	M200.7 ICP	1.25		*	mg/L	0.01	0.05	03/19/13 21:48	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:32	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 21:48	aeb
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:48	aeb
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:32	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:48	aeb
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:48	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW21

ACZ Sample ID: **L11118-04**  
Date Sampled: 03/13/13 10:35  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		124		*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity		124		*	mg/L	2	20	03/19/13 0:00	ljr
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.3			%			03/29/13 0:00	calc
Sum of Anions		10.9			meq/L	0.1	0.5	03/29/13 0:00	calc
Sum of Cations		10.4			meq/L	0.1	0.5	03/29/13 0:00	calc
Chloride	SM4500Cl-E	29		*	mg/L	1	5	03/25/13 14:06	lhb
Conductivity @25C	SM2510B	949		*	umhos/cm	1	10	03/19/13 16:12	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:55	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:44	pjb
Fluoride	SM4500F-C	1.7		*	mg/L	0.1	0.5	03/22/13 18:52	abm
Hardness as CaCO3	SM2340B - Calculation	420			mg/L	1	7	03/29/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved		U	*	mg/L	0.02	0.1	03/23/13 14:05	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 17:02	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	03/26/13 23:40	pjb
pH (lab)	SM4500H+ B								
pH		8.1	H	*	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		19.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus		U		mg/L	0.03	0.15	03/29/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)		U	*	mg/L	0.01	0.05	03/28/13 13:46	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid		UH	*	mg/L	0.01	0.05	03/15/13 22:52	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02	B	*	mg/L	0.01	0.05	03/27/13 23:49	pjb
Residue, Filterable (TDS) @180C	SM2540C	660		*	mg/L	10	20	03/18/13 9:55	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	9	B	*	mg/L	5	20	03/18/13 11:31	khw
Residue, Total (TS) @105C	SM2540B	730		*	mg/L	10	20	03/15/13 15:55	abm
Sulfate	D516-02 - Turbidimetric	360		*	mg/L	20	100	03/26/13 11:08	bsu
Sulfide as S	SM4500S2-D	0.16		*	mg/L	0.02	0.1	03/19/13 12:55	abm
TDS (calculated)	Calculation	663			mg/L	10	50	03/29/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.04						03/29/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SW2

ACZ Sample ID: **L11118-05**  
Date Sampled: 03/06/13 08:15  
Date Received: 03/15/13  
Sample Matrix: Surface Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/19/13 11:02	mpb

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/20/13 17:10	jlf

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW2A/WW5

ACZ Sample ID: **L11118-06**  
 Date Sampled: 03/06/13 09:05  
 Date Received: 03/15/13  
 Sample Matrix: Surface Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/19/13 11:02	mpb

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/20/13 17:10	jif

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SW4A

ACZ Sample ID: **L11118-07**  
 Date Sampled: 03/06/13 09:20  
 Date Received: 03/15/13  
 Sample Matrix: Surface Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/19/13 11:02	mpb

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/20/13 17:11	jif

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: WW6

ACZ Sample ID: **L11118-08**  
Date Sampled: 03/06/13 08:30  
Date Received: 03/15/13  
Sample Matrix: Waste Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/19/13 11:02	mpb

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/20/13 17:12	jif

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: WW9

ACZ Sample ID: **L11118-09**  
Date Sampled: 03/06/13 08:40  
Date Received: 03/15/13  
Sample Matrix: Waste Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation	-						03/19/13 11:03	mpb

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/20/13 17:14	jif



**Report Header Explanations**

<b>Batch</b>	A distinct set of samples analyzed at a specific time
<b>Found</b>	Value of the QC Type of Interest
<b>Limit</b>	Upper limit for RPD, in %.
<b>Lower</b>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<b>MDL</b>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<b>PCN/SCN</b>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<b>PQL</b>	Practical Quantitation Limit, typically 5 times the MDL.
<b>QC</b>	True Value of the Control Sample or the amount added to the Spike
<b>Rec</b>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<b>RPD</b>	Relative Percent Difference, calculation used for Duplicate QC Types
<b>Upper</b>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<b>Sample</b>	Value of the Sample of Interest

**QC Sample Types**

<b>AS</b>	Analytical Spike (Post Digestion)	<b>LCSWD</b>	Laboratory Control Sample - Water Duplicate
<b>ASD</b>	Analytical Spike (Post Digestion) Duplicate	<b>LFB</b>	Laboratory Fortified Blank
<b>CCB</b>	Continuing Calibration Blank	<b>LFM</b>	Laboratory Fortified Matrix
<b>CCV</b>	Continuing Calibration Verification standard	<b>LFMD</b>	Laboratory Fortified Matrix Duplicate
<b>DUP</b>	Sample Duplicate	<b>LRB</b>	Laboratory Reagent Blank
<b>ICB</b>	Initial Calibration Blank	<b>MS</b>	Matrix Spike
<b>ICV</b>	Initial Calibration Verification standard	<b>MSD</b>	Matrix Spike Duplicate
<b>ICSAB</b>	Inter-element Correction Standard - A plus B solutions	<b>PBS</b>	Prep Blank - Soil
<b>LCSS</b>	Laboratory Control Sample - Soil	<b>PBW</b>	Prep Blank - Water
<b>LCSSD</b>	Laboratory Control Sample - Soil Duplicate	<b>PQV</b>	Practical Quantitation Verification standard
<b>LCSW</b>	Laboratory Control Sample - Water	<b>SDL</b>	Serial Dilution

**QC Sample Type Explanations**

<b>Blanks</b>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<b>Control Samples</b>	Verifies the accuracy of the method, including the prep procedure.
<b>Duplicates</b>	Verifies the precision of the instrument and/or method.
<b>Spikes/Fortified Matrix</b>	Determines sample matrix interferences, if any.
<b>Standard</b>	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

<b>B</b>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<b>H</b>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<b>L</b>	Target analyte response was below the laboratory defined negative threshold.
<b>U</b>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extendedlist.pdf>

REP001.09.12.01

Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11118-01	WG340665	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340673	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341017	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG341059	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340973	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341119	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG340575	Residue, Filterable (TDS) @ 180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @ 105C	SM2540D	Q6	Sample was received above recommended temperature.
	WG340536	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

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Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341067	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340669	Sulfide as S	D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340673	Total Alkalinity	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11118-02	WG340685	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340673	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341017	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340673	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340973	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341122	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340536	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG341067	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340669	Sulfide as S			
			SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340673	Total Alkalinity			

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11118-03	WG340837	Cadmium, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [< MDL].
	WG340685	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
				Q6	Sample was received above recommended temperature.
				Q6	Sample was received above recommended temperature.
	WG340673	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341017	Chloride	SM4500C-E	Q6	Sample was received above recommended temperature.
			SM4500C-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.
				Q6	Sample was received above recommended temperature.
	WG340673	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.
	WG340916	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340673	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340973	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.
	WG341122	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.
	WG340673	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to Item C5 of ACZ's Terms & Conditions).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.
	WG341200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG340536		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341067		Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG340669		Sulfide as S	SM4500G2-D	Q6	Sample was received above recommended temperature.
			SM4500G2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340673		Total Alkalinity	SM2320B - Titration	BF	Target analyte in prep / method blank at or above the acceptance criteria. Target analyte was not detected in the sample [- MDL].
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11118-04	WG340837	Cadmium, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [- MDL].
			M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG340673		Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG341017		Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340673		Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	Q6	Sample was received above recommended temperature.
WG341069		Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
WG340966		Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340916		Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	Q6	Sample was received above recommended temperature.
WG340673		Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG340973		Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
WG340861		Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341122		Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340673		pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG341237		Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG340563		Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
WG341200		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG340575		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	Q6	Sample was received above recommended temperature.
WG340588		Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			SM2540D	Q6	Sample was received above recommended temperature.
WG340537		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	Q6	Sample was received above recommended temperature.
WG341067		Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte
			D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte

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Tahoe Resources, Inc.

ACZ Project ID: **L11118**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340669	Sulfide as S	D516-02 - Turbidimetric SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Total Alkalinity	SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
L11118-05	WG340776	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L11118-06	WG340776	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L11118-07	WG340776	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L11118-08	WG340776	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L11118-09	WG340776	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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Tahoe Resources, Inc.

ACZ Project ID: **L11118**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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**Sample Receipt**

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L11118  
Date Received: 03/15/2013 08:54  
Received By: ksj  
Date Printed: 3/18/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2694	10.8	13	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

**ACZ Laboratories, Inc. L11118** CHAIN OF CUSTODY  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Miguel Berganza Address: Km 8 la carretera antigua a El Salvador  
Company: Tahoe Resources Inc. Centro Corporativo Medial, Torre Oeste, Apto 504  
E-mail: Mberganza@sawapet.com.gt Telephone: (+502) 5951-5248

Name: Charlie Muerhoff E-mail: cmuerhoff@tahoresourcesinc.com  
Company: Tahoe Resources Inc. Telephone:

Name: Miguel Berganza Address: Km 8 la carretera antigua a El Salvador  
Company: Tahoe Resources Inc. Centro Corporativo Medial, Torre Oeste, Apto 504  
E-mail: Mberganza@sawapet.com.gt Telephone: (+502) 5951-5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be justified.

Are samples for SDWA Compliance Monitoring? Yes  No

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Fernanda Ramos State: \_\_\_\_\_ Zip code: \_\_\_\_\_ Time zone: \_\_\_\_\_

Quote #: Water Quality  
Project/PO #: Escobal  
Reporting state for compliance testing: \_\_\_\_\_

Check box if samples include NRC licensed material?

Sample ID	Date	Time	Matrix	# of Containers	GW	Total CN
MW10	13/02/13	12:10	GW	8	✓	
MW11	12/02/13	09:45	GW	8	✓	
MW20	13/02/13	13:55	GW	8	✓	
MW21	13/02/13	10:35	GW	8	✓	
SW2	06/03/13	08:15	SW	1	✓	
SW2A/WW5	06/03/13	08:05	SW	1	✓	
SW4A	06/03/13	09:20	SW	1	✓	
WW6	06/03/13	08:30	WW	1	✓	
WW9	06/03/13	08:40	WW	1	✓	

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Susana Arache 13/3/13 12:17 Eric Salazar 3/3/13 15:18  
ES ES

L11118 Chain of Custody

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**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Analytical Report**

April 03, 2013

Guatemala March 13th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

ORIGINAL: Amazon -> COPRA, Pabellon

Best regards,

*Miguel Berganza*  
**Miguel Berganza**  
 Environment Department.  
 Proyecto Escobal, S. A.

Report to:  
 Dave Christophersen  
 Crown Solutions  
 945 S. Brown School Rd.  
 Vandalia, OH 45377

Bill to:  
 Miguel Berganza  
 Tahoe Resources, Inc.  
 5190 Neil Road #310  
 Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
 ACZ Project ID: L11119

Dave Christophersen:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 15, 2013. This project has been assigned to ACZ's project number, L11119. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11119. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 03, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

*Tony Antalek*  
 Tony Antalek has reviewed and approved this report.



**Case Narrative**

Tahoe Resources, Inc. April 03, 2013

Project ID: Escobal  
ACZ Project ID: L11119

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on March 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11119. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

- Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW6

ACZ Sample ID: **L11119-01**  
Date Sampled: 03/13/13 13:05  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 13:28	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/22/13 17:49	lhb
Nitrogen, total Kjeldahl	M351.2 - Block Digester							04/02/13 9:53	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:42	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:16	bsu

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/19/13 21:51	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/22/13 20:01	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0022			mg/L	0.0002	0.001	03/22/13 5:35	msh
Barium, dissolved	M200.7 ICP	0.197			mg/L	0.003	0.02	03/19/13 21:51	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:51	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 21:51	aeb
Boron, dissolved	M200.7 ICP	0.03	B		mg/L	0.01	0.05	03/19/13 21:51	aeb
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/22/13 5:35	msh
Calcium, dissolved	M200.7 ICP	277			mg/L	0.2	1	03/19/13 21:51	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:51	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:51	aeb
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:51	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:51	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/19/13 21:51	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 20:01	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:51	aeb
Magnesium, dissolved	M200.7 ICP	38.8			mg/L	0.2	1	03/19/13 21:51	aeb
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:51	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 14:43	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:51	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:51	aeb
Potassium, dissolved	M200.7 ICP	11.4			mg/L	0.3	2	03/19/13 21:51	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:51	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	03/22/13 20:01	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:35	msh
Sodium, dissolved	M200.7 ICP	38.1			mg/L	0.3	2	03/19/13 21:51	aeb
Strontium, dissolved	M200.7 ICP	0.93		*	mg/L	0.01	0.05	03/19/13 21:51	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:35	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 21:51	aeb
Titanium, dissolved	M200.7 ICP	0.006	B		mg/L	0.005	0.03	03/19/13 21:51	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0008			mg/L	0.0001	0.0005	03/22/13 5:35	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:51	aeb
Zinc, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/19/13 21:51	aeb

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**ACZ Laboratories, Inc.**

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW6

ACZ Sample ID: **L11119-01**  
Date Sampled: 03/13/13 13:05  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
<b>Wet Chemistry</b>									
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		94		*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity		94		*	mg/L	2	20	03/19/13 0:00	ljr
<b>Cation-Anion Balance</b>									
Cation-Anion Balance	Calculation	-3.3			%			04/03/13 0:00	calc
Sum of Anions		20.3			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		19.0			meq/L	0.1	0.5	04/03/13 0:00	calc
Chloride	SM4500Cl-E	64		*	mg/L	1	5	03/25/13 14:08	lhb
Conductivity @25C	SM2510B	1590		*	umhos/cm	1	10	03/19/13 16:21	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:56	tdc
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/23/13 0:45	pjb
Fluoride	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	03/22/13 18:56	abm
Hardness as CaCO3	SM2340B - Calculation	852			mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1.31		*	mg/L	0.02	0.1	03/23/13 14:10	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 17:03	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester		U	*	mg/L	0.1	0.5	04/02/13 21:17	pjb
pH (lab)	SM4500H+ B								
pH		7.5	H	*	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		19.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.09	B		mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.03	B	*	mg/L	0.01	0.05	03/28/13 13:47	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.05	BH	*	mg/L	0.01	0.05	03/15/13 22:54	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.04	B	*	mg/L	0.01	0.05	03/27/13 23:50	pjb
Residue, Filterable (TDS) @180C	SM2540C	1370		*	mg/L	10	20	03/18/13 9:57	khw
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	03/18/13 11:33	khw
Residue, Total (TS) @ 105C	SM2540B	1410		*	mg/L	10	20	03/15/13 15:56	abm
Sulfate	D516-02 - Turbidimetric	790		*	mg/L	20	100	03/26/13 10:11	bsu
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/19/13 12:57	abm
TDS (calculated)	Calculation	1280			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.07						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW7

ACZ Sample ID: **L11119-02**  
Date Sampled: 03/12/13 09:15  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
<b>Inorganic Prep</b>									
Cyanide, total	M335.4 - Manual Distillation							03/25/13 13:36	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/25/13 14:42	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/26/13 12:08	jff/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:48	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:24	bsu
<b>Metals Analysis</b>									
Aluminum, dissolved	M200.7 ICP	0.06	B		mg/L	0.03	0.2	03/19/13 21:54	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0005	B		mg/L	0.0004	0.002	03/22/13 20:04	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0023			mg/L	0.0002	0.001	03/22/13 5:39	msh
Barium, dissolved	M200.7 ICP	0.292			mg/L	0.003	0.02	03/19/13 21:54	aeb
Beryllium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:54	aeb
Bismuth, dissolved	M200.7 ICP		U	*	mg/L	0.04	0.2	03/19/13 21:54	aeb
Boron, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:54	aeb
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/22/13 5:39	msh
Calcium, dissolved	M200.7 ICP	18.5			mg/L	0.2	1	03/19/13 21:54	aeb
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:54	aeb
Cobalt, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/19/13 21:54	aeb
Copper, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	03/19/13 21:54	aeb
Gallium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:54	aeb
Iron, dissolved	M200.7 ICP	0.05	B		mg/L	0.02	0.05	03/19/13 21:54	aeb
Lead, dissolved	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	03/22/13 20:04	msh
Lithium, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:54	aeb
Magnesium, dissolved	M200.7 ICP	5.8			mg/L	0.2	1	03/19/13 21:54	aeb
Manganese, dissolved	M200.7 ICP	0.022	B		mg/L	0.005	0.03	03/19/13 21:54	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/21/13 14:48	mfm
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.02	0.1	03/19/13 21:54	aeb
Nickel, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/19/13 21:54	aeb
Potassium, dissolved	M200.7 ICP	7.2			mg/L	0.3	2	03/19/13 21:54	aeb
Scandium, dissolved	M200.7 ICP		U	*	mg/L	0.1	0.5	03/19/13 21:54	aeb
Selenium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0003	03/22/13 20:04	msh
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/22/13 5:39	msh
Sodium, dissolved	M200.7 ICP	15.8			mg/L	0.3	2	03/19/13 21:54	aeb
Strontium, dissolved	M200.7 ICP	0.14		*	mg/L	0.01	0.05	03/19/13 21:54	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:39	msh
Tin, dissolved	M200.7 ICP		U		mg/L	0.1	0.5	03/19/13 21:54	aeb
Titanium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:54	aeb
Uranium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/22/13 5:39	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/19/13 21:54	aeb
Zinc, dissolved	M200.7 ICP	0.03	B		mg/L	0.01	0.05	03/19/13 21:54	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW7

ACZ Sample ID: **L11119-02**  
Date Sampled: 03/12/13 09:15  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration	68		*	mg/L	2	20	03/19/13 0:00	ljr
Bicarbonate as CaCO3				*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3			U	*	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity		68		*	mg/L	2	20	03/19/13 0:00	ljr
Cation-Anion Balance	Calculation				%			04/03/13 0:00	calc
Cation-Anion Balance		4.5			%			04/03/13 0:00	calc
Sum of Anions		2.1			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		2.3			meq/L	0.1	0.5	04/03/13 0:00	calc
Chloride	SM4500Cl-E	9		*	mg/L	1	5	03/25/13 14:06	lhb
Conductivity @25C	SM2510B	235		*	umhos/cm	1	10	03/19/13 16:30	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 10:59	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/26/13 11:17	tod
Fluoride	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	03/22/13 19:00	abm
Hardness as CaCO3	SM2340B - Calculation	70		*	mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M363.2 - H2SO4 preserved	3.57		*	mg/L	0.02	0.1	03/23/13 14:12	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/21/13 17:04	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1.0		*	mg/L	0.1	0.5	03/26/13 23:42	pjb
pH (lab)	SM4500H+ B				units				
pH		7.4	H	*	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		19.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.09	B	*	mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.03	B	*	mg/L	0.01	0.05	03/28/13 13:48	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	BH	*	mg/L	0.01	0.05	03/15/13 22:59	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.06		*	mg/L	0.01	0.05	03/27/13 23:54	pjb
Residue, Filterable (TDS) @180C	SM2540C	250		*	mg/L	10	20	03/18/13 9:59	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	9	B	*	mg/L	5	20	03/18/13 11:35	khw
Residue, Total (TS) @ 105C	SM2540B	260		*	mg/L	10	20	03/15/13 15:57	abm
Sulfate	D516-02 - Turbidimetric	23		*	mg/L	1	5	03/26/13 10:10	bsu
Sulfide as S	SM4500S2-D		U	*	mg/L	0.02	0.1	03/19/13 12:59	abm
TDS (calculated)	Calculation	121			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	2.07						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW8

ACZ Sample ID: **L11119-03**  
Date Sampled: 03/12/13 10:00  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 13:43	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/25/13 14:54	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/28/13 12:18	jff/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 10:54	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:31	bsu
Metals Analysis									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP			U	mg/L	0.03	0.2	03/19/13 21:58	aeb
Antimony, dissolved	M200.8 ICP-MS	0.0010	B		mg/L	0.0004	0.002	03/22/13 20:08	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0022			mg/L	0.0002	0.001	03/22/13 5:42	msh
Barium, dissolved	M200.7 ICP	0.196			mg/L	0.003	0.02	03/19/13 21:58	aeb
Beryllium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:58	aeb
Bismuth, dissolved	M200.7 ICP			U	mg/L	0.04	0.2	03/19/13 21:58	aeb
Boron, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/19/13 21:58	aeb
Cadmium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 5:42	msh
Calcium, dissolved	M200.7 ICP	55.1			mg/L	0.2	1	03/19/13 21:58	aeb
Chromium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:58	aeb
Cobalt, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:58	aeb
Copper, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:58	aeb
Gallium, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 21:58	aeb
Iron, dissolved	M200.7 ICP	0.03	B		mg/L	0.02	0.05	03/19/13 21:58	aeb
Lead, dissolved	M200.8 ICP-MS	0.0015			mg/L	0.0001	0.0005	03/22/13 20:08	msh
Lithium, dissolved	M200.7 ICP			U	mg/L	0.02	0.1	03/19/13 21:58	aeb
Magnesium, dissolved	M200.7 ICP	10.3			mg/L	0.2	1	03/19/13 21:58	aeb
Manganese, dissolved	M200.7 ICP			U	mg/L	0.005	0.03	03/19/13 21:58	aeb
Mercury, dissolved	M245.1 CVAA			U	mg/L	0.0002	0.001	03/21/13 14:48	mfm
Molybdenum, dissolved	M200.7 ICP			U	mg/L	0.02	0.1	03/19/13 21:58	aeb
Nickel, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 21:58	aeb
Potassium, dissolved	M200.7 ICP	5.4			mg/L	0.3	2	03/19/13 21:58	aeb
Scandium, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 21:58	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0003			mg/L	0.0001	0.0003	03/22/13 20:08	msh
Silver, dissolved	M200.8 ICP-MS			U	mg/L	0.00005	0.0003	03/22/13 5:42	msh
Sodium, dissolved	M200.7 ICP	18.0			mg/L	0.3	2	03/19/13 21:58	aeb
Strontium, dissolved	M200.7 ICP	0.37		*	mg/L	0.01	0.05	03/19/13 21:58	aeb
Thallium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 5:42	msh
Tin, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 21:58	aeb
Titanium, dissolved	M200.7 ICP			U	mg/L	0.005	0.03	03/19/13 21:58	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	03/22/13 5:42	msh
Vanadium, dissolved	M200.7 ICP			U	mg/L	0.005	0.03	03/19/13 21:58	aeb
Zinc, dissolved	M200.7 ICP	0.03	B		mg/L	0.01	0.05	03/19/13 21:58	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc. ACZ Sample ID: **L11119-03**  
Project ID: Escobal Date Sampled: 03/12/13 10:00  
Sample ID: MW8 Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		75		*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3				U	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3				U	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity		75		*	mg/L	2	20	03/19/13 0:00	ljr
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.0			%			04/03/13 0:00	calc
Sum of Anions		4.5			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		4.5			meq/L	0.1	0.5	04/03/13 0:00	calc
Chloride	SM4500Cl-E	10		*	mg/L	1	5	03/25/13 14:06	lhb
Conductivity @25C	SM2510B	461		*	umhos/cm	1	10	03/19/13 16:38	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation			U	mg/L	0.003	0.01	03/26/13 10:59	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation			U	mg/L	0.003	0.01	03/26/13 11:19	tod
Fluoride	SM4500F-C	0.2		B	mg/L	0.1	0.5	03/22/13 19:03	abm
Hardness as CaCO3	SM2340B - Calculation	180			mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2.85		*	mg/L	0.02	0.1	03/23/13 14:13	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate			U	mg/L	0.05	0.5	03/21/13 17:20	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester			U	mg/L	0.1	0.5	04/01/13 16:49	lhb
pH (lab)	SM4500H+ B								
pH		7.9		H	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		20.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus	0.16			mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	0.05		*	mg/L	0.01	0.05	03/28/13 13:49	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.06		H	mg/L	0.01	0.05	03/15/13 23:00	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.05		*	mg/L	0.01	0.05	03/27/13 23:55	pjb
Residue, Filterable (TDS) @180C	SM2540C	380		*	mg/L	10	20	03/18/13 10:01	khw
Residue, Non-Filterable (TSS) @105C	SM2540D			U	mg/L	5	20	03/18/13 11:36	khw
Residue, Total (TS) @105C	SM2540B	390		*	mg/L	10	20	03/15/13 15:58	abm
Sulfate	D516-02 - Turbidimetric	131		*	mg/L	5	30	03/26/13 10:39	bsu
Sulfide as S	SM4500S2-D			U	mg/L	0.02	0.1	03/19/13 13:01	abm
TDS (calculated)	Calculation	275			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.38						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc. ACZ Sample ID: **L11119-04**  
Project ID: Escobal Date Sampled: 03/13/13 10:20  
Sample ID: MW9 Date Received: 03/15/13  
Sample Matrix: Ground Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							03/25/13 13:51	bsu
Cyanide, WAD	SM4500-CN I- distillation							03/25/13 15:06	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digester							03/26/13 12:30	jff/bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion							03/28/13 11:06	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							03/27/13 18:38	bsu
Metals Analysis									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP				mg/L	0.03	0.2	03/19/13 22:07	aeb
Antimony, dissolved	M200.8 ICP-MS			U	mg/L	0.0004	0.002	03/22/13 20:18	msh
Arsenic, dissolved	M200.8 ICP-MS	0.0021			mg/L	0.0002	0.001	03/22/13 5:53	msh
Barium, dissolved	M200.7 ICP	0.043			mg/L	0.003	0.02	03/19/13 22:07	aeb
Beryllium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 22:07	aeb
Bismuth, dissolved	M200.7 ICP			U	mg/L	0.04	0.2	03/19/13 22:07	aeb
Boron, dissolved	M200.7 ICP	0.07			mg/L	0.01	0.05	03/19/13 22:07	aeb
Cadmium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 5:53	msh
Calcium, dissolved	M200.7 ICP	125			mg/L	0.2	1	03/19/13 22:07	aeb
Chromium, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 22:07	aeb
Cobalt, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 22:07	aeb
Copper, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 22:07	aeb
Gallium, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 22:07	aeb
Iron, dissolved	M200.7 ICP	0.21			mg/L	0.02	0.05	03/19/13 22:07	aeb
Lead, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 20:18	msh
Lithium, dissolved	M200.7 ICP	0.04		B	mg/L	0.02	0.1	03/19/13 22:07	aeb
Magnesium, dissolved	M200.7 ICP	27.0			mg/L	0.2	1	03/19/13 22:07	aeb
Manganese, dissolved	M200.7 ICP	0.387			mg/L	0.005	0.03	03/19/13 22:07	aeb
Mercury, dissolved	M245.1 CVAA			U	mg/L	0.0002	0.001	03/21/13 14:51	mfm
Molybdenum, dissolved	M200.7 ICP			U	mg/L	0.02	0.1	03/19/13 22:07	aeb
Nickel, dissolved	M200.7 ICP	0.01		B	mg/L	0.01	0.05	03/19/13 22:07	aeb
Potassium, dissolved	M200.7 ICP	4.9			mg/L	0.3	2	03/19/13 22:07	aeb
Scandium, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 22:07	aeb
Selenium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0003	03/22/13 20:18	msh
Silver, dissolved	M200.8 ICP-MS			U	mg/L	0.00005	0.0003	03/22/13 5:53	msh
Sodium, dissolved	M200.7 ICP	40.8			mg/L	0.3	2	03/19/13 22:07	aeb
Strontium, dissolved	M200.7 ICP	1.26		*	mg/L	0.01	0.05	03/19/13 22:07	aeb
Thallium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 5:53	msh
Tin, dissolved	M200.7 ICP			U	mg/L	0.1	0.5	03/19/13 22:07	aeb
Titanium, dissolved	M200.7 ICP	0.005		B	mg/L	0.005	0.03	03/19/13 22:07	aeb
Uranium, dissolved	M200.8 ICP-MS			U	mg/L	0.0001	0.0005	03/22/13 5:53	msh
Vanadium, dissolved	M200.7 ICP			U	mg/L	0.005	0.03	03/19/13 22:07	aeb
Zinc, dissolved	M200.7 ICP			U	mg/L	0.01	0.05	03/19/13 22:07	aeb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: MW9

ACZ Sample ID: **L11119-04**  
Date Sampled: 03/13/13 10:20  
Date Received: 03/15/13  
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration	124		*	mg/L	2	20	03/19/13 0:00	ljr
Bicarbonate as CaCO3				*	mg/L	2	20	03/19/13 0:00	ljr
Carbonate as CaCO3				*	mg/L	2	20	03/19/13 0:00	ljr
Hydroxide as CaCO3				*	mg/L	2	20	03/19/13 0:00	ljr
Total Alkalinity		124		*	mg/L	2	20	03/19/13 0:00	ljr
Cation-Anion Balance	Calculation				%			04/03/13 0:00	calc
Cation-Anion Balance		-9.9						04/03/13 0:00	calc
Sum of Anions		12.8			meq/L	0.1	0.5	04/03/13 0:00	calc
Sum of Cations		10.5			meq/L	0.1	0.5	04/03/13 0:00	calc
Chloride	SM4500Cl-E	29		*	mg/L	1	5	03/25/13 14:06	lhb
Conductivity @25C	SM2510B	951		*	umhos/cm	1	10	03/19/13 16:47	ljr
Cyanide, total	M335.4 - Colorimetric w/ distillation			U	mg/L	0.003	0.01	03/28/13 11:00	tod
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation			U	mg/L	0.003	0.01	03/28/13 11:21	tod
Fluoride	SM4500F-C	1.7		*	mg/L	0.1	0.5	03/22/13 19:07	abm
Hardness as CaCO3	SM2340B - Calculation	423			mg/L	1	7	04/03/13 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved			U	mg/L	0.02	0.1	03/23/13 14:14	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate			U	mg/L	0.05	0.5	03/21/13 17:09	lhb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester			U	mg/L	0.1	0.5	04/01/13 16:50	lhb
pH (lab)	SM4500H+ B								
pH		8.1		H	units	0.1	0.1	03/19/13 0:00	ljr
pH measured at		21.0		*	C	0.1	0.1	03/19/13 0:00	ljr
Phosphate	Calculation based on dissolved Phosphorus			U	mg/L	0.03	0.15	04/03/13 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)			U	mg/L	0.01	0.05	03/28/13 13:51	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid			UH	mg/L	0.01	0.05	03/15/13 23:01	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.02		B	mg/L	0.01	0.05	03/27/13 23:56	pjb
Residue, Filterable (TDS) @180C	SM2540C	690		*	mg/L	10	20	03/18/13 10:02	khw
Residue, Non-Filterable (TSS) @105C	SM2540D	8		B	mg/L	5	20	03/18/13 11:38	khw
Residue, Total (TS) @105C	SM2540B	740		*	mg/L	10	20	03/15/13 15:59	abm
Sulfate	D516-02 - Turbidimetric	450		*	mg/L	20	100	03/28/13 11:06	bsu
Sulfide as S	SM4500S2-D	0.16		*	mg/L	0.02	0.1	03/19/13 13:03	abm
TDS (calculated)	Calculation	755			mg/L	10	50	04/03/13 0:00	calc
TDS (ratio - measured/calculated)	Calculation	0.91						04/03/13 0:00	calc

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of Interest
Limit	Upper limit for RPD, in %
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of Interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	LCSWD	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	LFB	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	LFM	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	LFMD	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	LRB	Laboratory Reagent Blank
ICB	Initial Calibration Blank	MS	Matrix Spike
ICV	Initial Calibration Verification standard	MSD	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	PBS	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	PBW	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	PQV	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	SDL	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/mblc/externalist.pdf>

REP001.09.12.01

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11119-01	WG340637	Cadmium, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample (< MDL).
	WG340685	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340673	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341017	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340966	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340916	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340673	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340973	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341466	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG340537	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341067	Sulfate	D516-02 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340669	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG340673	Total Alkalinity	SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11119-02	WG340637	Cadmium, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [ $<$ MDL].
	WG340685	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG340673	Bicarbonate as CaCO <sub>3</sub> Carbonate as CaCO <sub>3</sub>	Chloride	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG341017	Chloride		SM4500CH-E	Q6	Sample was received above recommended temperature.
SM4500CH-E			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).	
WG340673	Conductivity @25C		SM2510B	Q6	Sample was received above recommended temperature.
WG341069	Cyanide, total		M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG341072	Cyanide, WAD		SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG340916	Fluoride		SM4500F-C	Q6	Sample was received above recommended temperature.
WG340673	Hydroxide as CaCO <sub>3</sub>		SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG340973	Nitrate/Nitrite as N		M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
WG340861	Nitrogen, ammonia		M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG341122	Nitrogen, total Kjeldahl		M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG340673	pH	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG341237	Phosphorus, dissolved		M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG340563	Phosphorus, ortho dissolved		M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG341200	Phosphorus, total		M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG340575	Residue, Filterable (TDS) @180C		SM2540C	Q6	Sample was received above recommended temperature.
WG340588	Residue, Non-Filterable (TSS) @105C		SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
WG340537	Residue, Total (TS) @ 105C		SM2540B	Q6	Sample was received above recommended temperature.
WG341067	Sulfate		D516-02 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG340669	Sulfide as S		SM4500S2-D	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG340673	Total Alkalinity		SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
			SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

**ACZ Laboratories, Inc.**

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Extended Qualifier Report**

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11119-03	WG340837	Cadmium, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [- MDL].
	WG340685	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340673	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341017	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG340673	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG341072	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG340916	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340673	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340973	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG341352	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG340673	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG341200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).
	WG340537	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG341067	Sulfate	D516-D2 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340669	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (- 10x MDL).

REPAD.15.06.05.01

**ACZ Laboratories, Inc.**

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Extended Qualifier Report**

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG340573	Total Alkalinity	SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11119-04	WG340837	Cadmium, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [ $<$ MDL].
	WG340685	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG340673	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG341017	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG340673	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG341069	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG341072	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG340916	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG340673	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG340973	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG340861	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG341352	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG340673	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG341237	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG340563	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to Item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG341200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG340575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG340588	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG340537	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG341067	Sulfate	D516-D2 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG340669	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG340673	Total Alkalinity	SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

REPAD.15.06.05.01



**Certification  
Qualifiers**

Tahoe Resources, Inc.

ACZ Project ID: **L11119**

**Metals Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
--------------	------------

**Sample  
Receipt**

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L11119  
Date Received: 03/15/2013 08:53  
Received By: ksj  
Date Printed: 3/15/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3737	14.2	12	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

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**ACZ** Laboratories, Inc. **11119** CHAIN OF CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5959

Name: Miguel Berganza	Address: Km 8.4 Carretera antigua a El Salvador
Company: Tahoe Resources Inc.	Centro Cooperativo Muxtal, P.O. Box 524
E-mail: mberganza@sanrafael.com.gt	Telephone: (+502) 5951-5248

Name: Charlie Muehloff	E-mail: cmuehloff@tahoeresourcesinc.com
Company: Tahoe Resources Inc.	Telephone:

Name: Miguel Berganza	Address: Km 8.4 Carretera antigua a El Salvador
Company: Tahoe Resources Inc.	Centro Cooperativo Muxtal, P.O. Box 524
E-mail: mberganza@sanrafael.com.gt	Telephone: (+502) 5951-5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

Are samples for SDWA Compliance Monitoring? Yes  No

Sampler's Name: Escoba Matia

Quote #	Project/PO #	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	# of Containers																
Water Quality	Escoba			GW																
MWB	12/03/13	13:05	GW	8	✓															
MW7	12/03/13	09:45	GW	8	✓															
MW8	12/03/13	10:20	GW	8	✓															
MW9	12/03/13	10:20	GW	8	✓															

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Suzana Aroche	13/13/13 12:12	Ericks Delgado	13/3/13 18:18
		120	3-15-13 8:53

Guatemala March 13th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of water, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

*Miguel Berganza*  
 Miguel Berganza  
 Environment Department.  
 Proyecto Escoba, S. A.

11119 Chain of Custody



Ref 381-13  
Pág 1/1

REG 016 Resultados de Análisis

Muestras: 8 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestras: 140313  
Fecha de análisis: 140313-220313  
Fecha de informe: 220313

Resultados:

Correlativo Ecosistemas	Identificación de la Muestra	Color Aparente (UC HZ equiv. Unid. Pt-Co)	Color Real (UC HZ equiv. Unid. Pt-Co)	Cromo Hexavalente Cr(VI) mg/L	* Coliformes Fecales (NMP/100ml)
594	MW21	359	< 1	N.D.	< 2
595	MW10	300	< 1	N.D.	< 2
596	MW9	361	< 1	N.D.	< 2
597	MW20	< 1	< 1	N.D.	< 2
598	MW5	< 1	< 1	N.D.	< 2
599	MW3	< 1	< 1	N.D.	< 2
600	MW6	< 1	< 1	N.D.	< 2
601	MW4	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración.  
Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.  
Fotométricos Merck: NMP: Número Mas Probable.  
Se trabajaron diluciones.  
N.D. No detectable. Debajo del límite de detección.  
Límites de detección: Cromo hexavalente (0.05 mg/L)  
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.  
Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
\* Análisis referidos.

Ing. Fernando Fuentes  
Gerente Técnico

teléfono / fax: (502) 2254 6156 - 2254 8268 - 5512 1821  
laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt  
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acreditado ISO 17025 según OGA-LE 006-04



Ref 376-13  
Pág 1/1

REG 016 Resultados de Análisis

Muestras: 3 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestras: 130313  
Fecha de análisis: 130313-210313  
Fecha de informe: 210313

Resultados:

Correlativo Ecosistemas	Identificación de la Muestra	Color Aparente (UC HZ equiv. Unid. Pt-Co)	Color Real (UC HZ equiv. Unid. Pt-Co)	Cromo Hexavalente Cr(VI) mg/L	* Coliformes Fecales (NMP/100ml)
571	RW1	10	< 1	N.D.	4.5
572	HW1	9	< 1	N.D.	< 2
573	PSASR	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración.  
Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.  
Fotométricos Merck: NMP: Número Mas Probable.  
Se trabajaron diluciones.  
N.D. No detectable. Debajo del límite de detección.  
Límites de detección: Cromo hexavalente (0.05 mg/L)  
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.  
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\* Análisis referidos.

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REG 016 Resultados de Análisis

Muestras: 12 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquescuinta, Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestras: 130313  
Fecha de análisis: 120313-210313  
Fecha de informe: 210313

Resultados:

Correlativo Ecosistemas	Identificación de la Muestra	Color aparente (UC HZ equiv. Unid. Pt-Co)	Color Real (UC HZ equiv. Unid. Pt-Co)	Cromo Hexavalente Cr(VI) mg/L	* Coliformes Fecales (NMP/100ml)
563	GW1A	343	66	N.D.	220
564	GW2	94	13	N.D.	13
565	GW3	< 1	< 1	N.D.	< 2
566	GW5	181	100	N.D.	4.5
567	GW6	37	18	N.D.	< 2
568	GW7	58	5	N.D.	13
569	GW10	< 1	< 1	N.D.	< 2
570	GW11	96	11	N.D.	49
574	MW2	42	< 1	N.D.	< 2
575	MW7	28	< 1	N.D.	< 2
576	MW8	< 1	< 1	N.D.	< 2
577	MW11	148	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas  
Transporte y preservación de la muestra: Refrigeración.  
Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.  
Fotométricos Merck. NMP: Número Mas Probable.  
Se trabajaron diluciones.  
N.D. No detectable. Debajo del límite de detección.  
Límites de detección: Cromo hexavalente (0.05 mg/L)  
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.  
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\* Análisis referidos.



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REG 016 Resultados de Análisis

Muestras: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquescuinta, Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestras: 250313  
Fecha de análisis: 250313-040413  
Fecha de informe: 040413

Resultados:

Correlativo Ecosistemas	Identificación de la Muestra	Color aparente (UC HZ equiv. Unid. Pt-Co)	Color Real (UC HZ equiv. Unid. Pt-Co)	Cromo Hexavalente Cr(VI) mg/L	* Coliformes Fecales (NMP/100ml)
789	MW1	165	< 1	N.D.	240

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración.  
Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.  
Fotométricos Merck. NMP: Número Mas Probable.  
N.D. No detectable. Debajo del límite de detección.  
Límites de detección: Cromo hexavalente (0.05 mg/L)  
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.  
Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
\* Análisis referidos.



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## 12.5 Informes Originales de los Resultados Analíticos Obtenidos del muestreo de sedimentos, septiembre 2013.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical  
Report

April 16, 2013

Report to:  
Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste.Apto 503y504 Guatemala, GT

Bill to:  
Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11293

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 27, 2013. This project has been assigned to ACZ's project number, L11293. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11293. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 16, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

  
Tony Antalek has reviewed and approved this report.



REPAD.01.06.05.02



Page 1 of 34

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Case  
Narrative

Tahoe Resources, Inc.

April 16, 2013

Project ID: Escobal  
ACZ Project ID: L11293

### Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 9 sediment samples from Tahoe Resources, Inc. on March 27, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11293. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

### Holding Times

All analyses were performed within EPA recommended holding times.

### Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

REPAD.03.06.05.01

Page 2 of 34

Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SED 2

ACZ Sample ID: **L11293-01**  
Date Sampled: 03/20/13 07:30  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 10:45	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/11/13 12:32	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	8180		*	mg/Kg	30	100	04/04/13 17:17	msh
Antimony, total (3050)	M6020 ICP-MS	2.3		*	mg/Kg	0.2	1	04/02/13 20:31	msh
Arsenic, total (3050)	M6020 ICP-MS	46.1		*	mg/Kg	0.1	0.5	04/02/13 20:31	msh
Barium, total (3050)	M6020 ICP-MS	177		*	mg/Kg	0.3	1	04/02/13 20:31	msh
Boron, total (3050)	M6010B ICP	3	B		mg/Kg	1	5	04/02/13 14:54	aeb
Cadmium, total (3050)	M6020 ICP-MS	0.88		*	mg/Kg	0.05	0.3	04/02/13 20:31	msh
Calcium, total (3050)	M6010B ICP	110000		*	mg/Kg	40	200	04/04/13 23:52	aeb
Chromium, total (3050)	M6020 ICP-MS	3.6			mg/Kg	0.3	1	04/02/13 20:31	msh
Copper, total (3050)	M6020 ICP-MS	7.6			mg/Kg	0.3	1	04/02/13 20:31	msh
Iron, total (3050)	M6010B ICP	16400		*	mg/Kg	2	5	04/02/13 14:54	aeb
Lead, total (3050)	M6020 ICP-MS	39.40		*	mg/Kg	0.05	0.3	04/02/13 20:31	msh
Magnesium, total (3050)	M6010B ICP	2200			mg/Kg	20	100	04/02/13 14:54	aeb
Manganese, total (3050)	M6020 ICP-MS	2510		*	mg/Kg	10	60	04/04/13 17:17	msh
Mercury, total	M7471A CVAA			U	mg/Kg	0.08	0.4	04/02/13 14:45	mfm
Molybdenum, total (3050)	M6010B ICP			U	mg/Kg	2	10	04/02/13 14:54	aeb
Nickel, total (3050)	M6020 ICP-MS	2.9			mg/Kg	0.3	2	04/02/13 20:31	msh
Potassium, total (3050)	M6010B ICP	1550			mg/Kg	30	200	04/02/13 14:54	aeb
Selenium, total (3050)	M6020 ICP-MS	0.12		*	mg/Kg	0.05	0.1	04/02/13 20:31	msh
Silver, total (3050)	M6020 ICP-MS	1.57			mg/Kg	0.03	0.1	04/02/13 20:31	msh
Zinc, total (3050)	M6020 ICP-MS	91			mg/Kg	2	5	04/08/13 22:36	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	48.5		*	%	0.1	0.5	03/28/13 23:33	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:00	mss2
Digestion - Hot Plate	M3050B ICP							04/01/13 12:38	mjj
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 12:38	mjj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 9:50	cra

Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SED 2

ACZ Sample ID: **L11293-01**  
Date Sampled: 03/20/13 07:30  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.08	0.4	04/02/13 23:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.0244		*	%	0.0007	0.004	04/12/13 11:34	lhb

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**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 3

ACZ Sample ID: **L11293-02**  
Date Sampled: 03/21/13 08:10  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 11:00	lhb
Phosphorus, total	M385.1 - Auto Ascorbic Acid Digestion							04/11/13 13:35	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	8400		*	mg/Kg	30	100	04/04/13 17:20	msh
Antimony, total (3050)	M6020 ICP-MS	1.5		*	mg/Kg	0.2	1	04/02/13 20:34	msh
Arsenic, total (3050)	M6020 ICP-MS	31.7		*	mg/Kg	0.1	0.5	04/02/13 20:34	msh
Barium, total (3050)	M6020 ICP-MS	170		*	mg/Kg	0.3	1	04/02/13 20:34	msh
Boron, total (3050)	M6010B ICP		U		mg/Kg	1	5	04/02/13 15:03	aeb
Cadmium, total (3050)	M6020 ICP-MS	0.30		*	mg/Kg	0.05	0.3	04/02/13 20:34	msh
Calcium, total (3050)	M6010B ICP	2880		*	mg/Kg	20	100	04/02/13 15:03	aeb
Chromium, total (3050)	M6020 ICP-MS	2.3			mg/Kg	0.3	1	04/02/13 20:34	msh
Copper, total (3050)	M6020 ICP-MS	4.4			mg/Kg	0.3	1	04/02/13 20:34	msh
Iron, total (3050)	M6010B ICP	9480		*	mg/Kg	2	5	04/02/13 15:03	aeb
Lead, total (3050)	M6020 ICP-MS	8.19		*	mg/Kg	0.05	0.3	04/02/13 20:34	msh
Magnesium, total (3050)	M6010B ICP	730			mg/Kg	20	100	04/02/13 15:03	aeb
Manganese, total (3050)	M6020 ICP-MS	950		*	mg/Kg	10	60	04/04/13 17:20	msh
Mercury, total	M7471A CVAA	0.06	B		mg/Kg	0.05	0.3	04/02/13 14:47	mfm
Molybdenum, total (3050)	M6010B ICP		U		mg/Kg	2	10	04/02/13 15:03	aeb
Nickel, total (3050)	M6020 ICP-MS	1.9	B		mg/Kg	0.3	2	04/02/13 20:34	msh
Potassium, total (3050)	M6010B ICP	2060			mg/Kg	30	200	04/02/13 15:03	aeb
Selenium, total (3050)	M6020 ICP-MS	0.12		*	mg/Kg	0.05	0.1	04/02/13 20:34	msh
Silver, total (3050)	M6020 ICP-MS	0.07	B		mg/Kg	0.03	0.1	04/02/13 20:34	msh
Zinc, total (3050)	M6020 ICP-MS	34			mg/Kg	2	5	04/08/13 22:38	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	65.3		*	%	0.1	0.5	03/28/13 0:36	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:07	mss2
Digestion - Hot Plate	M3050B ICP							04/01/13 13:52	mjj
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 13:52	mjj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 9:55	ora

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 3

ACZ Sample ID: **L11293-02**  
Date Sampled: 03/21/13 08:10  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.06	0.3	04/02/13 23:17	pjb
Phosphorus, total	M385.1 - Auto Ascorbic Acid (digest)	0.0145		*	%	0.0006	0.003	04/12/13 11:36	lhb

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REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 4

ACZ Sample ID: **L11293-03**  
Date Sampled: 03/21/13 07:40  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 11:15	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/11/13 14:37	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M8020 ICP-MS	10500		*	mg/Kg	30	100	04/04/13 17:30	msh
Antimony, total (3050)	M8020 ICP-MS	1.6		*	mg/Kg	0.2	1	04/02/13 20:44	msh
Arsenic, total (3050)	M8020 ICP-MS	13.8		*	mg/Kg	0.1	0.5	04/02/13 20:44	msh
Barium, total (3050)	M8020 ICP-MS	154		*	mg/Kg	0.3	1	04/02/13 20:44	msh
Boron, total (3050)	M8010B ICP	1	B		mg/Kg	1	5	04/02/13 15:07	aeb
Cadmium, total (3050)	M8020 ICP-MS	0.31		*	mg/Kg	0.05	0.3	04/02/13 20:44	msh
Calcium, total (3050)	M8010B ICP	9800		*	mg/Kg	20	100	04/02/13 15:07	aeb
Chromium, total (3050)	M8020 ICP-MS	3.9			mg/Kg	0.3	1	04/02/13 20:44	msh
Copper, total (3050)	M8020 ICP-MS	9.1			mg/Kg	0.3	1	04/02/13 20:44	msh
Iron, total (3050)	M8010B ICP	12200		*	mg/Kg	2	5	04/02/13 15:07	aeb
Lead, total (3050)	M8020 ICP-MS	12.50		*	mg/Kg	0.05	0.3	04/02/13 20:44	msh
Magnesium, total (3050)	M8010B ICP	1240			mg/Kg	20	100	04/02/13 15:07	aeb
Manganese, total (3050)	M8020 ICP-MS	1620		*	mg/Kg	10	60	04/04/13 17:30	msh
Mercury, total	M7471A CVAA	0.25	B		mg/Kg	0.08	0.4	04/02/13 14:49	mfm
Molybdenum, total (3050)	M8010B ICP			U	mg/Kg	2	10	04/02/13 15:07	aeb
Nickel, total (3050)	M8020 ICP-MS	3.6			mg/Kg	0.3	2	04/02/13 20:44	msh
Potassium, total (3050)	M8010B ICP	1740			mg/Kg	30	200	04/02/13 15:07	aeb
Selenium, total (3050)	M8020 ICP-MS	0.13		*	mg/Kg	0.05	0.1	04/02/13 20:44	msh
Silver, total (3050)	M8020 ICP-MS	0.33			mg/Kg	0.03	0.1	04/02/13 20:44	msh
Zinc, total (3050)	M8020 ICP-MS	45			mg/Kg	2	5	04/08/13 22:44	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	48.2		*	%	0.1	0.5	03/29/13 1:39	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:15	mss2
Digestion - Hot Plate	M3050B ICP							04/01/13 15:07	mij
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 15:07	mij
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 10:00	cra

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 4

ACZ Sample ID: **L11293-03**  
Date Sampled: 03/21/13 07:40  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.08	0.4	04/02/13 23:18	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.0286		*	%	0.0009	0.005	04/12/13 11:38	lhb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.



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**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 6

ACZ Sample ID: **L11293-04**  
Date Sampled: 03/21/13 08:50  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 11:30	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/11/13 15:08	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	8480		*	mg/Kg	30	100	04/04/13 17:33	msh
Antimony, total (3050)	M6020 ICP-MS	1.1		*	mg/Kg	0.2	1	04/02/13 20:48	msh
Arsenic, total (3050)	M6020 ICP-MS	87.7		*	mg/Kg	0.1	0.5	04/02/13 20:48	msh
Barium, total (3050)	M6020 ICP-MS	113		*	mg/Kg	0.3	1	04/02/13 20:48	msh
Boron, total (3050)	M6010B ICP	9			mg/Kg	1	5	04/02/13 15:10	aeb
Cadmium, total (3050)	M6020 ICP-MS	0.30		*	mg/Kg	0.05	0.3	04/02/13 20:48	msh
Calcium, total (3050)	M6010B ICP	1740		*	mg/Kg	20	100	04/02/13 15:10	aeb
Chromium, total (3050)	M6020 ICP-MS	5.8			mg/Kg	0.3	1	04/02/13 20:48	msh
Copper, total (3050)	M6020 ICP-MS	7.4			mg/Kg	0.3	1	04/02/13 20:48	msh
Iron, total (3050)	M6010B ICP	18300		*	mg/Kg	2	5	04/02/13 15:10	aeb
Lead, total (3050)	M6020 ICP-MS	6.59		*	mg/Kg	0.05	0.3	04/02/13 20:48	msh
Magnesium, total (3050)	M6010B ICP	1030			mg/Kg	20	100	04/02/13 15:10	aeb
Manganese, total (3050)	M6020 ICP-MS	500		*	mg/Kg	10	60	04/04/13 17:33	msh
Mercury, total	M7471A CVAA		U		mg/Kg	0.08	0.4	04/02/13 14:52	mfm
Molybdenum, total (3050)	M6010B ICP		U		mg/Kg	2	10	04/02/13 15:10	aeb
Nickel, total (3050)	M6020 ICP-MS	2.4			mg/Kg	0.3	2	04/02/13 20:48	msh
Potassium, total (3050)	M6010B ICP	1420			mg/Kg	30	200	04/02/13 15:10	aeb
Selenium, total (3050)	M6020 ICP-MS	0.14		*	mg/Kg	0.05	0.1	04/02/13 20:48	msh
Silver, total (3050)	M6020 ICP-MS	0.06	B		mg/Kg	0.03	0.1	04/02/13 20:48	msh
Zinc, total (3050)	M6020 ICP-MS	32			mg/Kg	2	5	04/08/13 22:46	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	43.3		*	%	0.1	0.5	03/29/13 2:42	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:22	mss2
Digestion - Hot Plate	M3050B ICP							04/01/13 15:31	mjj
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 15:31	mjj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 10:05	cra

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

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**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 6

ACZ Sample ID: **L11293-04**  
Date Sampled: 03/21/13 08:50  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.09	0.4	04/02/13 23:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.032		*	%	0.001	0.005	04/12/13 11:39	lhb

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REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED WW7

ACZ Sample ID: **L11293-05**  
Date Sampled: 03/20/13 16:00  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 11:45	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/11/13 15:40	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M8020 ICP-MS	17900		*	mg/Kg	30	100	04/04/13 17:43	msh
Antimony, total (3050)	M8020 ICP-MS	3.1		*	mg/Kg	0.2	1	04/02/13 20:51	msh
Arsenic, total (3050)	M8020 ICP-MS	22.5		*	mg/Kg	0.1	0.5	04/02/13 20:51	msh
Barium, total (3050)	M8020 ICP-MS	240		*	mg/Kg	10	60	04/04/13 17:43	msh
Boron, total (3050)	M8010B ICP	5			mg/Kg	1	5	04/02/13 15:19	aeb
Cadmium, total (3050)	M8020 ICP-MS	2.95		*	mg/Kg	0.05	0.3	04/02/13 20:51	msh
Calcium, total (3050)	M8010B ICP	75500		*	mg/Kg	20	100	04/02/13 15:19	aeb
Chromium, total (3050)	M8020 ICP-MS	14.9			mg/Kg	0.3	1	04/02/13 20:51	msh
Copper, total (3050)	M8020 ICP-MS	20.4			mg/Kg	0.3	1	04/02/13 20:51	msh
Iron, total (3050)	M8010B ICP	17200		*	mg/Kg	2	5	04/02/13 15:19	aeb
Lead, total (3050)	M8020 ICP-MS	156		*	mg/Kg	0.05	0.3	04/02/13 20:51	msh
Magnesium, total (3050)	M8010B ICP	11100			mg/Kg	20	100	04/02/13 15:19	aeb
Manganese, total (3050)	M8020 ICP-MS	2560		*	mg/Kg	10	60	04/04/13 17:43	msh
Mercury, total	M7471A CVAA			U	mg/Kg	0.3	1	04/02/13 14:55	mfm
Molybdenum, total (3050)	M8010B ICP	6		B	mg/Kg	2	10	04/02/13 15:19	aeb
Nickel, total (3050)	M8020 ICP-MS	11.5			mg/Kg	0.3	2	04/02/13 20:51	msh
Potassium, total (3050)	M8010B ICP	4000			mg/Kg	30	200	04/02/13 15:19	aeb
Selenium, total (3050)	M8020 ICP-MS	0.22		*	mg/Kg	0.05	0.1	04/02/13 20:51	msh
Silver, total (3050)	M8020 ICP-MS	14.10			mg/Kg	0.03	0.1	04/02/13 20:51	msh
Zinc, total (3050)	M8020 ICP-MS	321			mg/Kg	2	5	04/08/13 22:51	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	16.1		*	%	0.1	0.5	03/29/13 3:45	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:30	mss2
Digestion - Hot Plate	M3050B ICP							04/01/13 15:56	mij
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 15:56	mij
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 10:10	ora

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED WW7

ACZ Sample ID: **L11293-05**  
Date Sampled: 03/20/13 16:00  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric			U	mg/Kg	0.2	1	04/02/13 23:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.061		*	%	0.002	0.009	04/12/13 11:39	lhb

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**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 8

ACZ Sample ID: **L11293-06**  
Date Sampled: 03/20/13 10:05  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 12:00	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/11/13 16:11	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M8020 ICP-MS	8600		*	mg/Kg	30	100	04/04/13 17:46	msh
Antimony, total (3050)	M8020 ICP-MS	3.1		*	mg/Kg	0.2	1	04/02/13 21:01	msh
Arsenic, total (3050)	M8020 ICP-MS	21.3		*	mg/Kg	0.1	0.5	04/02/13 21:01	msh
Barium, total (3050)	M8020 ICP-MS	181		*	mg/Kg	0.3	1	04/02/13 21:01	msh
Boron, total (3050)	M8010B ICP		U		mg/Kg	1	5	04/02/13 15:22	aeb
Cadmium, total (3050)	M8020 ICP-MS	0.29	B	*	mg/Kg	0.05	0.3	04/02/13 21:01	msh
Calcium, total (3050)	M8010B ICP	4290		*	mg/Kg	20	100	04/02/13 15:22	aeb
Chromium, total (3050)	M8020 ICP-MS	4.7		*	mg/Kg	0.3	1	04/02/13 21:01	msh
Copper, total (3050)	M8020 ICP-MS	6.9		*	mg/Kg	0.3	1	04/02/13 21:01	msh
Iron, total (3050)	M8010B ICP	14300		*	mg/Kg	2	5	04/02/13 15:22	aeb
Lead, total (3050)	M8020 ICP-MS	9.88		*	mg/Kg	0.05	0.3	04/02/13 21:01	msh
Magnesium, total (3050)	M8010B ICP	1290		*	mg/Kg	20	100	04/02/13 15:22	aeb
Manganese, total (3050)	M8020 ICP-MS	1040		*	mg/Kg	10	60	04/04/13 17:46	msh
Mercury, total	M7471A CVAA	0.08	B		mg/Kg	0.07	0.4	04/02/13 14:57	mfm
Molybdenum, total (3050)	M8010B ICP		U		mg/Kg	2	10	04/02/13 15:22	aeb
Nickel, total (3050)	M8020 ICP-MS	3.7			mg/Kg	0.3	2	04/02/13 21:01	msh
Potassium, total (3050)	M8010B ICP	1540			mg/Kg	30	200	04/02/13 15:22	aeb
Selenium, total (3050)	M8020 ICP-MS		U		mg/Kg	3	6	04/04/13 17:46	msh
Silver, total (3050)	M8020 ICP-MS	0.18			mg/Kg	0.03	0.1	04/02/13 21:01	msh
Zinc, total (3050)	M8020 ICP-MS	48			mg/Kg	2	5	04/08/13 22:53	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	54.4		*	%	0.1	0.5	03/29/13 4:48	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:37	mss2
Digestion - Hot Plate	M3050B ICP							04/01/13 16:21	mjj
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 16:21	mjj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 10:15	cra

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 8

ACZ Sample ID: **L11293-06**  
Date Sampled: 03/20/13 10:05  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.06	0.3	04/02/13 23:20	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.0228		*	%	0.0009	0.005	04/12/13 11:40	lhb

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REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SED 9

ACZ Sample ID: **L11293-07**  
 Date Sampled: 03/21/13 09:20  
 Date Received: 03/27/13  
 Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M8013 - Manual Distillation							04/02/13 12:15	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/11/13 16:42	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	9490		*	mg/Kg	30	100	04/04/13 17:49	msh
Antimony, total (3050)	M6020 ICP-MS	1.0		*	mg/Kg	0.2	1	04/02/13 21:04	msh
Arsenic, total (3050)	M6020 ICP-MS	10.3		*	mg/Kg	0.1	0.5	04/02/13 21:04	msh
Barium, total (3050)	M6020 ICP-MS	145		*	mg/Kg	0.3	1	04/02/13 21:04	msh
Boron, total (3050)	M6010B ICP		U		mg/Kg	1	5	04/02/13 15:28	aeb
Cadmium, total (3050)	M6020 ICP-MS	0.41		*	mg/Kg	0.05	0.3	04/02/13 21:04	msh
Calcium, total (3050)	M6010B ICP	2630		*	mg/Kg	20	100	04/02/13 15:28	aeb
Chromium, total (3050)	M6020 ICP-MS	6.3			mg/Kg	0.3	1	04/02/13 21:04	msh
Copper, total (3050)	M6020 ICP-MS	7.6			mg/Kg	0.3	1	04/02/13 21:04	msh
Iron, total (3050)	M6010B ICP	19400		*	mg/Kg	2	5	04/02/13 15:28	aeb
Lead, total (3050)	M6020 ICP-MS	12.20		*	mg/Kg	0.05	0.3	04/02/13 21:04	msh
Magnesium, total (3050)	M6010B ICP	1420			mg/Kg	20	100	04/02/13 15:28	aeb
Manganese, total (3050)	M6020 ICP-MS	1010		*	mg/Kg	10	60	04/04/13 17:49	msh
Mercury, total	M7471A CVAA		U		mg/Kg	0.07	0.3	04/02/13 14:59	mfm
Molybdenum, total (3050)	M6010B ICP		U		mg/Kg	2	10	04/02/13 15:28	aeb
Nickel, total (3050)	M6020 ICP-MS	3.1			mg/Kg	0.3	2	04/02/13 21:04	msh
Potassium, total (3050)	M6010B ICP	1310			mg/Kg	30	200	04/02/13 15:28	aeb
Selenium, total (3050)	M6020 ICP-MS		U		mg/Kg	3	6	04/04/13 17:49	msh
Silver, total (3050)	M6020 ICP-MS	0.09		B	mg/Kg	0.03	0.1	04/02/13 21:04	msh
Zinc, total (3050)	M6020 ICP-MS	63			mg/Kg	2	5	04/08/13 22:55	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	59.7		*	%	0.1	0.5	03/29/13 5:51	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:45	mss2
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 16:45	mjj
Digestion - Hot Plate	M3050B ICP							04/01/13 16:45	mjj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 10:20	ora

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: SED 9

ACZ Sample ID: **L11293-07**  
 Date Sampled: 03/21/13 09:20  
 Date Received: 03/27/13  
 Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.06	0.3	04/02/13 23:21	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.0220		*	%	0.0009	0.005	04/12/13 11:43	lhb

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 2A

ACZ Sample ID: **L11293-08**  
Date Sampled: 03/20/13 08:33  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 12:30	lhb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion							04/11/13 17:13	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10800		*	mg/Kg	30	100	04/04/13 17:52	msh
Antimony, total (3050)	M6020 ICP-MS	2.2		*	mg/Kg	0.2	1	04/02/13 21:07	msh
Arsenic, total (3050)	M6020 ICP-MS	33.2		*	mg/Kg	0.1	0.5	04/02/13 21:07	msh
Barium, total (3050)	M6020 ICP-MS	188		*	mg/Kg	0.3	1	04/02/13 21:07	msh
Boron, total (3050)	M6010B ICP	2		B	mg/Kg	1	5	04/02/13 15:31	aeb
Cadmium, total (3050)	M6020 ICP-MS	0.56		*	mg/Kg	0.05	0.3	04/02/13 21:07	msh
Calcium, total (3050)	M6010B ICP	176000		*	mg/Kg	100	500	04/05/13 0:02	aeb
Chromium, total (3050)	M6020 ICP-MS	3.5			mg/Kg	0.3	1	04/02/13 21:07	msh
Copper, total (3050)	M6020 ICP-MS	5.8			mg/Kg	0.3	1	04/02/13 21:07	msh
Iron, total (3050)	M6010B ICP	11300		*	mg/Kg	2	5	04/02/13 15:31	aeb
Lead, total (3050)	M6020 ICP-MS	25.90		*	mg/Kg	0.05	0.3	04/02/13 21:07	msh
Magnesium, total (3050)	M6010B ICP	2320			mg/Kg	20	100	04/02/13 15:31	aeb
Manganese, total (3050)	M6020 ICP-MS	3570		*	mg/Kg	10	60	04/04/13 17:52	msh
Mercury, total	M7471A CVAA			U	mg/Kg	0.1	0.7	04/02/13 15:01	mfm
Molybdenum, total (3050)	M6010B ICP			U	mg/Kg	2	10	04/02/13 15:31	aeb
Nickel, total (3050)	M6020 ICP-MS	3.6			mg/Kg	0.3	2	04/02/13 21:07	msh
Potassium, total (3050)	M6010B ICP	1130			mg/Kg	30	200	04/02/13 15:31	aeb
Selenium, total (3050)	M6020 ICP-MS			U	mg/Kg	3	6	04/04/13 17:52	msh
Silver, total (3050)	M6020 ICP-MS	1.01			mg/Kg	0.03	0.1	04/02/13 21:07	msh
Zinc, total (3050)	M6020 ICP-MS	71			mg/Kg	2	5	04/08/13 22:57	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	27.5		*	%	0.1	0.5	03/29/13 6:54	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 15:52	mss2
Digestion - Hot Plate	M3050B ICP							04/01/13 17:10	mij
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 17:10	mij
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 10:25	cra

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: SED 2A

ACZ Sample ID: **L11293-08**  
Date Sampled: 03/20/13 08:33  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.1	0.7	04/02/13 23:24	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.026		*	%	0.002	0.008	04/12/13 11:43	lhb

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REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SED 4A

ACZ Sample ID: **L11293-09**  
Date Sampled: 03/20/13 09:05  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation							04/02/13 13:00	lhb
Phosphorus, total	M385.1 - Auto Ascorbic Acid Digestion							04/11/13 17:45	bsu

**Metals Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	11900		*	mg/Kg	30	100	04/04/13 17:59	msh
Antimony, total (3050)	M6020 ICP-MS	3.0		*	mg/Kg	0.2	1	04/02/13 21:10	msh
Arsenic, total (3050)	M6020 ICP-MS	19.5		*	mg/Kg	0.1	0.5	04/02/13 21:10	msh
Barium, total (3050)	M6020 ICP-MS	200		*	mg/Kg	0.3	1	04/02/13 21:10	msh
Boron, total (3050)	M6010B ICP	2	B		mg/Kg	1	5	04/02/13 15:34	aeb
Cadmium, total (3050)	M6020 ICP-MS	0.42		*	mg/Kg	0.05	0.3	04/02/13 21:10	msh
Calcium, total (3050)	M6010B ICP	13600		*	mg/Kg	20	100	04/02/13 15:34	aeb
Chromium, total (3050)	M6020 ICP-MS	5.4		*	mg/Kg	0.3	1	04/02/13 21:10	msh
Copper, total (3050)	M6020 ICP-MS	9.9		*	mg/Kg	0.3	1	04/02/13 21:10	msh
Iron, total (3050)	M6010B ICP	14300		*	mg/Kg	2	5	04/02/13 15:34	aeb
Lead, total (3050)	M6020 ICP-MS	16.60		*	mg/Kg	0.05	0.3	04/02/13 21:10	msh
Magnesium, total (3050)	M6010B ICP	1670		*	mg/Kg	20	100	04/02/13 15:34	aeb
Manganese, total (3050)	M6020 ICP-MS	2880		*	mg/Kg	10	60	04/04/13 17:59	msh
Mercury, total	M7471A CVAA		U		mg/Kg	0.1	0.7	04/02/13 15:03	mfm
Molybdenum, total (3050)	M6010B ICP		U		mg/Kg	2	10	04/02/13 15:34	aeb
Nickel, total (3050)	M6020 ICP-MS	5.1		*	mg/Kg	0.3	2	04/02/13 21:10	msh
Potassium, total (3050)	M6010B ICP	1980		*	mg/Kg	30	200	04/02/13 15:34	aeb
Selenium, total (3050)	M6020 ICP-MS		U		mg/Kg	3	6	04/04/13 17:59	msh
Silver, total (3050)	M6020 ICP-MS	0.38		*	mg/Kg	0.03	0.1	04/02/13 21:10	msh
Zinc, total (3050)	M6020 ICP-MS	56		*	mg/Kg	2	5	04/08/13 22:59	msh

**Soil Analysis**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	31.0		*	%	0.1	0.5	03/29/13 7:57	mss2

**Soil Preparation**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							03/28/13 16:00	mss2
Digestion - Hot Plate	M3050B ICP-MS							04/01/13 17:35	mjj
Digestion - Hot Plate	M3050B ICP							04/01/13 17:35	mjj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							04/01/13 10:30	cra

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SED 4A

ACZ Sample ID: **L11293-09**  
Date Sampled: 03/20/13 09:05  
Date Received: 03/27/13  
Sample Matrix: Sediment

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric		U	*	mg/Kg	0.1	0.5	04/02/13 23:26	pjb
Phosphorus, total	M385.1 - Auto Ascorbic Acid (digest)	0.037		*	%	0.001	0.008	04/12/13 11:44	lhb

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of Interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of Interest

**QC Sample Types**

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

**QC Sample Type Explanations**

<i>Blanks</i>	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
<i>Control Samples</i>	Verifies the accuracy of the method, including the prep procedure.
<i>Duplicates</i>	Verifies the precision of the instrument and/or method.
<i>Spikes/Fortified Matrix</i>	Determines sample matrix interferences, if any.
<i>Standard</i>	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

<i>B</i>	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
<i>H</i>	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
<i>L</i>	Target analyte response was below the laboratory defined negative threshold.
<i>U</i>	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extendedlist.pdf>

REP001.09.12.01

**Tahoe Resources, Inc.**

ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-01	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is + 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Arsenic, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG341457	Calcium, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341416	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is + 10X the concentration in the method blank.
	WG341564	Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG341468	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341965	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-02	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Arsenic, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG341416	Calcium, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Iron, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
		Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG341468	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341965	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-03	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Arsenic, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341416	Calcium, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Iron, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
		Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG341468	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG341965	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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Tahoe Resources, Inc.

ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-04	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453	Antimony, total (3050)		M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	Arsenic, total (3050)		M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	Barium, total (3050)		M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341416	Calcium, total (3050)		M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453	Lead, total (3050)		M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
WG341564	Manganese, total (3050)		M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453	Selenium, total (3050)		M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
WG341468	Cyanide, total		M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341965	Phosphorus, total		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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Tahoe Resources, Inc.

ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-05	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453	Antimony, total (3050)		M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	Arsenic, total (3050)		M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453	Cadmium, total (3050)		M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341416	Calcium, total (3050)		M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453	Lead, total (3050)		M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
WG341564	Manganese, total (3050)		M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453	Selenium, total (3050)		M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
WG341468	Cyanide, total		M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341965	Phosphorus, total		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-06	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Arsenic, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
WG341416		Calcium, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453		Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
WG341564		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341468		Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341965		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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Tahoe Resources, Inc.

ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-07	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Arsenic, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
WG341416		Calcium, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341453		Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
WG341564		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG341468		Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG341965		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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Tahoe Resources, Inc.

ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-08	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Arsenic, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG341457	Calcium, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
M6010B ICP			M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
WG341453	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.	
		M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
WG341564	Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
		M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
WG341468	Cyanide, total	M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
WG341965	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.	

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Tahoe Resources, Inc.

ACZ Project ID: **L11293**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L11293-09	WG341564	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG341453	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Arsenic, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG341416	Calcium, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
M6010B ICP			M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
WG341453	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.	
		M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
WG341564	Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
		M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
WG341468	Cyanide, total	M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
WG341965	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.	

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Tahoe Resources, Inc.

ACZ Project ID: **L11293**

**Soil Analysis**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Solids, Percent CLP50W390, PART F, D-98

**Wet Chemistry**

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Phosphorus, total M365.1 - Auto Ascorbic Acid (digest)

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Tahoe Resources, Inc.  
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ACZ Project ID: L11293

Date Received: 03/27/2013 10:29

Received By: ksj

Date Printed: 3/27/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?		X	
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3109	10.9	12	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

**ACZ** Laboratories, Inc. **L11293** CHAIN OF CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Miguel Berganza Address: Km 8.6 carretera antigua a El Salvador  
 Company: Minera Resources Inc. Centro Cooperativo Muxbol, 1era. Oest, Apto 524 y 504  
 E-mail: Mberganza@sanrafael.com.gt Telephone: (+502) 5951 5248

Name: Charlie Muerhoff E-mail: cmuerhoff@tamoresourcesinc.com  
 Company: Tamora Resources Inc. Telephone:

Name: Miguel Berganza Address: Km 8.6 carretera antigua a El Salvador  
 Company: Minera Resources Inc. Centro Cooperativo Muxbol, 1era. Oest, Apto 524 y 504  
 E-mail: Mberganza@sanrafael.com.gt Telephone: (+502) 5951 5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

Are samples for SDWA Compliance Monitoring? Yes  No

Sampler's Name: Susana Arcoche State: Zip code: Time Zone:

Quote #: Water Quality  
 Project/PO #: Escobal  
 Reporting state for compliance testing:  
 Are any samples NRC licensable material? Yes / No

Sample ID	Date	Time	Matrix	HT	HT Unit	# of Containers	sediments
SED 2	20/03/13	07:30	SED	1	✓		
SED 3	21/03/13	08:10	SED	1	✓		
SED 4	21/03/13	07:40	SED	1	✓		
SED 6	21/03/13	08:50	SED	1	✓		
SED WW1	20/03/13	16:00	SED	1	✓		
SED 8	20/03/13	10:05	SED	1	✓		
SED 9	21/03/13	09:20	SED	1	✓		
SED 2A	20/03/13	08:30	SED	1	✓		
SED 4A	20/03/13	09:05	SED	1	✓		

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Susana Arcoche 25/3/13 11:15 Erick Salazar 25/3/13 11:15  
ES BRT 15:10:59

Guatemala March 25th, 2013

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of sediments, which is not contaminated, that are going to be analyzed by the ACZ Laboratories in Steamboat Springs, Colorado, USA.

If you have any question or doubt, please contact Miguel Berganza at Minera San Rafael, S.A. (502 - 5951-5248) or Tony Antalek at ACZ Laboratories (970-879-6590).

Best regards,

*Miguel Berganza*  
 Miguel Berganza  
 Environment Department.  
 Proyecto Escobal, S. A.

L11293 Chain of Custody

## 11.6. Informes Originales de los Resultados Analíticos Obtenidos del Efluente en los meses de agosto a octubre 2013.

Ref 251-13  
Pág 1/2

## REG 016 Resultados de Análisis

Muestra: 1 muestra de agua  
 Análisis solicitado por: Ing. Miguel Berganza  
 Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa  
 Procedencia de la muestra: Proyecto Escobal  
 Fecha de ingreso de muestra: 140213  
 Fecha de análisis: 140213-250213  
 Fecha del informe: 250213

Identificación de la muestra: WW7  
 Correlativo Ecosistemas: 341

Acuerdo Gubernativo 236-2006 (excepto cianuros)

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.91	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Dixtop-Merck Análogo SMWW 5210D	ver nota
Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	mg/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	4.5	Digestión alcalina persulfato colorimétrico HACH Spectrophotometric Analogy EPA 815.2-3, SMWW 4500.P E: ISO 9978-1, DIN EN 1189 D11	20
Fósforo Total	mg/L	0.05	N.D.	UNICAM AN40177 E10/03C	10
* Arsénico As	mg/L	0.002	0.006	SMWW 3111B	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobalto Co	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

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PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	descarga a cuerpo receptor 0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC H2 equiv Unid. Pt-Co	1	1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC H2 equiv Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	2	NMP	< 1 x 10 <sup>4</sup>

## Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas  
 Transporte y preservación de la muestra: Refrigeración: pH < 2 en muestra para análisis de metales y Aceites y Grasas  
 Metodología: Espectrofotométrica / Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
 Organic Reagents for Trace Analysis. J.Friesch/Gotzost. E. Merck Darmstadt. 1977. EPA 1664  
 N.D. No detectable. Debajo del límite de detección.  
 NMP: Número más probable  
 El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.  
 Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 20)  
 Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.  
 Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
 \* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04  
 \*\* Análisis referido

Ing. Fernando Fuentes  
 Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ  
 INGENIERO QUIMICO  
 COLEGIADO No. 876

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Ref 252-13  
Pág 1/2

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestra: 140213  
Fecha de análisis: 140213-250213  
Fecha del informe: 250213

Identificación de la muestra: WW9  
Correlativo Ecosistemas: 342

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.93	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	mg/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	N.D.	Digestión alcalina permutado colorimétrico HACH	20
Fósforo Total	mg/L	0.05	0.05	Spectrophot Merck Análogo EPA 365.2+3 SMWW 4500-P E. ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.005	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

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Ref 252-13  
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PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	descarga a cuerpo receptor 0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	2	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 <sup>4</sup>

Notas:

Capilación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración: pH < 2 en muestra para análisis de metales y Aceites y Grasas  
Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J. Friesel, Getrost. E. Merck Darmstadt. 1977. EPA 1664  
N.D. No detectable. Debajo del límite de detección.  
NMP: Número mas probable  
El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.  
Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 20).  
Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.  
Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
\*\* Análisis acreditado COGUANOR NTGRS/IEC 17025:2005 según OGA LE 006-04  
\*\*\* Análisis referido.

Ing. Fernando Fuentes  
Gerente Técnico

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REG 016 Resultados de Análisis

Muestra: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestra: 140213  
Fecha de análisis: 140213-250213  
Fecha del informe: 250213

Identificación de la muestra: VVV10  
Correlativo Ecosistemas: 346

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.70	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	N.D.	Digestión alcalina persulfata colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroscan Merck Análogo EPA 365.3+3, SMWW 4500-P E, ISO 8978/1, DIN EN 1199 D11	10
* Arsénico As	mg/L	0.002	N.D.	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

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PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53405	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53405	500
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 <sup>4</sup>

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas  
Metodología: Espectrofotométrico / Standard Methods for water and wastewater APHA, AWWA, 22 edic. Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664  
N.D. No detectable. Debajo del límite de detección.

NMP: Numero mas probable  
El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección  
Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L. (ver Acuerdo Artículo 20).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04

\*\* Análisis referido.

Ing. Fernando Fuentes  
Gerente Técnico

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Analytical Report

February 28, 2013

Report to: Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste.Apto 503y504 Guatemala, GT

Bill to: Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L10695

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on February 15, 2013. This project has been assigned to ACZ's project number, L10695. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L10695. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after March 28, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

  
Tony Antalek has reviewed and approved this report.



REPAD.01.08.05.02



Page 1 of 30



Case Narrative

February 28, 2013

Tahoe Resources, Inc.

Project ID: Escobal  
ACZ Project ID: L10695

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 ground water samples from Tahoe Resources, Inc. on February 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L10695. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

Sample Analysis

These samples were analyzed for inorganic and organic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

REPAD.03.08.05.01

Page 2 of 30

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: WW9

ACZ Sample ID: **L10695-05**  
Date Sampled: 02/13/13 09:45  
Date Received: 02/15/13  
Sample Matrix: Surface Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							02/25/13 14:56	bsu

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	02/26/13 12:59	bsu

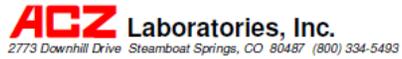
Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: WW10

ACZ Sample ID: **L10695-06**  
Date Sampled: 02/13/13 13:15  
Date Received: 02/15/13  
Sample Matrix: Surface Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							02/25/13 15:03	bsu

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	02/26/13 13:02	bsu



**Sample Receipt**

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L10695  
Date Received: 02/15/2013 10:02  
Received By: ksj  
Date Printed: 2/15/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate? The 'sampled by' field on the Chain of Custody was not completed.		X	
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3727	14.1	18	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

**ACZ Laboratories, Inc.** CHAIN OF CUSTODY  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Name:** Miguel Berganza  
**Company:** Tahoe Resources Inc.  
**E-mail:** M.Berganza@sumafael.com.gt

**Address:** Km 8 1/2 carretera antigua a El Salvador Centro Corporativo Muxbal Torre Desk, Apto 502, SSA  
**Telephone:** (+502) 5951-5428

**Name:** Charlie Muehloff  
**Company:** Tahoe Resources Inc.  
**E-mail:** c.muehloff@tahoeresourcesinc.com  
**Telephone:**

**Name:** Miguel Berganza  
**Company:** Tahoe Resources Inc.  
**E-mail:** M.Berganza@sumafael.com.gt

**Address:** Km 8 1/2 carretera antigua a El Salvador Centro Corporativo Muxbal Torre Desk, Apto 502, SSA  
**Telephone:**

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?  
YES  NO

Are samples for SDWA Compliance Monitoring? Yes  No

If yes, please include state forms. Results will be reported to PQL for Colorado.

**Sampler's Name:** \_\_\_\_\_ **Sampler's site information:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip code:** \_\_\_\_\_ **Time Zone:** \_\_\_\_\_

**Quote #:** Water Quality  
**Project/PO #:** Escobal  
**Reporting state for compliance testing:** \_\_\_\_\_

Check box if samples include NRC licensed material?

Sample ID	Date	Time	Matrix	Volume	# of Containers	SW	Total CN
DW4	13/02/13	07:20	GW	10	1	✓	
DW10	13/02/13	13:30	GW	10	1	✓	
SW2	13/02/13	10:05	SW	1	1	✓	
SW4A	13/02/13	12:05	SW	1	1	✓	
WW9	13/02/13	09:45	SW	1	1	✓	
WW10	13/02/13	13:15	SW	1	1	✓	

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

**Name:** \_\_\_\_\_ **Date:** 13/02/13 17:05  
**Signature:** \_\_\_\_\_ **Date:** 2/15/13 10:02

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REG 016 Resultados de Análisis

Ref 347-13  
Pág 1/2

Muestra: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquescuinta, Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestra: 070313  
Fecha de análisis: 070313-150313  
Fecha del informe: 150313

Ref 347-13  
Pag 2/2

Identificación de la muestra: WW9  
Correlativo Ecosistemas: 517

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.88	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	13	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	4.2	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	0.07	Espectrofotómetro Merck Análogo EPA 365.2-3, SMWW 4500-P E. ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.005	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	9	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	5	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

Capilación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas  
Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664  
N.D. No detectable. Debajo del limite de detección.  
NMP: Número mas probable  
El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros limites de detección.  
Respecto a la DBO el acuerdo 236-2006 le relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 20).  
Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.  
Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
\*\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04  
\*\* Análisis referido.

Ing. Fernando Fuentes  
Gerente Técnico

**LUIS FERNANDO FUENTES MÉNDEZ**  
INGENIERO QUIMICO  
COLEGIADO No. 876



REG 016 Resultados de Análisis

Ref 351-13  
Pag 1/2

Muestra: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestra: 070313  
Fecha de análisis: 070313-150313  
Fecha del informe: 150313

Identificación de la muestra: VVV10  
Correlativo Ecosistemas: 521

Ref 351-13  
Pag 2/2

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	6.20	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Oxítip-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	----	---	---
Relación DQO/DBO <sub>5</sub>	---	---	----	---	---
* Sólidos Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	N.D.	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	descarga a cuerpo receptor 0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 <sup>4</sup>

**Notas:**  
Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas.  
Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getroat. E. Merck Darmstadt. 1977. EPA 1664  
N.D. No detectable. Debajo del limite de detección.  
NMP. Numero mas probable  
El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros limites de detección.  
Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 20).  
Los resultados obtenidos corresponden unicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.  
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\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04  
\*\* Análisis referido

Ing. Fernando Fuentes  
Gerente Técnico  
**LUIS FERNANDO FUENTES MÉNDEZ**  
INGENIERO QUIMICO  
COLEGIADO NO. 075

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acreditado ISO 17025 según OGA-LE 006-04

March 29, 2013

Report to: Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 cartera Antigua a El Salvador Centro cor  
Torre Oeste.Apto 503y504 Guatemala, GT

Bill to: Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11118

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 15, 2013. This project has been assigned to ACZ's project number, L11118. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11118. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 29, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

  
Tony Antalek has reviewed and approved this report.



REPAD.01.06.05.02



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Tahoe Resources, Inc.

March 29, 2013

Project ID: Escobal  
ACZ Project ID: L11118

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 9 ground water samples from Tahoe Resources, Inc. on March 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11118. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

REPAD.03.06.05.01

Page 2 of 28

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: WW9

ACZ Sample ID: **L11118-09**  
Date Sampled: 03/06/13 08:40  
Date Received: 03/15/13  
Sample Matrix: Waste Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation	-						03/19/13 11:03	mpb

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	03/20/13 17:14	jlf

**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Sample Receipt**

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L11118  
Date Received: 03/15/2013 08:54  
Received By: ksj  
Date Printed: 3/18/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2694	10.8	13	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

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Name: Miguel Berganza Address: Km 8.6 carretera antigua a El Salvador  
 Company: Tahoe Resources Inc. Centro Corporativo Maxbal, Torre Oeste, Apto 509  
 E-mail: Mberganza@sawafel.com.gt Telephone: (+502) 5951-5248

Name: Charlie Muerhoff E-mail: cmuerhoff@tahoeresourcesinc.com  
 Company: Tahoe Resources Inc. Telephone:

Name: Miguel Berganza Address: Km 8.6 carretera antigua a El Salvador  
 Company: Tahoe Resources Inc. Centro Corporativo Maxbal, Torre Oeste, Apto 509  
 E-mail: Mberganza@sawafel.com.gt Telephone: (+502) 5951-5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?  
 YES  NO

Are samples for SDWA Compliance Monitoring? Yes  No

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Fernanda Ramos Sampler's site information State: Zip code: Time Zone:

Quote #: Water Quality

Project/PO#: Escobal

Reporting state for compliance testing:

Check box if samples include NRC licensed material?

Sample ID	Date	Time	Location	Container	SW	Total CN
MW10	13/02/13	12:10	GW	8	✓	
MW11	12/02/13	09:45	GW	8	✓	
MW20	13/02/13	13:55	GW	8	✓	
MW21	13/02/13	10:35	GW	8	✓	
SW2	06/03/13	08:15	SW	1	✓	
SW2A/WW5	06/03/13	09:05	SW	1	✓	
SW4A	06/03/13	09:20	SW	1	✓	
WW6	06/03/13	08:30	WW	1	✓	
WW9	06/03/13	08:40	WW	1	✓	

Matrix: SW (Surface Water) - GW (Ground Water) - WW (Waste Water) - DW (Drinking Water) - SL (Sludge) - SO (Soil) - OL (Oil) - Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Gussana Arache 13/3/13 12:18 Eric Salazar 13/3/13 15:18  
TCB 31038853



REG 016 Resultados de Analisis Ref 494-13 Pag 1/2  
 Muestra: 1 muestra de agua  
 Analisis solicitado por: Ing. Miguel Berganza  
 Direccion: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
 Procedencia de la muestra: Proyecto Escobal  
 Fecha de ingreso de muestra: 030413  
 Fecha de analisis: 030413-120413  
 Fecha del informe: 120413

Identificación de la muestra: **WW9**  
 Correlativo Ecosistemas: **816**

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.81	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Matena Flotante	---	---	ausente	Visual	ausente
Demanda Bioquimica de Oxigeno DBO <sub>5</sub>	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Quimica de Oxigeno DQO	mg/L	25	< 25	Reflejo Cerrado, Merck análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrogeno Total	mg/L	1	11.9	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	0.05	Spectroquant Merck Análogo EPA 305.2-3 SMWW 4500-P E, ISO 6979-1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.005	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

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 www.ecosistemas.com.gt

laboratorio ambiental e industrial  
 acreditado ISO 17025 según OGA-LE 006-04

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L1118 Chain of Custody





Ref 494-13  
Pag 2/2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006 descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N. D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N. D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	22	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	16	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*  
*Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas*  
*Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA. AWWA, 22 edic.*  
*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664*  
*N.D. No detectable. Debajo del límite de detección.*  
*NMP: Número mas probable*  
*El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.*  
*Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto a caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 20).*  
*Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.*  
*Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*  
 \* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04  
 \*\* Análisis referido.

Ing. Fernando Fuentes  
Gerente Técnico

**LUIS FERNANDO FUENTES MÉNDEZ**  
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laboratorio ambiental e industrial  
acreditado ISO 17025 según OGA-LE 006-04



Ref 495-13  
Pág 1/2

**REG 016 Resultados de Análisis**

Muestra: 1 muestra de agua  
 Análisis solicitado por: Ing. Miguel Berganza  
 Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
 Procedencia de la muestra: Proyecto Escobal  
 Fecha de ingreso de muestra: 030413  
 Fecha de análisis: 030413-120413  
 Fecha del informe: 120413

Identificación de la muestra: WW11  
 Correlativo Ecosistemas: 817

**Acuerdo Gubernativo 236-2006 (excepto cianuros)**

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006 descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.75	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N. D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	34	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	18	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	11.8	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	0.05	Spectroquant Merck Análogo EPA 365.2-3. SMWW 4500-P E, ISO 6978/1. DIN EN 1189 D11	10
* Arsenico As	mg/L	0.002	0.005	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N. D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N. D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N. D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N. D.	UNICAM AN40181 E10/03C	0.01
* Niquel Ni	mg/L	0.05	N. D.	SMWW 3111B	2

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laboratorio ambiental e industrial  
acreditado ISO 17025 según OGA-LE 006-04

Report to:  
Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste.Apto 503y504 Guatemala, GT

Bill to:  
Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11427

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 04, 2013. This project has been assigned to ACZ's project number, L11427. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11427. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 11, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Tony Antalek has reviewed and approved this report.

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes
					Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	descarga a cuerpo receptor 0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	22	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	2	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas  
Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664  
N.D. No detectable. Debajo del límite de detección.  
NMP: Número mas probable  
El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.  
Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L. (ver Acuerdo Artículo 20).  
Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.  
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\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04  
\*\* Análisis referido.*



Ing. Fernando Fuentes  
Gerente Técnico

**LUIS FERNANDO FUENTES MÉNDEZ**  
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**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Case Narrative**

Tahoe Resources, Inc. April 11, 2013

Project ID: Escobal  
 ACZ Project ID: L11427

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 7 waste water samples from Tahoe Resources, Inc. on April 4, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11427. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: WW9

ACZ Sample ID: **L11427-02**  
 Date Sampled: 04/02/13 09:00  
 Date Received: 04/04/13  
 Sample Matrix: Waste Water

**Inorganic Prep**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/09/13 16:41	mpb

**Wet Chemistry**

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.005	B	*	mg/L	0.003	0.01	04/10/13 17:22	mpb

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Tahoe Resources, Inc.  
Project ID: Escobal  
Sample ID: WW11

ACZ Sample ID: **L11427-03**  
Date Sampled: 04/02/13 09:15  
Date Received: 04/04/13  
Sample Matrix: Waste Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation							04/09/13 16:54	mpb

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.004	B	*	mg/L	0.003	0.01	04/10/13 17:24	mpb

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L11427  
Date Received: 04/04/2013 10:34  
Received By: ksj  
Date Printed: 4/4/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3229	15.4	12	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

**ACZ** Laboratories, Inc. **L11427** CHAIN OF CUSTODY

2773 Downhill Drive, Steamboat Springs, CO 80487 (800) 334-5493

Name: Miguel Berganza Address: Km 8.4 carretera antigua a El Salvador  
 Company: Tamoe Resources Inc. Centro Operativo Muxbal, Torre Oeste, Apto 500 5da  
 E-mail: Mberganza@sanrafael.com.gt Telephone: (502) 5451 5248

Name: Charlie Muerhoff E-mail: cmuerhoff@tmoerresourcesinc.com  
 Company: Tamoe Resources Inc. Telephone:

Name: Miguel Berganza Address: Km 8.4 carretera antigua a El Salvador  
 Company: Tamoe Resources Inc. Centro Operativo Muxbal, Torre Oeste, Apto 500 5da  
 E-mail: mberganza@sanrafael.com.gt Telephone: (502) 5451 5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

Are samples for SDWA Compliance Monitoring? Yes  No

Sampler's Name: Fernando Bratos State: \_\_\_\_\_ Zip code: \_\_\_\_\_ Time Zone: \_\_\_\_\_

Quote #: Water Quality

Project/PO #: Escobal

Reporting state for compliance testing: \_\_\_\_\_

Are any samples NRC licensable material? Yes / No

Container #	Date	Time	Sample Type	# of Containers	Total
WW6	02/04/13	08:45	WW	1	✓
WW9	02/04/13	09:00	WW	1	✓
WW11	02/04/13	09:15	WW	1	✓
WW5	02/04/13	09:40	SW	1	✓
SW2	02/04/13	08:20	SW	1	✓
SW4A	02/04/13	10:30	SW	1	✓
WW12	02/04/13	10:45	SW	1	✓

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Miguel Berganza 24/3 16:27 Enrick Zaque 24/3 16:27  
APL 4/4/13 1034



REG 016 Resultados de Análisis

Ref 554-13  
Pág 1/2

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 08:45 horas  
 Alicuota 2: 12:00 horas  
 Alicuota 3: 15:00 horas  
 Alicuota 4: 18:00 horas

Análisis solicitado por: Ing. Miguel Berganza  
 Dirección: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa  
 Procedencia de la muestra: Proyecto Escobal  
 Fecha de muestreo: 100413  
 Fecha de ingreso de muestra: 110413  
 Fecha de análisis: 110413-230413  
 Fecha del informe: 230413

Identificación de la muestra: Descarga de agua residual Minera San Rafael S. A. (WW9)  
 Correlativo Ecosistemas: 903

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	8.02	SMWW 4500H-B	descarga a cuerpo receptor
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	6 a 9
Materia Flotante	---	---	ausente	Visual	10
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ausente
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	ver nota
Relación DBO <sub>5</sub> /DQO	---	---	---	---	no especificado
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	mil	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	6.4	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	0.07	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D1	10
* Arsénico As	mg/L	0.002	0.005	UNICAM AN40177, E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181, E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

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PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes
					Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	9	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	23	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración, pH < 2 en muestra para análisis de metales y Aceites y Grasas  
Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664  
N.D. No detectable. Debajo del límite de detección.  
NMP: Número mas probable  
El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.  
Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L. (ver Acuerdo Artículo 20).  
Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.  
Se prohíbe la reproducción parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.  
\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04  
\*\* Análisis referido.

Ing. Fernando Fuentes  
Gerente Técnico

**LUIS FERNANDO FUENTES MÉNDEZ**  
INGENIERO QUIMICO  
COLEGIADO N.º. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de ingreso de muestra: 110413  
Fecha de análisis: 110413-230413  
Fecha del informe: 230413

Identificación de la muestra: P10  
Correlativo Ecosistemas: 904

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes
					Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	6.62	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	mg/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrogeno Total	mg/L	1	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fosforo Total	mg/L	0.05	0.05	Spectroquant Merck Análogo EPA 385.2+3, SMWW 4500-P E, ISO 6978-1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	N.D.	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2



Ref 555-13  
Pag 2/2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	descarga a cuerpo receptor 0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.  
Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas  
Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.  
Organic Reagents for Trace Analysis. J. Fresh. Gestost. E. Merck Darmstadt. 1977. EPA 1664  
N.D. No detectable. Debajo del límite de detección.  
NMP: Número mas probable  
El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.  
Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L. (ver Acuerdo Artículo 20).  
Los resultados obtenidos corresponden únicamente a la muestra (recibida por el personal de Ecosistemas Proyectos Ambientales.  
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\* Análisis acreditado COGUANOR NTGISO/IEC 17025:2005 según OGA LE 006-04  
\*\* Análisis referido.*

Ing. Fernando Fuentes  
Gerente Técnico

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**ACZ Laboratories, Inc.**  
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical  
Report

April 23, 2013

Report to:  
Miguel Berganza  
Tahoe Resources, Inc.  
Km 8.6 carretera Antigua a El Salvador Centro cor  
Torre Oeste Apto 503y504 Guatemala, GT

Bill to:  
Miguel Berganza  
Tahoe Resources, Inc.  
5190 Neil Road #310  
Reno, NV 89502

cc: Charlie Muerhoff

Project ID: Escobal  
ACZ Project ID: L11590

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 15, 2013. This project has been assigned to ACZ's project number, L11590. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L11590. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 23, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

Tony Antalek has reviewed and approved this report.



REPAD.01.06.05.02



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Tahoe Resources, Inc.

April 23, 2013

Project ID: Escobal  
ACZ Project ID: L11590

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 miscellaneous samples from Tahoe Resources, Inc. on April 15, 2013. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L11590. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. Client samples were received at a temperature outside of the acceptable range (See Sample Receipt Form).

Tahoe Resources, Inc.

ACZ Sample ID: **L11590-04**

Project ID: Escobal

Date Sampled: 04/10/13 08:45

Sample ID: DESCARGA DE AGUA RESIDUAL MINERA SA

Date Received: 04/15/13

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation			*				04/19/13 12:57	mpb

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.004	B	*	mg/L	0.003	0.01	04/19/13 17:08	bsu



**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Inorganic Analytical Results**

Tahoe Resources, Inc.  
 Project ID: Escobal  
 Sample ID: P10

ACZ Sample ID: **L11590-05**  
 Date Sampled: 04/10/13 19:00  
 Date Received: 04/15/13  
 Sample Matrix: Surface Water

Inorganic Prep									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation			*				04/19/13 13:04	mpb

Wet Chemistry									
Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	*	mg/L	0.003	0.01	04/19/13 17:08	bsu

REPIN.02.06.05.01

\* Please refer to Qualifier Reports for details.

**ACZ Laboratories, Inc.**  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**Sample Receipt**

Tahoe Resources, Inc.  
 Escobal

ACZ Project ID: L11590  
 Date Received: 04/15/2013 09:43  
 Received By: ksj  
 Date Printed: 4/16/2013

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?	X		
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA17413	7.6	12	N/A

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

REPAD LP11 2012-03

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**ACZ Laboratories, Inc.** *L11590*  
 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

**CHAIN of CUSTODY**

Report to:

Name: Miguel Berganza	Address: Km 8.6 carretera antigua a El Salvador (Muzbal)
Company: Tahoe Resources Inc.	Centro Corporativo Muzbal, Torre Oeste, Oficinas 503 y 504
E-mail: MBerganza@santafeal.com.gt	Telephone: (+502) 5651 5248

Copy of Report to:

Name: Charlie Muehloff	E-mail: cmuehloff@tahoeresourcesinc.com
Company: Tahoe Resources Inc.	Telephone:

Invoice to:

Name: Miguel Berganza	Address: Km 8.6 carretera antigua a El Salvador (Muzbal)
Company: Tahoe Resources Inc.	Centro Corporativo Muzbal, Torre Oeste, Oficinas 503 y 504
E-mail: MBerganza@santafeal.com.gt	Telephone: (+502) 5651 5248

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

**PROJECT INFORMATION** ANALYSES REQUESTED (attach list or use quote number)

Quote #:	Water Quality	# of Containers	Time(s)	ANALYSES REQUESTED											
Project/PO #:	Escobal														
Reporting state for compliance testing:															
Sampler's Name:	Fernanda Barrios														
Are any samples NRC licensable material?															
SAMPLE IDENTIFICATION	DATE-TIME	Matrix													
1. Entrada PTAR Minera San Rafael S.A. (WW9)	10/04/13 09:30	WW	1	X											
2. Aguata abajo Quebrada El Escobal	-														
2. Minera San Rafael S.A. (SW2A)	10/04/13 13:00	SW	1	X											
3. Salida de agua de tubería de mina subterránea	-														
3. Minera San Rafael S.A. (DWE1)	10/04/13 13:35	GW	1	X											
4. Descarga de agua residual	-														
4. Minera San Rafael S.A. (WW9)	10/04/13 08:45	WW	1	X											
5. P10	10/04/13 19:00	SW	1	X											
6. Mina Subterránea Minera San	-														
6. Rafael S.A. (1386)	10/04/13 11:10	GW	1	X											

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

**REMARKS**

Because of the long sample identification, samples number 2, 3, 4 and 6 were written in two lines. Please take in consideration when report results.

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE-TIME:	RECEIVED BY:	DATE-TIME:
	11/04/13		

FRMAD050.03.05.02 White - Return with sample. Yellow - Retain for your records.

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