

Proyecto Minero Escobal
San Rafael Las Flores, Santa Rosa

Informe de Monitoreo Ambiental



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 2014

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1 Introducción

A continuación se presenta al Ministerio de Ambiente y Recursos Naturales (**MARN**), el informe trimestral de monitoreo ambiental del Proyecto Minero Escobal (**el Proyecto**) basado en 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 Octubre de 2014.

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 (**PM₁₀**), en microgramos por metro cúbico (**µg/m³**). También se monitorearon siete estaciones para medir la concentración de metales en **PM₁₀**, sólidos sedimentables totales (**PST**), y gases de combustión: dióxido de azufre (**SO₂**) y óxidos nitrosos (**NO_x**).
- 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 AID 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 888 voladuras durante los meses de Agosto a Octubre 2014.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 28 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 (H₂S).
- 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 2014.
- Copia de registro documentado del análisis In Situ y kit de Cianuro de efluentes. En el anexo 0 se presenta copia de las lecturas diarias de parámetros *In Situ* (pH, temperatura, conductividad y 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 2014.

2 Condiciones Ambientales

En el Cuadro 2-1 se describen algunos parámetros meteorológicos en el área del Proyecto y de la Figura 2-1 a la Figura 2-3 se representa la dirección del viento durante Mayo a Julio 2014.

Cuadro 2-1: Condiciones meteorológicas, Proyecto Minero Escobal

Temperatura (°C)			Velocidad del viento (km/h)			Ráfagas (km/h)	Humedad relativa (%)			Evaporación (mm)			Precipitación (mm)
Max	Min	Media	Max	Min	Media	Max	Max	Min	Media	Max	Min	Media	Total
Agosto 2014													
29.1	14.2	21	46.4	0.3	10.1	74.6	100	30.1	73	126.3	40.3	84.9	145.1
Septiembre 2014													
29.5	14	19.9	53.8	0.3	3.3	67.3	100	38.3	85.9	263.7	104.8	194.1	215.6
Octubre 2014													
29.3	12.49	20.14	84.16	0.31	8.12	158.87	100	36.46	82.1	336.7*	293.8*	302.6*	116.6

*Datos a partir de la calibración del sensor (28/10/2014). °C = grados centígrados. Km/h = kilómetros por hora. % = porcentaje. mm = milímetros. Max = valor máximo. Min = valor mínimo. Fuente: MSR, 2014.

Durante el trimestre se registró una temperatura promedio de entre los 29.1° a los 29.3°C y en el mes de Octubre se registró la menor precipitación (116.6 mm). El mes que mayor humedad relativa presentó fue Septiembre con 85.9% y el mes que en promedio presentó la mayor velocidad de vientos fue Agosto con 10.1 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.



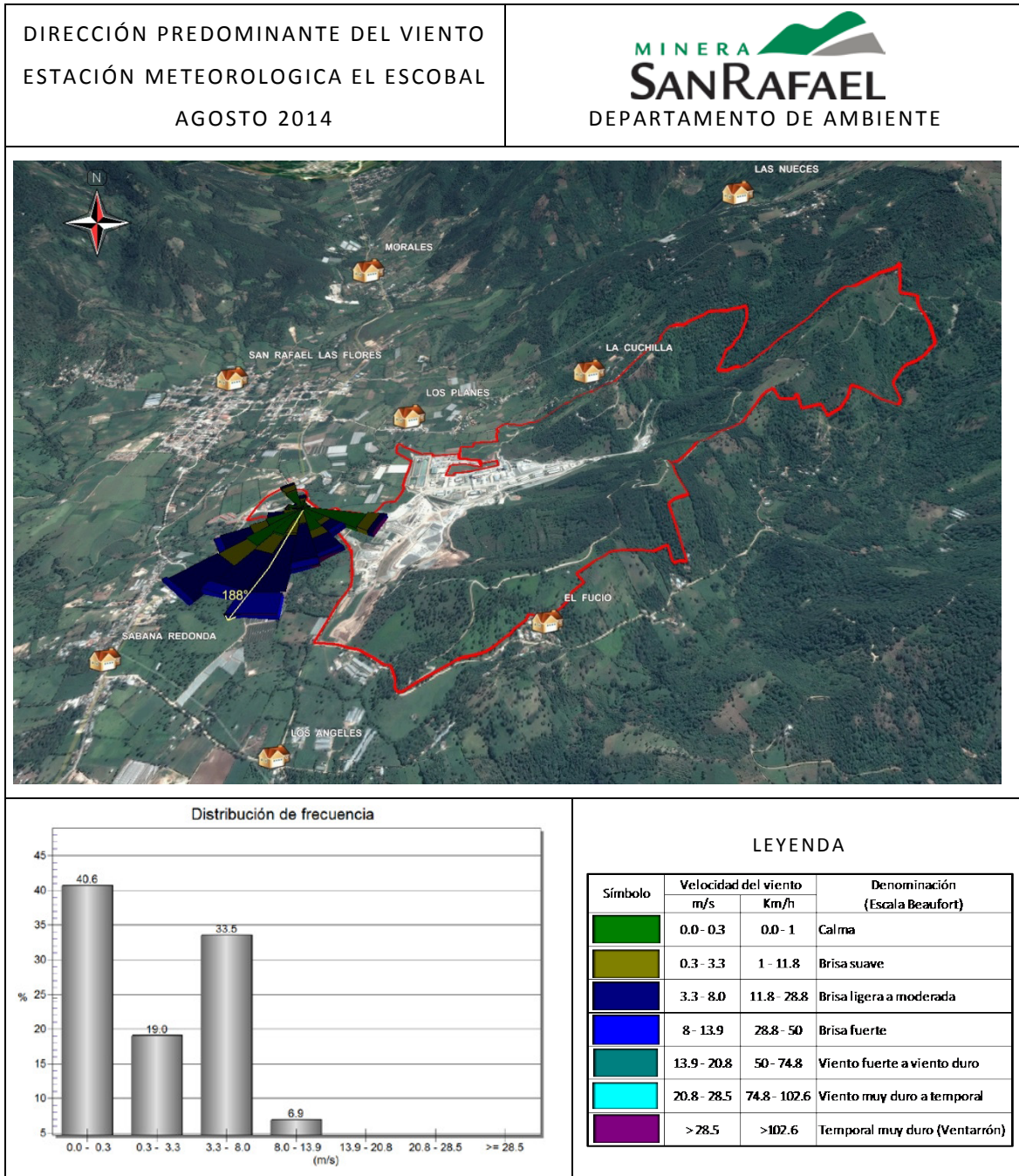
Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa.

Fuente: MSR, 2014.

Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 la predominancia de los vientos en el periodo de Agosto - Octubre de 2014 fue de norte a suroeste.

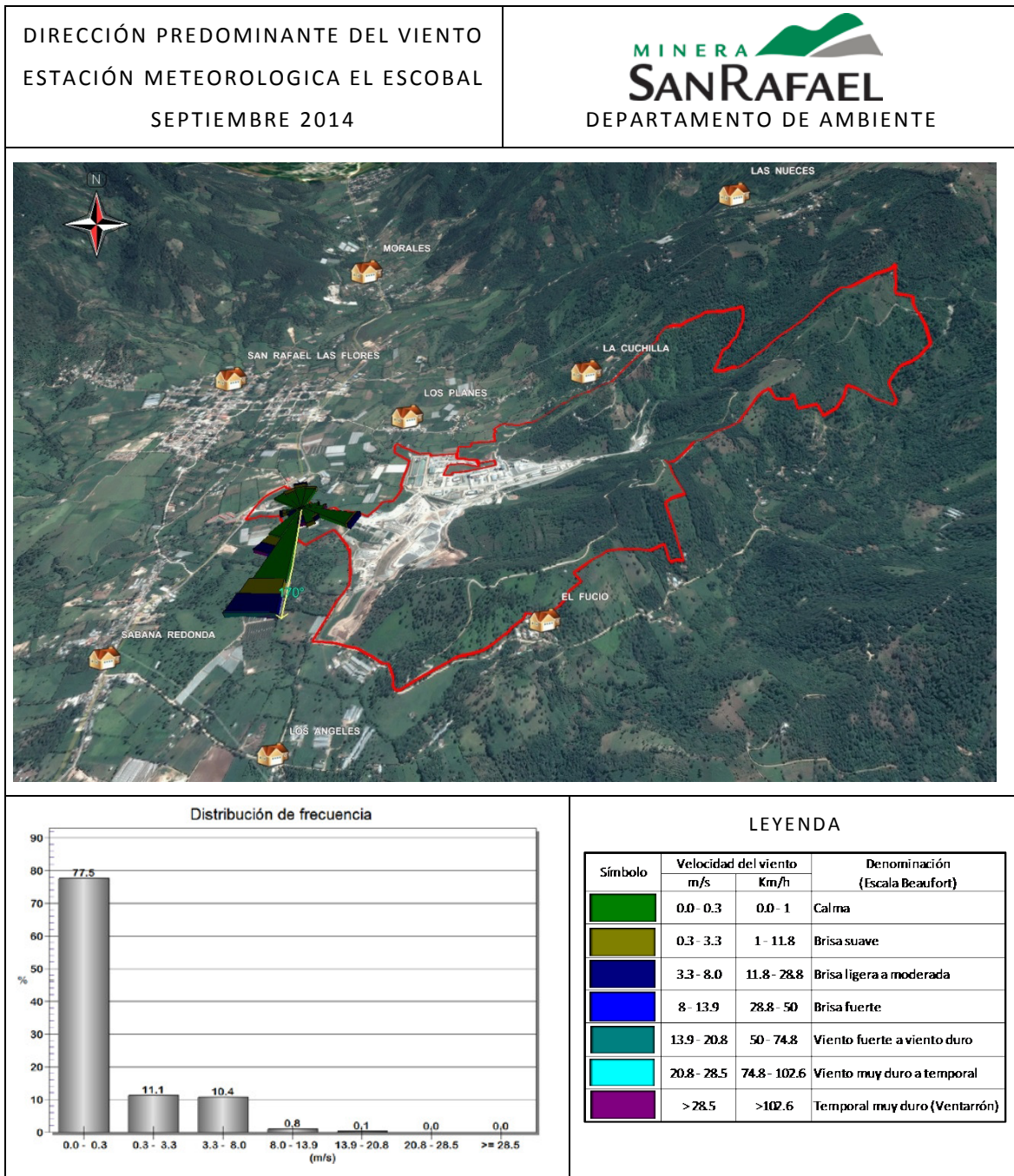
Figura 2-1: Dirección del viento Agosto 2014, Proyecto Minero Escobal

6



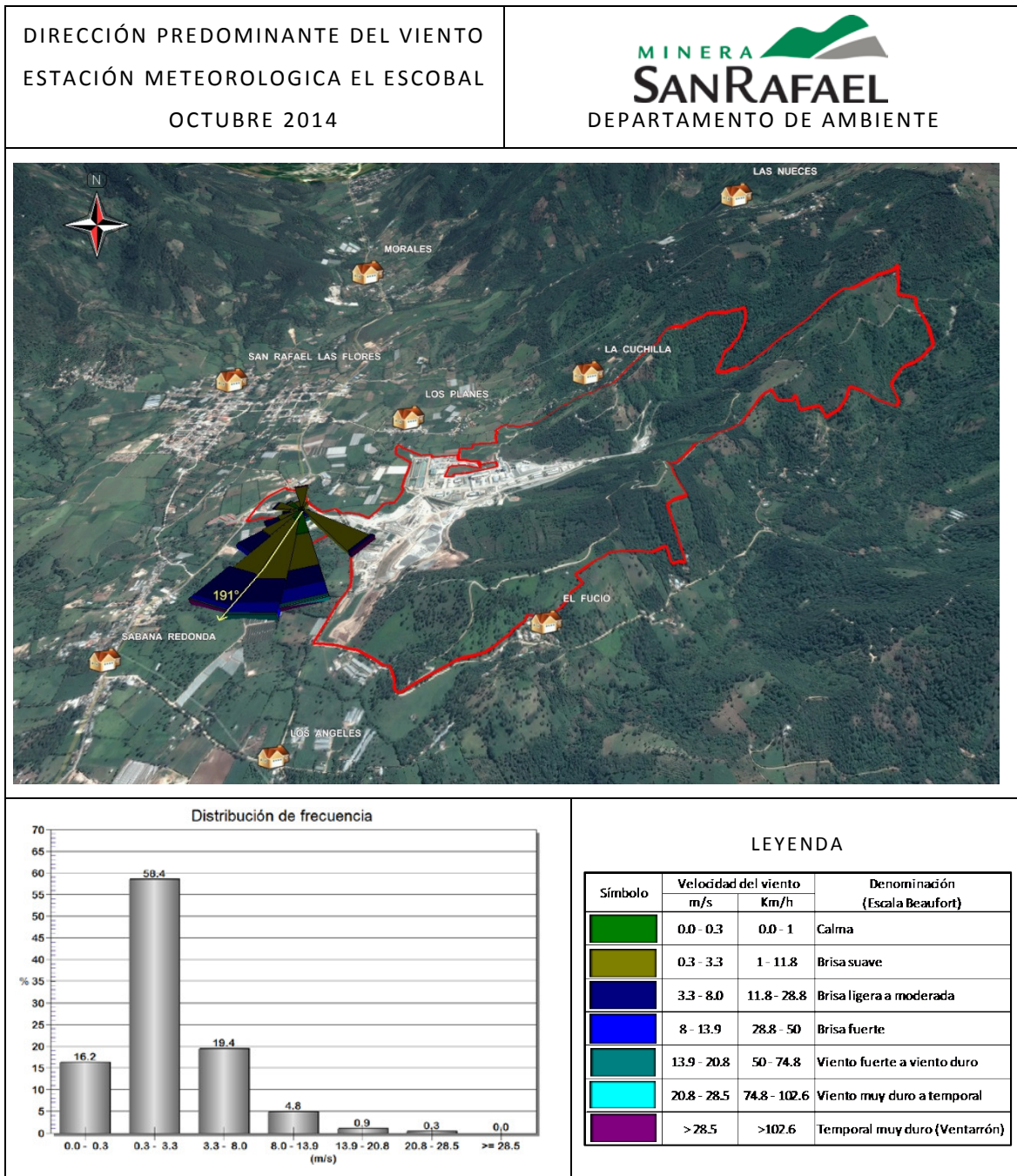
Fuente: MSR, 2014.

Figura 2-2: Dirección del viento Septiembre 2014, Proyecto Minero Escobal



Fuente: MSR, 2014.

Figura 2-3: Dirección del viento Octubre 2014, Proyecto Minero Escobal



Fuente: MSR, 2014.

3 Calidad de Aire

3.1 Material Particulado

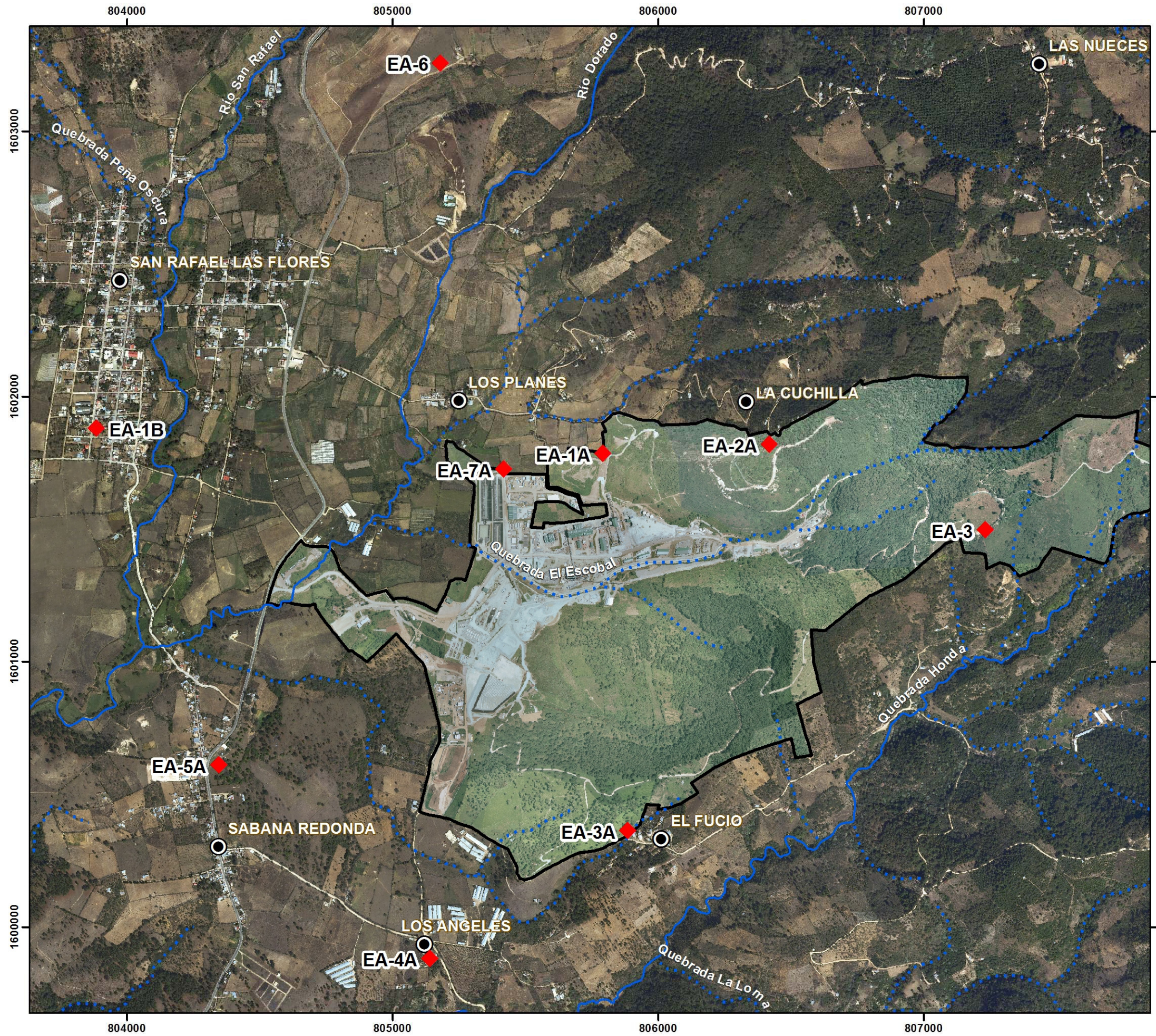
3.1.1 Sitios de Monitoreo

En el Cuadro 3-1 se enlistan las estaciones de monitoreo de material particulado (PM_{10}) menor o igual a 10 micrómetros, 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 Fucío, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. La ubicación de las estaciones de monitoreo de PM_{10} se presenta en la Figura 3-1.

Cuadro 3-1: Sitios de monitoreo de material particulado, Proyecto Minero Escobal

Estación	Coordenadas		Altitud (msnm)	Sitio	Período línea base
Periodicidad de monitoreo mensual					
EA-1A	805,797	1,601,582	1,417	Depósito de suelos, a inmediaciones de Aldea Los Planes	Febrero 2009 a Mayo 2011
EA-2A	806,427	1,601,605	1,564	Aldea La Cuchilla	
EA-3	807,165	1,601,255	1,679	Área Este del proyecto, a inmediaciones de Aldea El Fucío	
EA-7A*	805,425	1,601,523	1,320	Al noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción de Aldea Los Planes	No cuenta con línea base
Periodicidad de monitoreo trimestral					
EA-1B	803,894	1,601,727	1,328	Poblado San Rafael Las Flores, cercano a Escuela	No cuenta con línea base
EA-3A	806,000	1,600,108	1,416	Aldea El Fucío	
EA-4A	805,142	1,599,903	1,360	Caserío El Portón de los Ángeles	Enero 2011 a Abril 2011
EA-5A*	804,352	1,600,408	1,339	Aldea Sabana Redonda, al sur-oeste del proyecto	No cuenta con línea base
EA-6	805,168	1,603,247	1,434	Al norte del Proyecto, ruta a Mataquescuintla	Julio 2010 a Abril 2011

*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2014.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO MATERIAL PARTICULADO (PM10)

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO (PM10)

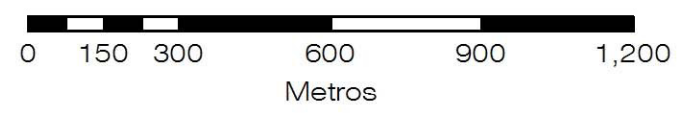
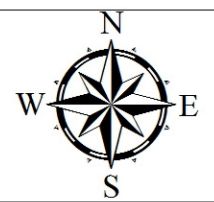
Símbolo	Estación	X	Y
	EA-1A	805791	1601785
	EA-1B	803885	1601881
	EA-2A	806419	1601819
	EA-3	807232	1601498
	EA-3A	805886	1600364
	EA-4A	805140	1599883
	EA-5A	804346	1600611
	EA-6	805181	1603257
	EA-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas catográficas año 2010 Mataquesuinta (2159-I) y Laguna de Ayarza (2159-II) del IGN, Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013. datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical de Grilla: 1,000 metros

Escala 1:15,000



3.1.2 Metodología

En el Cuadro 3-2 se describe el procedimiento, parámetros y equipo utilizados en la medición de PM₁₀.

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

Parámetros utilizados	
PM ₁₀	Material particulado igual o menor a 10 micrómetros ($\leq 10 \mu\text{m}$).
Procedimiento	
La medición se realiza haciendo pasar un flujo continuo de aire durante 24 ± 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 ₁₀ . El equipo de medición utilizado cumple con las especificaciones de la Agencia de Protección Ambiental de los Estados Unidos (EPA).	
Equipo utilizado	
Nombre	PM ₁₀ Air Sampler
Modelo	PQ 200
Fabricante	BGI INSTRUMENTS
Laboratorio contratado	
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.

Fuente: MSR, 2014.

3.1.3 Resultados

En el Cuadro 3-3 se presentan los resultados de PM₁₀ durante los meses de Agosto a Octubre 2014 y los resultados de laboratorio del análisis gravimétrico de filtros y los cálculos realizados para determinar el PM₁₀ se presentan en el anexo 11.3.1

Los valores de PM₁₀ registrados durante el monitoreo realizado en todas las localidades, se encuentran dentro de los valores máximos permisibles, conforme a los valores establecidos por la EPA y el Banco Mundial ($150 \mu\text{g}/\text{m}^3$), con excepción de la estación EA-4A durante Agosto de 2014.

Cuadro 3-3: Resultados de PM₁₀, Proyecto Minero Escobal

Estación	Norma*	Guías*		Línea Base			Resultados		
	USEPA ¹	Banco Mundial ²	OMS ³	Promedio	Máximo	Mínimo	Ago-14	Sep-14	Oct-14
				(µg/m ³)					
EA-1A	150	150**	50	24.36	89.95	3.67	20.78	72.19	10.13
EA-1B				NR	NR	NR	81.72	NA	NA
EA-2A				21.40	76.20	2.74	57.08	21.21	15.78
EA-3				25.68	78.85	1.25	41.81	12.41	12.92
EA-3A				NR	NR	NR	37.32	NA	NA
EA-4A				103.55	120.40	86.70	155.8	NA	NA
EA-5A				50.73 [¥]	104.80 [¥]	11.80 [¥]	42.24	NA	NA
EA-6				23.05	57.90	1.70	22.82	NA	NA
EA-7A				46.48 [¥]	115.90 [¥]	13.40 [¥]	22.54	24.88	15.81

µg/m³ = microgramos por metro cúbico. NR = cálculo No Realizado por falta de datos de línea base. NA = No Analizado. ¹USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). ²Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. ³Guía 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. Fuente: MSR, 2014.

Los resultados obtenidos durante los meses de Agosto a Octubre 2014 se encontraron entre los 10.13 a 155.8 µg/m³. En Agosto se registró el menor valor de PM₁₀ en la estación EA-1A (20.78 µg/m³), mientras que en Septiembre y Octubre se registró en la estación EA-3 y EA-1A (12.41 y 10.13 µg/m³ respectivamente). Los valores más altos de PM₁₀ se registraron en la estaciones EA-4A durante Agosto (155.8 µg/m³), mientras que los valores más altos en Junio y Julio se registraron en las estaciones EA-1A y EA-7A (72.19 y 15.81 µg/m³) respectivamente.

Todos los valores de PM₁₀ registrados durante el monitoreo trimestral, se encuentran por debajo de los límites máximos establecidos durante el levantamiento de línea base, a excepción de lo registrado en EA-4A durante Agosto. Todos los valores de PM₁₀ se encuentran por debajo de los valores establecidos por las guías de la USEPA y Banco mundial (150 µg/m³) a excepción de las estación EA-4A durante Agosto.

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_{10}) 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 Fucío, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. La ubicación de las estaciones de monitoreo de metales se presenta en la Figura 3-1.

Cuadro 3-4: Sitios de monitoreo de metales en PM_{10} , Proyecto Minero Escobal

Estación	Coordenadas		Altitud (msnm)	Sitio	Período línea base
EA-1B	803,891	1,601,678	1,328	Poblado San Rafael Las Flores, cercano a Escuela	No cuenta con línea base
EA-2A	806,427	1,601,605	1,564	aledaño a Aldea La Cuchilla	Julio 2010 a Abril 2011
EA-3A	805,892	1,600,161	1,416	aledaño a Aldea El Fucío	No cuenta con línea base
EA-4A	805,146	1,599,680	1,360	Caserío El Portón de los Ángeles	Enero 2011 a Abril 2011
EA-5A*	804,352	1,600,408	1,339	Aldea Sabana Redonda, al sur-oeste del proyecto	No se cuenta con línea base.
EA-6	805,187	1,603,054	1,434	Al norte del Proyecto, ruta a Mataquescuintla	Julio 2010 a Abril 2011
EA-7A*	805,425	1,601,523	1,320	al noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción de Aldea Los Planes	No se cuenta con línea base

*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. 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. Fuente: MSR, 2014.

3.2.2 Metodología

En el Cuadro 3-5 se describe el procedimiento, parámetros y laboratorio empleado para la determinación de metales en PM_{10} .

Cuadro 3-5: Procedimiento y laboratorio empleado para la determinación de metales en PM_{10} , Proyecto Minero Escobal

Parámetros utilizados	
Metales en PM_{10}	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
Procedimiento	
Los mismos filtros empleados para determinar el PM_{10} 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 $\mu\text{g}/\text{m}^3$. El	

análisis de laboratorio es destructivo, lo que hace imposible analizar metales y mercurio en un mismo filtro. Por tanto en el 1er y 3er trimestre del año se analizan metales totales; y en el 2do y 4to trimestre únicamente mercurio total.

Laboratorio

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.
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Fuente: MSR, 2014.

3.2.3 Resultados

En el Cuadro 3-6 se presentan los resultados de concentración de metales en PM10 durante el mes de Febrero 2014, los resultados de laboratorio del análisis de metales en filtros y los cálculos realizados para determinar el PM10 se presentan en el anexo 11.3.2. La concentración de metales registradas durante Agosto 2014 se encontraron cercanos a los valores registrados durante Agosto 2013 en todas las estaciones de monitoreo.

Cuadro 3-6: Resultados de concentración de metales en PM₁₀, Proyecto Minero Escobal (1/2)

Parámetros	Unidades	EA-1B	EA-2A			EA-3A	EA-4A										
		ago-14	Línea Base			ago-14	Línea Base			ago-14							
		2475-0707	Promedio	Máximo	Mínimo	2469-0101	2469-0101	Promedio	Máximo	Mínimo	2446-0303						
Aluminio	µg/m ³	0.743	0.23	0.28	<0.34	1.045	1	1.27	1.27	1.27	2.616						
Antimonio		N.D.	<0.10	<0.17	<0.04	N.D.	N.D.	<0.17	<0.17	<0.17	N.D.						
Arsénico		N.D.	<0.07	<0.10	<0.03	N.D.	N.D.	<0.10	<0.10	<0.10	N.D.						
Azufre		0.734	1.49	2.17	0.8	0.556	0	1.23	1.23	1.23	0.649						
Bario		0.013	0.01	0.01	<0.02	0.012	0.008	<0.02	<0.02	<0.02	0.046						
Berilio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.						
Bismuto		N.D.	<0.07	<0.10	<0.03	N.D.	N.D.	<0.1	<0.1	<0.1	N.D.						
Boro		N.D.	0.27	0.5	0.03	N.D.	N.D.	<0.1	<0.1	<0.1	0.042						
Cadmio		N.D.	<0.02	<0.03	<0.01	N.D.	N.D.	<0.03	<0.03	<0.03	N.D.						
Calcio		0.848	0.65	1.1	0.2	1.012	0.786	0.78	0.78	0.78	1						
Cromo		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.						
Cobalto		N.D.				N.D.	N.D.										
Cobre		N.D.				N.D.	N.D.										
Estaño		N.D.				N.D.	N.D.										
Estroncio		0.004				0.008	0.004										
Fósforo		0.009				0.008	0.004										
Hierro		0.799				0.26	0.32				0.2	1.173	1	1.22	1.22	1.22	2.213
Magnesio		0.376				0.11	0.14				<0.17	0.498	0.329	<0.33	<0.33	<0.33	0.541
Manganeso		0.022	0.01	0.01	<0.02	0.025	0.025	0.09	0.09	0.09	0.1						
Molibdeno		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.						
Níquel		N.D.	<0.03	<0.05	<0.01	N.D.	N.D.	<0.05	<0.05	<0.05	N.D.						
Plata		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.						
Plomo		N.D.	<0.03	<0.05	<0.01	N.D.	N.D.	<0.05	<0.05	<0.05	N.D.						
Potasio		N.D.	0.55	0.6	0.5	N.D.	N.D.	0.73	0.73	0.73	0.79						
Selenio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.						
Silicio		0.699	0.42	0.53	0.3	1.057	0.641	0.55	0.55	0.55	2						
Sodio		0.498	0.53	0.6	0.46	0.605	0.458	1.4	1.4	1.4	0.641						
Talio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.						
Titanio		0.019	0.02	0.02	0.02	0.024	0.019	0.09	0.09	0.09	0.117						
Uranio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.						
Vanadio		N.D.				N.D.	N.D.										
Zinc		N.D.				N.D.	N.D.										
Zirconio	N.D.	<0.012				<0.02	<0.004				N.D.	N.D.	<0.01	<0.01	<0.01	N.D.	

ND: no detectado. LD: límite de detección. µg/m³ = microgramos por metro cúbico. Fuente: MSR, 2014.

Cuadro 3-6: Resultados de concentración de metales en PM10, Proyecto Minero Escobal (2/2)

Parámetros	Unidades	EA-5A				EA-6				EA-7A												
		Línea Base			ago-14	Línea Base			ago-14	Línea Base			ago-14									
		Promedio	Máximo	Mínimo	2475-0515	Promedio	Máximo	Mínimo	2451-0808	Promedio	Máximo	Mínimo	2449-0606									
Aluminio	µg/m ³	<0.33	<0.33	<0.33	0.699	0.31	0.45	<0.33	0.349	0.45	0.73	<0.33	N.D.									
Antimonio		<0.17	<0.17	<0.17	N.D.	<0.17	<0.17	<0.17	N.D.	<0.17	<0.17	<0.17	N.D.									
Arsénico		<0.1	<0.1	<0.1	N.D.	<0.10	<0.10	<0.10	N.D.	<0.10	<0.10	<0.10	N.D.									
Azufre		<0.42	<0.42	<0.42	1	3.02	4.73	1.3	0.487	2.28	4.35	<0.42	0									
Bario		<0.02	<0.02	<0.02	0.008	0.01	0.01	<0.02	0.008	0.01	0.01	<0.02	N.D.									
Berilio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.									
Bismuto		<0.1	<0.1	<0.1	N.D.	<0.10	<0.10	<0.10	N.D.	<0.10	<0.10	<0.10	N.D.									
Boro		<0.1	<0.1	<0.1	N.D.	<0.10	<0.10	<0.10	N.D.	<0.10	<0.10	<0.10	0.033									
Cadmio		<0.03	<0.03	<0.03	N.D.	<0.03	<0.03	<0.03	N.D.	<0.03	<0.03	<0.03	N.D.									
Calcio		1.03	1.03	1.03	0.828	0.79	1.5	<0.17	0.849	0.28	0.48	<0.17	1									
Cromo		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.									
Cobalto					N.D.				N.D.													
Cobre					N.D.				N.D.													
Estaño					N.D.				N.D.													
Estroncio					0.004				N.D.													
Fósforo					N.D.				0.121													
Hierro					0.18				0.18				0.18	0.757	0.38	0.45	0.3	0.403	0.31	0.58	<0.08	N.D.
Magnesio					<0.33				<0.33				<0.33	0.366	3.05	6.02	<0.17	0.233	0.23	0.38	<0.17	N.D.
Manganeso		<0.02	<0.02	<0.02	0.021	0.02	0.02	<0.02	0.012	0.02	0.03	<0.02	0.017									
Molibdeno		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.									
Níquel		<0.05	<0.05	<0.05	N.D.	0.25	0.48	<0.05	N.D.	0.04	0.05	<0.05	N.D.									
Plata		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.									
Plomo		<0.05	<0.05	<0.05	N.D.	<0.05	<0.05	<0.05	0.021	<0.05	<0.05	<0.05	N.D.									
Potasio		<0.5	<0.5	<0.5	N.D.	0.83	1.05	0.6	N.D.	0.8	1.43	<0.33	N.D.									
Selenio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.									
Silicio		<0.17	<0.17	<0.17	0.682	0.49	0.58	0.4	0.345	0.43	0.78	<0.17	0									
Sodio		<0.08	<0.08	<0.08	0.562	0.07	0.1	<0.08	0.503	1.27	2.5	<0.08	0.32									
Talio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.									
Titanio		<0.02	<0.02	<0.02	0.018	0.02	0.03	<0.02	0.011	0.02	0.03	<0.02	0.006									
Uranio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.									
Vanadio					N.D.				N.D.													
Zinc					N.D.				0.05													
Zirconio	<0.01				<0.01				<0.01				N.D.	0.01	0.01	<0.02	N.D.	<0.02	<0.02	<0.02	N.D.	

NR: no registrado. ND: no detectado. LD: límite de detección. µg/m³ = microgramos por metro cúbico. Fuente: MSR, 2014.

3.3 Partículas Sedimentables Totales (PST)

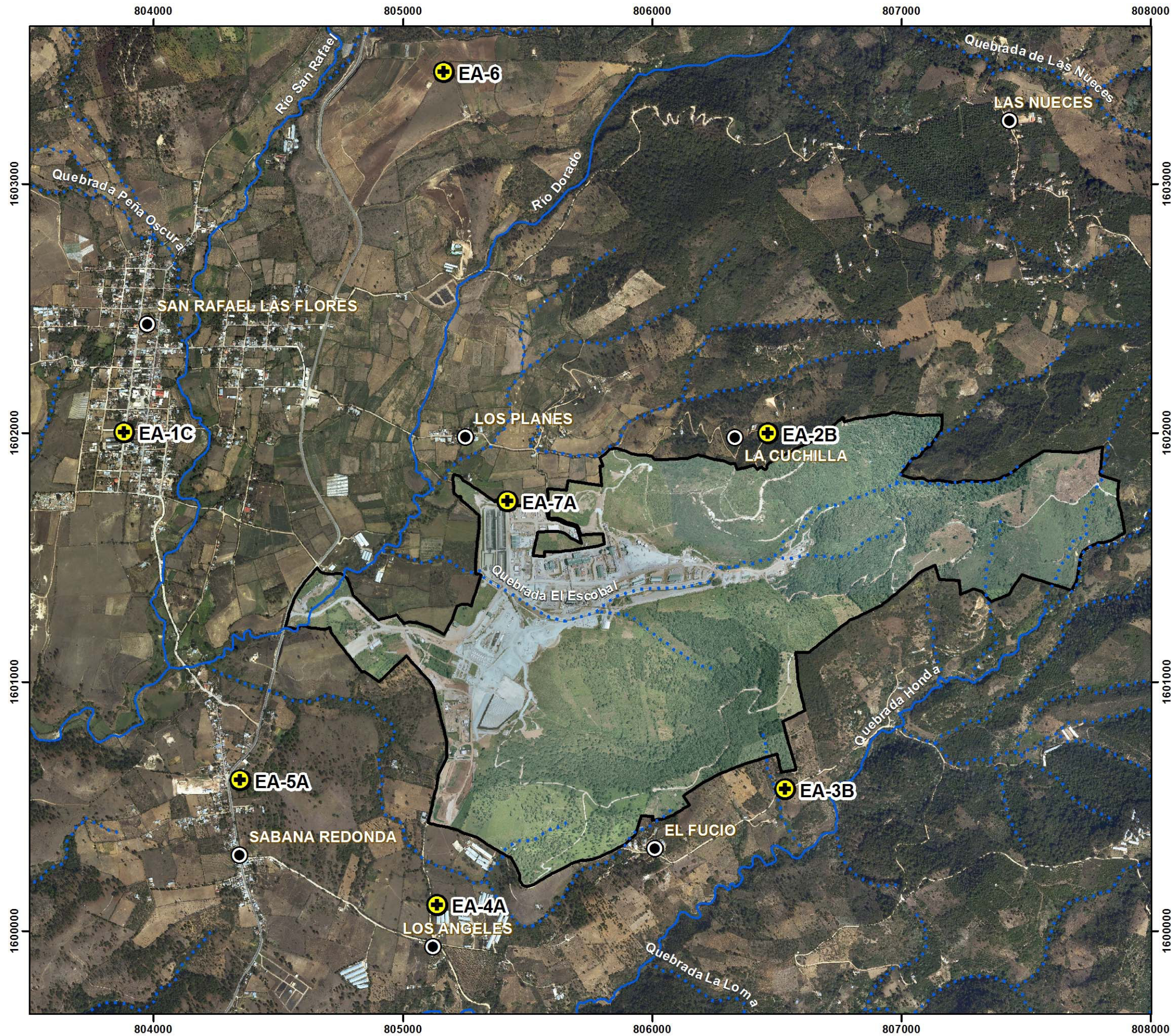
3.3.1 Sitios de Monitoreo

En el Cuadro 3-7 se enlistan las estaciones de monitoreo de PST ubicada en el área de influencia (AI) del Proyecto y su ubicación se presenta en la Figura 3-2.

Cuadro 3-7: Sitios de Monitoreo de PST, Proyecto Minero Escobal

Estación	Coordenadas		Altitud (msnm)	Sitio	Período Línea Base
EA-1C	803,887	1,601,801	1,337	Poblado San Rafael Las Flores, cercano a Escuela	No se cuenta con línea base
EA-2B	806,470	1,601,796	1,555	Aldea La Cuchilla	
EA-3B	806,538	1,600,367	1,427	Aldea El Fucío	
EA-4A	805,142	1,599,903	1,360	Caserío El Portón de los Ángeles	Diciembre 2010 a Mayo 2011
EA-5A*	804,352	1,600,408	1,339	Aldea Sabana Redonda, al sur-oeste del proyecto	No se cuenta con línea base
EA-6	805,168	1,603,247	1,434	Al norte del Proyecto, ruta a Mataquescuintla	
EA-7A	805,425	1,601,523	1,320	Noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción Aldea Los Planes	

*Se incluye como período de línea base de Agosto 2010 a Mayo 2011 la información registrada en la estación EA-5. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2014.



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE PARTICULAS SEDIMENTABLES
TOTALES

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO

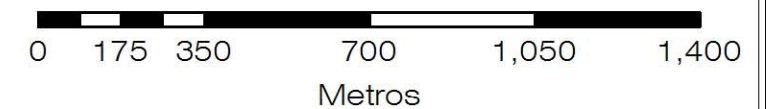
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN, Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013, datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000



3.3.2 Metodología

En el Cuadro 3-8 se describe el procedimiento, parámetros y equipo utilizados en la medición de PST.

Cuadro 3-8: Procedimiento y equipo utilizado para medición de PST, Proyecto Minero Escobal

Parámetros utilizados	
PST	Partículas Sedimentables Totales
Procedimiento	
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.	
Equipo utilizado	
Nombre	High Altitude Ambient Particulate Sampler
Modelo	Diseño establecido en norma ASTM D 1739-98
Fabricante	CTA

Fuente: MSR, 2014.

3.3.3 Resultados

En el Cuadro 3-9 se presentan los resultados de Partículas Sedimentables Totales (PST) realizado durante Septiembre 2014. El resumen del informe de resultados presentado por el contratista se presenta en el anexo 11.3.3.

Cuadro 3-9: Resultados de partículas sedimentables totales, Proyecto Minero Escobal

Parámetro	Norma	Guías	EA-1C	EA-2B	EA-3B	EA-4A			EA-5 ^a				EA-6	EA-7A	
	USEPA ¹	Banco Mundial ² OMS ³	Sep-14	Sep-14	Sep-14	Línea Base			Muestreo	Línea Base			Muestreo	Sep-14	Sep-14
						Promedio	Mínimo	Máximo	Sep-14	Promedio	Mínimo	Máximo	Sep-14		
	g/(m² x 30 días)														
Sólidos insolubles	ND	ND	1.41	1.88	2.41	6.27	2.60	10.80	4.06	6.50	0.80	16.00	1.10	0.86	1.47
Sólidos solubles			2.22	1.50	1.79	2.12	0.90	2.90	1.25	11.26	2.00	37.00	1.64	1.69	2.22
Sólidos totales			3.63	3.38	4.20	8.37	4.60	13.00	5.31	17.58	3.20	50.00	2.74	2.55	3.69

¹USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). ²Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. ³Guía de Calidad del Aire, OMS 2005. ND: estas normas y guías no establecen un límite para estos parámetros. g/(m² x 30 días)= gramos por metro cuadrado durante 30 días. ND: no determinado. Fuente: MSR, 2014.

Los valores de PST se encuentran entre 0.86 a 5.31 g/(m² x 30 días), los cuales corresponden a las estaciones EA-6 y EA-4A respectivamente. Todos los valores registrados se encuentran por debajo de los valores mínimos y máximos registrados durante el establecimiento de la línea base. Las estaciones EA-1C, EA-2B, EA-3B, EA-6 y EA-7A no cuentan con línea base.

3.4 Gases de Combustión (SO₂ y NO₂)

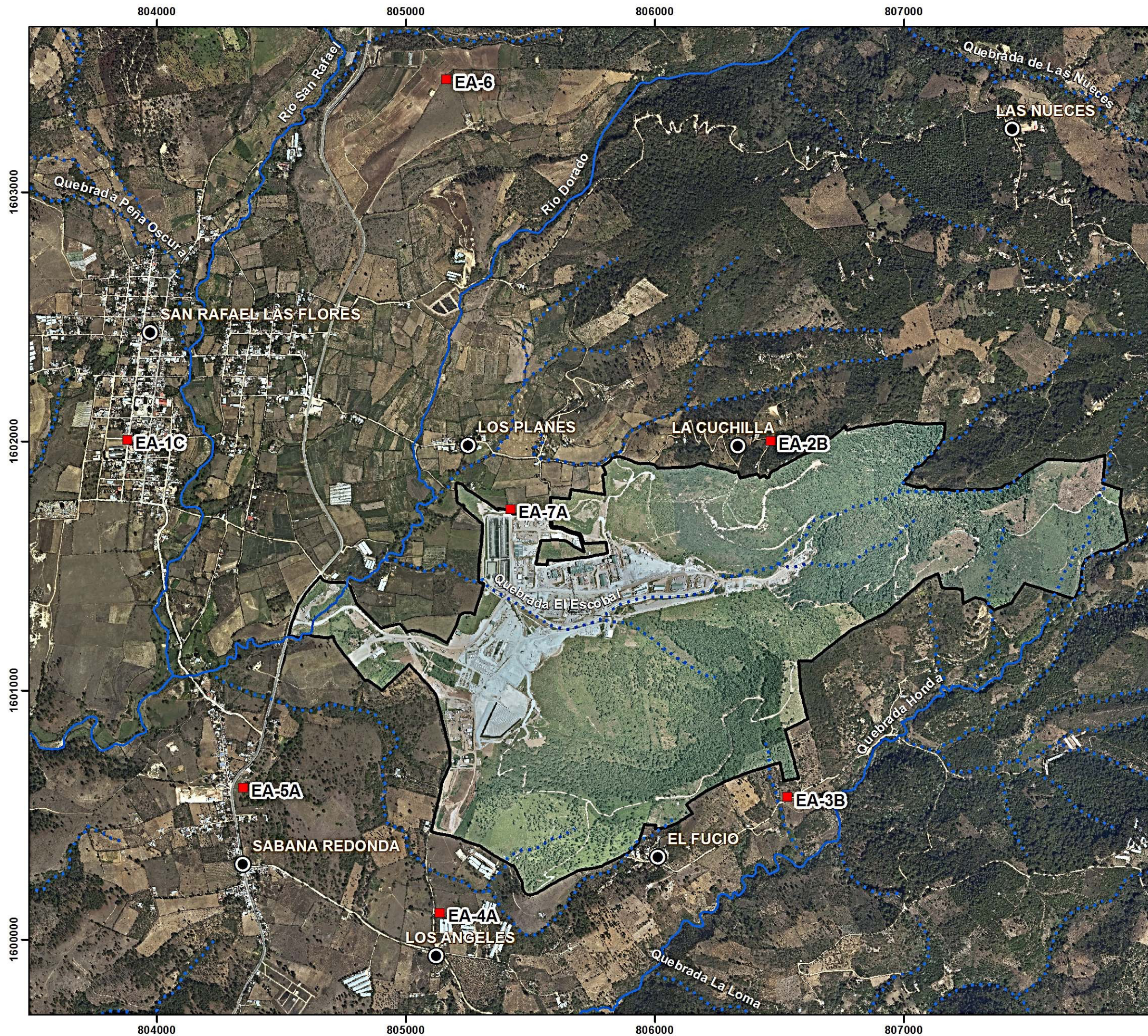
3.4.1 Sitios de Monitoreo

En el Cuadro 3-10 se enlistan las estaciones de monitoreo de dióxido de azufre (SO₂) y de dióxido de nitrógeno (NO₂) ubicada en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de SO₂ y NO₂ se presenta en la Figura 3-3.

Cuadro 3-10: Sitios de Monitoreo de SO₂ y NO₂, Proyecto Minero Escobal

Estación	Coordenadas		Altitud (msnm)	Sitio	Período Línea Base
EA-1C	803,887	1,601,801	1,337	Poblado San Rafael Las Flores, cercano a Escuela	No se cuenta con línea base.
EA-2B	806,470	1,601,796	1,555	Aldea La Cuchilla	
EA-3B	803,887	1,601,801	1,427	Aldea El Fucío	
EA-4A	805,142	1,599,903	1,360	Caserío El Portón de los Ángeles	
EA-5A*	804,352	1,600,408	1,339	Aldea Sabana Redonda, al sur-oeste del proyecto	
EA-6	805,168	1,603,247	1,434	Al norte del Proyecto, ruta a Mataquescuintla	
EA-7A*	805,425	1,601,523	1,320	Noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción Aldea Los Planes	

*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2014.



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE GASES DE COMBUSTIÓN

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO

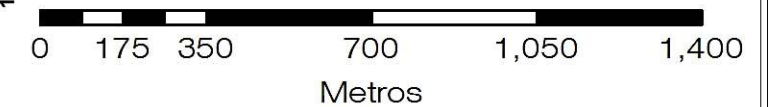
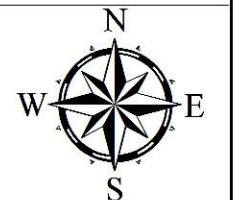
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000



3.4.2 Metodología

En el Cuadro 3-11 se describe el procedimiento, parámetros y equipo utilizados en la medición de gases de combustión.

Cuadro 3-11: Procedimiento y equipo utilizado para la medición de SO₂ y NO₂, Proyecto Minero Escobal

Parámetros utilizados	
SO ₂	Dióxido de azufre
NO ₂	Dióxido de nitrógeno
Procedimiento	
Los muestreos fueron realizados por personal de la empresa Consultoría y Tecnología Ambiental siguiendo las metodologías: SO₂ : Metodología descrita en el CFR, del título 40, parte 50, apéndice A de la USEPA. NO₂ : Metodología descrita en el método de referencia designado por la USEPA No. EQN-1277-026.	
Equipo utilizado	
Nombre	RAC3 Gas Sampler
Modelo	209063
Fabricante	Andersen Instrument's

Fuente: MSR, 2014.

3.4.3 Resultados

En el Cuadro 3-12 se presentan los resultados de las mediciones de SO₂ y NO₂ realizadas en siete estaciones de monitoreo de calidad de aire. El 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 SO₂ (<13µg/m³). Los valores de NO₂ se encontraron entre 10 µg/m³ (EA-1C, EA-3B) y 13 µg/m³ EA-5A y EA-7A. Todos los valores registrados de SO₂ y de NO₂ son menores a los valores guías establecidos por el Banco Mundial, la OMS, British Columbia y los valores norma establecidos por la USEPA. Lo que indica que las actividades realizadas durante el presente período, no han originado variaciones significativas en los parámetros reportados anteriormente.

Cuadro 3-12: Resultados de gases de combustión, Proyecto Minero Escobal

Parámetro	Norma*				EA-1C	EA-2B	EA-3B	EA-4A	EA-5A			EA-6	EA-7A				
	USEPA ¹	Banco Mundial ²	OMS ³	British Columbia ⁴					Línea base**				Muestreo	Línea base**			
					Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo							
					Sep-14	Sep-14	Sep-14	Sep-14				Sep-14	Sep-14				Sep-14
	(µg/m ³)																
SO ₂	370	20	20	160	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
NO ₂	100 [¥]	40 [¥]	40 [¥]	200	10	11	10	11	<9	<9	<9	13	11	<9	<9	<9	13

Nota: µg/m³ = microgramos por metro cúbico; SO₂= dióxido de azufre, NO₂= dióxido de nitrógeno. ¹USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). ²Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. ³Guía de Calidad del Aire, OMS 2005. ⁴Guías 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. **Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente. ¥ Este valor corresponde a la concentración promedio anual. Fuente: MSR, 2014.

3.5 Niveles de Presión Sonora

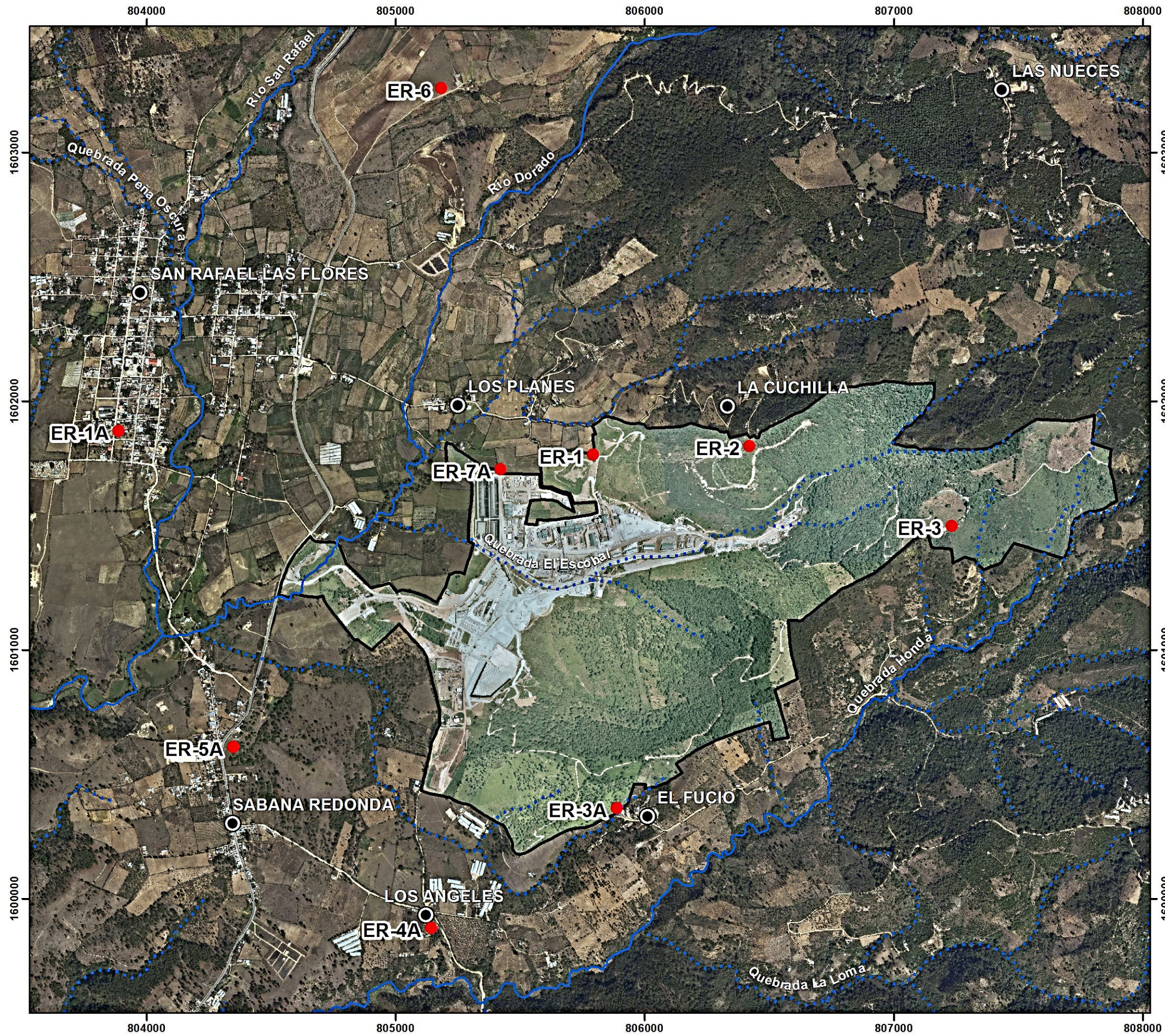
3.5.1 Sitios de Monitoreo

En el Cuadro 3-13 se enlistan las estaciones de monitoreo de presión sonora ubicados en el área de influencia (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. La ubicación de las estaciones de monitoreo de presión sonora se presenta en la Figura 3-4.

Cuadro 3-13: Sitios de Monitoreo de Presión Sonora, Proyecto Minero Escobal

Estación	Coordenadas		Altitud (msnm)	Sitio
Periodicidad de monitoreo mensual				
ER-1	805,797	1,601,582	1,417	Depósito de suelos, a inmediaciones de Aldea Los Planes
ER-2	806,427	1,601,605	1,564	Aldea La Cuchilla
ER-3	807,165	1,601,255	1,679	Área este del proyecto, a inmediaciones de Aldea El Fucío
ER-7A	805,425	1,601,523	1,320	Al noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción de Aldea Los Planes
Periodicidad de monitoreo trimestral				
ER-1A	803,891	1,601,678	1,328	Poblado San Rafael Las Flores, cercano a Escuela
ER-3A	805,892	1,600,161	1,416	Aldea El Fucío
ER-4A	805,146	1,599,680	1,360	Caserío El Portón de los Ángeles
ER-5A	804,352	1,600,408	1,339	Aldea Sabana Redonda, al sur-oeste del proyecto
ER-6	805,187	1,603,054	1,434	Al norte del Proyecto, ruta a Mataquescuintla

Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2014.



**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
NIVELES DE PRESIÓN SONORA**

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael S.A.

GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

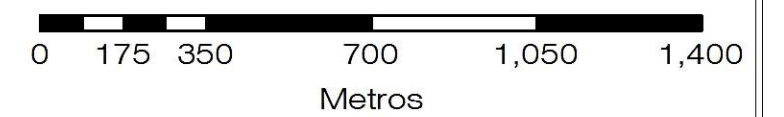
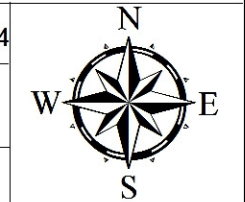
Símbolo	Estación	X	Y
	ER-1	805791	1601785
	ER-1A	803885	1601881
	ER-2	806419	1601819
	ER-3	807232	1601498
	ER-3A	805886	1600364
	ER-4A	805140	1599883
	ER-5A	804346	1600611
	ER-6	805181	1603257
	ER-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000



3.5.2 Metodología

En el Cuadro 3-14 se describe el procedimiento, parámetros y equipo utilizado en la medición de los niveles de presión sonora ubicados dentro del AI del Proyecto.

Cuadro 3-14: Procedimiento y equipo utilizado para medición de presión sonora, Proyecto Minero Escobal

Parámetros analizados	
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
Procedimiento	
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.	
Equipo utilizado	
Nombre	Sound Pro
Modelo	SE/DL
Fabricante	Quest Technologies, Inc.

Fuente: MSR, 2014.

3.5.3 Resultados

En el Cuadro 3-15 y en el

Cuadro 3-16 se presentan los valores registrados de los niveles de presión sonora (**NPS**) durante los meses de Agosto a Octubre 2014. Los informes generados por los equipos de medición se presentan en el anexo 11.3.4.

Los resultados obtenidos de NPS en las estaciones muestreadas respecto al parámetro Leq, están dentro del rango de 42.9 dBa y 54.9 dBa, los cuales corresponden a las estaciones ER-6 y ER-5A respectivamente.

La estación ER-3 presentó el menor promedio diurno (42.5 dBa) y nuevamente la estación ER-3 el menor promedio nocturno (41.5 dBa) de todas las mediciones efectuadas durante el monitoreo; mientras que la estación ER-5A presentó el

mayor promedio diurno (56.7 dBa) y el mayor promedio nocturno (54.6 dBa) se registró en la estación ER-2.

Las estaciones ER-1, ER-2, ER-3, ER-4A, ER-5A y presentaron valores de promedio diurno y nocturno dentro de los valores mínimos y máximos registrados en el establecimiento de la línea base, a excepción de las mediciones de Septiembre en promedio nocturno (51.8 dBa) en la estación ER-7A. Las estaciones ER-1A, ER-3A y ER-6 no cuentan con datos de línea base.

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Los promedios diurnos registrados durante los meses de Agosto a Octubre 2014 estuvieron por debajo de la guía establecida por la OMS y Banco Mundial para zonas residenciales; asimismo por debajo de la norma establecida por la USEPA. A excepción de ER-5A en Agosto. Los promedios nocturnos registrados estuvieron por debajo de la guía establecida por la OMS (50 dBa).

Ninguna de las estaciones monitoreadas presentó valores promedio diurno y nocturno superiores al valor de la guía para jornada diurna y nocturna del Banco Mundial para zonas industriales (70 dBa).

Cuadro 3-15: Resultados trimestrales de los niveles de presión sonora, Proyecto Minero Escobal

Parámetro	Norma*		Guías*		ER-1						ER-2					
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-14	Sep-14	Oct-14	Línea Base			Ago-14	Sep-14	Oct-14
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
			dBA													
Lmax					89.3	99.5	64.6	76.3	72.5	72	86.7	97.8	64.9	91.1	77.7	80.3
Lmin	NL	NL	NL	NL	32.5	37.7	27.0	33.3	39.5	39	35.2	42.8	26.5	46	43.9	49.4
Leq					49.9	57.1	41.2	47.2	48	46.5	49.4	58.7	39.7	54.4	54.1	54.6
PD	55	55	55	70	50.5	59.1	39.7	47.9	47.6	46.7	48.8	57.1	39.8	54.7	53.9	54.77
PN	55	50	45	70	47.6	55.7	39.3	45.9	48.7	46.3	46.6	54.5	37.9	54.1	54.5	54.56

Parámetro	Norma*		Guías*		ER-3						ER-7A					
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-14	Sep-14	Oct-14	Línea Base**			Ago-14	Sep-14	Oct-14
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
			dBA													
Lmax					87.4	100.7	67.2	74.5	42.1	79.6	87.5	89.0	82.1	93.2	71.6	89.1
Lmin	NL	NL	NL	NL	49.4	56.2	26.9	44	33.3	42.8	NR	NR	NR	44.4	45.1	38.9
Leq					56.8	63.2	39.7	48.2	42.1	46.5	52.8	54.5	50.9	49.3	52.2	51.4
PD	55	55	55	70	56.5	63.1	41.0	48.4	42.5	47.37	52.1	53.5	50.4	50.2	52.8	52.1
PN	55	50	45	70	57.2	64.0	34.1	48.1	41.5	44.74	49.7	50.9	48.8	48	51.8	50.3

*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. ¹USEPA, 2006. Normas nacionales de niveles de presión sonora. ²Guías sobre ruido comunitario, OMS 1999. ³Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. 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. ** Los valores de línea base corresponden a la estación ER-7. Fuente: MSR, 2014.

Cuadro 3-16: Resultados mensuales de los niveles de presión sonora, Proyecto Minero Escobal

Parámetro	Norma*		Guías*		ER-1A				ER-3A				ER-4A				
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-14	Línea Base			Ago-14	Línea Base			Ago-14	
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
			dBA														
Lmax								82.9					74.6	80.6	78.2	82.1	69.2
Lmin	NL	NL	NL	NL				34.6					45.5	NR	NR	NR	44.1
Leq					NR	NR	NR	51.1	NR	NR	NR		50	50.2	49.3	50.9	47.7
PD	55	55	55	70				51.6					50.4	49.5	48.4	50.4	48.1
PN	55	50	45	70				49.3					49.4	48.6	48.2	48.9	47.2

Parámetro	Norma*		Guías*		ER-5A				ER-6			
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-14	Línea Base			Ago-14
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
			dBA									
Lmax					91.6	85.1	92.2	80.6				65.3
Lmin	NL	NL	NL	NL	NR	NR	NR	44.1				33
Leq					65.8	51.6	67.6	54.9	NR	NR	NR	42.9
PD	55	55	55	70	61.2	50.2	63.8	56.7				42.7
PN	55	50	45	70	62.8	45.9	65.0	47.2				43.2

*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. ¹USEPA, 2006. Normas nacionales de niveles de presión sonora. ²Guías sobre ruido comunitario, OMS 1999. ³Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. 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. ** Los valores de línea base corresponden a la estación ER-7. Fuente: MSR, 2014

4 Calidad del Agua

4.1 Sitios de Monitoreo

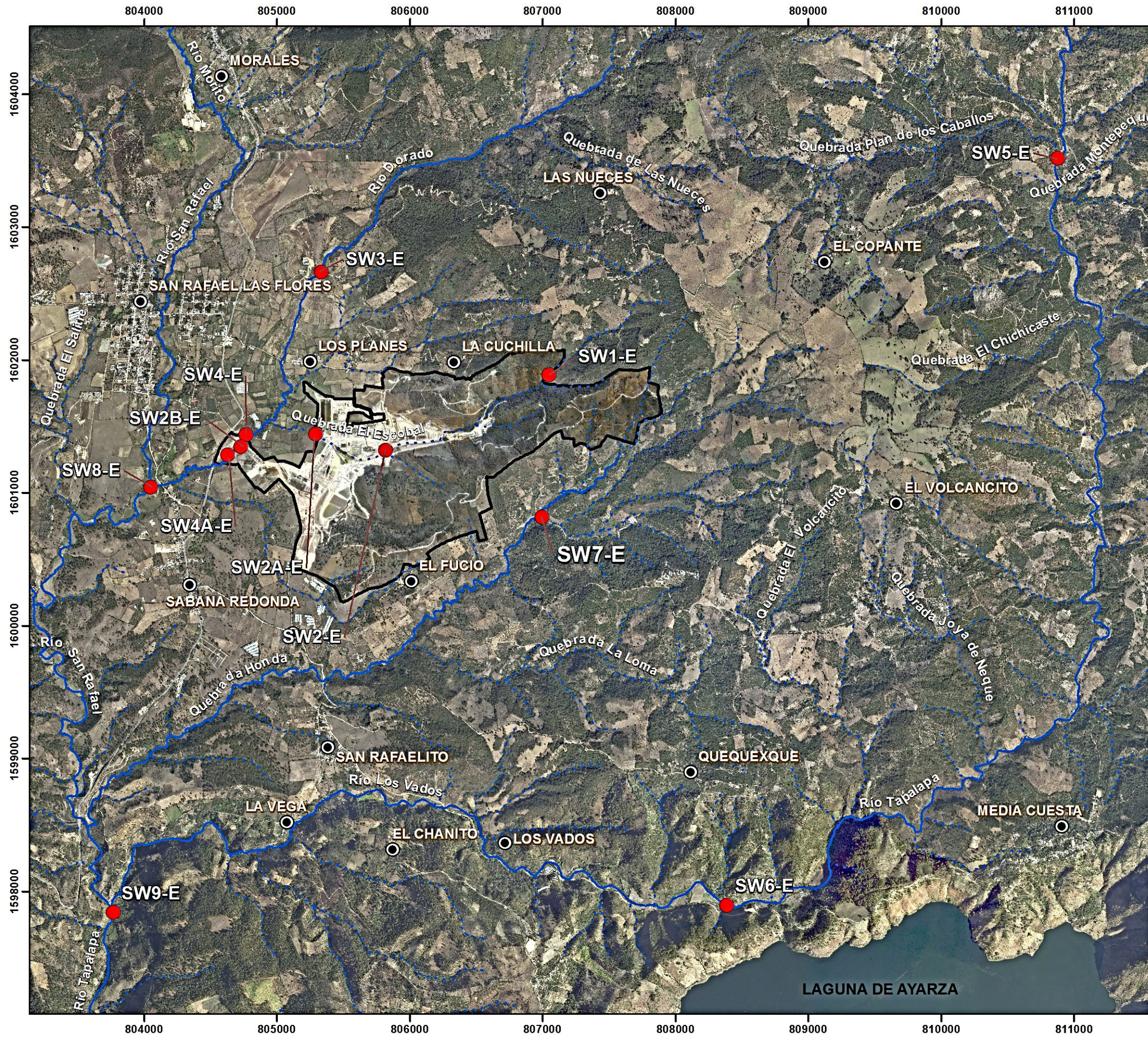
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua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

Cuadro 4-1: Sitios de Monitoreo de Calidad de Agua, Proyecto Minero Escobal

Estación	Coordenadas		Sitio	Período Línea Base
Agua Superficial				
SW-1	807,053	1,601,682	Quebrada El Escobal, aguas arriba	Junio 2008 a marzo 2011
SW-2	805,811	1,601,164	Quebrada El Escobal, en medio de la propiedad	Junio 2008 a septiembre 2010
SW-2A	805,295	1,601,230	Quebrada El Escobal, salida de la propiedad	No cuenta con línea base
SW-3	805,337	1,602,453	Río El Dorado, aguas arriba	Septiembre 2008 a marzo 2011
SW-4	804,781	1,601,228	Río El Dorado, aguas abajo	
SW-4A	804,629	1,601,052	Río El Dorado, por puente de acceso al Proyecto, 30mts aguas abajo SW-4	No cuenta con línea base
SW-5	810,882	1,603,313	Río Tapalapa	Septiembre 2008 a marzo 2011
SW-6	808,391	1,597,689	Río Los Vados	
SW-7	806,989	1,600,618	Quebrada La Honda	
SW-8	804,054	1,600,834	Unión Río San Rafael y El Dorado	Noviembre 2011 a Diciembre 2012
SW-9	803,772	1,597,635	Río Tapalapa, aguas abajo (cercano a la Ceibita)	
Agua Subterránea, Nacimientos				
GW-1A	808,670	1,599,754	Nacimiento de agua permanente, Aldea El Volcancito	Diciembre 2010 a marzo 2011
GW-2	807,515	1,601,059	Nacimiento de agua permanente, Aldea El Fucío	
GW-3	806,193	1,601,194	El Mora, zona central del proyecto (frente a portal Oeste)	
GW-4	805,992	1,600,533	Aguas arriba del depósito de colas y de GW5	Diciembre 2010
GW-5	805,962	1,600,525	Aguas arriba del depósito de colas	No cuenta con línea base
Agua Subterránea, Pozos de monitoreo				
MW-2	805,206	1,600,565	Sur-oeste del depósito de colas	Diciembre 2010 a marzo 2011
MW-3	805,153	1,600,790	Al oeste del depósito de colas	
MW-4	805,186	1,601,009	Al sur de montículos (acuífero somero)	
MW-5	805,304	1,601,277	Al oeste de taller, en el límite de la propiedad de MSR	
MW-6	805,457	1,601,454	Al norte de almacén general	Diciembre 2010 a

Estación	Coordenadas		Sitio	Período Línea Base
MW-7	805,796	1,601,582	Al oeste de depósito de suelos No. 1	marzo 2011
MW-8	805,304	1,601,277	Al oeste de taller, pozo de abastecimiento de oficinas temporales	Enero 2011 a marzo 2011
MW-9	805,198	1,601,019	Al sur de montículos (Acuífero profundo)	
MW-11	805,612	1,601,064	Al norte de zona de infiltración quebrada Escobal	Marzo 2011
RW-1	804,809	1,600,972	Pozo artesanal ubicado en Finca Suandys	No cuenta con línea base
Agua Subterránea, pozo de producción				
PSA-SR	803,678	1,602,044	Pozo mecánico ubicado en las piscinas de San Rafael las Flores	Marzo 2011
PSA-1	805,212	1,601,203	Pozo mecánico ubicado a un costado de la guardería	No cuenta con línea base
Agua de grifo				
HW-1	803,888	1,601,977	Agua de grifo, casa poblado San Rafael las Flores, cercano a Escuelita	No cuenta con línea base

Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2014.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO AGUA SUPERFICIAL

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.

GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

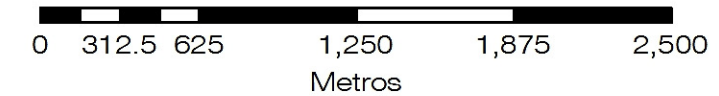
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW7-E	806995	1600815
	SW8-E	804048	1601037
SW9-E	803766	1597838	

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013,
datos de campo del departamento de Ambiente.

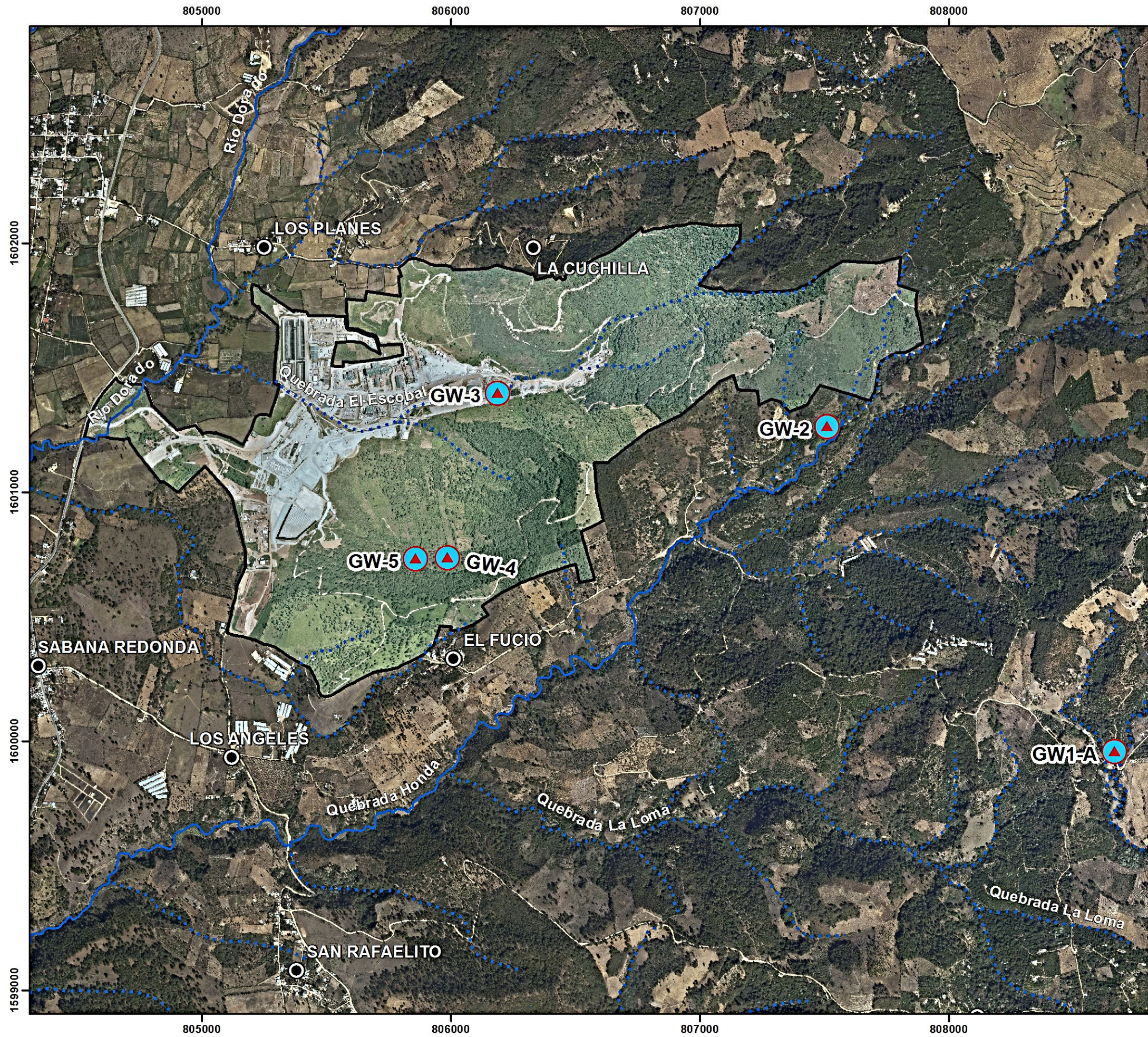
Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical de Grilla: 1,000 metros

Escala 1:30,000



LAGUNA DE AYARZA



**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
CALIDAD DE AGUA SUBTERRÁNEA**

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO (POZOS)

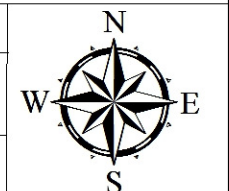
Símbolo	Estación	X	Y
	GW-1A	808664	1599957
	GW-2	807509	1601262
	GW-3	806187	1601397
	GW-4	805986	1600736
	GW-5	805858	1600731

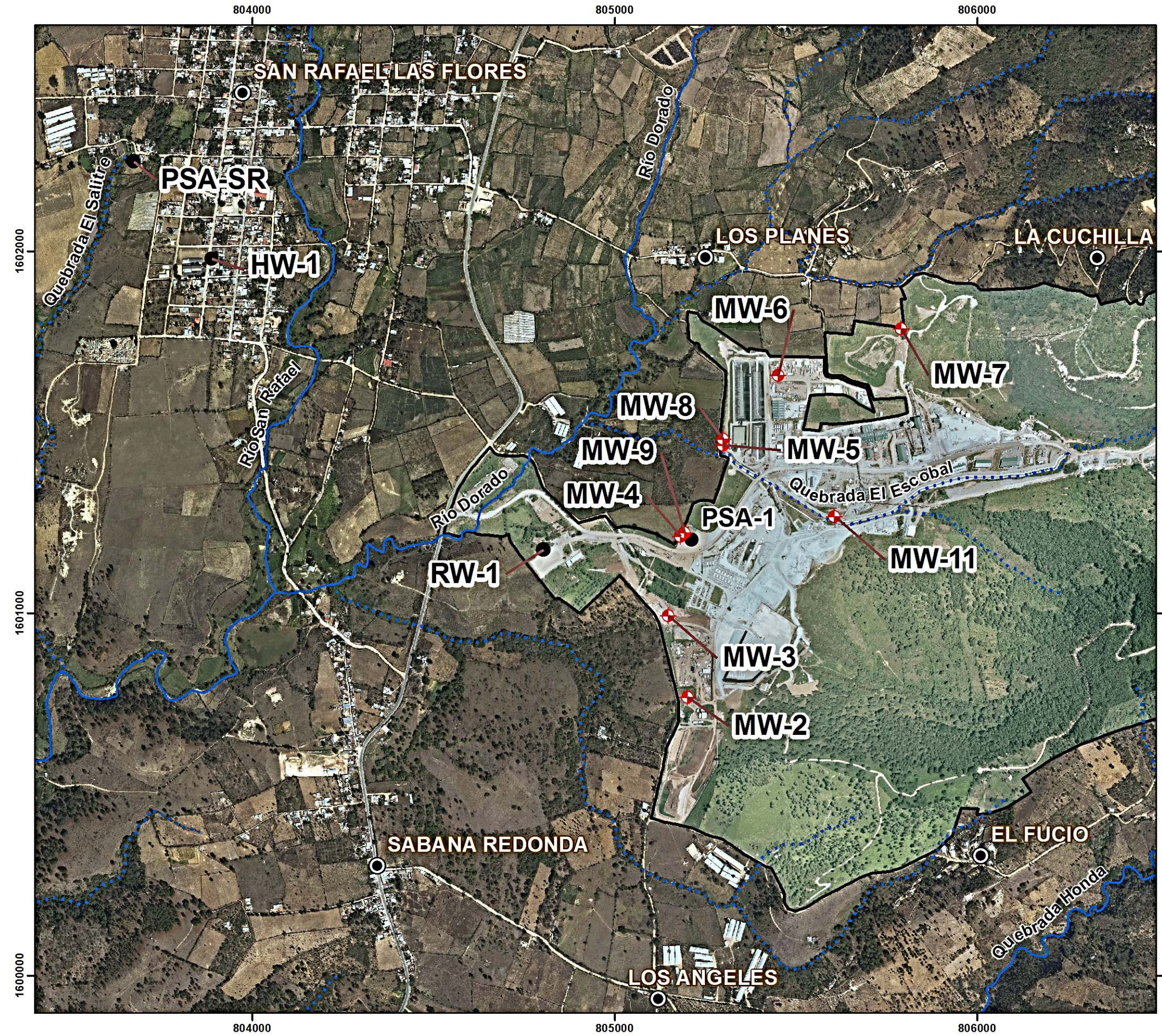
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000, Hojas catográficas año 2010 Mataquesuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN, Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013, datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000





MAPA DE LOCALIZACIÓN ESTACIONES (POZOS) DE MONITOREO Y REFERENCIA

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE
Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO (POZOS)

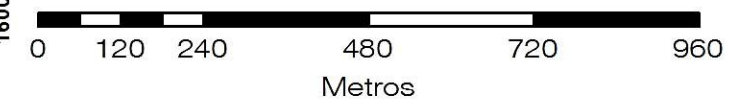
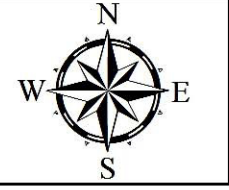
Símbolo	Estación	X	Y	
	MW-2	805201	1600768	
	MW-3	805148	1600993	
	MW-4	805181	1601212	
	MW-5	805299	1601463	
	MW-6	805452	1601657	
	MW-7	805791	1601785	
	MW-8	805298	1601480	
	MW-9	805192	1601222	
	MW-11	805607	1601267	
		RW-1	804803	1601175
		PSA-SR	803672	1602247
HW-1		803888	1601977	
PSA-1		805212	1601203	

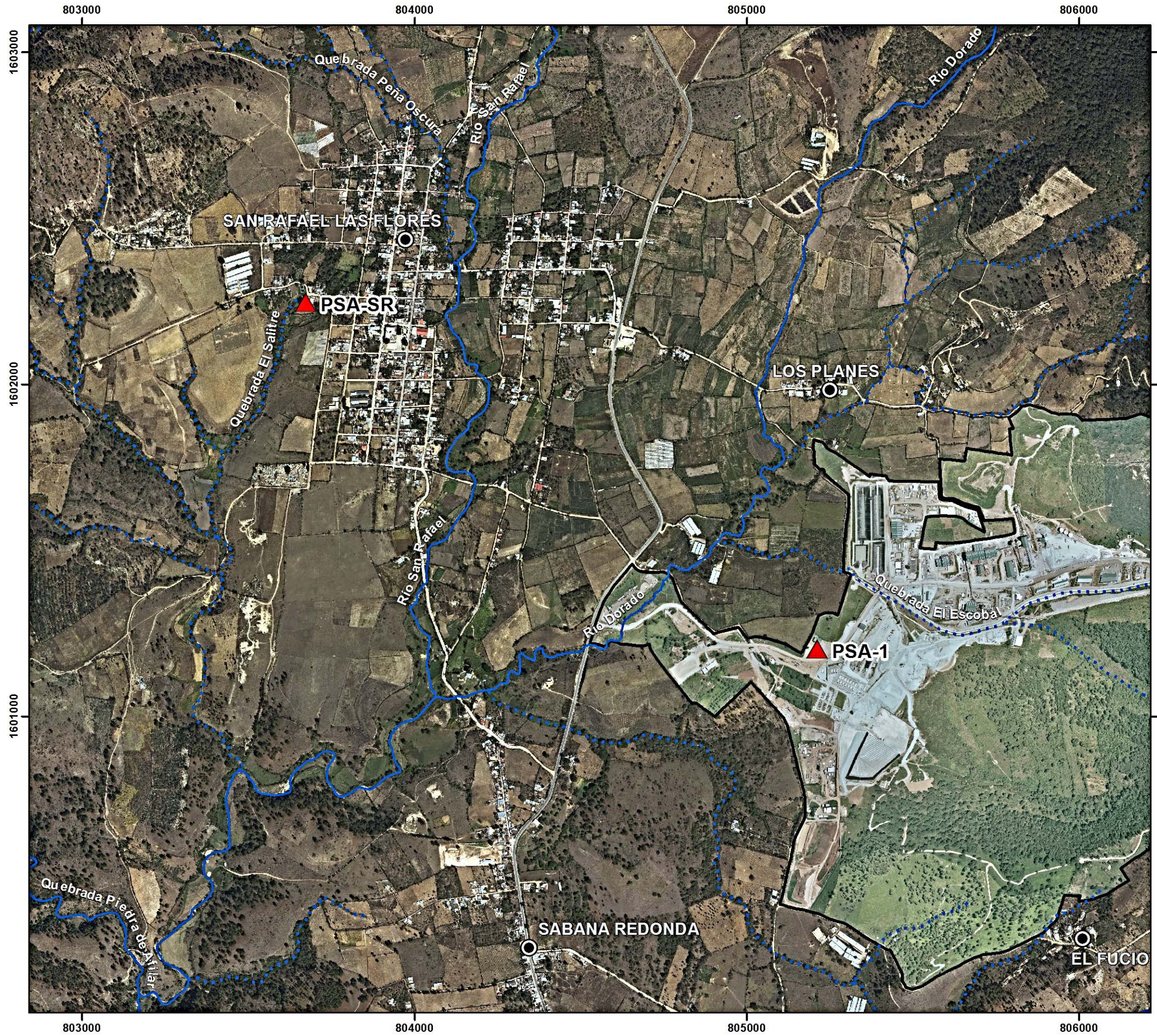
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:11,000





MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO POZOS DE SUMINISTRO

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

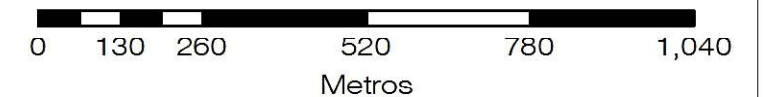
Símbolo	Estación	X	Y
	PSA-1	805212	1601203
	PSA-SR	803672	1602247

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:12,000



4.2 Metodología

En el Cuadro 4-2 se describe el procedimiento y equipo utilizado para la toma de muestras de agua.

Cuadro 4-2: Procedimiento y equipo utilizado para medir parámetros *in situ* de muestras de agua, Proyecto Minero Escobal

Parámetros analizados	
<i>In Situ</i>	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 de agua superficial (SW) y agua subterránea (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

Fuente: MSR, 2014.

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 Octubre 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 4-3.

En las tres muestras del control de calidad de los blancos de campo, se detectaron concentraciones mínimas de calcio disuelto (SW10) y nitrógeno Kjeldahl (SW10). Sin embargo las concentraciones detectadas están muy cerca a los límites de detección del método, por lo que 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 4-3: Resultados de control de calidad, blanco y duplicado, para análisis de agua superficial y subterránea

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Cr VI	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO		<10	N/A	N/A	<10	<10	N/A	N/A	N/A	N/A
Coliformes Fecales	NMP/100 ml	<2	<2	<2	2.4 x 10 ³	2.4 x 10 ³	<2	<2	<2	4.5
Color Aparente	U Pt/Co	<1	<1	<1	3	<1	<1	<1	276	264
Color Real	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	13	22
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03
Aluminio Total		<0.03	NA	NA	0.12	0.12	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0073	0.0068	<0.0004	<0.0004	<0.0004	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0067	0.0068	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.007	0.0068	0.0019	0.0018	0.0017	0.0017
Arsénico Total		<0.0002	NA	NA	0.0075	0.0074	NA			
Bario Disuelto		<0.003	<0.003	<0.003	0.069	0.069	0.151	0.151	0.058	0.061
Bario Total		<0.003	NA	NA	0.074	0.073	NA			
Berilio Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total		<0.01	NA	NA	<0.01	<0.01	NA			
Bismuto Disuelto		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Bismuto Total		<0.04	NA	NA	<0.04	<0.04	NA			
Boro Disuelto		<0.01	<0.01	<0.01	0.05	0.05	<0.01	<0.01	0.04	0.03
Boro Total		<0.01	NA	NA	0.07	0.06	NA			
Cadmio Disuelto		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		<0.0001	NA	NA	<0.0001	0.0001	NA			
Calcio Disuelto		0.3	0.1	0.2	315	314	94.9	95.3	54.7	54.2
Calcio Total		0.1	NA	NA	319	316	NA			
Cromo Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total		<0.01	NA	NA	<0.01	<0.01	NA			
Cobalto Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Total		<0.01	NA	NA	<0.01	<0.01	NA			
Cobre Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total		<0.01	NA	NA	<0.01	<0.01	NA			
Galio Disuelto		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Galio Total		<0.1	NA	NA	<0.1	<0.1	NA			
Hierro Disuelto		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	11.5	11.5
Hierro Total		<0.02	NA	NA	0.08	0.08	NA			
Plomo Disuelto		<0.0001	<0.0001	<0.0001	0.0003	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Plomo Total		<0.0001	NA	NA	0.0025	0.0023	NA			
Litio Disuelto	<0.008	<0.008	<0.008	0.06	0.059	<0.008	<0.008	0.015	0.017	

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Litio Total	mg/L	<0.008	NA	NA	0.065	0.064	NA			
Magnesio Disuelto		<0.2	<0.2	<0.2	18.5	18.5	21.3	21.4	9.3	9.3
Magnesio Total		0.2	NA	NA	19.3	19.2	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.155	0.152	0.159	0.168	0.162	0.166
Manganeso Total		<0.005	NA	NA	0.171	0.17	NA			
Mercurio Disuelto		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total		<0.0002	NA	NA	<0.0002	<0.0002	NA			
Molibdeno Disuelto		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Molibdeno Total		<0.02	NA	NA	<0.02	0.02	NA			
Níquel Disuelto		<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Níquel Total		<0.008	NA	NA	<0.008	<0.008	NA			
Potasio Disuelto		<0.2	<0.2	<0.2	8.9	8.8	10.1	10.1	4.1	4.3
Potasio Total		<0.2	NA	NA	9	8.9	NA			
Escandio Disuelto		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Escandio Total		<0.1	NA	NA	<0.1	<0.1	NA			
Selenio Disuelto		<0.0001	<0.0001	<0.0001	0.0007	0.0007	0.0002	0.0003	<0.0001	<0.001
Selenio Total		<0.0001	NA	NA	0.0006	0.0006	NA			
Plata Disuelta		<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<0.00005	<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵
Plata Total		<0.00005	NA	NA	0.00008	0.00011	NA			
Sodio Disuelto		<0.2	<0.2	<0.2	52.9	52.5	24.9	24.9	26.8	26.8
Sodio Total		<0.2	NA	NA	53.3	52.7	NA			
Estroncio Disuelto		<0.005	<0.005	<0.005	3.38	3.41	0.514	0.513	0.401	0.408
Estroncio Total		<0.005	NA	NA	3.45	3.41	NA			
Talio Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Talio Total		<0.0001	NA	NA	0.0001	0.0002	NA			
Estaño Disuelto		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Estaño Total		<0.04	NA	NA	<0.04	<0.04	NA			
Titanio Disuelto		<0.005	<0.005	<0.005	<0.005	<0.005	0.008	0.009	<0.005	0.005
Titanio Total		<0.005	NA	NA	0.02	0.02	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	0.0003	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Uranio Total		<0.0001	NA	NA	0.0003	0.0004	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadio Total		<0.005	NA	NA	<0.005	<0.005	NA			
Zinc Disuelto		<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc Total		<0.01	NA		<0.01	<0.01	NA			
Grasas y Aceites		<2	NA		<2	<2	NA			
DQO		<10	NA		<10	<10	NA			
Cloruros		<0.5	<0.5	<0.5	39.3	39.1	11.9	12.5	9.3	10.2
Cianuro Total		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoruros		<0.05	<0.05	<0.05	0.89	0.88	0.27	0.28	0.63	0.61
Nitratos/Nitritos como N	<0.02	<0.02	<0.02	2.04	2.04	3.92	3.87	<0.02	<0.02	
Amonio	<0.05	<0.05	<0.05	0.24	0.28	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)	0.1	<0.1	<0.1	0.6	0.5	<0.1	<0.1	<0.1	<0.1	
Fosfatos	<0.03	<0.03	<0.03	0.06	0.03	0.06	0.06	0.25	0.25	
Fósforo Disuelto (Orto)	<0.01	0.03	<0.01	0.01	0.01	0.03	0.03	0.02	0.03	
Fósforo Total	0.02	<0.01	<0.01	0.02	0.02	0.02	0.01	0.20	0.2	
STD (TDS)	<10	<10	<10	1360	1370	620	620	350	350	
SST (TSS)	<5	<5	<5	8	<5	<5	<5	27	25	
ST (TS)	<10	<10	<10	1410	1420	640	640	390	390	

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Sulfatos	mg/L	<1	<1	<1	806	778	255	262	88.3	93.1
Alcalinidad Total		<2	<2	<2	73.6	81.7	77.7	86.9	138	130
Hidrocarburos totales (TPH)		<0.1	NA		<0.1	<0.1	NA			

u.e.: unidades exponenciales. mg/L: miligramos por litro. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. Fuente: MSR, 2014.

4.3.2 Agua Superficial

En el Cuadro 4-4 se presentan los resultados de la calidad del agua superficial para el mes de Septiembre 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.

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

Las estaciones muestreadas presentaron un pH levemente alcalino (6.04 a 8.17 u.e.). En ninguna de las estaciones se detectaron valores de grasas y aceites, cianuro total cumpliendo con las guías establecidas por la USEPA para la salud humana, el Banco Mundial y el Acuerdo Gubernativo 236-2006 (**Acuerdo**) para aguas residuales. La Demanda Química de Oxígeno (**DQO**) se detectó en todas las estaciones en concentraciones entre <10-180 mg/L, y no sobrepasaron el valor guía establecido por el Banco Mundial (125 mg/L), a excepción de lo registrado en SW6. En ninguna estación se detectó concentración alguna de Demanda Bioquímica de Oxígeno (**DBO**).

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 valores establecidos por el Acuerdo para Fósforo total (10 mg/L) y el Banco Mundial (2 mg/L).

En nueve de las once estaciones se detectó sólidos suspendidos encontrándose por debajo de los valores establecidos por el Acuerdo (100 mg/L), por el Banco Mundial (50 mg/L) y dentro de los valores establecidos durante el levantamiento de línea base, a excepción de la estación SW-6E, SW8-E y SW9-E.

Los Sulfatos Totales y los Sólidos Disueltos Totales (**TDS**) fueron detectados en la mayoría de las estaciones en concentraciones por debajo de los valores máximos establecidos durante la línea base, SE3-E y SW4-E.

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. El Aluminio fue detectado en todas las estaciones en diferentes concentraciones. Sin embargo los datos se encuentran dentro de los límites establecidos durante el levantamiento de la línea base, a excepción de las estaciones SW6-E, SW8-E y SW9-E. El Antimonio fue detectado en ocho estaciones, excepto en SW5 y SW1 y se detectó en un rango de concentración de 0.0004 – 0.0038 mg/L, por debajo de los límites máximos establecidos durante la línea base.

Las concentraciones de Arsénico Total se encuentran por debajo de los límites establecidos por el Acuerdo (0.1 mg/L). Respecto de las directrices de la USEPA (0.01mg/L) todas las estaciones se encontraron por debajo del valor guía. En ninguna estación de monitoreo de agua superficial fue detectado el Mercurio y Cianuro Total. Y en todas las estaciones fue detectado el Plomo Total, registrándose todas las concentraciones por debajo de los valores guía sugeridos por la USEPA (0.015 mg/L) y el Acuerdo (0.4 mg/L).

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, 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-14	Línea Base			Sep-14	Línea Base			Sep-14
					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	7.509	7.14	8.06	8.16	7.42	6.56	7.87	6.04				8.17
Temperatura (campo)	°C				17.4	13	19.8	17.5	22.4	20.3	25.6	28.1				28.2
Conductividad (campo)	µS/cm				277.9	66.3	566.6	171.0	807.3	177.3	1965	1080				1623
Oxígeno disuelto (campo)					3.6	0.1	6.4	7.72	4.76	3.5	5.8	7.48				7.01
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							940				700				2.4 x 10 ³
Color Aparente	U Pt/Co				NR	NR	NR	104	NR	NR	NR	23				<1
Color Real								12				<1				<1
Turbidez	NTU							20.0				2.71				7.58
Aluminio Disuelto					0.035	<0.03	0.09	0.06	0.043	<0.03	0.12	0.07				<0.03
Aluminio Total		0.2			5.02	<0.03	35.1	2.24	2.35	0.06	8.77	0.16				0.12
Antimonio Disuelto					<0.0004	<0.0004	0.0006	<0.0004	<0.0004	<0.0004	<0.0004	0.0008				0.0068
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	<0.0004	<0.0004	<0.0004	0.0005	0.001				0.0068
Arsénico Disuelto					0.00216	0.0005	0.0034	0.0013	0.00184	0.0013	0.0024	0.006				0.0068
Arsénico Total		0.01		0.1	0.00339	0.0015	0.0094	0.002	0.00266	0.0012	0.0054	0.0071				0.0074
Bario Disuelto					0.1361	0.086	0.207	0.077	0.109	0.088	0.133	0.053				0.069
Bario Total		1			0.186	0.1	0.434	0.097	0.131	0.096	0.186	0.057				0.073
Berilio Disuelto					<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01				<0.01
Berilio Total		0.004			<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01				<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	0.04	<0.04	<0.04	0.05	0.06				<0.04
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.08	<0.04				<0.04
Boro Disuelto					<0.01	<0.01	<0.01	<0.01	0.114	<0.01	0.29	0.04				0.05
Boro Total					<0.01	<0.01	0.02	0.02	0.11	<0.01	0.28	0.04				0.06
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001
Cadmio Total		0.003		0.1	<0.0001	<0.0001	0.0007	0.0001	<0.0001	<0.0001	0.0001	<0.0001				0.0001
Calcio Disuelto					45.2	18.9	74.5	21	144.9	20.7	333	199				314
Calcio Total					45.5	20.9	70.5	21.7	144.6	20.5	331	207				316
Cromo Disuelto					<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01				<0.01
Cromo Total		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobalto Disuelto					<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobalto Total					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Total		1.3		3	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Hierro Disuelto					<0.02	<0.02	0.04	0.02	0.04	<0.02	0.12	0.02				<0.02
Hierro Total		0.3			2.7	<0.02	19.5	0.82	1.3	0.06	5.19	0.4				0.08
Plomo Disuelto					<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001	<0.0001				0.0002
Plomo Total		0.015		0.4	0.0025	<0.0001	0.0191	0.0006	0.00088	<0.0001	0.0038	0.002				0.0023
Litio Disuelto					<0.02	<0.02	<0.02	0.011	<0.02	<0.02	<0.02	0.037				0.059
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.035				0.064
Magnesio Disuelto					3.9	2.6	5.3	2.7	15.9	3.2	37.3	14.4				18.5
Magnesio Total					4.2	2.8	5.2	2.9	15.1	3.6	32.2	14.8				19.2
Manganeso Disuelto					0.0051	<0.005	0.02	0.008	0.0195	<0.005	0.07	0.106				0.152
Manganeso Total		0.4			0.1041	<0.005	0.721	0.024	0.0602	0.007	0.174	0.125				0.17
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002

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-14	Línea Base			Sep-14	Línea Base			Sep-14	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02				<0.02	
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02				0.02	
Níquel Disuelto					<0.01	<0.01	0.03	<0.008	0.013	<0.01	0.04	<0.008				<0.008	
Níquel Total		0.61		2	<0.01	<0.01	0.04	<0.008	0.022	<0.01	0.04	<0.008				<0.008	
Potasio Disuelto					4.4	3.5	5.1	3.9	6.1	4.9	7.6	4.9				8.8	
Potasio Total					5.3	3.5	13	4.3	6.3	5.2	7.4	5.2				8.9	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00045	<0.0001	0.0002	0.0001				0.0007	
Selenio Total		0.17			0.0001	<0.0001	0.0003	0.0001	0.00011	<0.0001	0.0002	0.0001				0.0006	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005	
Plata Total					<0.00005	<0.00005	0.00015	<0.00005	<0.00005	<0.00005	0.00006	0.00005				0.00011	
Sodio Disuelto					9.81	8.3	11.6	7.7	40.1	9.4	87.8	29.9				52.5	
Sodio Total					9.46	7.8	11.8	8.1	39.8	9.4	85.2	31.9				52.7	
Estroncio Disuelto					0.17	0.09	0.26	0.106	1.23	0.1	2.99	2.13				3.41	
Estroncio Total					0.18	0.1	0.25	0.111	1.23	0.11	2.91	2.22				3.41	
Talio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	0.0001	<0.0001				0.0001	
Talio Total		0.002			<0.0001	<0.0001	0.0004	0.0001	0.0001	<0.0001	0.0002	<0.0001				0.0002	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.008				<0.005	
Titanio Total					0.092	<0.005	0.591	0.052	0.2715	<0.005	0.171	0.008				0.02	
Uranio Disuelto					0.00013	<0.0001	0.0003	<0.0001	0.00028	<0.0001	0.0006	0.0002		NR	NR	NR	0.0003
Uranio Total					0.00038	<0.0001	0.0011	0.0002	0.00024	<0.0001	0.0005	0.0002				0.0004	
Vanadio Disuelto					<0.005	<0.005	0.007	0.007	0.0065	<0.005	0.015	0.007				<0.005	
Vanadio Total					0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	<0.005				<0.005	
Zinc Disuelto					0.053	<0.01	0.1	<0.01	0.046	<0.02	0.1	0.01				<0.01	
Zinc Total		7.4		10	0.064	<0.01	0.12	<0.01	0.041	<0.01	0.06	0.02				<0.01	
Grasas y Aceites				10	<2.062	<2.062	<2.248	<2.02	<2.04	<2.04	<2.04	<2				<2	
DQO				125	15.7	<10	40	<10	<2.04	<2.04	<2.04	12				2.6	
Cloruros		250			5	4	7	5	<2.04	<2.04	<2.04	19.6				39.1	
Cianuro Total		0.14		1	0.004	<0.003	0.015	<0.0003	<0.003	<0.003	<0.003	<0.003				<0.003	
Fluoruros		4			0.125	<0.1	0.2	0.12	0.6	0.1	1.2	0.52				0.88	
Nitratos/Nitritos como N				1.61	0.08	4.87	1.85	2.46	0.03	4.9	0.74				2.04		
Amonio				<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	<0.05				0.28		
Nitrógeno Kjeldahl (TKN)				3.53	<0.1	25.9	0.4	0.32	<0.1	0.8	0.2				0.5		
Fosfatos				0.185	0.1	0.3	0.09	0.19	0.1	0.4	0.03				0.03		
Fósforo Disuelto (Orto)				0.06	0.03	0.1	0.05	0.06	0.02	0.13	0.01				0.01		
Fósforo Total		2	10	0.37	0.04	2.51	0.05	0.08	0.03	0.19	0.02				0.02		
STD (TDS)	500			225	170	280	160	754	170	1620	860				1370		
SST (TSS)		50	100	163.6	<5	780	20	67	<5	320	12				<5		
ST (TS)				346.3	200	1080	200	850	230	1660	930				1420		
Sulfatos	250			26.3	10	42	16.0	472.6	14	1600	433				778		
Alcalinidad Total				104	38	161	58	80	44	119	90.2				81.7		
Hidrocarburos totales (TPH)				<0.1	<0.09	<0.1	<0.1	<0.1	<0.09	<0.1	<0.1				<0.1		

Dónde: **u.e.:** unidades exponenciales; **mg/L:** miligramos por litro; **µS/cm:** micro siemens 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: MSR, 2014.

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, 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-14	Línea Base			Sep-14	Línea Base			Sep-14
					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	7.6	7.4	6.56	7.94	7.67				7.81
Temperatura (campo)	°C				19.8	17	24	19.9	21	17.2	24	21.5				24.9
Conductividad (campo)	µS/cm				219.7	80	374.5	165.2	308.9	120	612	1054				842
Oxígeno disuelto (campo)					3.8	0.1	6.8	7.67	4.2	0.1	7.5	7.32				7.02
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							5.4 x 10 ³				4.9 x 10 ³				1.4 x 10 ⁴
Color Aparente	U Pt/Co				NR	NR	NR	269	NR	NR	NR	29				153
Color Real								29				<1				<1
Turbidez	NTU							51.9				7.90				7.90
Aluminio Disuelto					0.061	<0.03	0.15	<0.03	0.03	<0.03	0.1	0.08				<0.03
Aluminio Total		0.2			3.25	<0.03	17.4	5.14	5.72	0.1	36	0.71				3.1
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0037				0.0027
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	0.0004	0.0012	0.0005	0.0037	0.0038				0.0025
Arsénico Disuelto					0.00797	0.0041	0.0139	0.0102	0.00541	0.0039	0.0072	0.0079				0.0081
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0125	0.00873	0.0043	0.0326	0.0079				0.0096
Bario Disuelto					0.0915	0.051	0.118	0.068	0.1645	0.08	0.234	0.114				0.11
Bario Total		1			0.12445455	0.098	0.253	0.12	0.2356	0.144	0.567	0.116				0.133
Berilio Disuelto					<0.002	<0.0002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01				<0.01
Berilio Total		0.004			<0.002	<0.0002	<0.01	<0.01	0.002	<0.002	0.003	<0.01				<0.01
Bismuto Disuelto					<0.01	<0.01	<0.04	<0.04	0.04	<0.04	0.1	<0.04				<0.04
Bismuto Total					<0.01	<0.01	<0.04	<0.04	0.04	<0.04	0.04	<0.04				<0.04
Boro Disuelto					<0.01	<0.01	0.02	<0.01	0.008	<0.01	0.02	0.04				0.02
Boro Total					<0.01	<0.01	0.02	0.02	0.012	<0.01	0.02	0.04				0.04
Cadmio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001
Cadmio Total		0.003		0.1	<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0005	<0.0001				0.0001
Calcio Disuelto					27.8	11.7	39.9	21	37.4	18.5	61.7	185				142
Calcio Total					27.9272727	12.3	38.7	21.4	38.3	17.2	58.9	182				143
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01				<0.01
Cromo Total		0.1		0.1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01				<0.01
Cobalto Disuelto					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobalto Total					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobre Disuelto					<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Total		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Hierro Disuelto					0.033	<0.02	0.06	<0.02	0.032	<0.02	0.15	0.03				<0.02
Hierro Total		0.3			1.9	0.06	10.2	2.28	3.8	0.09	26.5	0.41				1.43
Plomo Disuelto					<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	0.0002	<0.0001				<0.0001
Plomo Total		0.015		0.4	0.0013	<0.0001	0.0072	0.0018	0.003	<0.0001	0.0198	0.0016				0.0029
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.037				0.021
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.033				0.024
Magnesio Disuelto					2.6	1.3	3.5	2	4.2	2.4	7.3	12.6				9.9
Magnesio Total					2.7	1.6	3.5	2.1	4.6	2.5	7.3	12.6				10.2
Manganeso Disuelto					0.07418182	0.01	0.381	0.013	0.116	0.011	0.26	0.206				0.143
Manganeso Total		0.4			0.14745455	0.025	0.403	0.109	0.2844	0.101	1.23	0.213				0.203
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02				<0.02

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-14	Línea Base			Sep-14	Línea Base			Sep-14	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Molibdeno Total	mg/L				0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02				<0.02	
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.02	<0.008				<0.008	
Níquel Total		0.61		2	<0.01	<0.01	0.05	<0.008	0.01	<0.01	0.06	<0.008				<0.008	
Potasio Disuelto					4.2	3.5	5.5	3.9	5.8	4.2	8.7	7.6				7.4	
Potasio Total					4.5	3.6	7	4.4	6.5	4.4	11.7	7.9				7.5	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0003				0.0002	
Selenio Total		0.17			<0.0001	<0.0001	0.0001	0.0001	0.0002	<0.0001	0.0002	0.0003				0.0003	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005	
Plata Total					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	<0.00005				0.00006	
Sodio Disuelto					12.65	7.7	16.6	9.1	12.44	9	15.6	33.4				26.7	
Sodio Total					12.17	7.5	15.4	9.1	12.13	8.6	15.2	34.1				26.9	
Estroncio Disuelto					0.19	0.06	0.3	0.14	0.22	0.09	0.36	1.76				1.36	
Estroncio Total					0.18818182	0.08	0.3	0.148	0.228	0.11	0.33	1.73				1.38	
Talio Disuelto					<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	<0.0001				<0.0001	
Talio Total		0.002			<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007	0.0001				0.0001	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008				<0.005	
Titanio Total					0.071	<0.005	0.307	0.123	0.127	0.005	0.534	0.021				0.085	
Uranio Disuelto					<0.0001	<0.0001	0.0002	0.0001	0.00012	<0.0001	0.0004	0.0002		NR	NR	NR	0.0002
Uranio Total					0.00019	<0.0001	0.0005	0.0002	0.00027	<0.0001	0.0009	0.0003				0.0003	
Vanadio Disuelto					<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	0.008				<0.005	
Vanadio Total					0.0051	<0.005	0.019	<0.005	0.0085	<0.005	0.04	<0.005				<0.005	
Zinc Disuelto					0.068	<0.01	0.14	<0.01	0.061	0.05	0.14	<0.01				<0.01	
Zinc Total		7.4		10	0.174	<0.01	1.01	0.01	0.065	0.01	0.17	<0.01				0.01	
Grasas y Aceites				10	<2.062	<2.04	<2.326	<2	<2.062	<2.02	<2.084	<2				<2	
DQO				125	10.9	<10	40	15	16.8	<10	60	<2				<10	
Cloruros		250			2.7	2	3	2.4	8.5	4	16	25				18.4	
Cianuro Total		0.14		1	<0.003	<0.003	0.015	<0.003	<0.003	<0.003	0.014	<0.003				<0.003	
Fluoruros		4			<0.003	<0.003	0.015	0.11	0.15	0.1	0.2	0.55				0.35	
Nitratos/Nitritos como N					0.59	<0.02	1.51	0.58	4.49	1.96	10.1	3.83				1.95	
Amonio					0.05	<0.05	0.21	<0.05	0.059	<0.05	0.15	0.62				0.05	
Nitrógeno Kjeldahl (TKN)					0.35	<0.1	0.6	0.4	0.58	0.1	1.3	0.8				0.5	
Fosfatos					0.12	0.1	0.4	0.009	0.36	0.1	1.2	0.09				0.47	
Fósforo Disuelto (Orto)					0.04	0.02	0.12	0.04	0.12	0.03	0.39	0.04				0.18	
Fósforo Total			2	10	0.05	0.02	0.14	0.06	0.17	0.04	0.39	0.05				0.16	
STD (TDS)		500			183.636364	140	220	180	233.6	150	350	830				660	
SST (TSS)			50	100	48	5	340	36	115	<5	880	8				35	
ST (TS)				231.8	140	500	220	378.2	260	1180	880				730		
Sulfatos	250			16.9	4	25	137	27.5	10	57	434				334		
Alcalinidad Total				83	38	118	65.1	80	45	102	85.5				79.1		
Hidrocarburos totales (TPH)				<0.1	<0.09	<0.2	<0.1	<0.1	<0.09	<0.1	0.2				<0.1		

Dónde: **u.e.:** unidades exponenciales; **mg/L:** miligramos por litro; **µS/cm:** micro siemens 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: MSR, 2014.

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, 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 La Honda			
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14
					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	7.5	7.1	8	6.7	7.4	7.1	7.8	7.55	7.5	6.9	8	7.64
Temperatura (campo)	°C				17.4	14.5	21.5	17.4	19.4	12.2	27.3	17.3	18.7	15	21.3	18.2
Conductividad (campo)	µS/cm				72.1	0.1	160.2	58.23	259	60	948	65.28	216	120	416.2	116.6
Oxígeno disuelto (campo)	mg/L				4	0	8	7.67	4	0	8.3	8.24	3.9	0.1	7.5	7.67
Cr VI								<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml				NR	NR	NR	540	NR	NR	NR	5.4 x 10 ⁴	NR	NR	NR	2.4 x 10 ³
Color Aparente	U Pt/Co							192				1502				84
Color Real								37				50				13
Turbidez	NTU							42.7				751				20.0
Aluminio Disuelto	mg/L				0.055	<0.03	0.14	0.12	0.031	<0.03	0.08	<0.03	0.033	<0.03	0.13	0.09
Aluminio Total		0.2			1.09	<0.03	3.7	3.65	1.89	<0.03	8.1	34.2	3.05	0.1	16.4	4.43
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	<0.0004
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0005	0.0005	<0.0004	0.0007	0.0005
Arsénico Disuelto					0.00139	0.0005	0.0024	0.0009	0.0032	0.0007	0.0076	0.001	0.00382	0.0022	0.0054	0.0029
Arsénico Total		0.01	0.1		0.00177	0.0013	0.0028	0.0028	0.00387	0.0025	0.0074	0.013	0.00446	0.003	0.0061	0.0037
Bario Disuelto					0.0447	0.023	0.072	0.034	0.0618	0.027	0.136	0.029	0.0946	0.052	0.143	0.068
Bario Total		1			0.0556	0.039	0.069	0.064	0.0806	0.055	0.136	0.382	0.2142	0.088	0.99	0.099
Berilio Disuelto					<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		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
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.1	<0.04	<0.04	<0.04	0.04	<0.04
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					0.01	<0.01	0.01	0.01	0.361	<0.01	1.8	<0.01	<0.01	<0.01	0.01	<0.01
Boro Total					0.01	<0.01	0.02	0.01	0.379	<0.01	1.93	0.02	0.013	<0.01	0.02	0.02
Cadmio Disuelto					<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		0.003	0.1		<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0002	0.0004	<0.0001	<0.0001	0.0003	<0.0001
Calcio Disuelto					7.9	3.4	13.7	8.5	15.1	5.4	38.9	5.4	23.1	11.2	38.1	14.8
Calcio Total					7.73	3.4	13.1	5.2	14.81	5.9	37.5	8	23.04	11.5	36.7	14.8
Cromo Disuelto					<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		0.1	0.1		0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Cobalto Disuelto				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobalto Total				<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				<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	1.3	3		<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	
Galio Disuelto				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Galio Total				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Hierro Disuelto				0.055	0.03	0.09	0.07	0.097	<0.02	0.28	0.04	0.022	<0.02	0.07	0.04	
Hierro Total	0.3			0.7	0.16	1.8	1.67	1.3	0.33	4.8	20	1.8	0.08	9.5	1.66	
Plomo Disuelto				<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0014	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Plomo Total	0.015	0.4		0.0003	<0.0001	0.0012	0.0015	0.0007	<0.0001	0.0028	0.0138	0.0015	<0.0001	0.0083	0.0014	
Litio Disuelto				<0.02	<0.02	<0.02	0.009	0.13	<0.02	0.67	<0.008	<0.02	<0.02	<0.02	0.01	
Litio Total				<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.012	<0.02	<0.02	<0.02	<0.008	
Magnesio Disuelto				1.5	0.8	2.5	1.6	3	1.4	7.4	1.3	4.1	2.2	6.4	2.7	
Magnesio Total				1.5	0.9	2.5	1.3	3.1	1.8	7.5	2.3	4.3	2.6	6.5	2.8	
Manganeso Disuelto				0.025	0.006	0.047	0.019	0.114	<0.005	0.551	0.015	0.032	0.014	0.074	0.031	
Manganeso Total	0.4			0.0406	0.014	0.062	0.053	0.1482	0.04	0.543	1.02	0.0981	0.019	0.342	0.05	
Mercurio Disuelto				<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	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				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	

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 La Honda			
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Total					<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					<0.01	<0.01	0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Níquel Total		0.61		2	0.013	<0.01	0.03	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.04	<0.008
Potasio Disuelto					3	2.5	3.7	2.4	4.1	3.2	7.1	3.2	4.1	3.6	5.4	3.2
Potasio Total					3	2.2	4.1	2.8	4.2	3.1	7.5	6.5	4.5	3.6	7	3.7
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto					<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		0.17			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0002	<0.0001	<0.0001	0.0002	<0.0001
Plata Disuelta					<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					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00009	<0.00005	<0.00005	0.00006	<0.00005
Sodio Disuelto					6.34	3.7	10.8	4.6	32.16	6	135	4.2	11.69	8.7	15.4	7.7
Sodio Total					5.99	3.4	9.4	3.8	31.11	5.3	124	4.5	11.45	8.3	15.5	7.9
Estroncio Disuelto					0.06	0.02	0.09	0.072	0.12	0.03	0.33	0.038	0.17	0.07	0.29	0.106
Estroncio Total					0.057	0.02	0.08	0.044	0.122	0.04	0.35	0.07	0.174	0.09	0.28	0.109
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Talio Total		0.002			<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0004	0.0004	<0.0001	<0.0001	0.0002	<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.006	0.005
Titanio Total					0.027	<0.005	0.094	0.08	0.05	<0.005	0.22	0.905	0.069	<0.005	0.325	0.085
Uranio Disuelto					<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranio Total					<0.0001	<0.0001	0.0002	0.0001	<0.0001	<0.0001	0.0003	0.0012	0.00013	<0.0001	0.0005	0.0001
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.01	<0.005	<0.0005	<0.0005	0.008	0.008
Vanadio Total					<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.005	0.04	0.0047	<0.0005	0.018	<0.005
Zinc Disuelto					0.04	<0.01	0.1	0.01	<0.1	<0.1	0.4	<0.01	0.131	<0.01	0.81	<0.01
Zinc Total		7.4		10	0.197	<0.01	1.6	<0.01	<0.1	<0.1	0.22	0.05	0.339	<0.01	1.87	<0.01
Grasas y Aceites			10	10	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	<2
DQO			125		6.5	<10	20	<10	<10	<10	30	180	10	<10	40	10
Cloruros		250			1.8	1	3	2.4	43.9	3	230	2.3	3	5	3	2.6
Cianuro Total		0.14		1	0.003	<0.003	0.014	<0.003	<0.003	<0.003	0.014	<0.003	<0.003	0.015	<0.003	<0.003
Fluoruros		4			<0.1	<0.1	<0.1	0.10	0.11	<0.1	0.3	0.07	<0.1	0.2	0.1	0.14
Nitratos/Nitritos como N					0.13	0.03	0.42	0.32	0.3	<0.02	1.22	0.31	<0.1	3.53	0.19	0.54
Amonio					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.1	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)					0.21	<0.1	0.4	0.3	0.2	0.1	0.5	2.4	<0.1	0.7	0.4	0.4
Fosfatos					0.04	<0.03	0.2	0.03	0.08	<0.03	0.3	0.06	0.1	0.2	0.09	0.12
Fósforo Disuelto (Orto)					0.15	<0.01	0.06	<0.01	0.03	<0.01	0.09	0.02	0.03	0.08	0.03	0.04
Fósforo Total			2	10	0.02	<0.01	0.05	0.03	0.04	0.02	0.08	0.41	0.03	0.19	0.19	0.05
STD (TDS)		500			84	60	110	80	187	90	540	130	140	240	100	160
SST (TSS)			50	100	9	<5	32	15	21	<5	105	680	<5	330	6	7
ST (TS)					97	70	130	120	221	120	550	790	150	610	140	190
Sulfatos		250			16.5	<10	47	18.5	14	<10	23	6.3	9	38	19.4	10.2
Alcalinidad Total					25	13	43	16.8	48	22	108	17.7	30	101	54	50.8
Hidrocarburos totales (TPH)					<0.1	<0.09	<0.09	<0.1	11.54375	<0.1	92	<0.1	<0.09	<0.1	<0.1	<0.1

Dónde: **u.e.:** unidades exponenciales; **mg/L:** miligramos por litro; **µS/cm:** micro siemens 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: MSR, 2014.

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, 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 confluencia del Río San Rafael Y el Río El Dorado				Río Tapalapa, aguas debajo de la confluencia del Río San Rafael Río Los Vados y Quebrada La Honda			
					Línea Base			Sep-14	Línea Base			Sep-14
					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	9.8	7.63	7.86	7.5	10.7	7.84
Temperatura (campo)	°C				22.1	18.9	25.1	22.4	21.8	19.1	24.2	21.1
Conductividad (campo)	µS/cm				363.7	186.8	807.6	320.7	267.4	121.8	518	172.1
Oxígeno disuelto (campo)	mg/L				5.14	0.28	7.48	7.03	6.2	0.8	8.5	7.68
Cr VI					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO	NMP/100ml				15	15	25	<10	<10	<10	<10	<10
Coliformes Fecales					2x10 ⁶	2x10 ⁴	5x10 ⁶	2.6 x 10 ⁶	9x10 ⁴	1x10 ²	2x10 ⁵	1.6 x 10 ⁷
Color Aparente	U Pt/Co				172	19	351	1118	342	29	824	1262
Color Real					20	22	36	29	43	10	60	28
Turbidez	NTU				14.15	6.09	22.2	157.7	25.72	4.93	46.5	576
Aluminio Disuelto	mg/L				0.033	<0.03	0.06	0.15	0.087	<0.03	0.22	<0.03
Aluminio Total		0.2			2.39	0.04	7.35	16.4	2.96	0.4	8.6	28.9
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0006	0.0006	<0.0004	0.0013	<0.0004
Antimonio Total		0.006			0.001	<0.0004	0.0027	0.0006	0.0007	<0.0004	0.0012	0.0007
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0033	0.004	0.0023	0.0057	0.0019
Arsénico Total		0.01	0.1		0.006	0.0041	0.0096	0.0115	0.0042	0.002	0.006	0.0102
Bario Disuelto					0.107	0.074	0.143	0.097	0.094	0.056	0.135	0.063
Bario Total		1			0.136	0.102	0.185	0.242	0.121	0.09	0.154	0.314
Berilio Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total		0.004			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					0.022	<0.01	0.05	<0.01	0.043	<0.01	0.09	<0.01
Boro Total					0.023	<0.01	0.06	0.02	0.041	<0.01	0.1	0.03
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		0.003	0.1		<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	0.0002	0.0004
Calcio Disuelto					50.4	17.5	156	38.5	35.7	18.2	78.3	18.1
Calcio Total					52.1	18.6	156	38.9	36.2	18.5	79.7	25.8
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total		0.1	0.1		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Disuelto				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobalto Total				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobre Disuelto				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobre Total	1.3	3		<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	
Galio Disuelto				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Galio Total				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Hierro Disuelto				0.06	0.02	0.11	0.12	0.09	<0.02	0.17	0.04	
Hierro Total	0.3			1.53	0.05	4.36	8.46	1	0.25	2.2	15.6	
Plomo Disuelto				0.0001	<0.0001	0.0003	0.0008	0.0002	<0.0001	0.0005	<0.0001	
Plomo Total	0.015	0.4		0.003	<0.0001	0.0089	0.0162	0.0022	0.0002	0.008	0.0198	
Litio Disuelto				<0.02	<0.02	0.04	<0.008	<0.02	<0.02	0.04	<0.008	
Litio Total				<0.02	<0.02	0.04	0.012	<0.02	<0.02	0.04	0.017	
Magnesio Disuelto				6.3	3.2	14.7	4.3	6	3.3	9.7	2.8	
Magnesio Total				6.6	3.3	14.8	4.8	6.2	3.4	10.1	4.4	
Manganeso Disuelto				0.095	0.009	0.118	0.109	0.057	0.023	0.148	0.028	
Manganeso Total	0.4			0.1808	0.047	0.349	0.362	0.115	0.043	0.187	0.835	
Mercurio Disuelto				<0.0002	<0.0002	<0.0002	<0.002	<0.0002	<0.0002	<0.0002	<0.0002	
Mercurio Total	0.002	0.01		<0.0002	<0.0002	<0.0002	<0.002	<0.0002	<0.0002	<0.0002	<0.0002	

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW8-E				SW9-E				
					Aguas debajo de la confluencia del Río San Rafael Y el Río El Dorado				Río Tapalapa, aguas debajo de la confluencia del Río San Rafael Río Los Vados y Quebrada La Honda				
					Línea Base			Sep-14	Línea Base			Sep-14	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	
Níquel Total		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	
Potasio Disuelto					6.5	5.8	7.4	7	6	4.5	8.1	5.1	
Potasio Total					6.8	6.4	7.8	10.1	6.1	4.8	8.5	8	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Selenio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	
Selenio Total		0.17			0.00011	<0.0001	0.0002	0.0002	<0.0001	<0.0001	0.0001	0.0002	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	
Plata Total					<0.00005	<0.00005	0.00007	0.00018	<0.00005	<0.00005	0.00007	0.00027	
Sodio Disuelto					18.8	12.3	33.7	14.9	17.6	10.7	26.9	9	
Sodio Total					18.4	12.9	34.3	15	17.4	11	28.5	10.7	
Estroncio Disuelto					0.44	0.16	1.5	0.35	0.29	0.14	0.71	0.142	
Estroncio Total					0.44	0.16	1.48	0.364	0.295	0.14	0.73	0.219	
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Talio Total		0.002			<0.0001	<0.0001	0.0003	0.0002	<0.0001	<0.0001	0.0002	0.0003	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	
Titanio Disuelto					<0.005	<0.005	0.005	0.005	<0.005	<0.005	0.009	<0.005	
Titanio Total					0.069	<0.005	0.195	0.289	0.084	0.015	0.237	0.798	
Uranio Disuelto					0.00014	<0.0001	0.0003	0.0001	0.00014	<0.0001	0.0002	<0.0001	
Uranio Total					0.00022	0.0001	0.0003	0.0005	0.00022	0.0002	0.0003	0.0008	
Vanadio Disuelto					<0.005	<0.005	0.006	<0.005	<0.005	<0.005	0.006	<0.005	
Vanadio Total					<0.005	<0.005	0.01	0.014	0.0054	<0.005	0.012	0.032	
Zinc Disuelto					<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.03	<0.01	
Zinc Total		7.4		10	0.015	<0.01	0.04	0.06	<0.01	<0.01	0.03	0.07	
Grasas y Aceites				10	<2.04	<2.02	<2.062	<2	<2.02	<2.02	<5	<2	
DQO				125	20	<10	40	90	17.8	<10	35	126	
Cloruros				250	10	7	19	8.3	12	6	20	5.7	
Cianuro Total				0.14	1	0.007	<0.003	0.014	<0.003	0.006	<0.003	0.013	<0.003
Fluoruros				4	0.27	0.1	0.6	0.13	0.006	<0.003	0.013	0.1	
Nitratos/Nitritos como N				3.07	2.01	5.23	1.80	1.97	1.14	3.85	1.0		
Amonio				0.24	<0.05	0.58	0.37	0.129	<0.05	0.22	0.1		
Nitrógeno Kjeldahl (TKN)				0.74	<0.1	1.6	1.9	0.57	0.3	0.9	2.1		
Fosfatos				0.55	0.3	1	0.31	0.49	0.22	1.3	0.31		
Fósforo Disuelto (Orto)				0.18	0.08	0.33	0.12	0.18	0.09	0.49	0.10		
Fósforo Total		2	10	0.27	0.12	0.51	0.29	0.25	0.09	0.58	0.34		
STD (TDS)	500			312	160	750	310	255	160	440	250		
SST (TSS)		50	100	34	<5	102	237	73	<5	340	390		
ST (TS)				362	180	750	520	310	200	450	650		
Sulfatos	250			91	22	360	74.9	60	25	169	38.9		
Alcalinidad Total				79	50	110	60.5	70	45	90	47.7		
Hidrocarburos totales (TPH)				<0.01	<0.01	<0.01	<0.1	70	45	90	<0.1		

Dónde: u.e.: unidades exponenciales; mg/L: miligramos por litro; µS/cm: micro siemens 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: MSR, 2014.

4.3.3 Agua Subterránea

En el Cuadro 4-5 se presentan los resultados de la calidad del agua subterránea (manantiales) y los resultados de laboratorio se presentan en el Anexo 11.5.2. En términos generales los parámetros analizados en las estaciones GW-1A, GW-2, GW-3, GW-4 y GW-5 cumplen con el Acuerdo 236-2006 y todos los valores se encuentran dentro del rango estadístico de la línea base. Únicamente los valores de color real y aparente en las estaciones GW4 y GW5 y materia flotante en GW2 y GW4 están sobre los límites establecidos.

La temperatura de las estaciones muestreadas se encontró entre 19 y 23.7 °C. La lectura menor de pH se obtuvo en la estación GW-4 (6.02 u.e.) y la mayor en la estación GW-1A (6.68 u.e.). Los Sólidos Suspendidos Totales (**SST**) se registraron en las estaciones GW1-A GW2 y GW5 (9 y 8 mg/L respectivamente) por debajo de las guías del Acuerdo (100 mg/L) y del Banco Mundial (50 mg/L). Las concentraciones registradas de Cloruros y Fluoruros están por debajo de las guías de la USEPA (250 mg/L).

La concentración de sulfatos está por debajo de las guías de la USEPA (250mg/L) en todas las estaciones de monitoreo, a excepción de la estación GW3. 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 GW3; se dará seguimiento a este parámetro en la presente estación en futuros muestreos para comprobar o descartar que dicho aumento se deba a las actividades realizadas dentro del Proyecto. 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 Cadmio, Cianuro, Berilio, Bismuto, Cobalto, Cobre, Cromo, Galio, Litio, Cromo hexavalente, Mercurio, Molibdeno, Escandio, Talio, Estaño, Plata, Uranio y Vanadio no fueron detectados en ninguna de las estaciones. El Selenio fue detectado en la estación GW3 (0.0003 mg/L) por debajo de la guía de la USEPA (0.17mg/L). El Antimonio fue detectado en la estación GW2 en concentraciones por debajo de la guía dada por la USEPA (0.01 mg/L). El Plomo se registró en GW3 en concentración por debajo de la guía de la USEPA y Acuerdo (0.015 y 0.4 mg/L respectivamente). En todas las estaciones se registró Arsénico. Sin embargo las concentraciones registradas se encuentran por debajo de los valores máximos establecidos durante la línea base y todos por debajo de las guías sugeridas por USEPA (0.01 mg/L) y el Acuerdo (0.1 mg/L).

Cuadro 4-5: Resultados de la Calidad de Agua Subterránea (manantiales), 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 Fucío				Nacimiento – Zona central del Proyecto (frente al portal oeste)				Manantial – Aguas arriba del depósito de colas				Manantial – Aguas arriba del depósito de colas debajo de GW-4			
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14
					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	7.08	6.89	7.26	6.68	6.54	6.01	7.16	6.38	6.54	6.21	7.13	6.36	6.13	6.13	6.13	6.02				6.34
Temperatura de campo	°C				15.2	14.8	15.6	21.6	21.4	19	23.7	20.1	19.4	18.5	21	23.7	18.1	18.1	18.1	19				20.9
Conductividad de campo	µS/cm				229.8	223	236.5	172.6	323.4	111.3	500.5	189.3	315.3	236.7	501.1	743.4	147.3	147.3	147.3	108.8				123.3
Oxígeno Disuelto de campo	mg/L				0.1	0.03	0.17	8.77	1.18	0.13	2.35	3.69	0.68	0.03	1.26	3.48	0.14	0.14	0.14	2.49				5.63
Turbidez	NTU							7.50				6.66				2.1				120				125
Materia Flotante				Ausente				Ausente				Presente				Ausente				Presente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	69	NR	NR	NR	25	NR	NR	NR	<1	NR	NR	NR	823				966
Color Real	u Pt/Co							<1				<1				<1				461				547
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				4.5				49				<2				5.4 x 10 ²				23
Aluminio Disuelto		0.2			<0.03	<0.03	<0.03	<0.03	0.075	<0.03	0.24	0.05	<0.03	<0.03	0.04	<0.03	1.42	1.42	1.42	0.19				0.38
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	0.00078	<0.0004	0.0011	0.0007	0.0004	<0.0004	0.001	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004				<0.0004
Arsénico Disuelto		0.01		0.1	0.001	0.0008	0.0011	0.0005	0.0156	0.0043	0.0299	0.0106	0.0059	0.0037	0.0115	0.0018	0.0008	0.0008	0.0008	0.0004				0.0006
Bario Disuelto		1			0.025	0.022	0.028	0.052	0.24	0.125	0.451	0.163	0.186	0.12	0.328	0.151	0.127	0.127	0.127	0.119				0.073
Berilio Disuelto		0.004			<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				<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	NR	NR	NR	<0.04
Boro Disuelto					<0.01	<0.01	<0.01	0.02	<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
Cadmio Disuelto		0.003		0.1	<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				<0.0001
Calcio Disuelto					5.7	5.1	6.2	10.9	33.5	9.6	65.3	21	31.6	25.7	43.4	95.3	4.4	4.4	4.4	4.8				4.3
Cromo Disuelto		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				<0.01
Cobalto Disuelto					<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				<0.01
Cobre Disuelto		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				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Hierro Disuelto		0.3			0.02	<0.02	0.03	<0.02	0.103	0.03	0.17	0.07	0.103	<0.02	0.33	<0.02	0.74	0.74	0.74	0.21				0.13
Plomo Disuelto		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	0.0004				0.0011
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008				<0.008
Magnesio Disuelto					3.1	2.9	3.3	3	5.9	1.8	12	3.8	4.9	3.3	8.3	21.4	2.6	2.6	2.6	2.9				2.7
Manganeso Disuelto		0.05			<0.005	<0.005	<0.005	<0.005	0.123	0.02	0.356	0.076	0.057	<0.005	0.133	0.168	0.069	0.069	0.069	0.248				<0.005
Mercurio Disuelto		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				<0.0002
Molibdeno Disuelto					<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				<0.02
Níquel Disuelto		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008				0.009

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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 Fucío				Nacimiento – Zona central del Proyecto (frente al portal oeste)				Manantial – Aguas arriba del depósito de colas				Manantial – Aguas arriba del depósito de colas debajo de GW-4			
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Potasio Disuelto					7.3	5.9	8.6	6.4	2.9	1.3	4.3	2.5	3.8	2.5	5	10.1	4.6	4.6	4.6	5.1				6
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Selenio Disuelto		0.17			0.0002	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001
Plata Disuelta					<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				<0.00005
Sodio Disuelto					17.6	16.9	18.2	15.2	13.5	7.2	22	10.6	11.5	9.3	16.4	24.9	10.3	10.3	10.3	10.8				10.9
Estroncio Disuelto					0.03	0.03	0.03	0.08	0.26	0.08	0.56	0.173	0.2	0.12	0.37	0.513	0.03	0.03	0.03	0.045				0.035
Talio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.1	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	0.042	0.042	0.042	0.007				<0.005
Uranio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0001				0.0003
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.006	0.006	<0.005				<0.005
Zinc Disuelto		7.4		10	<0.01	<0.01	<0.01	0.03	<0.1	<0.1	0.1	<0.01	0.94	<0.01	3.47	<0.01	0.1	0.1	0.1	<0.01				<0.01
Cloruros	mg/L	250			15	14	16	9.8	4	2	7	5.2	5	3	6	12.5	4	4	4	4	NR	NR	NR	3.7
Cianuro Total		0.14		1	0.008	<0.003	0.014	<0.003	0.004	<0.003	0.012	<0.003	0.0046	<0.003	0.014	<0.003	<0.003	<0.003	<0.003	<0.003				<0.003
Fluoruros					<0.1	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	0.21	0.15	0.1	0.2	0.28	<0.1	<0.1	<0.1	0.12				0.22
Nitratos/Nitritos como N					2.19	1.9	2.48	0.94	0.74	0.14	1.1	0.03	1.19	0.05	3.16	3.87	0.07	0.07	0.07	0.04				0.50
Amonio					<0.05	<0.05	0.07	<0.05	0.059	<0.05	0.16	<0.05	0.065	<0.05	0.14	<0.05	<0.05	<0.05	<0.05	<0.05				0.10
Nitrógeno Kjeldahl (TKN)					0.7	0.3	1.1	0.9	0.63	0.2	0.9	0.2	0.46	<0.05	1.2	<0.1	0.3	0.3	0.3	0.8				0.8
Fosfatos					0.2	0.1	0.2	<0.03	0.4	0.1	0.7	0.16	0.3	0.1	0.5	0.06	0.09	0.09	0.09	0.09				0.06
Fósforo Total			2	10	0.1	0.02	0.17	0.06	0.18	0.09	0.27	0.10	0.1	0.05	0.15	0.01	0.03	0.03	0.03	0.08				0.08
STD (TDS)		500			190	190	190	180	223	130	350	170	213	190	260	620	170	170	170	430				420
SST (TSS)			50	100	6.5	6	7	9	7.7	6	9	8	39	5	105	<5	206	206	206	<5				8
ST (TS)					200	180	220	190	237.5	140	380	200	217.5	170	270	640	360	360	360	440				450
Sulfatos		250			12.5	11	14	<1	43	7	90	23.6	30	16	71	262	7	7	7	15.5				10.3
Alcalinidad Total					31	31	31	61.7	0.18	0.09	0.27	62.9	83	71	97	86.9	35	35	35	40.4				39.1

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens 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: MSR, 2014.

Cuadro 4-6: Resultados de la medición de calidad de agua subterránea (Pozos de Monitoreo, Producción y Artesanal), 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				
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	
					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	6.56	6.37	6.77	7.82	6.44	6.34	6.49	6.62	6.32	6.23	6.41	6.67	6.19	6.04	6.34	6.25	
Temperatura de campo	°C				24.4	23.4	25.1	20	24.1	23.7	24.5	25.5	23.3	22.2	24.4	23.4	23.4	23	24.6	23.7	
Conductividad de campo	µS/cm				427.5	211.9	1001.3	135.5	803.9	741.6	829.1	566.5	916.9	872.1	944.8	661.9	469.7	401.4	494.1	1142	
Oxígeno Disuelto de campo	mg/L				0.75	0.3	1.21	6.33	0.65	0.11	1.44	5.56	0.97	0.48	1.93	4.98	0.82	0.19	1.77	3.14	
Turbidez	NTU							>1000				0.82				0.48				4.89	
Materia flotante	Visual			Ausente				Ausente				Ausente				Ausente				Ausente	
Color Aparente	u Pt/Co			500	NR	NR	NR	5925	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	<1
Color Real		89	<1																		
Cr (VI)	mg/L			0.1				<0.05													<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				540													23
Aluminio Disuelto	mg/L	0.2			0.038	<0.03	0.07	<0.003	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01		0.1	0.0011	0.0008	0.0014	0.0009	0.0023	0.0021	0.0027	0.0023	0.0023	0.0021	0.0028	0.0022	0.0013	0.001	0.0016	0.0008	
Bario Disuelto		1			0.03	0.024	0.039	0.064	0.036	0.032	0.041	0.04	0.042	0.038	0.047	0.037	0.162	0.157	0.166	0.052	
Berilio Disuelto		0.004			<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	
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Boro Disuelto					0.014	<0.01	0.04	0.01	0.06	0.05	0.07	0.07	0.078	0.06	0.09	0.08	0.015	<0.01	0.03	0.06	
Cadmio Disuelto		0.003		0.1	<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					20.6	9.4	48.7	7.4	80.3	76.4	83.3	75.5	100	93	107	80.7	40.8	39.2	42.2	181	
Cromo Disuelto		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	
Cobalto Disuelto					<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		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	
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Hierro Disuelto		0.3			<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	
Plomo Disuelto		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	
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	0.02	0.019	<0.02	<0.02	0.02	0.018	<0.02	<0.02	<0.02	0.011	
Magnesio Disuelto					3.5	2.4	6.1	2.4	10.3	10.1	10.7	9.2	11.3	10.9	11.6	8.8	7.3	6.8	7.6	24.3	
Manganeso Disuelto		0.05			0.108	0.03	0.308	0.678	<0.005	<0.005	0.008	<0.05	0.009	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	<0.005	
Mercurio Disuelto		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					<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	0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008		
Potasio Disuelto				2.2	1.9	2.4	3	4.2	3.9	4.6	4	4.7	4.5	5.2	4.3	6	5.5	6.5	9.2		
Escandio Disuelto				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Selenio Disuelto	0.17			0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0003	0.0002	0.0003	0.0003	0.0004	0.0003	0.0004		

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Plata Disuelta					<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	
Sodio Disuelto					22	17.4	33.6	14	29.5	28.2	30.9	27.3	32.3	30.4	35.8	27	16.9	15.6	19.1	34.8
Estroncio Disuelto					0.18	0.07	0.46	0.056	0.74	0.71	0.77	0.72	0.89	0.84	0.98	0.75	0.27	0.26	0.29	0.633
Talio Disuelto					<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
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007
Uranio Disuelto					0.00016	<0.0001	0.0005	0.0001	0.0002	0.0002	0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0002	0.00033	0.0001	0.001	0.0003
Vanadio Disuelto					0.0059	<0.005	0.008	0.014	0.0055	<0.005	0.009	0.006	0.006	<0.005	0.009	0.006	<0.005	<0.005	<0.005	<0.005
Zinc Disuelto		7.4		10	0.031	<0.01	0.11	<0.01	0.053	<0.01	0.1	0.03	<0.01	<0.01	0.1	0.03	<0.01	<0.01	0.1	0.02
Cloruros		250			12	3	28	3.6	16	16	17	16.4	20	19	21	16.8	9	8	9	34.8
Cianuro Total		0.14		1	0.0039	<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
Fluoruros					0.35	0.2	0.7	0.50	0.8	0.8	0.8	0.69	0.8	0.8	0.8	0.94	0.18	0.1	0.2	0.19
Nitratos/Nitritos como N					2.48	2.04	2.93	1.77	2.2	2.08	2.26	2.23	2.13	1.98	2.32	2.49	3.32	3	3.57	5.16
Amonio					<0.05	<0.05	<0.05	0.22	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)					0.56	<0.1	1.1	2.3	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.3	<0.1
Fosfatos					0.233	0.21	0.27	0.12	0.315	0.27	0.37	0.22	0.248	0.24	0.27	0.19	0.203	0.15	0.24	0.09
Fósforo Total			2	10	0.24	0.06	0.44	0.43	0.09	0.08	0.1	0.07	0.07	0.06	0.08	0.05	0.06	0.05	0.07	0.03
STD (TDS)		500			253	190	360	270	470	460	480	480	553	540	560	470	305	290	320	960
SST (TSS)			50	100	345.8	137	584	1090	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	33
ST (TS)					597.5	350	810	1420	487.5	450	510	490	555	520	580	490	325	280	350	1030
Sulfatos		250			28.5	4	97	9.5	166	162	169	166	212.5	210	220	188	72.3	64	76	425
Alcalinidad Total					64	56	80	46.4	84	82	86	79.6	85	83	88	87.0	66	61	68	74.5

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens 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: MSR, 2014.

Cuadro 4-6: Resultados de la medición de calidad de agua subterránea (Pozos de Monitoreo, Producción y Artesanal), 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			
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14
					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	6.22	6.17	6.25	6.28	6.38	6.14	6.98	6.11	6.16	6.07	6.29	6.3	7.15	6.9	7.4	7.28
Temperatura de campo	°C				22.3	21.6	22.8	25.6	22.4	22	23.1	23.6	23.3	23.2	23.4	24.4	27.5	25.9	29	28.5
Conductividad de campo	µS/cm				538.2	342.9	752.6	1024	299.6	285.9	323.8	363.3	426.8	424.6	428.1	988.6	1595	1569	1621	494.9
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	2.74	0.61	0.25	1.19	5.11	0.72	0.16	1.45	4.48	0.38	0.35	0.41	6.74
Turbidez	NTU							1.85				2.94				0.72				9.51
Materia flotante	Visual			Ausente				Ausente								Ausente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	264
Color Real																				
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				4.5				9 x10 ³				<2				4.5
Aluminio Disuelto	mg/L	0.2			<0.03	<0.03	0.05	0.04	0.053	<0.03	0.07	0.05	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	0.03
Antimonio Disuelto		0.01			0.00045	<0.0004	0.0012	<0.00004	0.00063	0.0005	0.0008	<0.0004	0.001	0.0009	0.0011	0.0006	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01		0.1	0.0028	0.0024	0.0032	0.0026	0.0034	0.0029	0.0041	0.0013	0.0021	0.0019	0.0024	0.0012	0.003	0.0007	0.0052	0.0017
Bario Disuelto		1			0.198	0.134	0.281	0.131	0.156	0.129	0.176	0.373	0.125	0.122	0.129	0.095	0.031	0.028	0.034	0.061
Berilio Disuelto		0.004			<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
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					<0.01	<0.01	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.05	0.09	0.08	0.1
Cadmio Disuelto		0.003		0.1	<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					52.5	35.1	71.9	163	16.7	13.9	19.6	33.4	34.6	32.5	36.3	149	185.5	170	201	54.2
Cromo Disuelto		0.1		0.1	<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
Cobalto Disuelto					<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		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
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hierro Disuelto		0.3			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	1.39	<0.02	<0.02	<0.02	<0.02	5.52	1.53	9.51	11.5
Plomo Disuelto		0.015		0.4	<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.014	0.07	0.07	0.07	0.017
Magnesio Disuelto					7.5	4.9	10.5	17.6	4.8	4.6	5	8.6	6.4	6.3	6.7	23.3	35.8	34.4	37.2	9.3
Manganeso Disuelto		0.05			<0.005	<0.005	0.006	0.007	0.0065	<0.005	0.012	0.038	0.019	0.012	0.029	<0.005	0.203	0.149	0.257	0.166
Mercurio Disuelto		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					<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	0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	
Potasio Disuelto				5.7	5	6.5	9.6	6.2	5.4	6.8	9.2	4.8	4.6	5.1	7.7	4.8	4.6	5	4.3	
Escandio Disuelto				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Selenio Disuelto	0.17			0.0005	0.0004	0.0005	0.0008	0.0002	0.0001	0.0002	<0.0001	0.0004	0.0003	0.0006	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Plata Disuelta					<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	0.00007	<0.00005	
Sodio Disuelto					14	12.3	17	34.1	19.1	15.4	27.5	19.3	15.2	15	15.6	30.9	45.1	44.7	45.4	26.8
Estroncio Disuelto					0.26	0.18	0.35	0.671	0.1	0.09	0.11	0.25	0.22	0.21	0.23	0.558	1.64	1.58	1.69	0.408
Talio Disuelto					<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
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	0.05	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	0.007	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.005
Uranio Disuelto					0.00013	0.0001	0.0002	0.001	<0.0001	<0.0001	0.0001	<0.0001	0.00017	0.0001	0.0002	0.0002	<0.0001	<0.0001	0.0004	<0.0001
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc Disuelto		7.4		10	0.034	<0.01	0.1	0.05	0.034	<0.01	0.1	0.08	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01	<0.01
Cloruros		250			11	6	17	22.9	11	9	12	19.9	6	6	6	30.1	37	36	37	10.2
Cianuro Total		0.14		1	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
Fluoruros					0.18	0.1	0.2	0.14	0.13	0.1	0.2	0.10	0.17	0.1	0.2	0.14	2.55	2.5	2.6	61
Nitratos/Nitritos como N					5.08	4.42	6.15	4.1	4.75	4.08	5.24	1.71	2.76	2.63	2.83	4.60	<0.02	<0.02	<0.02	<0.02
Amonio					<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
Nitrógeno Kjeldahl (TKN)					<0.1	<0.1	0.2	<1	0.21	<0.1	0.4	0.3	0.09	<0.1	0.2	<0.1	0.23	<0.1	0.4	<0.1
Fosfatos					0.173	0.15	0.21	0.12	0.113	0.09	0.18	<0.03	0.23	0.21	0.24	0.12	<0.03	<0.03	<0.03	0.25
Fósforo Total			2	10	0.05	0.04	0.06	0.04	0.04	0.01	0.07	0.01	0.07	0.06	0.08	0.04	<0.01	<0.01	0.02	0.20
STD (TDS)		500			340	260	440	870	233	220	250	340	277	270	290	840	905	890	920	350
SST (TSS)			50	100	<5	<5	<5	<5	19.75	7	45	9	9	6	14	<5	27	25	29	25
ST (TS)					345	240	450	890	260	230	280	320	300	290	310	880	940	910	970	390
Sulfatos		250			85.3	33	153	339	19.3	17	23	63.9	54.7	54	55	394	440	440	440	93.1
Alcalinidad Total					65	62	68	121	48	41	60	71.2	68	66	70	71.4	147	136	157	130

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens 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: MSR, 2014.

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

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1				
					Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	Línea Base			Sep-14	
					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	7.05	7.05	7.05	7.34	7.45	7.45	7.45	7.33				7.24				7.28				7.49	
Temperatura de campo	°C				30.4	30.4	30.4	31.2	27.8	27.8	27.8	28.1				26.7				24.9				32.6	
Conductividad de campo	µS/cm				2.243	2.243	2.243	1598	663.9	663.9	663.9	997.2				833.1				388				1298	
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	3.56	0.05	0.05	0.05	2.01				8.27				6.74				4.79	
Turbidez	NTU							20.3				2.48				10.9				15.8				3.79	
Materia flotante	Visual			Ausente				Ausente				NA				NA				Presente					
Color Aparente	u Pt/Co			500	NR	NR	NR	199	NR	NR	NR	<1				<1				86				237	
Color Real								<1				<1				<1				<1				<1	
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05				<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2				<2				2.4 x 10 ²				<2	
Aluminio Disuelto	mg/L	0.2			<0.03	<0.03	<0.03	<0.03	0.06	0.06	0.06	<0.03				<0.03				0.07				<0.03	
Antimonio Disuelto		0.01			0.001	0.001	0.001	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004				<0.0004				<0.0004				<0.0004
Arsénico Disuelto		0.01		0.1	0.0022	0.0022	0.0022	0.0029	0.0136	0.0136	0.0136	0.0123	0.009				0.009				0.0009				0.007
Bario Disuelto		1			0.033	0.033	0.033	0.029	0.125	0.125	0.125	0.101	0.092				0.092				0.18				0.021
Berilio Disuelto		0.004			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01				<0.01				<0.01
Bismuto Disuelto					<0.08	<0.08	<0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04				<0.04				<0.04				<0.04
Boro Disuelto					0.18	0.18	0.18	0.18	0.07	0.07	0.07	0.12	0.1				0.1				0.01				0.11
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001				<0.0001				<0.0001
Calcio Disuelto					271	271	271	241	47.5	47.5	47.5	117	94.2				94.2				35.9				203
Cromo Disuelto		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
Cobalto Disuelto					<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		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
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1				<0.1				<0.1
Hierro Disuelto		0.3			0.21	0.21	0.21	2.21	0.05	0.05	0.05	0.03	<0.02				<0.02				<0.02				1.1
Plomo Disuelto		0.015		0.4	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001				0.0003				<0.0001
Litio Disuelto					0.06	0.06	0.06	0.077	0.08	0.08	0.08	0.154	0.125				0.125				<0.008				0.089
Magnesio Disuelto					41.3	41.3	41.3	35.6	4.1	4.1	4.1	7.7	6.8				6.8				6.1				36
Manganeso Disuelto		0.05			0.044	0.044	0.044	0.032	0.03	0.03	0.03	0.077	0.056				0.056				0.04				0.054
Mercurio Disuelto		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					0.01	0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02				<0.02				<0.02				<0.02
Níquel Disuelto	0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.008				<0.008				<0.008				<0.008	
Potasio Disuelto				5	5	5	4.4	2.5	2.5	2.5	2.5	2.6				2.6				9.9				4.7	
Escandio Disuelto				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1				<0.1				<0.1	
Selenio Disuelto	0.17			0.0006	0.0006	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001				<0.0001				<0.0001	

En el Cuadro 4-6 se presentan los resultados de la calidad del agua subterránea (Pozos de Monitoreo, Producción y Artesanal) correspondientes al mes de Septiembre. Los resultados de laboratorio se presentan en el Anexo 11.5.2. La mayoría de los pozos monitoreados cumplen con los valores establecidos en el Acuerdo 236-2006 para entes generadores nuevos y los valores en general se encuentran dentro del rango estadístico de la línea base.

Los valores de pH estuvieron en el rango de 6.3 a 7.82 u.e. y la temperatura en el rango de 20 a 32.6 °C. Las concentraciones registradas de Cloruros y Fluoruros están por debajo de las directrices de la USEPA (250 mg/L).

En los pozos MW-5, MW-6, MW-8, MW11, PSA-SR y PSA-1 los valores registrados de sulfatos se encuentran por encima de los valores establecidos durante el levantamiento de línea base y por las guías de USEPA (250 mg/L). Todos los demás pozos se encuentran por debajo de las directrices que establece la USEPA.

Se reportaron valores de Sólidos Suspendidos Totales (**SST**) en los pozos MW2, MW5, MW7, MW9, MW11, RW-1 y PSA-1 los cuales se encuentran debajo de las guías establecidas por el Banco Mundial y el Acuerdo (50 y 100 mg/L respectivamente) y dentro de los rangos establecidos en la línea base, a excepción del MW2.

El Berilio, Bismuto, Cadmio, Galio, Cromo, Cromo Hexavalente, Mercurio, Níquel, Plata, Talio, Estaño y Escandio no fueron detectados en ninguno de los pozos monitoreados.

El Antimonio se detectó en el pozo 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).

El Hierro fue detectado en los pozos MW-4, MW-7, MW9, MW-11, PSA-SR, RW-1 y PSA-1. El pozo MW-11, MW-9, MW-7 y PSA-1 presenta una concentración por encima de lo establecido por USEPA.

El Arsénico fue detectado en todas las estaciones de pozos de monitoreo y las concentraciones se encuentran dentro los mínimos y máximos establecidos en la línea base y por debajo de lo estipulado por la USEPA (0.01 mg/L).

5 Sedimentos

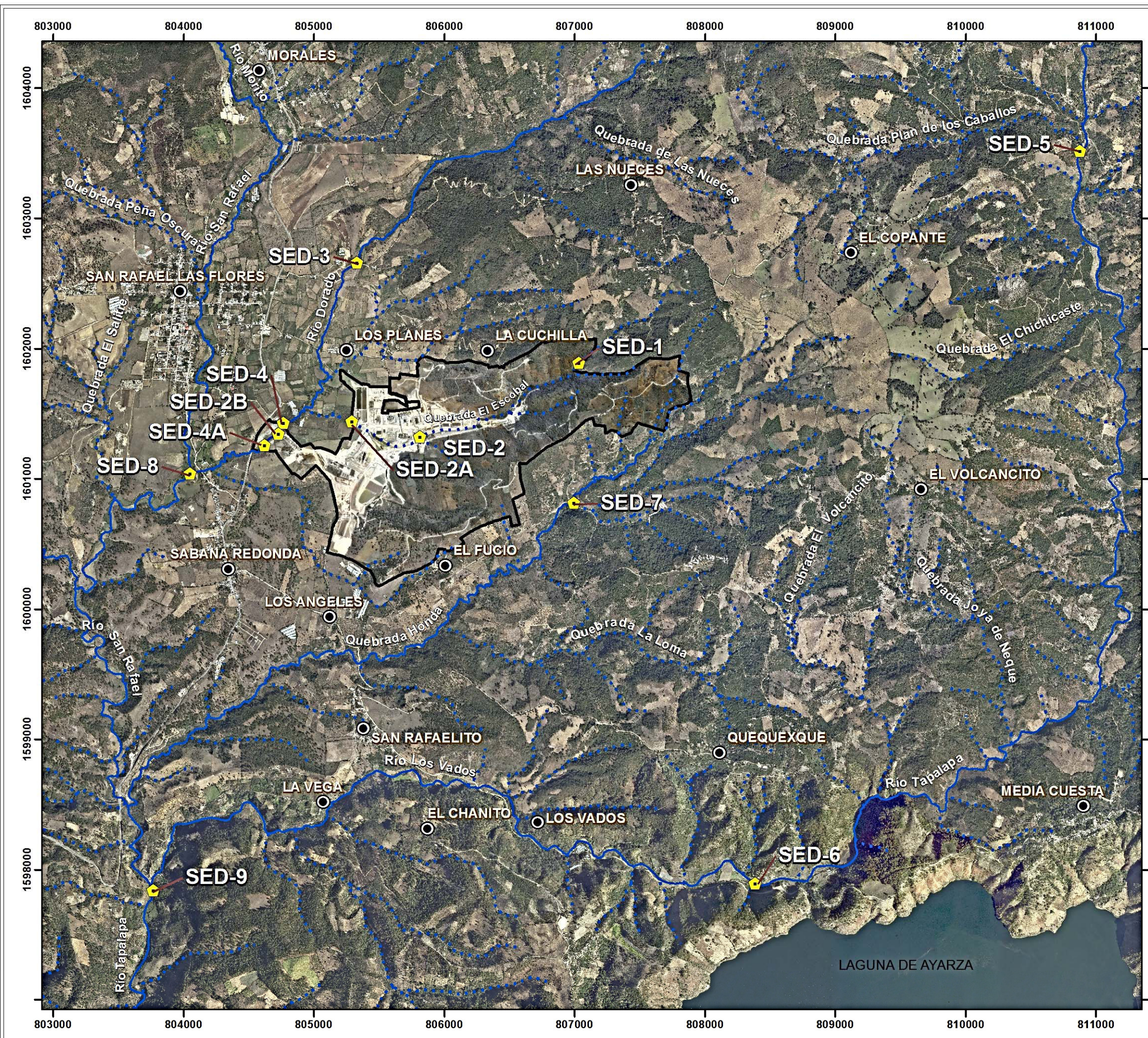
5.1 Sitios de Monitoreo

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

Cuadro 5-1: Sitios de Monitoreo de Sedimento, Proyecto Minero Escobal

Estación	Coordenadas		Sitio
SED1	807,053	1,601,682	Quebrada El Escobal, aguas arriba del proyecto
SED2	805,811	1,601,164	Quebrada El Escobal, en medio del proyecto
SED2A	805,295	1,601,230	Quebrada El Escobal, Salida de la Propiedad
SED3	805,337	1,602,453	Río El Dorado, aguas arriba
SED4	804,781	1,601,228	Río El Dorado, aguas abajo
SED4A	804,629	1,601,052	Río El Dorado, por puente de acceso al Proyecto (Suandys)
SED5	810,882	1,603,313	Río Tapalapa, aguas arriba
SED6	808,391	1,597,689	Río Los Vados, aguas abajo
SED7	806,989	1,600,618	Quebrada La Honda
SED8	804,054	1,600,834	Unión Río San Rafael y El Dorado
SED9	803,772	1,597,635	Río Tapalapa, aguas abajo (cercano a la Ceibita)

Nota: en ninguna de las estaciones monitoreadas se cuenta con línea base de metales en sedimentos. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2014.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO DE SEDIMENTOS

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

Símbolo	Estación	X	Y
	SED-1	807047	1601885
	SED-2	805805	1601367
	SED-2A	805289	1601433
	SED-2B	804728	1601341
	SED-3	805331	1602656
	SED-4	804775	1601431
	SED-4A	804623	1601255
	SED-5	810876	1603516
	SED-6	808385	1597892
	SED-7	806995	1600815
	SED-8	804048	1601037
	SED-9	803766	1597838

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN, Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013, datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical de Grilla: 1,000 metros

Escala 1:30,000

0 312.5 625 1,250 1,875 2,500 Metros

5.2 Metodología

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

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

Parámetros utilizados	
Análisis	Metales Totales, Cianuro Total, Fósforo Total.
Laboratorio contratado	
Nombre	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

Fuente: MSR, 2014.

5.3 Resultados

En el Cuadro 5-3 se presenta los resultados de metales registrados para el mes de Marzo 2014. Los resultados del laboratorio se presentan en el Anexo 0

El porcentaje de fósforo total se encuentra en el rango de 0.006% (SED-7) a 0.037% (SED-2A). No se detectó cianuro en ninguna de las estaciones muestreadas.

El mercurio solo se detectó en todas las estaciones, en concentraciones por debajo de lo establecido (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 valores guía. Todas las estaciones muestreadas registraron concentraciones de Arsénico menor al valor sugerido (50 mg/Kg).

Cuadro 5-3: Resultados de sedimentos, Proyecto Minero Escobal

Parámetro	Unidades	Acuerdo 236-2006	SED-1	SED-2	SED-2A	SED-3	SED-4	SED-4A
		Aplicación al suelo	Sep-14	Sep-14	Sep-14	Sep-14	Sep-14	Sep-14
Arsénico Total	mg/Kg**	50	9.3	44.2	37.6	7.7	15.2	21
Cadmio Total	mg/Kg**	50	0.11	3.09	8.47	0.19	0.58	0.31
Cromo Total	mg/Kg**	1500	2.7	4.2	10.1	2.3	5	5.7
Plomo Total	mg/Kg**	500	11.1	115	521	10.4	28.2	18.9
Mercurio Total	mg/Kg**	25	0.09	0.09	0.18	0.11	0.1	0.09
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.2	<0.2	<0.02	<0.2
Fósforo Total	%		0.017	0.022	0.037	0.014	0.021	0.017

Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7	SED-8	SED-9
		Aplicación al suelo	Sep-14	Sep-14	Sep-14	Sep-14	Sep-14
Arsénico Total	mg/Kg**	50	12.5	4.5	5.9	8.6	5.6
Cadmio Total	mg/Kg**	50	0.24	0.17	0.17	0.31	0.28
Cromo Total	mg/Kg**	1500	2.1	3.6	4.6	2	5.4
Plomo Total	mg/Kg**	500	7	4	12.3	9	8
Mercurio Total	mg/Kg**	25	0.1	0.06	0.08	0.11	0.07
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.2	<0.2	<0.2
Fósforo Total	%		0.007	0.013	0.006	0.013	0.013

mg/Kg: miligramo por kilogramo. ** mg/kg de materia seca a 104°C. %: porcentaje. *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. Fuente: MSR, 2014.

6 Calidad de Efluentes

6.1 Sitios de Monitoreo

En el Cuadro 6-1 se describe la estación de monitoreo del efluente hacia la quebrada El Escobal, del agua proveniente de la planta de tratamiento de aguas especiales. Su ubicación se presenta en la Figura 6-1.

Cuadro 6-1: Sitio de Monitoreo de Calidad de Agua del Efluente de Planta de Tratamiento, Proyecto Minero Escobal

Estación	Coordenadas		Sitio
WW9	805,467	1,601,111	Dispositivo para toma de muestras de la planta de tratamiento de aguas residuales de tipo especial del proceso de minado.

Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2014.



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
EFLUENTES PLANTA DE TRATAMIENTO
DE AGUAS RESIDUALES

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIÓN DE MONITOREO

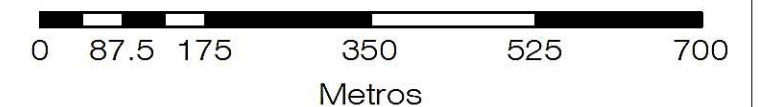
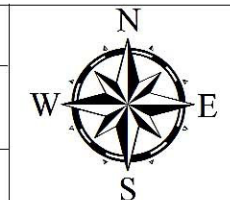
Símbolo	Estación	X	Y
	WW9	805461	1601314

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:8,000



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 <i>Standard Methods for the Examination of Water and Wastewater, part 1060 B</i> 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

Fuente: MSR, 2014.

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, 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, 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.			1600-14	1709-14	2036-14	1351-14	2035-14
Grasas y Aceites	mg/L	10	<5	<5	<5	<5	<5
Materia Flotante	NL	Ausente	ausente	ausente	ausente	ausente	ausente
DBO	mg/L	200	< 10	< 10	< 10	< 10	< 10
DQO		< 25	< 25	< 25	< 25	< 25	
SST (TSS)		100	< 10	< 10	< 10	< 10	< 10
Sólidos Sedimentables		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrógeno Total		20	<1	<1	<1	4	5.9
Fósforo Total		10	<0.05	<0.05	<0.05	N.D.	<0.05
Arsénico		0.1	<0.002	<0.002	<0.002	0.007	0.006
Cadmio		0.1	<0.02	<0.02	<0.02	<0.02	<0.02
Cobre		3	<0.03	<0.03	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Cianuro Total*		1	<0.003	<0.003	<0.003	<0.003	<0.003
Mercurio		0.01	<0.004	<0.004	<0.004	<0.004	<0.004
Níquel		2	<0.05	<0.05	<0.05	<0.05	<0.05
Plomo		0.4	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc		10	<0.01	<0.01	<0.01	<0.01	<0.01
Color Aparente		u Pt/Co	500	< 1	< 1	< 1	< 1
Color Real	< 1			< 1	< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	< 2	< 2	< 2	49	< 2

*análisis realizado por laboratorio AZC. 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. NL = no hay límite establecido para este parámetro. Fuente: MSR, 2014.

Para la preparación de blancos analíticos de los parámetros fisicoquímicos y metales se utilizó agua desmineralizada y 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 0.

Los valores de pH se encontraron en el rango de 7.55 a 7.80 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 totales (**SST**), Arsénico Total, Plomo Total, Cadmio Total, Cobre Total, Cromo Hexavalente, Mercurio Total, Níquel Total y Coliformes fecales están por debajo de los valores establecidos por el acuerdo.

Por lo tanto los resultados obtenidos durante las descargas de la planta de tratamiento cumplen con el Acuerdo Gubernativo 236-2006 para entes generadores nuevos, Banco Mundial para el sector minero y la USEPA.

Cuadro 6-4: Calidad del Efluente de la Planta de Tratamiento, Proyecto Minero Escobal

Mes	Unidades	LMP Acuerdo 236-2006	Valores Indicador Banco Mundial Sector Minero	LMP EPA. CFR 440, Subparte J, 440.102, (a)	Agosto	Septiembre	Octubre
Fecha Muestreo					25/08/2014	10/09/2014	28/10/2014
ID Muestra					WW9	WW9	WW9
No. Reporte Lab.					1602-14	1708-14	2035-14
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.55	7.67	7.80
Temperatura de campo	°C		+/- 3		26.6	26.4	27.8
Temperatura. Quebrada El Escobal					27.75	25.23	25.73
Grasas y Aceites	mg/L	10	10		<5	<5	<5
Materia Flotante		Ausente			ausente	ausente	ausente
DBO	mg/L	200	50		< 10	< 10	< 10
DQO			150		< 25	< 25	< 25
SST (TSS)		100	50	30	< 10	< 10	< 10
Sólidos Sedimentables					< 0.1	< 0.1	< 0.1
Nitrógeno Total		20	10		7.1	9.5	5.9
Fósforo Total		10	2		<0.05	<0.05	<0.05
Arsénico		0.1	0.1		0.006	0.007	0.006
Cadmio		0.1	0.05		<0.02	<0.02	<0.02
Cobre		3	0.3	0.3	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	0.1		<0.05	<0.05	<0.05
Cianuro Total*		1	1		<0.003	<0.003	<0.003
Mercurio		0.01	0.002	0.002	<0.004	<0.004	<0.004
Níquel		2	0.5		<0.05	<0.05	<0.05
Plomo		0.4	0.2	0.6	<0.05	<0.05	<0.05
Zinc		10	0.5	1.5	<0.01	<0.01	<0.01
Color Aparente		u Pt/Co	500			< 1	19
Color Real					< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10⁴	400		23	400	< 2

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. Fuente: MSR, 2014.

7 Vibraciones

7.1 Sitios de Monitoreo

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

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

Estación	Coordenadas		Sitio
BS-1	806,424	1,601,608	Colindancia con Aldea La Cuchilla
BS-2	806,366	1,601,291	Entre ambos portales
BS-3	805,798	1,601,563	Depósito de Suelo

Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar.
Fuente: MSR, 2014.



**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE VIBRACIONES PERMANENTE**

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

Sistema de coordenadas: WGS 1984 UTM Zone 15N
Proyección: Transverse Mercator
Dato: WGS 1984

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Portal de Acceso
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO

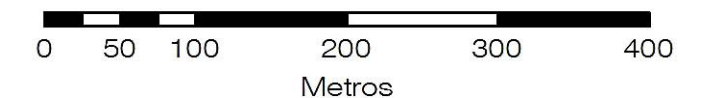
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2013,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2014

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:5,000



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 2014. 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.

Fuente: MSR, 2014.

7.3 Resultados

En el Cuadro 7-3 se presentan todas las mediciones de las voladuras registradas en los instrumentos, y los resultados se encuentran por debajo del límite de detección del equipo (1.3 mm/s). 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 ambiente.

Cuadro 7-3 Resultados de medición de vibraciones, Proyecto Minero Escobal

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1290-6900	1	17:50	<1.3
	1340-6660	1	18:00	<1.3
	1340-6440	1	18:10	<1.3
	1340-6340	1	18:15	<1.3
	1215, ESTE	1	5:55	<1.3
	1315-6460	1	6:00	<1.3
	1340-6700	1	6:05	<1.3
	1340-6740	1	6:10	<1.3
	1340-6400	1	6:15	<1.3
	1386-RAM. E. CENTRAL	1	6:20	<1.3
	1190 Ac. R/E.	1	17:50	<1.3
	1315-6980	1	18:00	<1.3
	1315-6420	1	18:10	<1.3
	1340-6980	1	18:15	<1.3
	1340-6800 Producción	1	18::20	<1.3
	1340-6660	1	18::25	<1.3
	1190, RAM. OESTE	1	5:55	<1.3
	1340-6900, 2 DESGUINCHES	1	6:00	<1.3
	1315-6300	1	6:05	<1.3
	1340-6340	1	6:10	<1.3
	1340-6960	1	6:15	<1.3
	1290-6900	2	17:50	<1.3
	1290-6300	2	18:00	<1.3
	1340-6400	2	18:10	<1.3
	1340-6380	2	18:15	<1.3
	1340-6320	2	18::20	<1.3
	1190. RAM ESTE	2	5:50	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1265-6660	2	5:50	<1.3
	1315-6940	2	5:55	<1.3
	1340-6700	2	6:00	<1.3
	1340-6740	2	6:10	<1.3
	2- DESG. 1340-6660	2	6:10	<1.3
	1215 R/Este	4	17:50	<1.3
	1386 R/Este	4	18:00	<1.3
	1340 6780	4	18:10	<1.3
	1315-6380	4	5:50	<1.3
	1190-R/W	5	17:45	<1.3
	1315-6420	5	17:50	<1.3
	1215-C/F E	5	5:35	<1.3
	1215-C/F W.X.W	5	5:40	<1.3
	1190-SBST. E/C.	5	5:45	<1.3
	1340-6700	5	5:50	<1.3
	1340-6980	5	5:55	<1.3
	1340-7000	6	17:25	<1.3
	1340-6740	6	17:30	<1.3
	1315-1315	6	17:35	<1.3
	1315-6940	6	17:40	<1.3
	1315-6980	6	17:45	<1.3
	1290-6500	6	17:50	<1.3
	1290-6980	6	17:55	<1.3
	producción 1290-6600	6	5:35	<1.3
	producción 1290-6500	6	5:40	<1.3
	1340-c/w ESTE	6	5:45	<1.3
	1340-6320	6	5:50	<1.3

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Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1340-6620	6	5:55	<1.3
	6980-1290	7	17:25	<1.3
	1315-6420	7	17:30	<1.3
	6400-1340	7	17:35	<1.3
	6700-1340	7	17:40	<1.3
	1215-C/E	7	17:45	<1.3
	1215/C/O	7	17:50	<1.3
	1110-ESTE	7	18:00	<1.3
	1315-6380	7	5:30	<1.3
	1340-6980	7	5:35	<1.3
	1340-6820	7	5:40	<1.3
	1215-C/F.E.W	7	5:45	<1.3
	1215-C/F.W.W	7	5:50	<1.3
	1290 R/W	7	5:55	<1.3
	1290-6600 Producción	7	6:00	<1.3
	6380-1315	8	17:25	<1.3
	6740-1340	8	17:30	<1.3
	6780-1340	8	17:35	<1.3
	c/e-1315	8	17:40	<1.3
	6500-1290	8	17:45	<1.3
	1315-6940	8	5:30	<1.3
	1290-6900	8	5:35	<1.3
	1340-7020	8	5:40	<1.3
	1340-c/f .E	8	5:45	<1.3
	1340-6620	8	5:50	<1.3
	1315-6480	9	17:25	<1.3
	c/e-1215/o	9	17:30	<1.3
	c/o-1215/o	9	5:35	<1.3
	1340-6700	9	5:40	<1.3
	6320-1340	9	5:45	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1190-Ac. R/E.	9	5:30	<1.3
	1290-6980 Producción	9	5:35	<1.3
	1315-6980	9	5:40	<1.3
	1315-6560 dos desguinches	9	5:45	<1.3
	1340-6380	9	5:50	<1.3
	1340-6740	9	6:00	<1.3
	1315-6460	9	6:05	<1.3
	1315-6440	9	6:10	<1.3
	1340-6820	10	17:25	<1.3
	1215-c/e	10	17:30	<1.3
	1215-c/o	10	17:35	<1.3
	6420-1315	10	17:40	<1.3
	1290-6980 Producción	10	5:30	<1.3
	1290-6600 Producción	10	5:35	<1.3
	1315 C/F.E.	10	5:40	<1.3
	1315-7000 Requema	10	5:45	<1.3
	1315-6420	10	5:50	<1.3
	1340-6780	10	6:00	<1.3
	1340-6400	10	6:05	<1.3
	1290-6840 Moneo de roca	10	6:10	<1.3
	C/E-1340	11	17:25	<1.3
	6230-1340	11	17:30	<1.3
	1315-6480	11	17:35	<1.3
	1340	11	17:40	<1.3
	1386-ESTE	11	17:45	<1.3
	1110-DE	11	18:00	<1.3
	1315-6460	11	5:30	<1.3
	1315-6380	11	5:35	<1.3
	1340-6740	11	5:40	<1.3
	1315-6700	12	17:25	<1.3

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Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1340-6820	12	17:30	<1.3
	C/E-1215	12	17:35	<1.3
	C/O-1215	12	17:40	<1.3
	1340-7220	12	17:30	<1.3
	1190-R/W	12	17:35	<1.3
	1340-6700	13	17:25	<1.3
	1340-6740	13	17:30	<1.3
	1340-6780	13	17:35	<1.3
	1290-6500	13	17:40	<1.3
	1315-6700	13	5:30	<1.3
	1190 R/W	13	5:35	<1.3
	1290-6900	13	5:40	<1.3
	1340-6620	13	5:45	<1.3
	1340-6380	13	5:50	<1.3
	1340-6820	13	5:55	<1.3
	1386 R/E	14	17:25	<1.3
	1290-6980-PRODUCCION	14	17:30	<1.3
	1315-6420	14	17:35	<1.3
	1190-ACC/R/E	14	17:40	<1.3
	1340-6360	14	17:45	<1.3
	1265-C/F.ESTE	14	17:50	<1.3
	1315-6910	14	17:55	<1.3
	6320-1340	14	5:30	<1.3
	6320-1340	14	5:35	<1.3
	1315-6920	14	5:40	<1.3
	1290-6500	14	5:45	<1.3
	1340-C/E	14	5:50	<1.3
	1190-ESTE	14	5:55	<1.3
	6900-1290	15	17:25	<1.3
	1340-6740	15	17:30	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1340-6820	15	17:35	<1.3
	1340-6580	15	17:40	<1.3
	1315-6480 PRODUCCION	15	17:45	<1.3
	1340-6320	15	5:30	<1.3
	1340-6620	15	5:35	<1.3
	6780-1340	15	5:40	<1.3
	1215-C/O	15	5:45	<1.3
	1315-6940	15	5:50	<1.3
	1190-ESTE	15	5:55	<1.3
	1340-CF/E	16	17:25	<1.3
	1340-6820	16	17:30	<1.3
	1190-W	16	17:35	<1.3
	1386	16	17:40	<1.3
	1190-ACC	16	17:45	<1.3
	1215-C/E	16	5:30	<1.3
	1215/C/O	16	5:35	<1.3
	1315-6480/E	16	5:40	<1.3
	1315-6480	16	5:45	<1.3
	1340-6780	17	17:25	<1.3
	1340-6340	17	17:30	<1.3
	1340-6620	17	17:35	<1.3
	1290-6500	17	17:40	<1.3
	1315-6700 PRODUCCION	17	17:45	<1.3
	1190-ACC.RAM.E	17	17:45	<1.3
	1215 C/E	17	5:30	<1.3
	1215/C/O	17	5:35	<1.3
	1315-6480/E	17	5:40	<1.3
	1315-6480	17	5:45	<1.3
	DESG.1315-6420	18	17:25	<1.3
	DESG.1315-7020	18	17:30	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1315-6980	18	17:35	<1.3
	1386-RAM.E	18	17:40	<1.3
	6820-1340	18	5:30	<1.3
	6380-1315	18	5:35	<1.3
	6900-1290	18	5:40	<1.3
	1315-6980	19	17:25	<1.3
	1290-6500	19	17:30	<1.3
	1340-6520	19	17:35	<1.3
	6780-1340	19	5:30	<1.3
	6980-1340	19	5:35	<1.3
	6900-1290	19	5:40	<1.3
	PRODUCCION 1215-6700	20	17:25	<1.3
	1315-6500	20	17:30	<1.3
	1340-6620	20	17:35	<1.3
	1386-RAM.E.	20	17:40	<1.3
	1290-6500	20	17:45	<1.3
	1315-6980	20	17:50	<1.3
	6740-1340	20	5:30	<1.3
	6820-1340	20	5:35	<1.3
	6900-1290	20	5:40	<1.3
	1215-C/E	20	5:45	<1.3
	1340-C/E	20	5:50	<1.3
	1340-7020	21	17:30	<1.3
	1340-6580	21	17:35	<1.3
	1340-6520	21	17:40	<1.3
	1386 R/E	21	17:45	<1.3
	1215-R/E ESTE	21	17:50	<1.3
	1215-R/EOESTE	21	17:55	<1.3
	C.F.E-1340	21	18:00	<1.3
	6980-1340	21	5:30	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	6500-1315	21	5:35	<1.3
	6820-1315	21	5:40	<1.3
	1190-ACC.RAM.E	21	5:45	<1.3
	1386-r/e	22	17:30	<1.3
	1340-6820	22	17:35	<1.3
	1340-6620	22	17:40	<1.3
	1315-6580	22	5:30	<1.3
	1340-6500	22	5:35	<1.3
	1340-6740	22	5:40	<1.3
	1190-oeste	22	5:45	<1.3
	1290-6500	22	5:50	<1.3
	1290-6660	22	5:55	<1.3
	1390-6780	22	6:00	<1.3
	1315-6560 PRODUCCION	23	17:30	<1.3
	1340-6580	23	17:35	<1.3
	1340-7020	23	17:40	<1.3
	1340-C/F.E	23	17:45	<1.3
	1290-6900	23	17:50	<1.3
	1265-6650 DESG	23	17:55	<1.3
	1265-6680 DESG	23	18:00	<1.3
	1315-6700 PRODUCCION	23	5:30	<1.3
	1290-6780 PLASTE0	23	5:35	<1.3
	1340-6520	23	5:40	<1.3
	1340-6980	23	5:45	<1.3
	1386-RAM.E	23	5:50	<1.3
	1215-C/E.OESTE	23	5:55	<1.3
	1290-6500	23	6:00	<1.3
	1340-6500	24	17:30	<1.3
	1340-6980	24	17:35	<1.3
	1290-6900	24	17:40	<1.3

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Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1190-ACC.ESTE	24	5:30	<1.3
	1265-6650	24	5:35	<1.3
	1386-RAM.ESTE	24	5:40	<1.3
	1340-6620	24	5:45	<1.3
	1340-6280	24	5:50	<1.3
	1315-6580	25	17:30	<1.3
	1265-6690	25	17:35	<1.3
	1215-6480 R/W	25	17:40	<1.3
	1290-6900	25	5:30	<1.3
	1315-6560 PRODUCCION	26	17:30	<1.3
	1290-6700 MONEO	26	17:35	<1.3
	1386 R/E	26	17:40	<1.3
	1665-6690	26	17:45	<1.3
	1265-6650	26	17:50	<1.3
	1340-6500	26	5:30	<1.3
	1340-6980	26	5:35	<1.3
	1290-6780 PLASTEO	26	5:40	<1.3
	1215-CF OESTE	26	5:45	<1.3
	1215-6480	26	5:50	<1.3
	1315-6660 PRODUCCION	27	17:30	<1.3
	1386-R/E	27	17:35	<1.3
	1315-6500	27	17:40	<1.3
	1340-6820	27	17:45	<1.3
	1340-6500	27	17:50	<1.3
	1215-C/E	27	17:55	<1.3
	1190-R/OESTE	27	18:00	<1.3
	6690-1265	27	18:05	<1.3
	1315-580	27	5:30	<1.3
	1340-6580	27	5:35	<1.3
	1340-C.ESTE	27	5:40	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1290-6500	27	5:45	<1.3
	1215-OESTE	27	5:50	<1.3
	1340-6620	27	5:55	<1.3
	1340-6500	28	17:30	<1.3
	1340-6980	28	17:35	<1.3
	1265-6650	28	17:40	<1.3
	1290-6900	28	17:45	<1.3
	1386 ESTE	28	17:50	<1.3
	1315-6660 PRODUCCION	28	17:55	<1.3
	1315-6900	28	5:30	<1.3
	1315-6500	28	5:35	<1.3
	1340-7020	28	5:40	<1.3
	1340-6740	28	5:45	<1.3
	1215/F.E	28	5:50	<1.3
	1190 R/E DESG ESTE	28	5:55	<1.3
	1190 R/E DESG OESTE	28	6:00	<1.3
	1340-6620	29	17:30	<1.3
	1315-6580	29	17:35	<1.3
	1290-6500	29	17:40	<1.3
	1315-6660	29	17:45	<1.3
	1340-6580	29	5:30	<1.3
	1340 C/F	29	5:35	<1.3
	1386-R/E	29	5:40	<1.3
	1215-R/W	29	5:45	<1.3
	1315-6480	29	5:50	<1.3
	1290-6900	29	5:55	<1.3
	1340-6980	30	17:30	<1.3
	1340-6740	30	17:35	<1.3
	1215-C/E	30	17:40	<1.3
	1265/6690	30	17:45	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1315-6780	30	17:50	<1.3
	1215-6480	30	5:30	<1.3
	1315-C/F.E	30	5:35	<1.3
	1215-6690	30	5:40	<1.3
	1340-6500	30	5:45	<1.3
	1340-7020	30	5:50	<1.3
	1315-6900	30	5:55	<1.3
Septiembre	1386-rampa	1	17:30	<1.3
	1290-6500	1	17:35	<1.3
	1315-6500	1	5:30	<1.3
	1315-6580	1	5:35	<1.3
	1315-6660	2	17:30	<1.3
	1340-	2	17:35	<1.3
	1265-6650	2	17:40	<1.3
	1265-6690	2	17:45	<1.3
	1315-6900	2	5:30	<1.3
	1340-6620	2	5:35	<1.3
	1386-R/E	2	5:40	<1.3
	1290-6500	2	5:45	<1.3
	1215-6460	2	5:50	<1.3
	1215-6480	2	5:55	<1.3
	1190-R/W REQUEMA	2	6:00	<1.3
	1340-6500	3	17:30	<1.3
	1340-6580	3	17:35	<1.3
	1340-6980	3	17:40	<1.3
	1265-6500	3	17:45	<1.3
	1265-6690	3	17:50	<1.3
	1190-V/E	3	17:55	<1.3
	1340-6980	3	5:30	<1.3
	1190-R/W DESG	3	5:35	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1190-R/W C/F.W DESG	3	5:40	<1.3
	1265-6650	3	5:45	<1.3
	1315-6780 PRODUCCION	3	5:50	<1.3
	1290-6500	4	17:30	<1.3
	1215-C/E	4	17:35	<1.3
	1340-VENTILACION	4	17:40	<1.3
	1315-6900	4	17:45	<1.3
	1315-6580	4	17:50	<1.3
	1215-6480	4	5:30	<1.3
	1265-6500	4	5:35	<1.3
	1340-6620	4	5:40	<1.3
	1315-6500	4	5:45	<1.3
	1315-6660	4	5:50	<1.3
	1425 RAM.EST	5	17:30	<1.3
	1340-6500	5	17:35	<1.3
	1190-CF/E	5	17:40	<1.3
	1190-CF/W	5	17:45	<1.3
	1340-6580	5	17:50	<1.3
	1190-VENT/CHIMENEA	5	17:55	<1.3
	1215-C/E/W	5	5:30	<1.3
	1290-6500	5	5:35	<1.3
	1340-6820	5	5:40	<1.3
	1340-6980	5	5:45	<1.3
	1190-CF/W	6	17:30	<1.3
	1425-R.ESTE	6	17:35	<1.3
	1315-6900	6	17:40	<1.3
	1315-6500	6	17:45	<1.3
	1315-6580	6	5:30	<1.3
	1340-6500	6	5:35	<1.3
	1340-6580	6	5:40	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1340-6620	7	17:30	<1.3
	1315-6500	7	17:35	<1.3
	1290-6500	7	17:40	<1.3
	1240-ACC.E	7	17:45	<1.3
	1315-6780 PRODUCCION	7	5:30	<1.3
	1315-6580	7	5:35	<1.3
	1340-ACC	8	17:30	<1.3
	1190-C/E	8	5:30	<1.3
	1340-6820	9	17:30	<1.3
	1215-6400	9	17:35	<1.3
	1290-6500	9	17:40	<1.3
	1215-C/E	9	5:30	<1.3
	1215-C/O	9	5:35	<1.3
	1215-6720	9	5:40	<1.3
	1340-6500	9	5:45	<1.3
	1265-6650	10	17:30	<1.3
	1265-6690	10	17:35	<1.3
	1215-C/F E	10	17:40	<1.3
	1315-6500	10	17:45	<1.3
	1340-6620	10	17:50	<1.3
	1386-R.E	10	17:55	<1.3
	1190-C/E	10	5:30	<1.3
	1190-C/O E	10	5:35	<1.3
	1340-6340	10	5:40	<1.3
	1315-6900	10	5:45	<1.3
	1315-6380	11	17:30	<1.3
	1340-6380	11	17:35	<1.3
	1190-6500	11	17:40	<1.3
1315-6620	11	17:45	<1.3	
1340-6700	11	5:30	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1340-6620	11	5:35	<1.3
	1315-6380	11	5:40	<1.3
	1290-6580	11	5:45	<1.3
	1265-6500	11	5:50	<1.3
	1315-6380	12	17:30	<1.3
	1340-6380	12	17:35	<1.3
	1190-6500	12	17:40	<1.3
	1315-6620	12	17:45	<1.3
	1315-6900	12	5:30	<1.3
	1340-6340	12	5:35	<1.3
	1315-6780	12	5:40	<1.3
	1190-R/E CHIMENEA	12	5:45	<1.3
	1290-66580	13	17:30	<1.3
	1240-4C	13	17:35	<1.3
	1340-6580	13	17:40	<1.3
	1290-6740	13	17:45	<1.3
	1190-R.E	13	17:50	<1.3
	1365-C/F.W	13	17:55	<1.3
	1315-6380	13	5:30	<1.3
	1265-6580	13	5:35	<1.3
	1215-CF.W	13	5:40	<1.3
	1290-6620 PRODUCCION	13	5:45	<1.3
	1190-ACC.E CHIMENEA	13	5:50	<1.3
	1190-R.E	14	17:30	<1.3
	1240 4 C	14	17:35	<1.3
	1265-6500	14	17:40	<1.3
	1240-6380	14	17:45	<1.3
	1386-R.E	14	17:50	<1.3
	1290-PRODUCCION	14	17:55	<1.3
	1290-6500	14	5:30	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1315-6500	14	5:35	<1.3
	1340-6700	14	5:40	<1.3
	1290-6740	14	5:45	<1.3
	1190- CHIMENEA	15	17:30	<1.3
	1365- C/F .E	15	17:35	<1.3
	1190-R/W	15	17:40	<1.3
	11190-R/W C/F W	15	17:45	<1.3
	1265-6690	15	17:50	<1.3
	1265-6650	15	17:55	<1.3
	1215-C/F E.X.M	15	5:30	<1.3
	1265-6580	15	5:35	<1.3
	1340-6820	15	5:40	<1.3
	1340-6380	15	5:45	<1.3
	1290-6620 PRODUCCION	15	5:50	<1.3
	1315-6580	16	17:30	<1.3
	1365-R/E	16	17:35	<1.3
	1365-R/W	16	17:40	<1.3
	1215- C/F.E	16	17:45	<1.3
	1190-CHIMENEA	16	17:50	<1.3
	1386-RAM.E	16	5:30	<1.3
	1265-6690	16	5:35	<1.3
	1340-6700	17	17:30	<1.3
	1340-6620	17	17:35	<1.3
	1315-6900	17	17:40	<1.3
	1215-C/F	17	17:45	<1.3
	1265-6500	17	17:50	<1.3
	1265-6580	17	17:55	<1.3
	1290-6620 PRODUCCION	17	5:30	<1.3
	1190-ESTE	17	5:35	<1.3
	1340-6340	17	5:40	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1340-6580	17	5:45	<1.3
	1290-6580	17	5:50	<1.3
	1215-C/F E.X.M	17	5:55	<1.3
	1240-W	17	6:00	<1.3
	1190-c/e	18	17:30	<1.3
	1190-C/O	18	17:35	<1.3
	1265-7020	18	17:40	<1.3
	1315-6500	18	17:45	<1.3
	1190-CHIMENEA	18	17:50	<1.3
	1190-R/E CHIMENEA	18	5:30	<1.3
	1190-C/F-E/W	18	5:35	<1.3
	1190 CF-R/W	18	5:40	<1.3
	1215-6720	18	5:45	<1.3
	1315-6580	18	5:50	<1.3
	1340-6700	18	5:55	<1.3
	1315-6900	19	17:30	<1.3
	1340-6620	19	17:35	<1.3
	1315-6600	19	17:40	<1.3
	1190-C/O-/E	19	17:45	<1.3
	1190-CHIMENEA	19	17:50	<1.3
	1190-6940	19	17:55	<1.3
	1265-6900	19	18:00	<1.3
	1190-R/E CHIMENEA	19	5:30	<1.3
	1290-6740	19	5:35	<1.3
	1340-6500	19	5:40	<1.3
	1290-6580	19	5:45	<1.3
	1265-6550	19	5:50	<1.3
	1240-R/E	19	5:55	<1.3
	1265-6580	19	6:00	<1.3
	1290-6580	20	17:30	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1340-6620	20	17:35	<1.3
	1190-CHIMENEA	20	17:40	<1.3
	1265-6690	20	17:45	<1.3
	1215-6720	20	17:50	<1.3
	1190-R/E	20	5:30	<1.3
	1190-C/F	20	5:35	<1.3
	1340-6580	20	5:40	<1.3
	1190-ESTE	21	17:30	<1.3
	1265-6900	21	17:35	<1.3
	1190 R/E	21	5:30	<1.3
	1190-C/FE R/E	21	5:35	<1.3
	1190 ESTE CHIMENEA	22	17:30	<1.3
	1215-C/F	22	17:35	<1.3
	1190 R/ESTE CHIMENEA	22	5:30	<1.3
	1265-6690	22	5:35	<1.3
	1215-C/F R/E	22	5:40	<1.3
	1215-6720	22	5:45	<1.3
	1190 R/ESTE CHIMENEA	23	5:30	<1.3
	1265-6690	23	5:35	<1.3
	1215-C/F R/E	23	5:40	<1.3
	1215-6720	23	5:45	<1.3
	1290-6620	23	17:30	<1.3
	1190-6340	23	17:35	<1.3
	1265-6650	23	17:40	<1.3
	1190 CHIMENEA	23	17:45	<1.3
	1190-C/F-R/E	23	5:30	<1.3
	1215-6500	23	5:35	<1.3
	1365-R/E	23	5:40	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1365-R/W	23	5:45	<1.3
	1340-6340	24	17:30	<1.3
	1340-6620	24	17:35	<1.3
	1190-6940	24	5:40	<1.3
	1215-C/E	24	17:45	<1.3
	1240 -ESTE	24	17:50	<1.3
	1290-6580	24	17:55	<1.3
	1315-6900	24	5:30	<1.3
	1340-6700	24	5:35	<1.3
	1215-C/F	24	5:40	<1.3
	1215-R/E	24	5:45	<1.3
	1190-6340	24	5:50	<1.3
	1190 R/E	24	5:55	<1.3
	1315-6600	24	6:00	<1.3
	1340-6580	25	17:30	<1.3
	1340-6820	25	17:35	<1.3
	1290-VENTILACION	25	17:40	<1.3
	1265-6900	25	17:45	<1.3
	1215-6720	25	17:50	<1.3
	1340-6380	25	5:30	<1.3
	1315-6900	25	5:35	<1.3
	1340-6580	25	5:40	<1.3
	1290-ESTE	25	5:45	<1.3
	1215-6500	25	5:50	<1.3
	1190-CHIMENEA	25	5:55	<1.3
	1315-6900	26	17:30	<1.3
	1365-ACC.E	26	17:35	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1365-CF/E.W	26	17:40	<1.3
	1240-RAM.E	26	17:45	<1.3
	1190-6940	26	17:50	<1.3
	1340-6620	26	5:30	<1.3
	1315-6580	26	5:35	<1.3
	1265-6900	26	5:40	<1.3
	1340-6700	27	17:30	<1.3
	1340-6580	27	17:35	<1.3
	1265-6690	27	17:40	<1.3
	1315-6600	27	17:45	<1.3
	1190 CHIMENEA	27	17:50	<1.3
	1190-CHIMENEA	27	5:30	<1.3
	1315-6900	27	5:35	<1.3
	1190-C/O ESTE	27	5:40	<1.3
	1290-6860	28	17:30	<1.3
	1265-6650	28	17:35	<1.3
	1265-6580 MONEO	28	17:40	<1.3
	1190 CHIMENEA	28	17:45	<1.3
	1315-6000	28	5:30	<1.3
	1340-6620	28	5:35	<1.3
	1190-C/E	28	5:40	<1.3
	1190-ACC-CHIMENEA	29	17:30	<1.3
	1340-6580	29	17:35	<1.3
	1215-CF/ESTE	29	17:40	<1.3
	1215-6500	29	17:45	<1.3
	1240-ACC R.E	29	17:50	<1.3
1365-AC/E	29	5:30	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)	
Septiembre	1315-6320	29	5:35	<1.3	
	1190-ESTE	29	5:40	<1.3	
	1240-ACCESO	29	5:45	<1.3	
	1190-6740	29	5:50	<1.3	
	1190-C/E	29	5:55	<1.3	
	1190-ACC-CHIMENEA	30	17:30	<1.3	
	1340-6580	30	17:35	<1.3	
	1215-CF/ESTE	30	17:40	<1.3	
	1215-6500	30	17:45	<1.3	
	1240-ACC R.E	30	17:50	<1.3	
	1365-AC/E	30	5:30	<1.3	
	1315-6320	30	5:35	<1.3	
	1190-ESTE	30	5:40	<1.3	
	1240-ACCESO	30	5:45	<1.3	
	1190-6740	30	5:50	<1.3	
	1190-C/E	30	5:55	<1.3	
	Octubre	1265-6690	1	17:30	<1.3
		1190-C/W	1	17:35	<1.3
1340-6620		1	17:40	<1.3	
1340-6700		1	17:45	<1.3	
1265-6650		1	17:50	<1.3	
1315-6600		1	17:55	<1.3	
1190 CHIMENEA		1	18:00	<1.3	
1190 CHIMENEA		1	5:30	<1.3	
1290-7020		1	5:35	<1.3	
1215-C/O		1	5:40	<1.3	
1215-6700	1	5:45	<1.3		

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1340-6340	1	5:50	<1.3
	1340-6020	1	5:55	<1.3
	1265-6900	1	6:00	<1.3
	1315-6900	1	6:05	<1.3
	1215-C/E	2	17:30	<1.3
	1215-6540	2	17:35	<1.3
	1386-ESTE	2	17:40	<1.3
	1365-SUB ESTACION	2	17:45	<1.3
	1290-6690	2	17:50	<1.3
	1386-R/E	2	5:30	<1.3
	1215-6740	2	5:35	<1.3
	1190-CF/R/W	2	5:40	<1.3
	1315-6980	2	5:45	<1.3
	1365-CF/R/W	2	5:50	<1.3
	1215-C/F	3	17:30	<1.3
	1190-R/E	3	17:35	<1.3
	1365-C/F W	3	17:40	<1.3
	1265-6500	3	17:45	<1.3
	1340-6340	3	5:30	<1.3
	1340-6580	3	5:35	<1.3
	1265-6540	3	5:40	<1.3
	1190-6340	3	5:45	<1.3
	1190 CHIMENEA	3	5:50	<1.3
	1190-C/F	4	17:30	<1.3
	1190-R/E	4	17:35	<1.3
	1315-6900	4	17:40	<1.3
	1265-6690	4	17:45	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1290-6540	4	5:30	<1.3
	1365-ACC	4	5:35	<1.3
	1190-6940	4	5:40	<1.3
	1215-6500	4	5:45	<1.3
	1190-CF/E	4	5:50	<1.3
	1190-CHIMENEA	4	5:55	<1.3
	1215-CF E.X.W	4	6:00	<1.3
	1215-C/F.W	5	17:30	<1.3
	1215-6700	5	17:35	<1.3
	1265-6900	5	17:40	<1.3
	1265-6690	5	17:45	<1.3
	1365-SUB ESTE	5	5:30	<1.3
	1290-6800	5	5:35	<1.3
	1215-6500	5	5:40	<1.3
	1315-6580	6	17:30	<1.3
	1365-R/W	6	17:35	<1.3
	1190-C/F	6	17:40	<1.3
	1190-E	6	5:30	<1.3
	1365-SUB ESTE	6	5:35	<1.3
	1265-6520	6	5:40	<1.3
	1290-6540	6	5:45	<1.3
	1240-este	7	5:30	<1.3
	1190-CF/E	7	5:35	<1.3
	1315-6580	7	5:40	<1.3
	1190-CHIMENEA	7	5:45	<1.3
	1290-6860	7	5:50	<1.3
	1315-6320	7	5:55	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1265-6540	8	17:30	<1.3
	1265-6690	8	17:35	<1.3
	1265-6500	8	17:40	<1.3
	1340-6580	8	17:45	<1.3
	1290-7020	8	17:50	<1.3
	1215-VENTILACION	8	17:55	<1.3
	1215-6520	8	18:00	<1.3
	1215 C/F	8	18:05	<1.3
	1190-CF.R/E	8	5:30	<1.3
	1190-CF.W.E	8	5:35	<1.3
	1340-7000	8	5:40	<1.3
	1365-ACC.E	8	5:45	<1.3
	1190-CHIMENEA	8	5:50	<1.3
	1215-6700	9	17:30	<1.3
	1215-C/O	9	17:35	<1.3
	1340-6940	9	17:40	<1.3
	1340-6420	9	17:45	<1.3
	1315-6900	9	17:50	<1.3
	1265-6900	9	5:30	<1.3
	1340-6580	9	5:35	<1.3
	1265-6500	9	5:40	<1.3
	1190 R/E	9	5:45	<1.3
	1240-AC	9	5:50	<1.3
	1190-C/F R/W	9	5:55	<1.3
	1190-6940	9	6:00	<1.3
	1290-6860	10	17:30	<1.3
	1290-6540	10	17:35	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-CE/E	10	17:40	<1.3
	1360-SUB OESTE	10	17:45	<1.3
	1190-C/O	10	17:50	<1.3
	1190-CHIMENEA	10	17:55	<1.3
	1265-6540	10	5:30	<1.3
	1315-6580	10	5:35	<1.3
	1340-6420	10	5:40	<1.3
	1340-6940	10	5:45	<1.3
	1215-ACC	10	5:50	<1.3
	1190-C/E	11	17:30	<1.3
	1190-CHIMENA	11	17:35	<1.3
	1315-6900	11	17:40	<1.3
	1365-C/E	11	17:45	<1.3
	1290-6860	11	17:50	<1.3
	1315-6840	11	17:55	<1.3
	1215-C/F	11	5:30	<1.3
	1215-6520	11	5:35	<1.3
	1215-SERVICIOS	11	5:40	<1.3
	1290-6540	11	5:45	<1.3
	1265-6900	11	5:50	<1.3
	1190-CHIMENEA	11	5:55	<1.3
	1190-CHIMENEA	12	17:30	<1.3
	1215-6700	12	17:35	<1.3
	1215-CO/E	12	17:40	<1.3
	1315-6580	12	17:45	<1.3
	1265-6540	12	17:50	<1.3
	1340-7000	12	5:30	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-R/W	12	5:35	<1.3
	1190-C/F	12	5:40	<1.3
	1190-CHIMENEA	12	5:45	<1.3
	1290-6540	13	17:30	<1.3
	1340-4000	13	17:35	<1.3
	1190 C/O	13	17:40	<1.3
	1240-ESTE	13	17:45	<1.3
	1315-6840	13	17:50	<1.3
	1190 CHIMENEA	13	17:55	<1.3
	1190 R/E	13	5:30	<1.3
	1340-6380	13	5:35	<1.3
	1190-CHIMENEA	14	17:30	<1.3
	1265-6500	14	17:35	<1.3
	1240-C/F E	14	17:40	<1.3
	1240-C/F W	14	17:45	<1.3
	1190-C/F OESTE	14	17:50	<1.3
	1190-CHIMENEA	14	5:30	<1.3
	1290-6540	14	5:35	<1.3
	1265-6540	14	5:40	<1.3
	1290-6860	14	5:45	<1.3
	1215-C/F R/E	14	5:50	<1.3
	1190-CHIMENEA	15	17:30	<1.3
	1365-ACC-E	15	17:35	<1.3
	1265-6500	15	17:40	<1.3
	1190-ESTE	15	17:45	<1.3
	1190-OESTE	15	17:50	<1.3
1215-C/E	15	17:55	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1315-6440	15	18:00	<1.3
	1340-6940	15	18:05	<1.3
	1190-CHIMENEA	15	5:30	<1.3
	1315-6580	15	5:35	<1.3
	1290-6540	15	5:40	<1.3
	1240-NICHO	16	17:30	<1.3
	1190-CHIMENEA	16	17:35	<1.3
	1240-CF/W	16	17:40	<1.3
	1340-640	16	17:45	<1.3
	1290-6540	16	17:50	<1.3
	1265-6520	16	17:55	<1.3
	1240-CF/E	16	18:00	<1.3
	1215-OESTE	16	5:30	<1.3
	1212-C/E OESTE	16	5:35	<1.3
	1190-CHIMENEA	16	5:40	<1.3
	1340-7000	16	5:45	<1.3
	1340-6940	16	5:50	<1.3
	1190-CHIMENEA	17	17:30	<1.3
	1340-6940	17	17:35	<1.3
	1265-6620	17	17:40	<1.3
	1315-6840	17	17:45	<1.3
	1290-6540	17	17:50	<1.3
	1290-6860	17	17:55	<1.3
	1190-C/E	17	5:30	<1.3
	1190-C/E OESTE	17	5:35	<1.3
	1190-CO/ESTE	17	5:40	<1.3
1340-6420	17	5:45	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1315-6540	17	5:50	<1.3
	1340-7000	18	17:30	<1.3
	1365-CF.EXW	18	17:35	<1.3
	1215-6740	18	17:40	<1.3
	1215-CF/ESTE	18	17:45	<1.3
	1190-CHIMENEA	18	17:50	<1.3
	1265-6610	18	5:30	<1.3
	1190-CHIMEMEA	18	5:35	<1.3
	1215-C/O	18	5:40	<1.3
	1215-6520	18	5:45	<1.3
	1365-ACC-ESTE	19	17:30	<1.3
	1215-6440	19	17:35	<1.3
	1190-CHIMENEA	19	17:40	<1.3
	1290-6540	19	17:45	<1.3
	1315-6340	19	5:30	<1.3
	1265-6500	19	5:35	<1.3
	1315-6540	19	5:40	<1.3
	1315-6660	19	5:45	<1.3
	1190-OESTE	19	5:50	<1.3
	1215-6520	20	17:30	<1.3
	1215-SERV.W	20	17:35	<1.3
	1340-6940	20	17:40	<1.3
	1190-CHIMENEA	20	17:45	<1.3
	1386-R/E	20	17:50	<1.3
	1315-6840	20	5:30	<1.3
	1215-6740	20	5:35	<1.3
1265-6610	20	5:40	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1290-6690	20	5:45	<1.3
	1190-DUMAS	20	5:50	<1.3
	1240-C/E	20	5:55	<1.3
	1190-C/O ESTE	20	6:00	<1.3
	1215-6680	21	17:30	<1.3
	1215-CF/R/E	21	17:35	<1.3
	1315-6660	21	5:30	<1.3
	1190-C/E OESTE	21	5:35	<1.3
	1190-CHIMENEA	21	5:40	<1.3
	1290-6690	21	5:45	<1.3
	1215-6440	22	17:30	<1.3
	1365-ACC	22	17:35	<1.3
	1340-6420	22	17:40	<1.3
	1340-6940	22	17:45	<1.3
	1315-6660	22	5:30	<1.3
	1240-C/O	22	5:35	<1.3
	1290-6840	22	5:40	<1.3
	1240-REQUEMA	22	5:45	<1.3
	1240-C/E	22	5:50	<1.3
	1340-7000	22	5:55	<1.3
	1315-6540	22	6:00	<1.3
	1290-6540	22	6:05	<1.3
	1386-R/E	23	17:30	<1.3
	1190-C/F R/E	23	17:35	<1.3
	1190-R/E	23	17:40	<1.3
	1365-C/F R/W	23	17:45	<1.3
1340-6900	23	17:50	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1215-R/E	23	5:30	<1.3
	1215-CF	23	5:35	<1.3
	1265-6580	23	5:40	<1.3
	1340-6940	23	5:45	<1.3
	1265-6500	23	5:50	<1.3
	1315-6660	23	5:55	<1.3
	1365-ESTACION	24	17:30	<1.3
	1365-ACESSO	24	17:35	<1.3
	1215-6740	24	17:40	<1.3
	1215-C/F.E	24	17:45	<1.3
	1315-6740	24	17:50	<1.3
	05:30PM	24	5:30	<1.3
	05:35PM	24	5:35	<1.3
	05:40PM	24	5:40	<1.3
	05:45PM	24	5:45	<1.3
	05:50PM	24	5:50	<1.3
	1315-6740	25	17:30	<1.3
	1290-6860	25	17:35	<1.3
	1315-6540	25	17:40	<1.3
	1340-6900	25	17:45	<1.3
	1190-C/F R/W	25	17:50	<1.3
	1190-CF/ R/E	25	17:55	<1.3
	1190-NUEVO ACSS DESG	25	18:00	<1.3
	1265-6500	25	5:30	<1.3
	1365-CF/E	25	5:35	<1.3
	1315-6540	25	5:40	<1.3
	1240-CF/E	25	5:45	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1240-CF/W	25	5:50	<1.3
	1215-CF/W	25	5:55	<1.3
	1215-CF/ R/W	26	17:30	<1.3
	1215-SERVICOS	26	17:35	<1.3
	1215-6520	26	17:40	<1.3
	1386-R/E	26	17:45	<1.3
	1290-6690	26	17:50	<1.3
	1365-SUB ESTE	26	5:30	<1.3
	1265-	26	5:35	<1.3
	1290-CHIMENEA	26	5:40	<1.3
	1190-CF/ R/W	26	5:45	<1.3
	1315-6740	27	17:30	<1.3
	1340-6480	27	17:35	<1.3
	1215-CF-EX	27	17:40	<1.3
	1290-CHIMENEA	27	17:45	<1.3
	1265-6610	27	17:50	<1.3
	1215-6740	27	17:55	<1.3
	1190-6900	27	5:30	<1.3
	1190-CF-R/E	27	5:35	<1.3
	1290-CHIMENEA	27	5:40	<1.3
	1215-6520	28	17:30	<1.3
	1340-6480	28	17:35	<1.3
	1290-6690	28	17:40	<1.3
	1215-CF/R/E	28	17:45	<1.3
	1215-6880	28	17:50	<1.3
	1315-6740	28	5:30	<1.3
	1190-CF-R/E	28	5:35	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1240-CF-OESTE R/E	28	5:40	<1.3
	1386-RAMPA ESTE	28	5:45	<1.3
	1365-CF R/W	29	17:30	<1.3
	1340-7000	29	17:35	<1.3
	1315-6540	29	17:40	<1.3
	1215-C/F	29	17:45	<1.3
	1215-6540	29	17:50	<1.3
	1340-6900	29	17:55	<1.3
	1340-6480	29	5:30	<1.3
	1340-6500	29	5:35	<1.3
	1340-6520	29	5:40	<1.3
	1190-CF/ESTE	29	5:45	<1.3
	1265-6610 REQUEMA	29	5:50	<1.3
	1290-6340	30	17:30	<1.3
	1190-CF/ESTE	30	17:35	<1.3
	1365-ESTACION	30	17:40	<1.3
	1340-6540	30	17:45	<1.3
	SUMIDERO	30	17:50	<1.3
	1365-C/F ESTE	30	17:55	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-C/FOESTE	30	18:00	<1.3
	1265-6580	30	5:30	<1.3
	1315-6540	30	5:35	<1.3
	1340-6900	30	5:40	<1.3
	1240-CF-R/E	30	5:45	<1.3
	1240-CF/R/E	30	5:50	<1.3
	1215-C/E	31	17:30	<1.3
	1386-ESTE	31	17:35	<1.3
	1340-7000	31	17:40	<1.3
	1215-6740	31	17:45	<1.3
	1265-6610	31	17:50	<1.3
	1265-6580	31	5:30	<1.3
	1315-6540	31	5:35	<1.3
	1340-6900	31	5:40	<1.3
	1240-CF-R/E	31	5:45	<1.3
	1240-CF/R/E	31	5:50	<1.3

Donde mm/s: milímetros por segundo; NR: no registrado
 Fuente: MSR, 2014.

8 Geoquímica de Roca Estéril

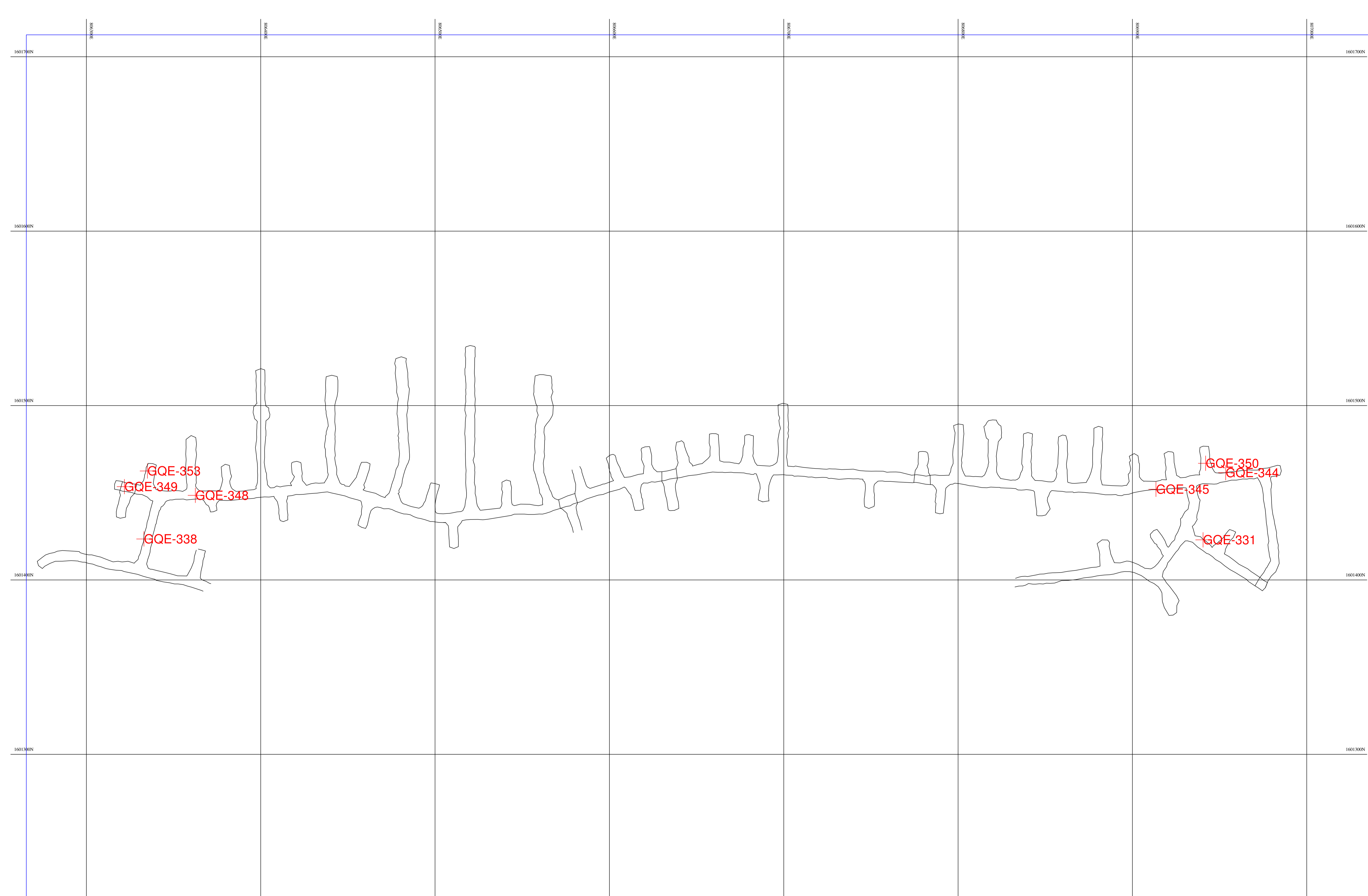
8.1 Sitios de Monitoreo

En el 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 de 2014. La ubicación de la extracción de las muestras 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, Proyecto Minero Escobal

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-331	1190-VENT-C	806940.5	1601423	1192
GQE-332	1215-CFTO-OC	806444.5	1601431	1217
GQE-333	1340-6980-EC	806982.5	1601413	1341
GQE-334	1340-7000-EC	807000	1601421	1341
GQE-335	1340-CFTE-EC	807014	1601406	1341
GQE-336	1215-CFTE-EC	806732.5	1601436.5	1216
GQE-337	1215-CFTE-OC	806492	1601429.5	1217
GQE-338	1190-ACC-OC	806333	1601423.5	1191
GQE-339	1340-6320-OC	806319	1601440.5	1341
GQE-340	1340-6340-OC	806340	1601441.5	1341
GQE-341	1340-CFTO-OC	806305	1601431.5	1342
GQE-342	1340-7020-EC	807020	1601427.5	1341
GQE-343	1215-6460-OC	806457.5	1601449	1216
GQE-344	1190-CFTE-EC	806953.5	1601461.5	1192
GQE-345	1190-CFTO-EC	806913.5	1601452	1192
GQE-346	1215-CFTO-EC	806693.5	1601427	1266
GQE-347	1215-6720-EC	806721.2	1601446.6	1217
GQE-348	1190-CFTE-OC	806362.5	1601448.5	1192
GQE-349	1190-CFTO-OC	806321.8	1601453.5	1192
GQE-350	1190-6940-EC	806942	1601466.9	1192
GQE-351	1215-6500-OC	806500.5	1601442.1	1217
GQE-352	1215-CFTE-OC	806543.5	1601431	1217
GQE-353	1190-6340-OC	806335	1601462.5	1192
GQE-354	1215-6740-EC	806740	1601449	1217
GQE-355	1215-6520-OC	806521	1601443	1217
GQE-356	1365-ACC-EC	806810	1601366.5	1367
GQE-357	1365-CFTE-OC	806417	1601402	1367
GQE-358	1365-CFTE-OC	806363	1601413	1367

Fuente: MSR, 2014.



Plano ARD Nivel 1190

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	Agosto-Oct	RICHARD YANCEY	02-Mar-16	1:1000

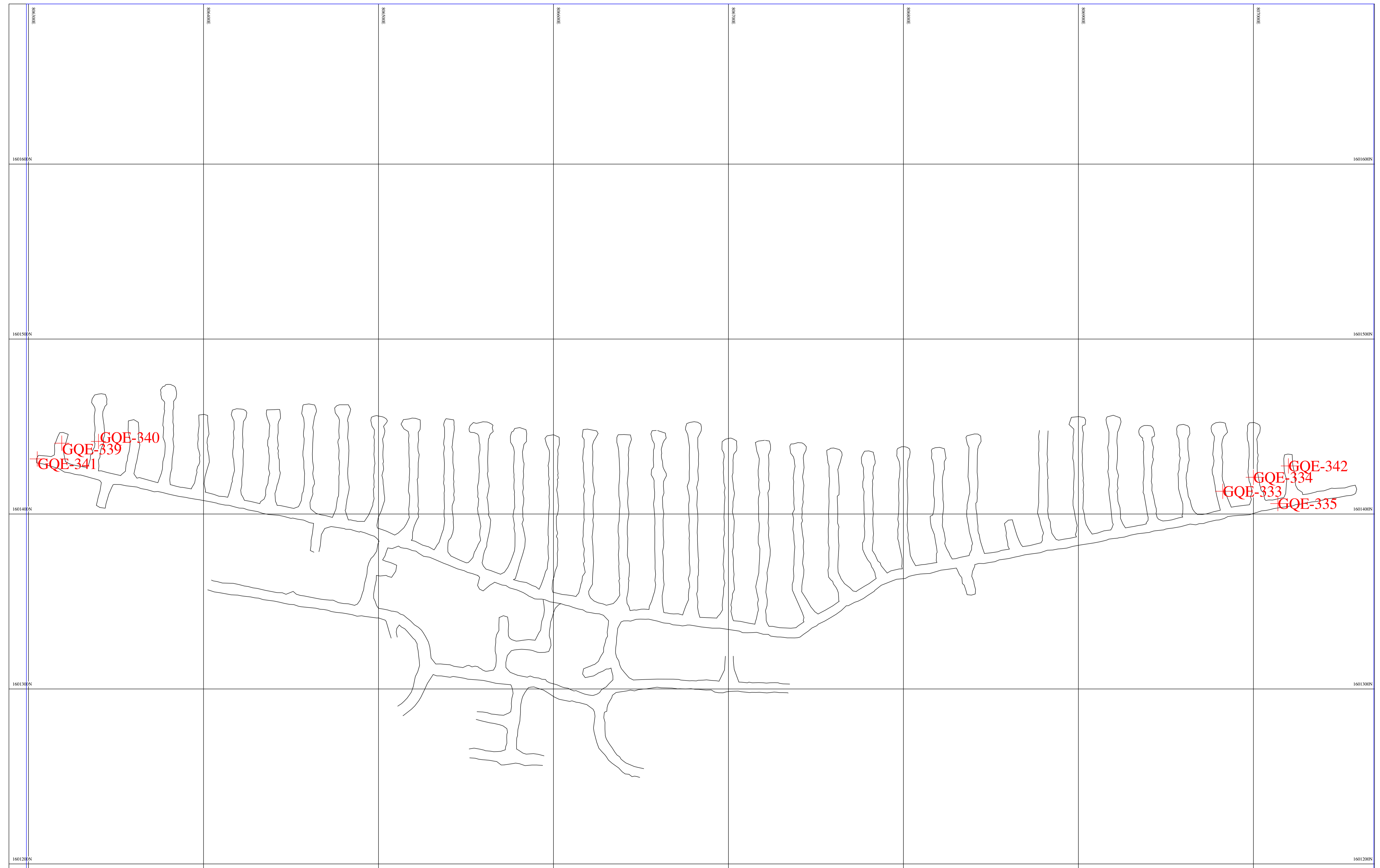
01_102014_ard_str



Plano ARD Nivel 1215

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Agosto-Octubre	1:1000

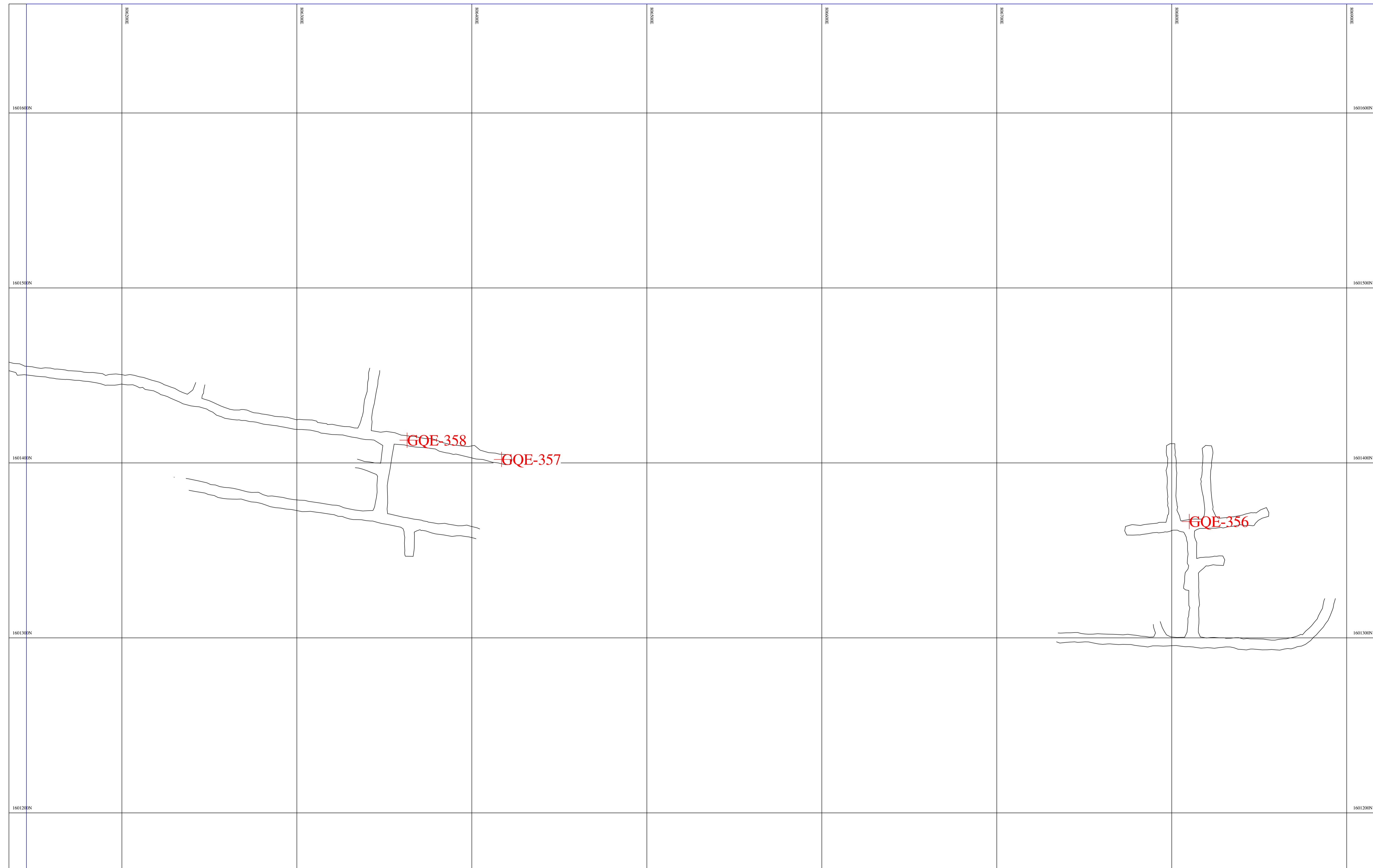
agosto-oct-1214



Plano ARD Nivel 1340

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Agosto-Oct	1:1000

agosto-oct-2014



Plano ARD Nivel 1365

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Agosto-Oct	1:1000

agosto-oct-2014_01

8.2 Metodología

En el Cuadro 8-2 se describe el procedimiento y equipo utilizado para la toma de muestras en pasta de material extraído en túneles.

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

Parámetros analizados	
pH	pH en pasta.
Procedimiento	
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.	
Equipo utilizado	
Nombre	Potenciómetro pH & EC
Modelo	H-series H170G
Fabricante	HACH

Fuente: MSR, 2014.

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 8.02 a 10.09 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, Proyecto Minero Escobal

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-331	02/08/2014	11/08/2014	8.02	19.4
GQE-332	02/08/2014	11/08/2014	8.62	20.7
GQE-333	09/08/2014	11/08/2014	8.71	18.7
GQE-334	09/08/2014	11/08/2014	8.34	23.3
GQE-335	09/08/2014	11/08/2014	8.4	20.2
GQE-336	09/08/2014	11/08/2014	8.43	20.6
GQE-337	09/08/2014	11/08/2014	8.42	20.3
GQE-338	09/08/2014	11/08/2014	8.25	19.9
GQE-339	02/09/2014	04/09/2014	8.29	19.3
GQE-340	02/09/2014	04/09/2014	8.79	19.2
GQE-341	02/09/2014	04/09/2014	8.3	19.3

Código de Muestra	Fecha Toma de	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-342	02/09/2014	04/09/2014	8.9	19.4
GQE-343	19/09/2014	22/09/2014	8.86	21.2
GQE-344	19/09/2014	22/09/2014	8.71	21.9
GQE-345	19/09/2014	22/09/2014	8.69	21.0
GQE-346	21/09/2014	22/09/2014	8.96	20.7
GQE-347	01/10/2014	03/10/2014	8.88	20.5
GQE-348	01/10/2014	03/10/2014	9.08	20.0
GQE-349	01/10/2014	03/10/2014	9.05	19.3
GQE-350	01/10/2014	03/10/2014	9.02	19.2
GQE-351	02/10/2014	03/10/2014	9.05	18.9
GQE-352	06/10/2014	14/10/2014	8.9	20.3
GQE-353	07/10/2014	14/10/2014	8.89	18.5
GQE-354	30/10/2014	31/10/2014	8.55	21.3
GQE-355	30/10/2014	31/10/2014	9.02	21.8
GQE-356	30/10/2014	31/10/2014	9.09	21.9
GQE-357	30/10/2014	31/10/2014	10.09	22.4
GQE-358	30/10/2014	31/10/2014	8.64	22.7

Fuente: MSR, 2014.

9 Mediciones de Seguridad Industrial y Salud Ocupacional

9.1 Presión Sonora

La medición de Presión Sonora en el trimestre de Agosto a Octubre 2014 se muestra en el Cuadro 9-1. Se hicieron monitoreos mediante el uso de dosímetros portables y posteriormente se realizan comparaciones con la norma OSHA. Los resultados muestran que se está dentro de parámetros aceptables OSHA en los puntos evaluados. Se debe considerar que el parámetro Leq está acumulado para periodo de 10.6 para operaciones en mina subterránea y 12 horas para operaciones en superficie, lo que implica una mayor dosis recibida por efecto de acumulación. Sin embargo los datos se encuentran dentro de parámetros aceptables; lo que indica que si con 24 horas de exposición es aceptable, al estar expuesto a un periodo menor se cumple con las normas establecidas.

Cuadro 9-1: Resultados de Presión Sonora de Salud Ocupacional, Proyecto Minero Escobal

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Superficie Planta de Proceso - TRITURADORA		2014		
Trimestre		VII		
Mes		Ago	Sep	Oct
Fecha		03/08/14	11/09/14	08/10/14
Hora Inicio		7:00	7:00	7:00
Duración		11h	11h	11h
Lmax dBA		92,1	86,8	87,4
Lmin dBA		92	86,7	86,3
Prom. Diurno dBA		92,05	86,75	86,85
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas) ²		86	86	86
Duración de Referencia OSHA		87	87	87
Leq (Normal sin uso de EPP)		12h	12h	12h
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		92,05	86,75	86,85
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		77,55	72,25	72,35
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - MOLINO		2014		
Trimestre		VII		
Mes		Ago	Sep	Oct
Fecha		03/08/14	12/09/14	17/10/14
Hora Inicio		7:00	7:00	7:00
Duración		11h	11h	11h
Lmax dBA		87,4	92,3	88,4
Lmin dBA		87,2	92	88,1
Prom. Diurno dBA		87,3	92,15	88,25
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas) ²		86	86	86
Duración de Referencia OSHA		87	87	87
Leq (Normal sin uso de EPP)		12h	12h	12h
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		87,3	92,15	88,25
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		72,8	77,65	73,75
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - FILTROS		2014		
Trimestre		VII		
Mes		Ago	Sep	Oct
Fecha		03/08/14	15/09/14	10/10/14
Hora Inicio		7:00	7:00	7:00
Duración		11h	11h	11h
Lmax dBA		88,2	79,7	89,9
Lmin dBA		87,4	74,1	89,7
Prom. Diurno dBA		87,8	76,9	89,8
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas) ²		86	86	86
Duración de Referencia OSHA		87	87	87
Leq (Normal sin uso de EPP)		12h	12h	12h
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		87,8	76,9	89,8
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		73,3	62,4	73,3
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Scoop		2014		
Trimestre		VII		
Mes		Ago	Sep	Oct
Fecha		01/08/14	03/09/14	24/10/14
Hora Inicio		7:00	7:00	7:00
Duración		10h 30min	10h 30min	10h 30min
Lmax dBA		89	92	93
Lmin dBA		85	91	92
Prom. Diurno dBA		87	91,5	92,5
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas) ²		86	86	86
Duración de Referencia OSHA		87	87	87
Leq (Normal sin uso de EPP)		12h	12h	12h
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		87	91,5	92,5
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		72,5	77	78
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Boltec		2014		
Trimestre		VII		
Mes		Ago	Sep	Oct
Fecha		04/08/14	06/09/14	08/10/14
Hora Inicio		7:00	7:00	7:00
Duración		10h 30min	10h 30min	10h 30min
Lmax dBA		100	92	89
Lmin dBA		95	90	85
Prom. Diurno dBA		97,5	91	87
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas) ²		86	86	86
Duración de Referencia OSHA		87	87	87
Leq (Normal sin uso de EPP)		12h	12h	12h
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		97,5	91	87
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		83	76,5	72,5
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Jumbo		2014		
Trimestre		VII		
Mes		Ago	Sep	Oct
Fecha		06/08/14	11/09/14	18/10/14
Hora Inicio		7:00	7:00	7:00
Duración		10h 30min	10h 30min	10h 30min
Lmax dBA		90	102	85
Lmin dBA		89	99	82
Prom. Diurno dBA		89,5	100,5	83,5
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas) ²		86	86	86
Duración de Referencia OSHA		87	87	87
Leq (Normal sin uso de EPP)		12h	12h	12h
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		89,5	100,5	83,5
Leq ajustado (Coo EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		75	86	69
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Fuente: MSR, 2014.

9.2 Mediciones de Partículas Respirables

Los resultados se muestran en el Cuadro 9-2 y corresponden al área de interior mina y planta de proceso. En este trimestre los resultados fueron satisfactorios 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, por lo tanto 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 609326 Homologación NIOSH.

Cuadro 9-2: Resultados de Material Particulado de Salud Ocupacional, Proyecto Minero Escobal

Superficie Planta de Proceso - TRITURACION				2014		
Trimestre				VII		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICION CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Agosto	Septiembre	Octubre
Fecha				26/08/2014	19/09/2014	10/10/2014
Hora Inicio				6:58	7:01	7:10
Duración				OSHA	99.97%	11h
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	0,051	0,675	0,042
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,052	1,03	0,111
<p>Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (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>						
Superficie Planta de Proceso - MOLINO				2014		
Trimestre				VII		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICION CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Agosto	Septiembre	Octubre
Fecha				26/08/2014	19/09/2014	10/10/2014
Hora Inicio				7:00	7:00	7:00
Duración				OSHA	99.97%	11 h
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	0,068	0,024	0,027
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,107	0,094	0,047
<p>Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (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>						
Superficie Planta de Proceso - FILTROS				2014		
Trimestre				VII		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICION CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Agosto	Septiembre	Octubre
Fecha				26/08/2014	19/09/2014	10/10/2014
Hora Inicio				7:00	7:00	7:00
Duración				OSHA	99.97%	11 h
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	0,041	0,64	0,225
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,069	0,037	0,24
<p>Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (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>						

Interior Mina General - REZAGA				2014		
Trimestre				VII		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICION CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Agosto	Septiembre	Octubre
Fecha				29/08/2014	17/09/2014	02/10/2014
Hora Inicio				7:00	7:00	7:00
Duración				OSHA	99.97%	10h 30min
OSHA Fracción Respirable PM ₄	mg/m ³	5	16667	0,414	1,45	2,3
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,515	2,06	2,53
<p>Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (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>						
Interior Mina General - LANZADO				2014		
Trimestre				VII		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICION CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Agosto	Septiembre	Octubre
Fecha				09/08/2014	17/09/2014	02/10/2014
Hora Inicio				7:00	7:00	7:00
Duración				OSHA	99.97%	10h 30min
OSHA Fracción Respirable PM ₄	mg/m ³	5	16667	0,176	0,83	0,511
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,32	1,73	0,927
<p>Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (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: MSR, 2014.

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 el Cuadro 9-3 se siguió monitoreando la no presencia de Ácido Sulhídrico - Sulfuro de Hidrógeno (H_2S) y se omitirá hasta detectarse la primera vez. De igual forma, para efectos de publicación de informes, se seleccionará la primera etapa del ciclo que aparezca en las mediciones rutinarias, por lo que en los resultados se ha colocado como mínimo 3 turnos de alguno de los meses del trimestre, a fin de tener información sistematizada.

Cuadro 9-3: Extracto de las mediciones del IV trimestre 2013, acorde a procedimiento de tomar la primera etapa del ciclo que aparezca.

FECHA	Lugar	Maquinaria	Etapa de Ciclo	CO (PPM)	H2S (PPM)	Hora	Turno	Reportado por
				Límite Máximo Turno 90 ppm, Exposición Breve 100 ppm	Límite 10ppm, Valores mayores a 1ppm alertar.			
25 ago-14	1265 6690 E.C	Ninguna	voladura	10	0	19:00	Nocturno	Marvín Lopez
	1265 6480 O.C	Ninguna	voladura	7	0	18:48		
	1315 6580 O.C	Ninguna	voladura	6	0	19:15		
	1290 6840 E.C	ST-01	Lanzado	17	0	22:30		
	1290 Sub. O.C	TL-03	Desmontaje Porton	6	0	0:15		
	1340 6440 O.C	RB-02	Fortificación	2	0	3:10		
	1340 6700 E.C	RB-04	Fortificación	8	0	3:30		
	1315 6780 E.C	PD-12	Perforacion	6	0	3:50		
1315 6800 E.C	LI-30	Limpieza	8	0	4:15			
18-sep-14	1265 6620 E.C	Ninguna	Medición posterior a voladura	20	0	7:30	Diurno	Marvín Lopez
	1215 CFTE O.C	Ninguna	Medición posterior a voladura	24	0	7:50		
	1240 ACCS CONX	Ninguna	Medición posterior a voladura	40	0	7:18		
	1190 ALIMAK E.C	Ninguna	Medición posterior a voladura	25	0	7:18		
	1340 6340 O.C	Ninguna	Medición posterior a voladura	20	0	7:55		
	1340 6580 O.C	Ninguna	Medición posterior a voladura	20	0	7:55		
	1290 6580 O.C	Ninguna	Medición posterior a voladura	11	0	0:00		
	1215 6720	E.C	Lanzado	9	0	11:00		
	1190 CFTE	E.C	Cargando explosivos	8	0	11:50		
	1315 6600	E.C	Fortificación	10	0	14:50		
1315 6620	E.C	Instalando cables	12	0	15:30			
21 oct-14	1215 CFTE EC	Ninguna	Medición posterior a voladura	35	0	18:35	Nocturno	Antonio Sapon
	1215 6880 EC	Ninguna	Medición posterior a voladura	35	0	18:35		
	1290 6580 OC	AT-02	Instalando cables	15	0	22:00		
	1265 6840 EC	TL-02	Colocando mangas	12	0	23:00		
	1358 SUM OC	LH-01	Perforación	0	0	0:00		

Fuente: MSR, 2014.

10 Conclusiones

10.1 Mediciones del aire en el ambiente

- 1) El material particulado (**PM₁₀**), los gases de combustión (**SO₂** y **NO₂**) y los niveles de presión sonora (**NPS**) presentaron valores por debajo de las guías establecidos por la USEPA (**PM₁₀**, **SO₂** y **NO₂**), Banco Mundial (**PM₁₀**, **SO₂**, **NO₂** y **NPS**), OMS (**SO₂** y **NO₂**) y British Columbia (**SO₂** y **NO₂**). Los niveles de **PM₁₀** se encontraron dentro de los valores máximos y mínimos registrados durante el establecimiento de la línea base del Proyecto.

10.2 Mediciones del agua, sedimentos y efluentes en el ambiente

- 2) Del control de calidad (blancos de campo) realizado a los dos laboratorios subcontratados (Laboratorio Ecosistemas Proyectos Ambientales S.A. y ACZ Laboratories, Inc.) para el análisis de agua superficial y efluentes, se obtuvieron resultados confiables tanto en la manipulación de las muestras como en los resultados de los análisis.
- 3) El agua superficial (**SW**), subterránea (**GW**) y los pozos de monitoreo (**MW**) presentaron un pH alcalino y dentro del rango establecido por la USEPA para la salud humana. No se detectó mercurio en ninguna categoría de agua (SW, GW y MW). Se registraron sólidos suspendidos totales en SW, GW y MW y los resultados encontrados están por debajo de lo establecido por las guías del banco mundial (50 mg/L). Se detectaron cloruros y fluoruros en SW, GW y MW, todos los valores por debajo de lo sugerido por la USEPA (250 mg/L y 4 mg/L respectivamente). Se detectó arsénico en todas las categorías de agua (SW, GW y MW) y todos los resultados se encontraron por debajo de los establecido por la USEPA (0.01 mg/L) y dentro del rango registrado durante el establecimiento de la línea base. El plomo se detectó en SW, GW y MW en concentraciones por debajo de lo sugerido por la USEPA y por debajo del rango de lo establecido durante la línea base. Los sólidos disueltos totales y sulfatos totales se detectaron en MW, GW y SW en concentraciones por debajo de lo establecido por la USEPA y de lo registrado durante el establecimiento de la línea base respectivamente.
- 4) El efluente (**WW9**) de la planta de tratamiento de aguas residuales de tipo especial del proceso de minado cumple con el Acuerdo Gubernativo 236-2006 para entes generadores nuevos para todas las muestras tomadas durante Mayo a Julio 2014.

10.3 Vibraciones, geoquímica de roca estéril y mediciones de seguridad industrial y salud ocupacional

- 5) Las vibraciones generadas por las voladuras registradas se encuentran por debajo de los límites de detección del equipo (1.3 mm/s); el cual incluso es menor al límite a partir del cual, las vibraciones inducidas por voladuras (50.8 mm/s), pueden ocasionar daños según la norma establecida por United States Bureau of Mines.
- 6) Las lecturas de pH en pasta obtenidas de las muestras de material extraídas de mina subterránea fueron alcalinas, lo que indica que no hay indicios de un potencial de generación ácida dentro los túneles.
- 7) Los resultados obtenidos en los niveles de presión sonora para ambientes laborales, indican que se está por debajo de los límites de nivel de sonido ponderado "A" acorde a OSHA para 24 horas (82-83 dBA) y los resultados de partículas respirables en las estaciones de monitoreo, cumplen con el rango de aceptación que el fabricante establece basado en el equipo 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.

ago-14																															
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
LECTURA FLUJÓMETRO (m³)																															
Portal Este (tubería 6")	385149	386322	387206	388132	389996	390153	390949	391816	392629	393178	393928	394468	394732	395198	395660	396368	397241	398032	398809	399881	401712	403651	405960	406417	407415	408437	409586	410474	411344	412004	412914
Total Este (tubería 8")	145673	145673	146417	146432	146533	146678	146800	147134	147162	147168	NL	147255	147326	147418	147511	147767	147834	147842	147842	147843	147848	147850	147859	147861	147870	147871	147888	147888	147900	147904	147912
Portal Oeste (tubería 6")	219730	219730	219730	219730	219730	219730	219730	219730	219730	219330	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	
Portal Oeste (tubería 8")	1122339	1124276	1126208	1128211	1129981	1131475	1133253	1135176	1137369	1139015	1140773	1142515	1144982	1145563	1146951	1148798	1150669	1152545	1154396	1156357	1157793	1159333	1161004	1162951	1164994	1166943	1169036	1171149	1173443	1175406	1177610
Clarificador	2324450	2327039	2329740	2332199	2334468	2337005	2339269	2341858	2344831	2346938	2348293	2350227	2352675	2355093	2357599	2359726	2362228	2364952	2366995	2369562	2372468	2375684	2378164	2380975	2383863	2386315	2389289	2391910	2394420	2396836	2399613
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	992	1173	884	926	1864	157	796	867	813	549	750	540	264	466	462	708	873	791	777	1072	1831	1939	2309	457	998	1022	1149	888	870	660	910
Total Este (tubería 8")	0	0	744	15	101	145	122	334	28	6	NL	NL	71	92	93	256	67	8	0	1	5	2	9	2	9	1	17	0	12	4	8
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	-400	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	1730	1937	1932	2003	1770	1494	1778	1923	2193	1646	1758	1742	2467	581	1388	1847	1871	1876	1851	1961	1436	1540	1671	1947	2043	1949	2093	2113	2294	1963	2204
Clarificador	2437	2589	2701	2459	2269	2537	2264	2589	2973	2107	1355	1934	2448	2418	2506	2127	2502	2724	2043	2567	2906	3216	2480	2811	2888	2452	2974	2621	2510	2416	2777
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	182	215	162	170	342	29	146	159	149	101	138	99	48	85	85	130	160	145	142	197	336	355	423	84	183	187	211	163	160	121	167
Total Este (tubería 8")	0	0	136	3	19	27	22	61	5	1	NL	NL	13	17	17	47	12	1	0	0	1	0	2	0	2	0	3	0	2	1	1
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	-73	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	317	355	354	367	325	274	326	353	402	302	322	319	452	107	254	339	343	344	339	360	263	282	306	357	375	357	384	387	421	360	404
Clarificador	447	475	495	451	416	465	415	475	545	386	248	355	449	443	459	390	459	499	375	471	533	590	455	515	529	450	545	481	460	443	509

m³: metro cúbico. Gpm: galones por minuto. Gris: fallo de flujómetro. NL: no hay lectura. Fuente: MSR, 2014.

sep-14																															
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	
LECTURA FLUJÓMETRO (m³)																															
Portal Este (tubería 6")	413414	413812	414368	414959	415637	416232	416727	417169	417588	418307	NL	420521	421858	423080	423958	424462	425032	425541	426743	428638	430073	431217	432599	433923	435115	436232	437454	437874	438747	439168	
Total Este (tubería 8")	147916	147921	147926	147937	147944	147955	NL	NL	NL	148291	148685	148763	NL	15.64	148773	148777	148779	148783	148821	15.64	15.64	15.64	148984	148989	148995	149149	NL	149188	15.64	149197	
Portal Oeste (tubería 6")	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	
Portal Oeste (tubería 8")	1179830	1181408	1183748	1185593	1187672	1189662	1192431	1194889	1197089	1199579	1201995	1204350	1206473	1208823	1211162	1213624	1215234	1218360	1220397	1222017	1224641	1227175	1229881	1232664	1235553	1238095	1241142	1243887	1246453	1249209	
Clarificador	2402301	2404208	2406783	2408991	2410964	2413701	2416404	2418837	2421238	2423742	2427211	2430409	2433634	2436801	2439846	2442515	2444017	2448053	2450817	2453279	2456937	2460224	2463821	2467572	2470632	2474704	2478883	2482009	2485215	2488688	
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	500	398	556	591	678	595	495	442	419	719	NL	2214	1337	1222	878	504	570	509	1202	1895	1435	1144	1382	1324	1192	1117	1222	420	873	421	
Total Este (tubería 8")	4	5	5	11	7	11	NL	NL	NL	336	394	78	NL	16	148757	4	2	4	38	-148805	0	0	163	5	6	154	NL	149188	-149172	149181	
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	2220	1578	2340	1845	2079	1990	2769	2458	2200	2490	2416	2355	2123	2350	2339	2462	1610	3126	2037	1620	2624	2534	2706	2783	2889	2542	3047	2745	2566	2756	
Clarificador	2688	1907	2575	2208	1973	2737	2703	2433	2401	2504	3469	3198	3225	3167	3045	2669	1502	4036	2764	2462	3658	3287	3597	3751	3060	4072	4179	3126	3206	3473	
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	92	73	102	108	124	109	91	81	77	132	NL	406	245	224	161	92	105	93	220	347	263	210	253	243	219	205	224	77	160	77	
Total Este (tubería 8")	1	1	1	2	1	2	NL	NL	NL	62	72	14	NL	3	27272	1	0	1	7	-27281	0	0	30	1	1	28	NL	27351	-27348	27350	
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	407	289	429	338	381	365	508	451	403	457	443	432	389	431	429	451	295	573	373	297	481	465	496	510	530	466	559	503	470	505	
Clarificador	493	350	472	405	362	502	496	446	440	459	636	586	591	581	558	489	275	740	507	451	671	603	659	688	561	747	766	573	588	637	

m³: metro cúbico. Gpm: galones por minuto. Gris: fallo de flujómetro. NL: no hay lectura. Fuente: MSR, 2014.

		oct-14																													
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
LECTURA FLUJÓMETRO (m³)																															
Portal Este (tubería 6")	439305	439316	440203	441528	442851	444057	444996	446014	447035	448158	449433	450608	451743	453077	454442	455287	456286	457662	459262	460605	461876	463154	464332	465136	465804	466041	466564	467145	467689	468335	468910
Total Este (tubería 8")	149197	149197	NL	149197	149197	149197	149197	149197	149197	149197	149197	149197	NL	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	149197	468341
Portal Oeste (tubería 6")	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	291730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730
Portal Oeste (tubería 8")	1252027	1254671	1257914	1261091	1263853	1264908	1268103	1271075	1273998	1276536	1279470	1282105	1284598	1287439	1290017	1292758	1295621	1297939	1300430	1302871	1305326	1307687	1310227	1312353	1314885	1317824	1320530	1323126	1325874	1328534	1331370
Clarificador	2492480	2495434	2500109	2504369	2508187	2511908	2515479	2519385	2522760	2525627	2529202	2532268	2535664	2539383	2542403	2546425	2549657	2553467	2557009	2560724	2564260	2567548	2570866	2574679	2577110	2580129	2583285	2586473	2589205	2591779	2594016
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	137	11	887	1325	1323	1206	939	1018	1021	1123	1275	1175	1135	1334	1365	845	999	1376	1600	1343	1271	1278	1178	804	668	237	523	581	544	646	575
Total Este (tubería 8")	0	0	NL	NL	0	0	0	0	0	0	0	0	NL	NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	319144
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72000	-72000	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	2818	2644	3243	3177	2762	1055	3195	2972	2923	2538	2934	2635	2493	2841	2578	2741	2863	2318	2491	2441	2455	2361	2540	2126	2532	2939	2706	2596	2748	2660	2836
Clarificador	3792	2954	4675	4260	3818	3721	3571	3906	3375	2867	3575	3066	3396	3719	3020	4022	3232	3810	3542	3715	3536	3288	3318	3813	2431	3019	3156	3188	2732	2574	2237
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	25	2	163	243	243	221	172	187	187	206	234	215	208	245	250	155	183	252	293	246	233	234	216	147	122	43	96	107	100	118	105
Total Este (tubería 8")	0	0	NL	NL	0	0	0	0	0	0	0	0	NL	NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58510
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13200	-13200	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	517	485	595	582	506	193	586	545	536	465	538	483	457	521	473	503	525	425	457	448	450	433	466	390	464	539	496	476	504	488	520
Clarificador	695	542	857	781	700	682	655	716	619	526	655	562	623	682	554	737	593	699	649	681	648	603	608	699	446	553	579	584	501	472	410

m³: metro cúbico. Gpm: galones por minuto. Gris: fallo de flujómetro. NL: no hay lectura. Fuente: MSR, 2014.

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

		Agosto 2014																														
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
		Efluente Planta de Tratamiento Agua de Túneles (WW9)																														
pH	u.e.	7.65	7.73	7.15	7.21	7.41	7.78	7.73	7.54	8.1	7.41	7.26	7.36	7.46	7.48	7.48	7.38	7.6	7.55	7.74	7.79	7.68	7.47	7.35	7.63	7.55	7.1	7.46	7.72	7.47	7.65	8.41
Temperatura	°C	26.8	27.6	27.8	27.6	26.2	27	25.8	26.7	27	25.9	26.6	26.6	27.6	28.6	27.7	27.2	27.5	26.7	26.8	25.3	26	26.3	25.1	26.7	26.6	26.4	27.2	23.3	27.3	26.9	25.8
Conductividad	µS/cm	2076	1986	2004	2028	2035	2129	2118	2154	1957	1895	2002	2049	2010	1938	1953	1957	1937	2030	2085	1754	1727	1707	1648	2037	2014	1993	1948	2090	2012	1999	2040
Turbidez	NTU	17.4	3.4	5.42	2.52	2.18	4.03	13.5	9.54	6.75	13.6	2.11	2.01	2.72	3.15	6.17	2.18	2.51	7.73	9.38	3.38	1.99	1.88	2.27	2.91	5.05	2.23	6.35	8.96	2.78	3.5	5.32
kit CN	mg/L	0.000	0.005	0.006	0.004	0.002	0.000	0.000	0.000	0.001	0.004	0.000	0.003	0.004	0.004	0.000	0.002	0.004	0.000	0.002	0.001	0.002	0.002	0.000	0.004	0.003	0.005	0.005	0.004	0.001	0.001	0.002
CN Total		NA	NA	<0.003	NA	NA	NA	NA	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	NA
		Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																														
pH	u.e.	8.3	8.22	8.03	8.39	8.6	8.68	8.5	8.75	8.72	8.62	8.33	8.67	8.79	8.87	8.85	8.74	8.61	8.77	8.92	8.91	8.74	8.78	8.37	8.7	8.62	8.84	8.86	8.89	8.89	8.98	8.86
Temperatura	°C	21.6	21.5	22.3	22.7	21.7	21.8	21	22	22.6	22.4	21.5	23.8	22.7	22.4	23.7	22.4	22.3	23.4	22.4	22.2	21.5	21.9	20.2	25	23.2	22.2	23.2	22.1	23.7	24	24.2
Conductividad	µS/cm	1526	1520	1548	1545	1659	1591	1498	1476	1484	1361	1302	1480	1305	1317	1302	1316	1316	1314	1331	1353	1301	1307	1283	1323	1336	1328	1324	937	1302	1237	1221
Turbidez	NTU	3.86	3.25	3.2	5.86	3.59	5.1	7.07	4.55	5.18	7.78	8.69	7.35	6.87	6.59	11.5	5.2	5.02	4.85	3.89	8.04	2.78	3.1	3.72	3.16	3.22	3.46	3.21	2.58	4.89	4.16	3.91
Kit CN	mg/L	0.006	0.004	0.000	0.012	0.001	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.000	0.005	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.003	0.000	0.000	0.000	0.001	0.000	0.000	0.000
CN Total		NA	NA	0.006	NA	NA	NA	NA	0.003	NA	<0.003	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	NA	NA

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NTU: unidades naftalométricas de turbidez. ND: no determinado. NA: no analizado. Fuente: MSR, 2014.

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Septiembre 2014																															
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
Efluente Planta de Tratamiento Agua de Túneles (WW9)																															
pH	u.e.	7.8	7.45	7.46	7.42	7.38	7.4	7.63	8.4	7.6	7.67	7.78	7.6	7.8	7.61	7.82	7.78	7.98	7.61	7.79	6.71	8.45	7.91	7.84	7.82	8.04	7.13	7.43	7.74	7.88	7.34
Temperatura	°C	26.7	26.5	26.2	26.7	27.6	25.8	26.6	26.4	26.7	26.4	27.1	26.6	25.6	27.3	27.3	26	26.4	27.7	27.1	25.1	27.1	25.1	26.2	26.4	26.6	26.6	21.2	27.6	26.3	26.6
Conductividad	µS/cm	2009	1958	2004	1902	1976	1987	1966	1940	1833	1751	1715	1677	1628	1929	1904	1947	2073	1738	1733	1338	2026	1805	1680	1726	1822	1612	1524	1693	1508	1704
Turbidez	NTU	2.55	5.83	3.55	6.85	6.7	9.14	26.2	4.69	4.84		4.98	3.93	4.56		5.05	13	8.49	8	6.15	16.6	2.5	3.8	9.02	9.35	4.28	6.44	3.99	13	20.1	12.7
kit CN	mg/L	0.000	0.003	0.000	0.002	0.000	0.004	0.004	0.003	0.000	0.000	0.000	0.004	0.000	0.001	0.002	0.003	0.002	0.013	0.013	0.000	0.000	0.003	0.002	0.003	0.001	0.001	0.003	0.001	0.000	0.003
CN Total		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	0.005	NA	<0.003	NA	NA	NA	<0.003	NA	0.005	NA	NA	NA	NA	NA	NA	NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																															
pH	u.e.	8.96	8.87	8.96	8.64	8.65	8.73	8.52	8.58	8.65	8.7	8.54	8.69	8.73	8.43	8.49	8.59	8.57	8.47	8.51	8.42	8.39	8.58	8.58	8.53	8.55	8.48	8.48	8.26	8.29	8.23
Temperatura	°C	23.8	23.9	24.1	24.1	24	22.2	22.8	22.6	25.1	22.9	23.7	22.6	22.4	24.5	23.4	23	23.4	24.4	24.4	24.2	24.8	25.9	23.8	22.5	23.9	23.9	24.3	23.4	23.6	24.6
Conductividad	µS/cm	1203	1200	1210	1030	1037	1042	1040	1039	979.7	994.4	936.6	936	912.4	1122	1126	1136	1093	1095	1070	1055	1055	1037	1088	1025	1017	1956	901.3	888.9	893.7	891.9
Turbidez	NTU	3.99	5.62	4.36	9.72	11.5	8.9	7.7	5.9	7.55	5.84	8.63	9.48	5.74	3.62	3.55	10.1	8.34	6.16	6.75	7.39	7.38	16.7	6.81	6.16	5.39	6	6.98	13.4	10.6	7.3
Kit CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.004	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.000	0.001	0.000	0.000	0.002	0.001	0.001	0.000	0.000	0.001	0.003	0.000	0.000
CN Total		NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	NA	0.003	NA	0.004	NA	NA	NA	<0.003	0.004	NA	0.036	NA

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NTU: unidades naftalométricas de turbidez. ND: no determinado. NA: no analizado. Fuente: MSR, 2014.

Octubre 2014																																
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
Efluente Planta de Tratamiento Agua de Túneles (WW9)																																
pH	u.e.	7.01	7.45	7.4	8.67	7.55	7.48	7.47	7.51	7.49	7.43	7.43	7.2	8.25	7.19	7.81	7.7	6.75	7.23	7.58	8.48	7.28	7.59	7.5	7.16	7.11	7.46	8.75	7.8	7.47	7.17	7.29
Temperatura	°C	26.2	25.2	26.4	26.8	26	27.8	25.6	26.8	26	26.2	26.5	26	26.9	26.9	26.4	25.4	26.9	27	27.3	25.9	27.2	26.1	27.5	26.6	26.3	26.8	26.4	27.8	27.6	27.1	26.3
Conductividad	µS/cm	1465	1628	1637	1778	1625	1896	1893	1862	2788	2754	2836	1434	1925	1859	2125	1919	1947	1795	2039	2103	2045	2113	2047	1966	2023	2102	2176	2055	2204	2313	2131
Turbidez	NTU	13.4	15.9	13.5	6.84	7.21	8.68	12.2	6.2	4.64	5.34	3.14	4.21	21.9	6.68	9.17	11.2	1.78	6.46	10.3	4.14	6.35	7.33	3.45	2.73	2.68	4.56	3.9	3.74	8.87	8.82	4.09
kit CN	mg/L	0.002	0.000	0.002	0.003	0.003	0.003	0.003	0.004	0.000	0.001	0.000	0.003	0.004	0.002	0.002	0.005	0.004	0.000	0.000	0.003	0.004	0.003	0.004	0.003	0.003	0.001	0.003	NA*	0.002	0.003	0.001
CN Total		NA	0.006	<0.003	NA	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	<0.003	NA	0.003	NA	NA	NA	NA	NA	NA	NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	8.34	7.99	7.83	7.44	7.8	7.87	8.04	8.12	8.51	8.51	8.43	8.46	8.51	8.61	8.58	8.48	8.79	8.63	8.86	8.98	9.02	9.02	9.12	9.15	9.02	9.07	9.09	9.16	9.16	9.2	
Temperatura	°C	24.5	23.7	24.1	23.7	23.2	22.2	23.1	22.3	21.5	21.5	21.5	21.3	21.7	22.5	22	21.7	22.1	22.4	20.1	25.5	23.6	23.2	23.6	23.5	21.7	20	18.5	21.5	23	21.7	
Conductividad	µS/cm	960	1032	1031	1040	1045	1094	1092	1091	1584	1584	1581	1586	1102	1103	1018	1051	1038	1022	1063	1101	983.4	988.1	991.5	988.6	996.2	1021	1133	1206	1066	1003	
Turbidez	NTU	15	13.3	10.5	9.69	6.55	5.67	5.85	4.14	3.38	3.38	4.54	3.08	3.94	3.98	5.52	4.43	6.17	6.07	5.99	6.39	7.49	6.71	10.3	5.09	5.86	5.37	5.48	4.02	7.86	4.81	
kit CN	mg/L	0.000	0.000	0.001	0.002	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.001	0.002	0.002	0.000	0.000	0.003	0.000	0.001	0.002	
CN Total		0.007	NA	0.004	NA	NA	<0.003	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NTU: unidades naftalométricas de turbidez. ND: no determinado. NA: no analizado. NA*: no analizado por visita del MARN. Fuente: MSR, 2014.

Con el objetivo de verificar si los resultados obtenidos con el método colorimétrico empleado para la determinación rápida de Cianuro (kit de CN), desde el mes de Octubre 2013 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, entre otras. Se realizarán los cambios necesarios para obtener resultados más confiables.

11.3 Resultados crudos de calidad de aire

11.3.1 Material Particulado (PM₁₀)

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

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: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	650	647	644	mmHg
TA	30.5	15.2	20.7	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	7-Aug-14	15:37:00
Stop:	8-Aug-14	15:37:00

Mass Concentration Data:

Filter ID:	2448-0505
Final Wt:	147.720 mg
Initial Wt:	147.290 mg
Delta Wt:	0.430 mg
Total Vol:	20.69 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 20.78 µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal
Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

Job Name: EA-2A
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

Job Code: EA-2A
Site Name: La Cuchilla.
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	633	629	631	mmHg
TA	27.4	15.8	19.8	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	15-Aug-14	08:40:00
Stop:	16-Aug-14	08:40:00

Mass Concentration Data:

Filter ID:	2469-0101
Final Wt:	146.580 mg
Initial Wt:	145.420 mg
Delta Wt:	1.160 mg
Total Vol:	20.32 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 57.08 µg/m³

Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa.
Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

Job Name: EA-3
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

Job Code: EA-3
Site Name: El Fucío, zona este.
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	625	622	623	mmHg
TA	27.0	14.7	19.4	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	15-Aug-14	09:23:00
Stop:	16-Aug-14	09:23:00

Mass Concentration Data:

Filter ID:	2470-0212
Final Wt:	149.110 mg
Initial Wt:	148.270 mg
Delta Wt:	0.840 mg
Total Vol:	20.09 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 21:24:00

Mass Conc: 41.81 µg/m³

Notes 1: Aldea El Fucío, San Rafael Las Flores, Santa Rosa.
Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

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: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	653	646	649	mmHg
TA	29.2	15.3	20.6	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	7-Aug-14	15:15:00
Stop:	8-Aug-14	15:15:00

Mass Concentration Data:

Filter ID:	2449-0606
Final Wt:	148.490 mg
Initial Wt:	148.020 mg
Delta Wt:	0.470 mg
Total Vol:	20.86 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 22.54 µg/m³

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 2014

Job Details:

Job Name: EA-4A
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

Job Code: EA-4A
Site Name: Aldea Los Ángeles
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	650	647	648	mmHg
TA	28.5	18.0	21.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	4-Aug-14	12:05:00
Stop:	5-Aug-14	12:05:00

Mass Concentration Data:

Filter ID:	2446-0303
Final Wt:	149.450 mg
Initial Wt:	146.220 mg
Delta Wt:	3.230 mg
Total Vol:	20.73 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 155.80 µg/m³

Notes 1: Caserío El Portón de los Ángeles, San Rafael Las Flores, Santa Rosa

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

Job Name: EA-6
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

Job Code: EA-6
Site Name: Carretera a Mataquesquintla
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	644	641	642	mmHg
TA	28.0	17.2	21.1	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	4-Aug-14	11:11:00
Stop:	5-Aug-14	11:11:00

Mass Concentration Data:

Filter ID:	2451-0808
Final Wt:	146.330 mg
Initial Wt:	145.860 mg
Delta Wt:	0.470 mg
Total Vol:	20.60 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 22.82 µg/m³

Notes 1: Carretera a Mataquesquintla, al norte del Proyecto, San Rafael Las Flores Santa Rosa

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

Job Name: EA-3A
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

Job Code: EA-3A
Site Name: Aldea El Fucío
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	645	641	643	mmHg
TA	28.7	16.6	21.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	19-Aug-14	09:10:00
Stop:	20-Aug-14	09:10:00

Mass Concentration Data:

Filter ID:	2472-0404
Final Wt:	147.520 mg
Initial Wt:	146.750 mg
Delta Wt:	0.770 mg
Total Vol:	20.64 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 37.32 µg/m³

Notes 1: Aldea El Fucío, San Rafael Las Flores, Santa Rosa.

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

Job Name: EA-5A
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

Job Code: EA-5A
Site Name: Sabana Redonda
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	644	641	642	mmHg
TA	28.0	17.2	21.1	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	4-Aug-14	11:11:00
Stop:	5-Aug-14	11:11:00

Mass Concentration Data:

Filter ID:	2451-0808
Final Wt:	147.010 mg
Initial Wt:	146.140 mg
Delta Wt:	0.870 mg
Total Vol:	20.60 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 42.24 µg/m³

Notes 1: Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2014

Job Details:

Job Name: EA-1B
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

Job Code: EA-1B
Site Name: San Rafael Las Flores
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	652	647	650	mmHg
TA	29.2	17.0	21.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	21-Aug-14	14:48:00
Stop:	22-Aug-14	14:48:00

Mass Concentration Data:

Filter ID:	2475-0707
Final Wt:	148.720 mg
Initial Wt:	147.020 mg
Delta Wt:	1.700 mg
Total Vol:	20.80 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 81.72 µg/m³

Notes 1: San Rafael Las Flores, Santa Rosa.

Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-14-11233

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-040 (El Escobal)
Análisis de muestras: Septiembre, 01-03 de 2014
Emisión del reporte: Septiembre, 04 de 2014

Tipo de muestras: 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 de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-4A	2446-0303	0.14622	0.14945
2	EA-6	2451-0808	0.14586	0.14633
3	EA-1A	2448-0505	0.14729	0.14772
4	EA-7A	2449-0606	0.14802	0.14849
5	EA-2A	2469-0101	0.14542	0.14658
6	EA-3	2470-0212	0.14827	0.14911
7	EA-3A	2472-0404	0.14675	0.14752
8	EA-5A	2473-0515	0.14614	0.14701
9	EA-1B	2475-0707	0.14702	0.14872
10	EA-10	2476-1010	0.14690	0.14703

¹: Código asignado por Laboratorio Ambiental, S.A. *: corresponde a los pesos iniciales indicados en el reporte analítico RA-14-11222 y RA-14-11229.

Anexos:

Anexo 1. Cadena de Custodia R-02-000453

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. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte.

Lic. Levis Donado
Lic. En Química, Encargado Químico
Colegiado 4003

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

Redacción: D.S./L.D.	Fecha: Septiembre, 04/14	Revisión y aprobación: A.G.J.	Fecha: Septiembre, 04/14	Versión Cliente: 01
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BGI PQ200 Air Sampling System

Downloaded September 2014

Job Details:

Job Name: EA-1A
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

Job Code: EA-1A
Site Name: Los Planes (Top Soil Deposit)
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	649	645	647	mmHg
TA	29.9	16.4	20.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Sep-14	16:38:00
Stop:	17-Sep-14	16:38:00
ET:	23:59:00	

Mass Concentration Data:

Filter ID:	2485-0414
Final Wt:	148.790 mg
Initial Wt:	147.290 mg
Delta Wt:	1.500 mg
Total Vol:	20.78 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **72.19** µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded September 2014

Job Details:

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: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	631	627	629	mmHg
TA	27.7	16.2	19.7	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	4-Sep-14	14:25:00
Stop:	5-Sep-14	14:25:00
ET:	24:04:00	

Mass Concentration Data:

Filter ID:	2482-0111
Final Wt:	147.850 mg
Initial Wt:	147.420 mg
Delta Wt:	0.430 mg
Total Vol:	20.28 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **21.21** µg/m³

Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa.

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded September 2014

Job Details:

Job Name: EA-3
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

Job Code: EA-3
Site Name: El Fucío, zona este.
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	624	619	622	mmHg
TA	13.6	15.4	18.1	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-Sep-14	09:23:00
Stop:	12-Sep-14	09:23:00
ET:	23:59:00	

Mass Concentration Data:

Filter ID:	2483-0212
Final Wt:	146.280 mg
Initial Wt:	146.030 mg
Delta Wt:	0.250 mg
Total Vol:	20.15 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **12.41** µg/m³

Notes 1: Aldea El Fucío, San Rafael Las Flores, Santa Rosa.

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded September 2014

Job Details:

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: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	650	646	648	mmHg
TA	27.4	16.7	19.5	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	25-Sep-14	11:10:00
Stop:	26-Sep-14	11:10:00
ET:	22:49:00	

Mass Concentration Data:

Filter ID:	2484-0303
Final Wt:	146.380 mg
Initial Wt:	145.860 mg
Delta Wt:	0.520 mg
Total Vol:	20.90 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **24.88** µg/m³

Notes 1: Aldea Los Planes, San Rafael Las Flores, Santa Rosa.

Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-14-11244

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-040 (El Escobal)
Análisis de muestras: Octubre, 02-03 de 2014
Emisión del reporte: Octubre, 06 de 2014

Tipo de muestras: 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 de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2485-0414	0.14839	0.14879
2	EA-2A	2482-0111	0.14742	0.14785
3	EA-3	2483-0212	0.14603	0.14628
4	EA-7A	2484-0303	0.14586	0.14638

¹: Código asignado por Laboratorio Ambiental, S.A. *: corresponde a los pesos iniciales indicados en el reporte analítico RA-14-11235

Reporte Analítico RA-14-11244

Anexos:

Anexo 1. Cadena de Custodia R-02-000455

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. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte.

Lic. Levis Donado
Lic. En Química, Encargado Químico
Colegiado 4480

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

Redacción:	Fecha:	Revisión y aprobación:	Fecha:	Versión Cliente:
D.S./L.D.	Octubre, 06/14	A.G.J.	Octubre, 06/14	01

BGI PQ200 Air Sampling System

Downloaded October 2014

Job Details:

Job Name: EA-1A
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

Job Code: EA-1A
Site Name: Los Planes (Top Soil Deposit)
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	649	643	647	mmHg
TA	29.8	15.7	21.5	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 2-Oct-14	15:15:00
Stop: 3-Oct-14	15:15:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2489-0818
Final Wt:	145.740 mg
Initial Wt:	145.530 mg
Delta Wt:	0.210 mg
Total Vol:	20.73 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **10.13** µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal
Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded October 2014

Job Details:

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: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	631	626	628	mmHg
TA	24.4	16.2	19.1	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 7-Oct-14	14:25:00
Stop: 8-Oct-14	14:25:00
ET: 24:00:00	

Mass Concentration Data:	
Filter ID:	2507-0414
Final Wt:	146.360 mg
Initial Wt:	146.040 mg
Delta Wt:	0.320 mg
Total Vol:	20.28 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **15.78** µg/m³

Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa.
Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded October 2014

Job Details:

Job Name: EA-3
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

Job Code: EA-3
Site Name: El Fucío, zona este.
Station Code:
Operators: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	624	620	622	mmHg
TA	24.6	15.1	18.5	°C
Q	---	---	16.70	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 7-Oct-14	16:50:00
Stop: 8-Oct-14	16:50:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2508-0515
Final Wt:	148.770 mg
Initial Wt:	148.510 mg
Delta Wt:	0.260 mg
Total Vol:	20.12 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **12.92** µg/m³

Notes 1: Aldea El Fucío, San Rafael Las Flores, Santa Rosa.
Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded October 2014

Job Details:

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: LF
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	651	646	649	mmHg
TA	30.8	16.6	20.3	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 2-Oct-14	14:50:00
Stop: 3-Oct-14	14:50:00
ET: 19:08:00	

Mass Concentration Data:	
Filter ID:	2488-0717
Final Wt:	148.600 mg
Initial Wt:	148.270 mg
Delta Wt:	0.330 mg
Total Vol:	20.88 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **15.81** µg/m³

Notes 1: Aldea Los Planes, San Rafael Las Flores, Santa Rosa.
Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-14-11258

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-040 (El Escobal)
Análisis de muestras: Octubre, 22-23 de 2014
Emisión del reporte: Octubre, 28 de 2014

Tipo de muestras: 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 de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2489-0818	0.14553	0.14574
2	EA-7A	2488-0717	0.14827	0.14860
3	EA-2A	2507-0414	0.14604	0.14636
4	EA-3	2508-0515	0.14851	0.14877

¹: Código asignado por Laboratorio Ambiental, S.A. *: corresponde a los pesos iniciales indicados en el reporte analítico RA-14-11235 Y RA-14-11246

Anexos:

Anexo 1. Cadena de Custodia R-02-000456

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. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte.

Ing. Diego Silva
Ing. Químico, Gestor de Calidad
Colegiado 1595

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

Redacción: D.S./L.D.	Fecha: Octubre, 28/14	Revisión y aprobación: A.G.J.	Fecha: Octubre, 28/14	Versión Cliente: 01
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11.3.2 Informe de Metales en PM₁₀

Reporte Analítico RA-14-11234

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-041 (El Escobal)
Análisis de muestras: Septiembre, 16-17 de 2014
Emisión del reporte: Septiembre, 18 de 2014

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

Análisis: Gravimetría de partículas en filtro de calidad del aire.

Método analítico: ICP Masas. EPA Total Metals 6010Cmod and Total Metals on Small Filter 6020mod.

*Parámetros	LDM (µg)	Estación							
		EA-4A	EA-6	EA-7A	EA-2A	EA-3A	EA-5A	EA-1B	EA-10
Código de filtro		2446-0303	2451-0808	2449-0606	2469-0101	2472-0404	2473-0515	2475-0707	2476-1010
Aluminio (Al)	5.0	62.9	8.4	< 5.0	25.2	14.1	16.8	17.0	< 5.0
Antimonio (Sb)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsénico (As)	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Azufre (S)	2.5	15.6	11.7	11.2	13.4	10.4	16.4	16.8	< 2.5
Bario (Ba)	0.1	1.1	0.2	< 0.1	0.3	0.2	0.2	0.3	< 0.1
Berilio (Be)	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuto (Bi)	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Boro (B)	0.6	1.0	< 0.6	0.8	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Cadmio (Cd)	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Calcio (Ca)	5.0	46.7	36.6	33.5	40.6	35.1	36.1	35.6	16.2
Cromo (Cr)	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6
Cobalto (Co)	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Cobre (Cu)	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Estaño (Sn)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Estroncio (Sr)	0.1	0.2	< 0.1	< 0.1	0.2	0.1	0.1	0.1	< 0.1
Fósforo (P)	2.5	17.0	13.1	16.4	13.7	13.6	13.5	13.7	13.5
Hierro (Fe)	5.0	53.2	9.7	< 5.0	28.3	15.3	18.2	18.3	< 5.0

Reporte Analítico RA-14-11234

*Parámetros	LDM (µg)	Estación							
		EA-4A	EA-6	EA-7A	EA-2A	EA-3A	EA-5A	EA-1B	EA-10
Código de filtro		2446-0303	2451-0808	2449-0606	2469-0101	2472-0404	2473-0515	2475-0707	2476-1010
Magnesio (Mg)	5.0	13.0	5.6	< 5.0	12.0	7.9	8.8	8.6	< 5.0
Manganeso (Mn)	0.1	2.4	0.3	0.4	0.6	0.6	0.5	0.5	< 0.1
Molibdeno (Mo)	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Níquel (Ni)	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Plata (Ag)	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Plomo (Pb)	0.3	< 0.3	0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Potasio (K)	10.0	19.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Selenio (Se)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Silicio (Si)	1.0	50.8	20.0	15.1	37.2	27.1	28.1	27.7	11.7
Sodio (Na)	5.0	55.4	52.1	47.7	54.6	51.0	53.5	51.4	40.0
Talio (Tl)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanio (Ti)	0.1	2.82	0.27	0.14	0.57	0.45	0.44	0.44	< 0.1
Uranio (U)	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vanadio (V)	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc (Zn)	0.5	0.8	< 0.5	1.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zirconio (Zr)	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

*: Análisis realizados por laboratorio subcontratado. **µg**: microgramos. <: menor que el límite de detección del método. **LDM**: límite de detección del método.

Reporte Analítico

RA-14-11234

Anexos:

Anexo 1. Cadena de Custodia R-02-000453

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. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte

Lic. Levis Donado
Lic. En Química, Encargado Químico
Colegiado 4080

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

Redacción: D.S./L.D.	Fecha: Septiembre, 18/14	Revisión y aprobación: A.G.J.	Fecha: Septiembre, 19/14	Versión Cliente: 01
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11.3.3 Informe sobre PST y Gases de Combustión.



**MONITOREO DE NO₂, SO₂ Y PARTÍCULAS
SEDIMENTABLES TOTALES
PROYECTO MINERO EL ESCOBAL**

Septiembre y Octubre 2014

San Rafael Las Flores, Santa Rosa, Guatemala

Noviembre de 2014

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 22 al 25 de Septiembre para gases de combustión y del 22 de septiembre al 23 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 (**SO₂** y **NO₂**); 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 SO₂ y NO₂ y PST

Septiembre y Octubre 2014		
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): 804,352 N (m): 1,600,404
EA-6	Norte del proyecto, ruta a Mataquescuintla	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: NAD27 UTM zona 16 N. Fuente: CTA, 2014.

Cuadro 2: Metodologías utilizadas para SO₂ y NO₂ y PST

Gases de Combustión	<p>SO₂: Se utilizó el análisis espectrofotométrico, descrito en el Título 40, Parte 50, Apéndice A de USEPA.</p> <p>NO₂: Se utilizó el análisis espectrofotométrico. Método de referencia designado por USEPA: No. EQN-1277-026.</p>
PST	ASTM D 1739-98 (re-aprobación 2004).

Fuente: CTA, 2014.

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**)¹ para SO₂ y NO₂, tomadas de International Finance Corporation (**IFC**) Industry Sector Guidelines for Mining, December 10, 2007 y General Environment Health and Safety Guidelines, December 19/2008.

Los resultados de Partículas Sedimentables Totales (**PST**) se compararon con los valores guía reportados en el Ministerio de Ambiente de la provincia canadiense British Columbia (**BC**)² con respecto a las partículas sedimentables totales para industrias mineras, de fundición y relacionadas (BC air quality objectives for total suspended particulates and dustfall, agosto 12, 2013).

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en septiembre de 2014; y en el Cuadro 4 se presentan los resultados de la medición de PST para el 22 septiembre de 2014 al 23 de octubre de 2014.

Cuadro 3: Resultados de la medición de gases de combustión en µg/m³

Estaciones de Muestreo	LDM ¹	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guías del Banco
SO₂	13.0	<13	<13	<13	<13	<13	<13	<13	20 µg/m ³
NO₂	9.0	10	11	10	11	13	11	13	*40µg/m ³

SO₂: dióxido de azufre. NO₂: dióxido de nitrógeno. *: Promedio anual. ¹: LDM: Límite de detección del método. µg/m³: microgramos sobre metros cúbicos. Fuente: Laboratorio Ambiental, S. A., 2014.

¹ Guías del Banco Mundial: www.ifc.org/ifcext/EnvironmentalGuidelines

² Guía de BC: <http://www.bcairquality.ca/reports/pdfs/aqotable.pdf>

Cuadro 4: Resultados de la medición de PST g / (m² x 30 días)

Estaciones de Muestreo	Unidad	LDM	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía de BC
Sólidos Insolubles	g/(m ² x 30 días)	0.0019	1.41	1.88	2.41	4.06	1.10	0.86	1.47	
Sólidos Solubles	g/(m ² x 30 días)	0.017	2.22	1.50	1.79	1.25	1.64	1.69	2.22	
Sólidos Totales	g/(m ² x 30 días)	0.019	3.63	3.38	4.20	5.31	2.74	2.55	3.69	
Sólidos Totales	(mg/dm²X día)	0.0063	1.17	1.09	1.35	1.71	0.88	0.82	1.19	2.9 (mg/dm ² X día)

g: gramos. m²: metro cuadrado. mg: miligramos. dm²: decímetro cuadrado. ¹: valor referido para un período promedio de un mes. Fuente: Laboratorio Ambiental, S. A., 2014.

Gases de Combustión

SO₂:

- Para las estaciones de muestreo evaluadas durante la visita al Proyecto, el resultado obtenido de SO₂ en laboratorio para cada una es menor al límite establecido por El Banco (**20 µg/m³**). En todas las estaciones el resultado se mantuvo por debajo del LDM (13 µg/m³).

NO₂:

- En todas las estaciones de muestreo se obtuvieron resultados detectables, pero ninguna supera el valor establecido por El Banco (**40 µg/m³**). Las estaciones EA-5A y EA-7A presentan las concentraciones más altas (13 µg/m³) mientras que las estaciones EA-1C y EA-3B presentan los valores más bajos de concentración (10 µg/m³).

Partículas Sedimentables Totales

- Las estaciones EA-4A (y EA-3B presentaron la mayor cantidad de sólidos totales, con concentraciones de 1.71 mg/ (dm² x día)) y 1.35 mg / (dm² x día) respectivamente. La estación EA-6 presentó la menor cantidad de sólidos totales obteniéndose un valor de 0.82 mg / (dm² x día). Ninguno de los resultados obtenidos sobrepasa el valor guía utilizado de **2.9 mg/dm²X día**.



Anexos

Anexo 1-1: Reportes analíticos

Cliente: Consultoría y Tecnología Ambiental, S.A.
Dirección: Tronco I, sector E, lote 14, el Encinal Z. 7 de Mixco.
Proyecto: 178-039
Fecha de muestreo: Septiembre 22 – 25 de 2014
Fecha de análisis: Octubre, 23-24 de 2014
Emisión del reporte: Octubre, 27 de 2014

Tipo de muestras: Soluciones absorbentes dióxido de azufre (SO₂) y dióxido de nitrógeno (NO₂).

Análisis: Determinación espectrofotométrica de SO₂ y de NO₂ en la atmósfera.

Métodos analíticos:

- SO₂: 40 CFR, parte 50, Apéndice A-2, EPA. Reference Method for the determination of Sulfur Dioxide in the atmosphere (Pararosaniline Method).
- NO₂: EPA Designated Equivalent Method No. EQN-1277-026. Sodium Arsenite method for the determination of Nitrogen Dioxide in the atmosphere.

Parámetro	Unidades	LDM	Identificación de las muestras						
			EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A
SO ₂	µg/m ³	13	<13	<13	<13	<13	<13	<13	<13
	ppm	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
NO ₂	µg/m ³	9	10	11	10	11	13	11	13
	ppm	0.005	0.005	0.006	0.006	0.006	0.007	0.006	0.007

LDM: límite de detección del método. . µg/m³: microgramos por metro cúbico, ppm: partes por millón.
NA: no aplica. **ND:** no detectado.

Concentraciones de SO₂ y NO₂ en controles de laboratorio

Parámetro	Unidades	control con duplicado		Unidades	Control con estándar	
		DEA-4A	DEA-5A		Teórica	Real
SO ₂	µg/m ³	NA	<13	µg	19.57	20.43
	ppm	NA	<0.005			
NO ₂	µg/m ³	11	NA	µg/mL	1.00	1.01
	ppm	0.006	NA			

CDL: controles de laboratorio. **µg:** microgramo. **µg/mL:** microgramo por mililitro. Según los métodos analíticos, la diferencia entre las concentraciones teóricas y reales de los controles no deben ser mayores a 1 µg de SO₂ y a 0.1 µg/mL de NO₂, respectivamente.

Anexos:

Anexo 1. Cadena de custodia R-02-000523.

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. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte.

Ing. Diego Silva
Ing. Químico, Gestor de Calidad
Colegiado 1595

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

Redacción:	Fecha:	Revisión y aprobación:	Fecha:	Versión Cliente:
D.S./L.D.	Octubre, 27/14	A.G.J.	Octubre, 31/14	01

Reporte Analítico RA-14-11265

Cliente: Consultoría y Tecnología Ambiental, S.A.
Dirección: Tronco I, sector E, lote 14, el Encinal zona 7 de Mixco
Proyecto: 178-039
Fecha de muestreo: Septiembre 22 – Octubre 23 de 2014
Fecha de análisis: Octubre, 27-29 de 2014
Emisión del reporte: Septiembre, 29 de 2014

Tipo de muestras: Partículas sedimentables en aire durante un período de 30 días.
Análisis: Medición de material particulado total sedimentable en el aire (tasa de sedimentación).
Método analítico: ASTM D1739-98 (*Reapproved 2004*) *Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter).*

No.	Identificación de la muestra	Tasa de sedimentación para un período de 30 días g/(m ² • 30 días)		
		Material insoluble en agua	Material soluble en agua	Total (material soluble e insoluble en agua)
LDM		0.0019	0.017	0.019
1	EA-1C	1.41	2.22	3.63
2	EA-2B	1.88	1.50	3.38
3	EA-3B	2.41	1.79	4.20
4	EA-4A	4.06	1.25	5.31
5	EA-5A	1.10	1.64	2.74
6	EA-6	0.86	1.69	2.55
7	EA-7A	1.47	2.22	3.69

LDM: límite de detección del método. **g:** gramos; **m²:** metros cuadrados.

Reporte Analítico RA-14-11265

Anexos:

Anexo 1. Cadena de Custodia R-02-000531

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. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte.

Ing. Diego Silva
Ing. Químico, Gestor de Calidad
Colegiado 1595

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

Redacción:	Fecha:	Revisión y aprobación:	Fecha:	Versión Cliente:
D.S./L.D.	Octubre, 29/14	A.G.J.	Octubre, 31/14	01

11.3.4 Presión Sonora

ER-1

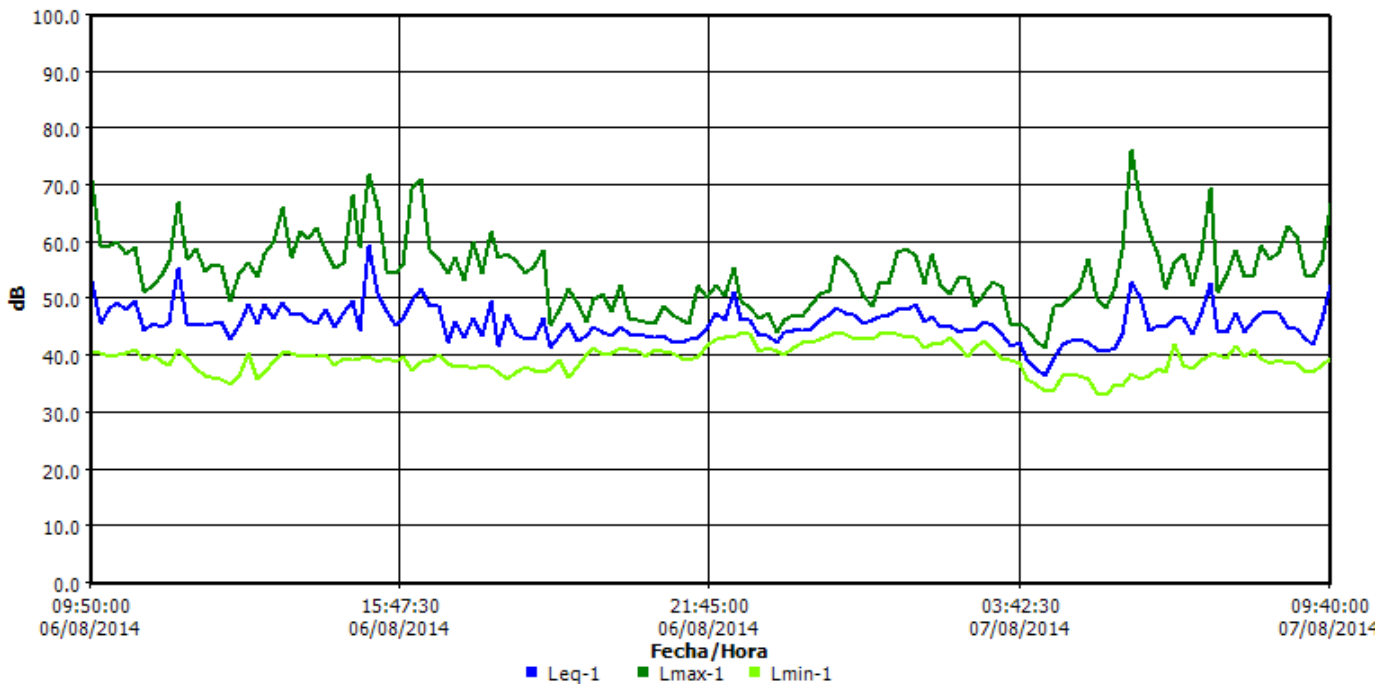
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la Aldea Los Planes.
Nombre ER-1
Sesión padre S042
Hora de inicio Miércoles, 06 de Agosto de 2014 09:40:00
Hora de paro Jueves, 07 de Agosto de 2014 09:40:00
Nombre del usuario Inga. Fernanda Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	33.3 dB	Lmax	1	76.3 dB
Lpk	1	95.7 dB	Leq	1	47.2 dB

Gráfica de datos de registro



ER-1A

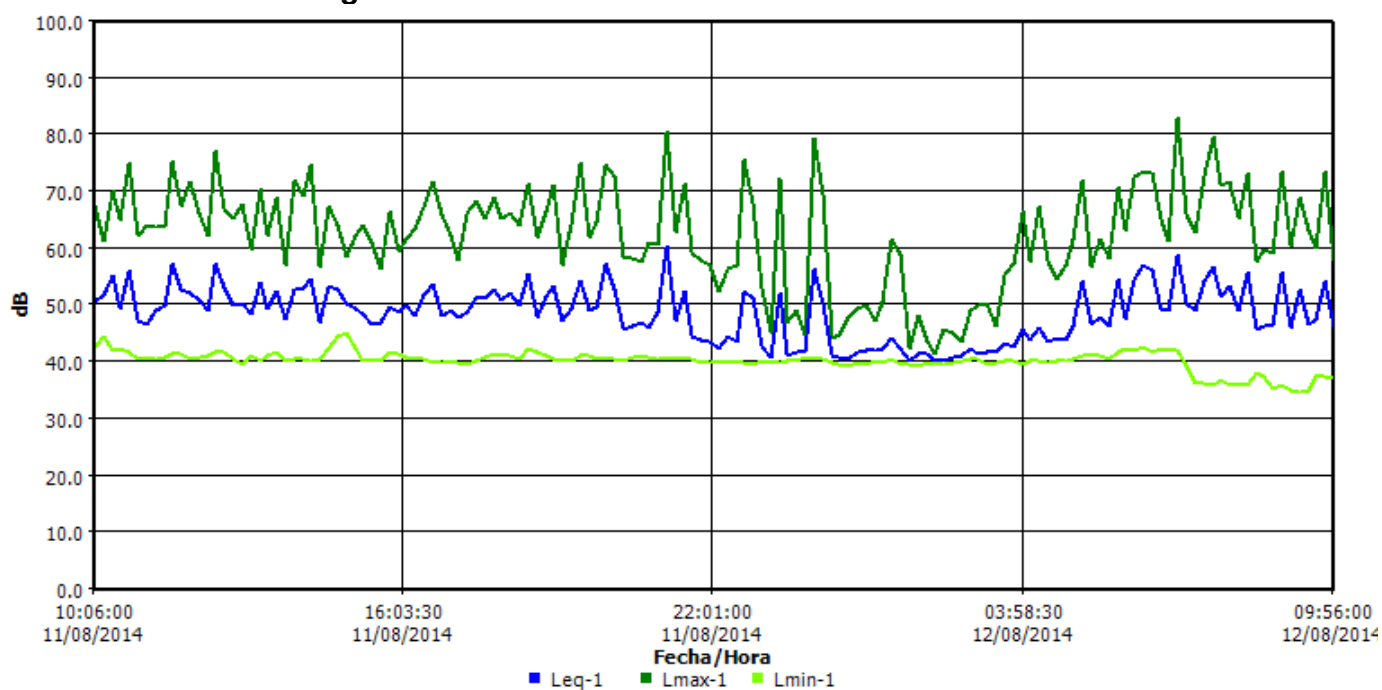
Panel de información

Ubicación San Rafael Las Flores
Nombre ER-1A
Sesión padre S043
Hora de inicio Lunes, 11 de Agosto de 2014 09:56:00
Hora de paro Martes, 12 de Agosto de 2014 09:56:00
Nombre del usuario Inga. Fernanda Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	34.6 dB	Lmax	1	82.9 dB
Lpk	1	100.1 dB	Leq	1	51.1 dB

Gráfica de datos de registro



ER-2

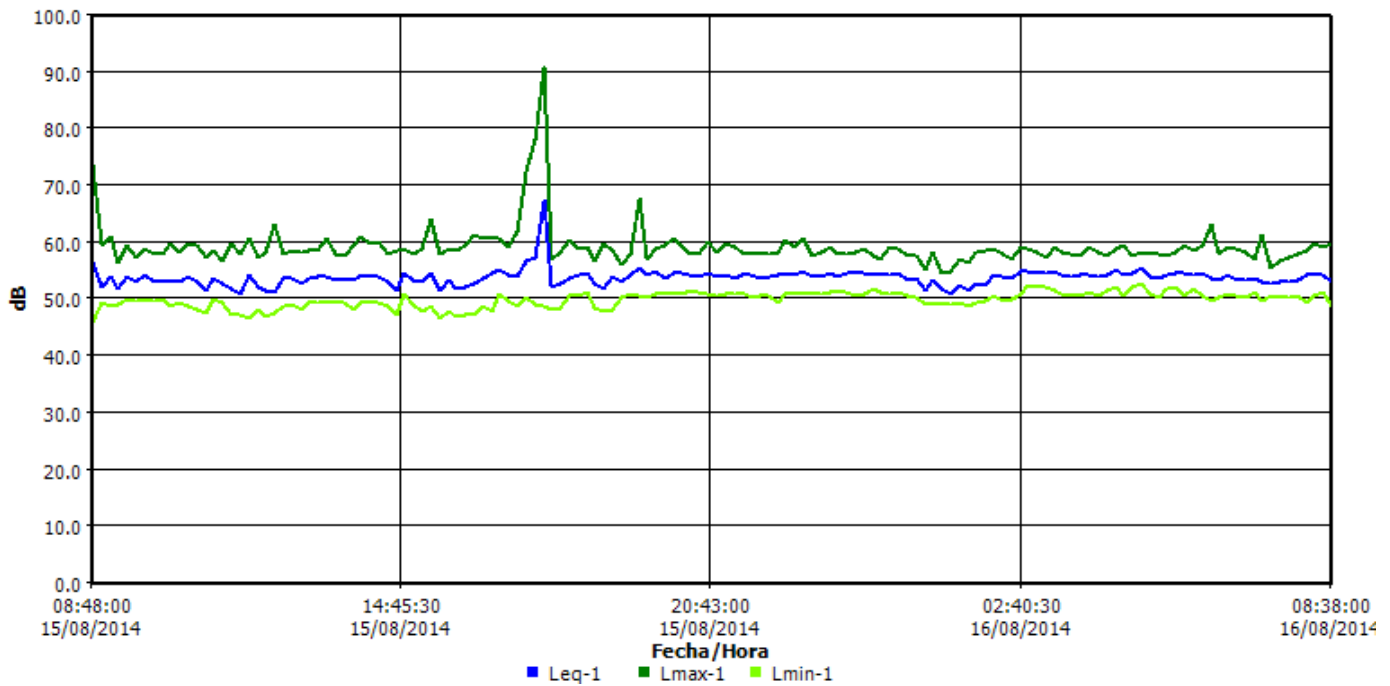
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S044
Hora de inicio Viernes, 15 de Agosto de 2014 08:38:00
Hora de paro Sábado, 16 de Agosto de 2014 08:38:00
Nombre del usuario Inga. Luisa Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	46 dB	Lmax	1	91.1 dB
Lpk	1	106.2 dB	Leq	1	54.4 dB

Gráfica de datos de registro



ER-3

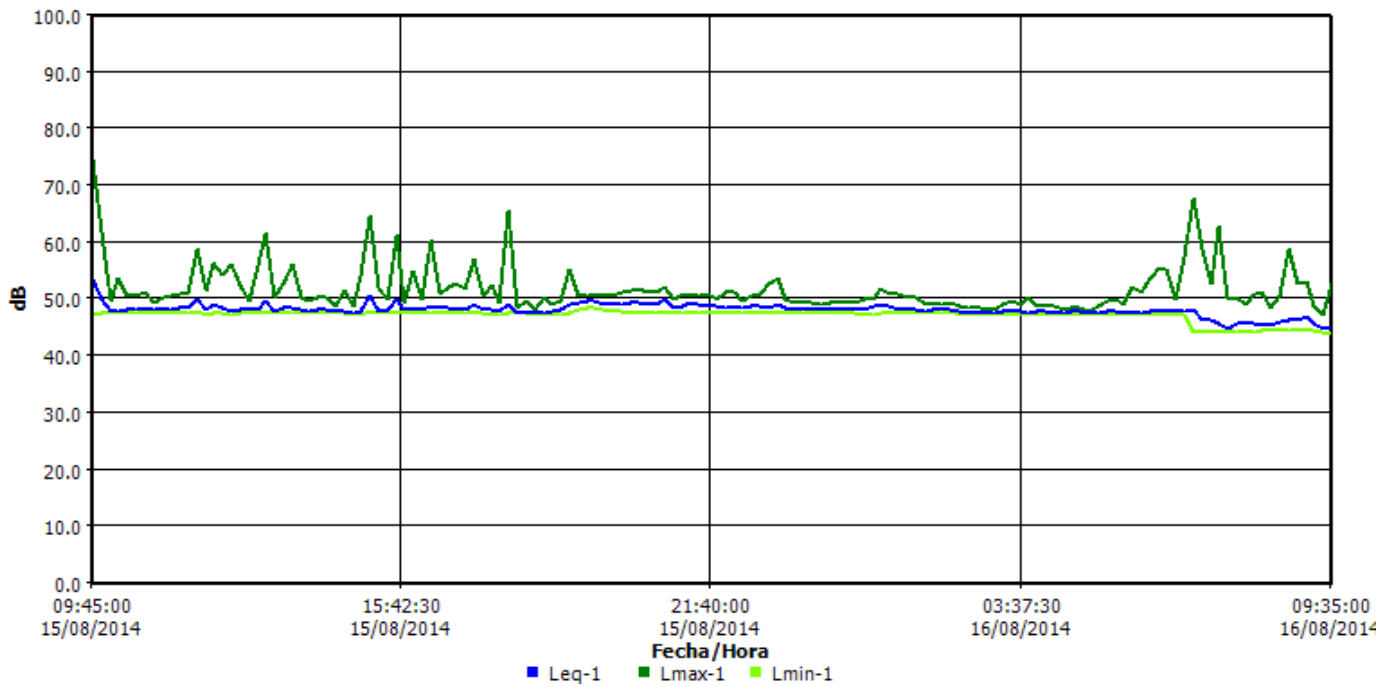
Panel de información

Ubicación Zona este del proyecto, aldea El Fucío
Nombre ER-3
Sesión padre S146
Hora de inicio Viernes, 15 de Agosto de 2014 09:35:00
Hora de paro Sábado, 16 de Agosto de 2014 09:35:00
Nombre del usuario Inga. Luisa Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	44 dB	Lmax	1	74.5 dB
Lpk	1	100.9 dB	Leq	1	48.2 dB

Gráfica de datos de registro



ER-3A

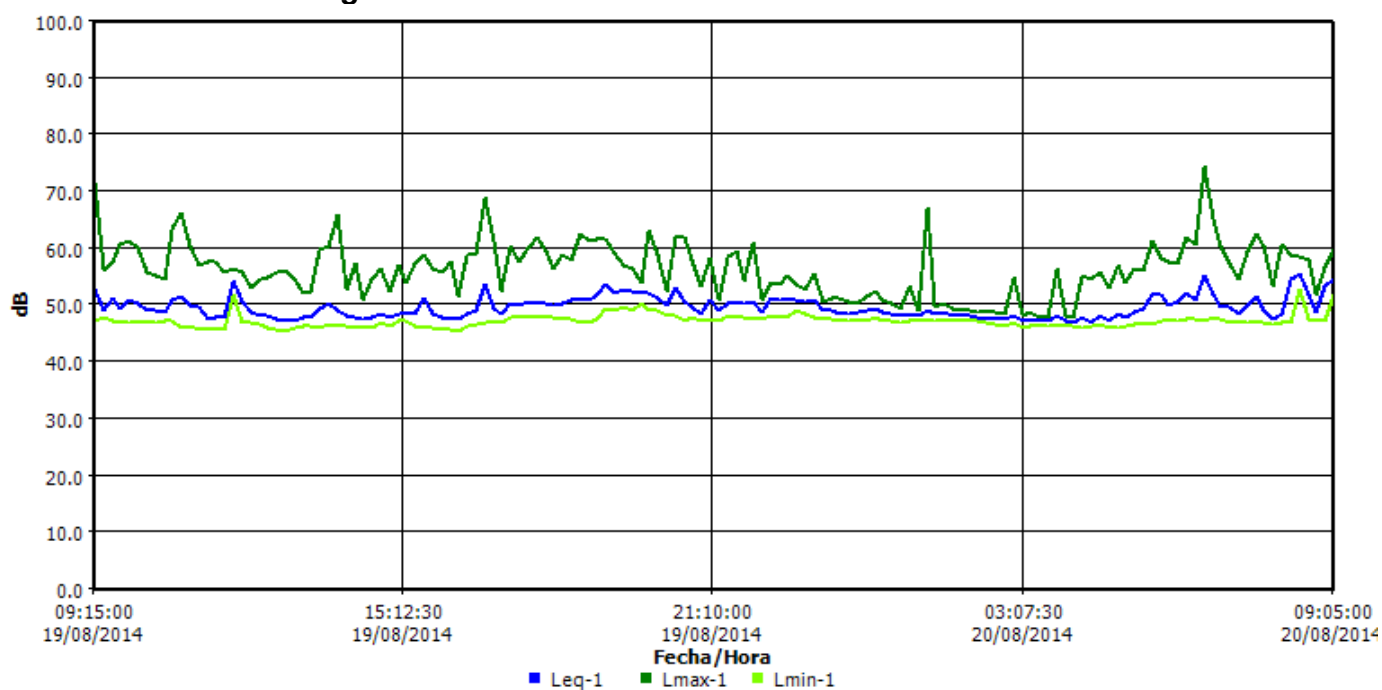
Panel de información

Ubicación Aledaño a aldea El Fucío
Nombre ER-3A
Sesión padre S045
Hora de inicio Martes, 19 de Agosto de 2014 09:05:00
Hora de paro Miércoles, 20 de Agosto de 2014 09:05:00
Nombre del usuario Inga. Luisa Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	45.5 dB	Lmax	1	74.6 dB
Lpk	1	97.9 dB	Leq	1	50 dB

Gráfica de datos de registro



ER-4A

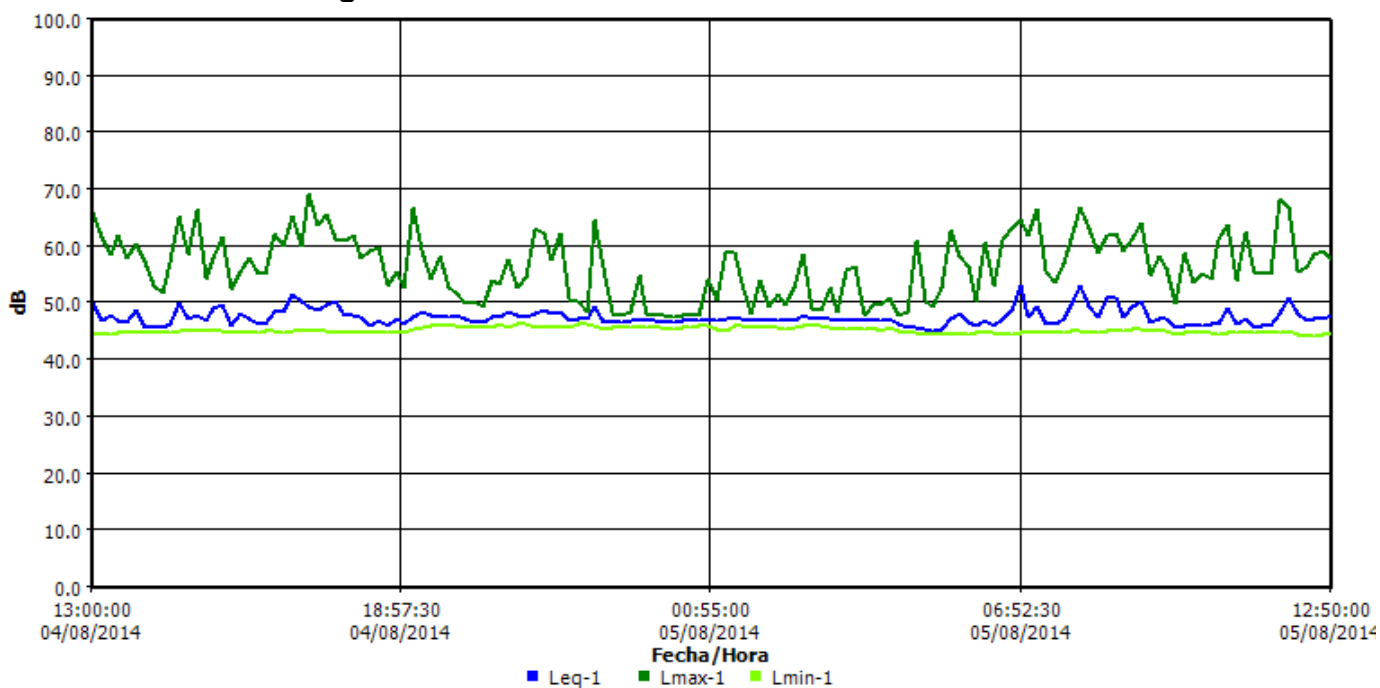
Panel de información

Ubicación Caserío El Portón de los Ángeles
Nombre ER-4A
Sesión padre S143
Hora de inicio Lunes, 04 de Agosto de 2014 12:50:00
Hora de paro Martes, 05 de Agosto de 2014 12:50:00
Nombre del usuario Inga. Luisa Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	44.1 dB	Lmax	1	69.2 dB
Lpk	1	97.2 dB	Leq	1	47.7 dB

Gráfica de datos de registro



ER-5A

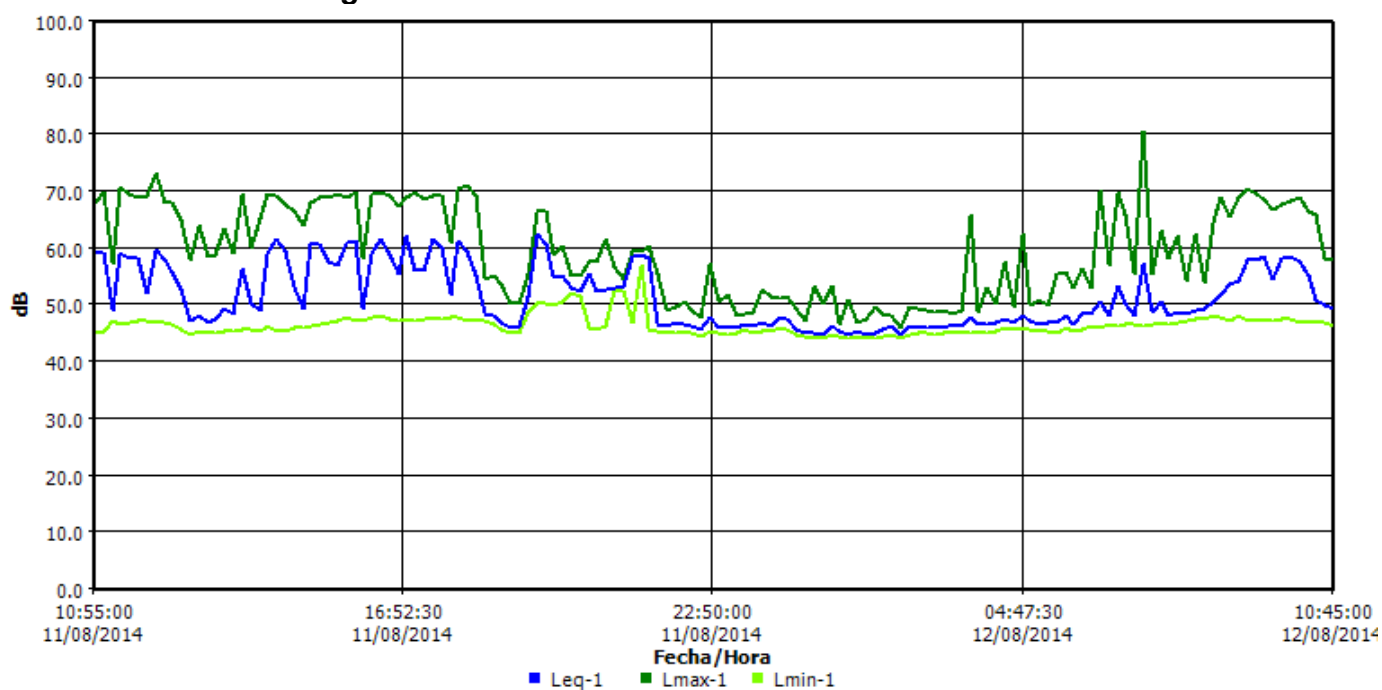
Panel de información

Ubicación Aldea Sabana Redonda
Nombre ER-5A
Sesión padre S145
Hora de inicio Lunes, 11 de Agosto de 2014 10:45:00
Hora de paro Martes, 12 de Agosto de 2014 10:45:00
Nombre del usuario Inga. Luisa Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	44.1 dB	Lmax	1	80.6 dB
Lpk	1	93.8 dB	Leq	1	54.9 dB

Gráfica de datos de registro



ER-6

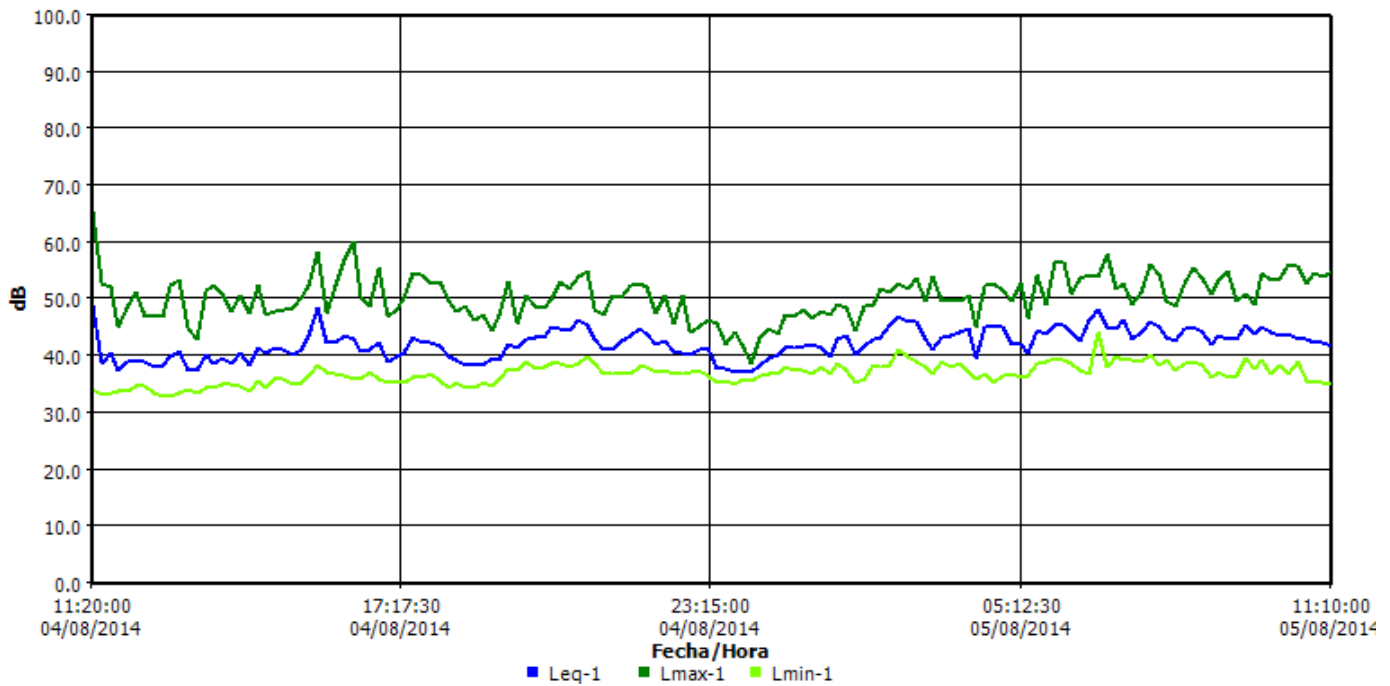
Panel de información

Ubicación Al norte del Proyecto, ruta a Mataquesuintla
Nombre ER-6
Sesión padre S041
Hora de inicio Lunes, 04 de Agosto de 2014 11:10:00
Hora de paro Martes, 05 de Agosto de 2014 11:10:00
Nombre del usuario Inga. Luisa Fernanda Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	33 dB	Lmax	1	65.3 dB
Lpk	1	96.1 dB	Leq	1	42.9 dB

Gráfica de datos de registro



ER-7A

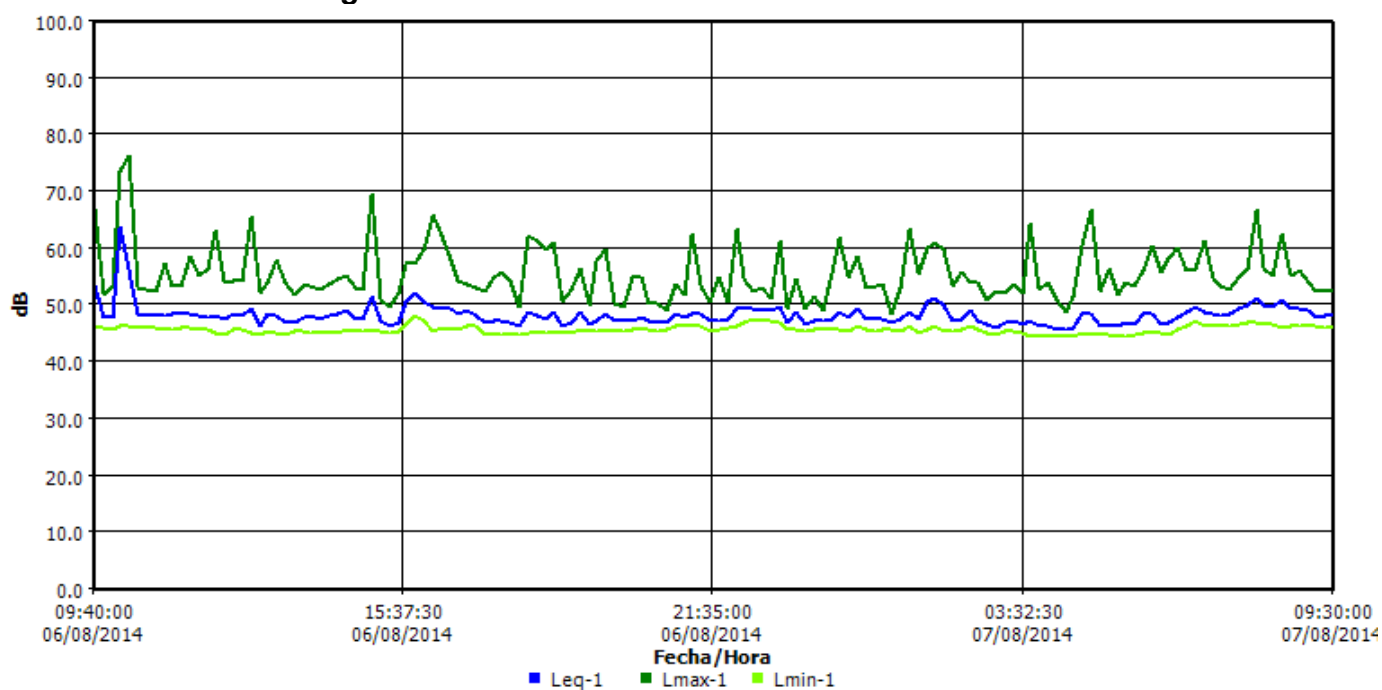
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S144
Hora de inicio Miércoles, 06 de Agosto de 2014 09:30:00
Hora de paro Jueves, 07 de Agosto de 2014 09:30:00
Nombre del usuario Inga. Luisa Barrios / Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	44.4 dB	Lmax	1	76.2 dB
Lpk	1	93.2 dB	Leq	1	49.3 dB

Gráfica de datos de registro



ER-1

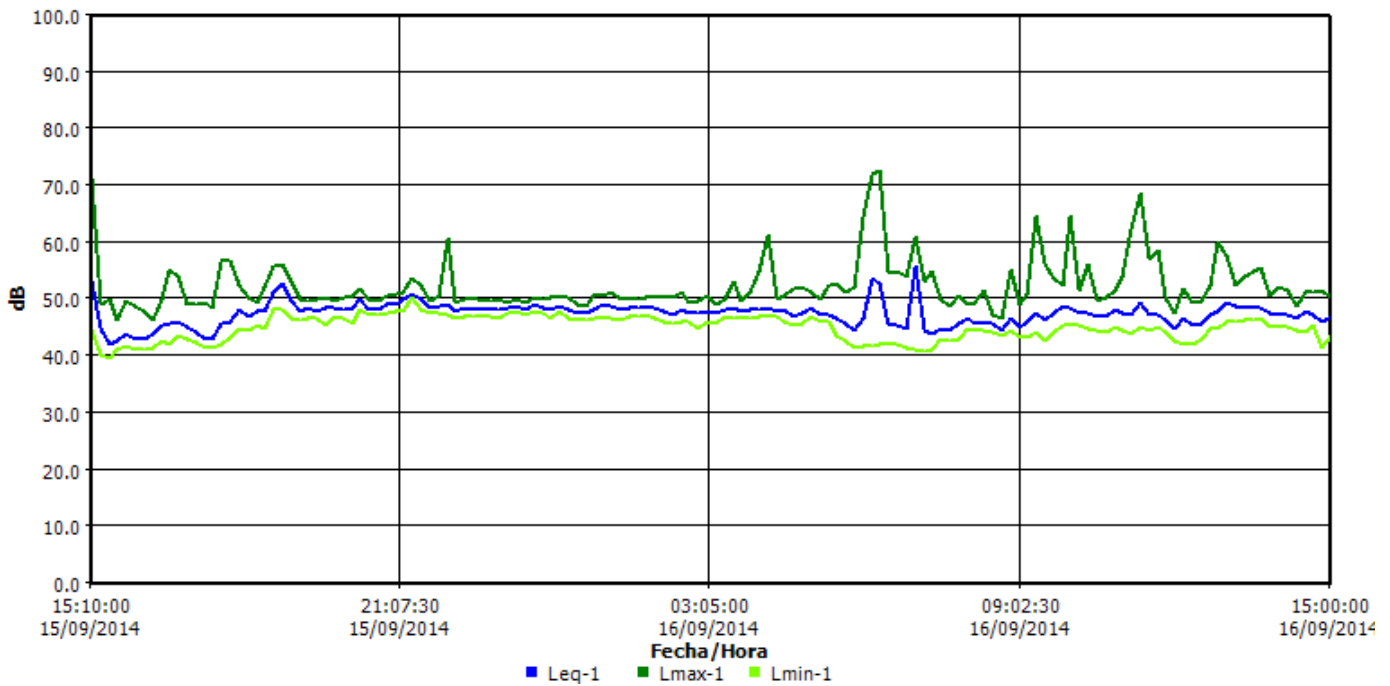
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S049
Hora de inicio Lunes, 15 de Septiembre de 2014 15:00:00
Hora de paro Martes, 16 de Septiembre de 2014 15:00:00
Nombre del usuario Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	39.5 dB	Lmax	1	72.5 dB
Lpk	1	100.2 dB	Leq	1	48 dB

Gráfica de datos de registro



ER-2

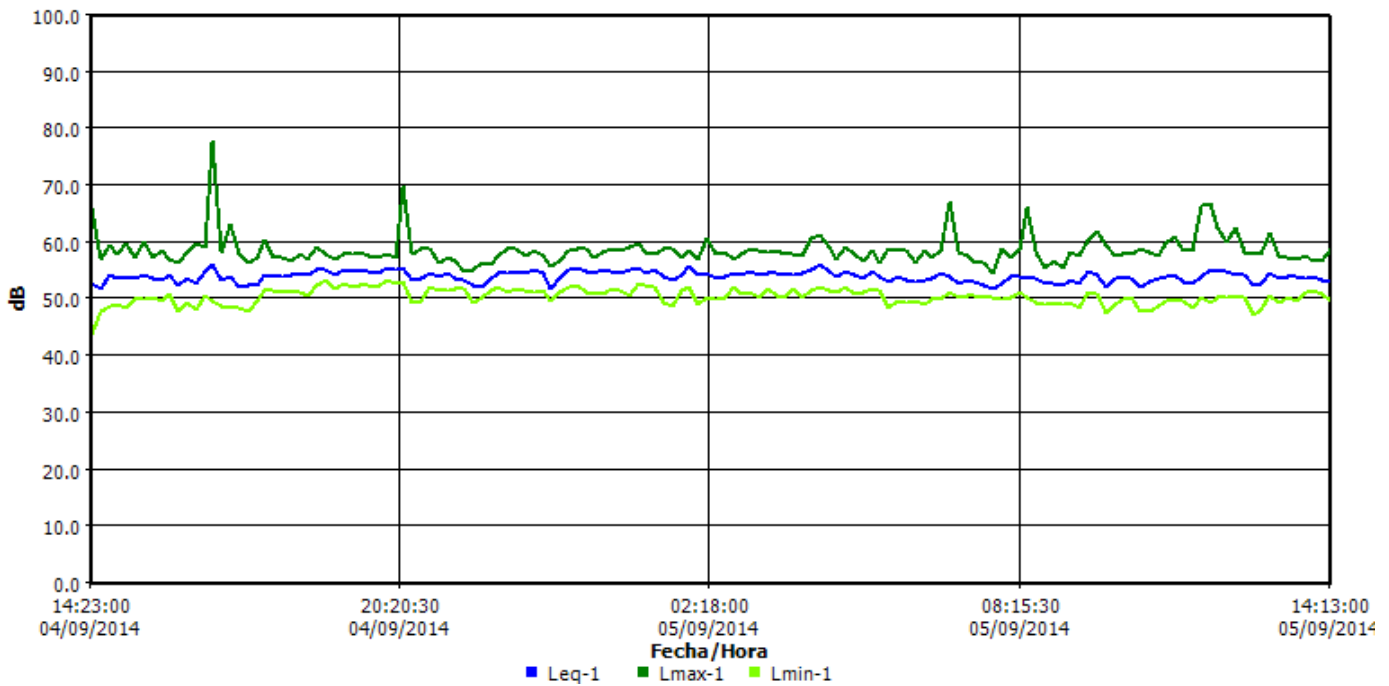
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S047
Hora de inicio Jueves, 04 de Septiembre de 2014 14:13:00
Hora de paro Viernes, 05 de Septiembre de 2014 14:13:00
Nombre del usuario Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	43.9 dB	Lmax	1	77.7 dB
Lpk	1	95.3 dB	Leq	1	54.1 dB

Gráfica de datos de registro



ER-3

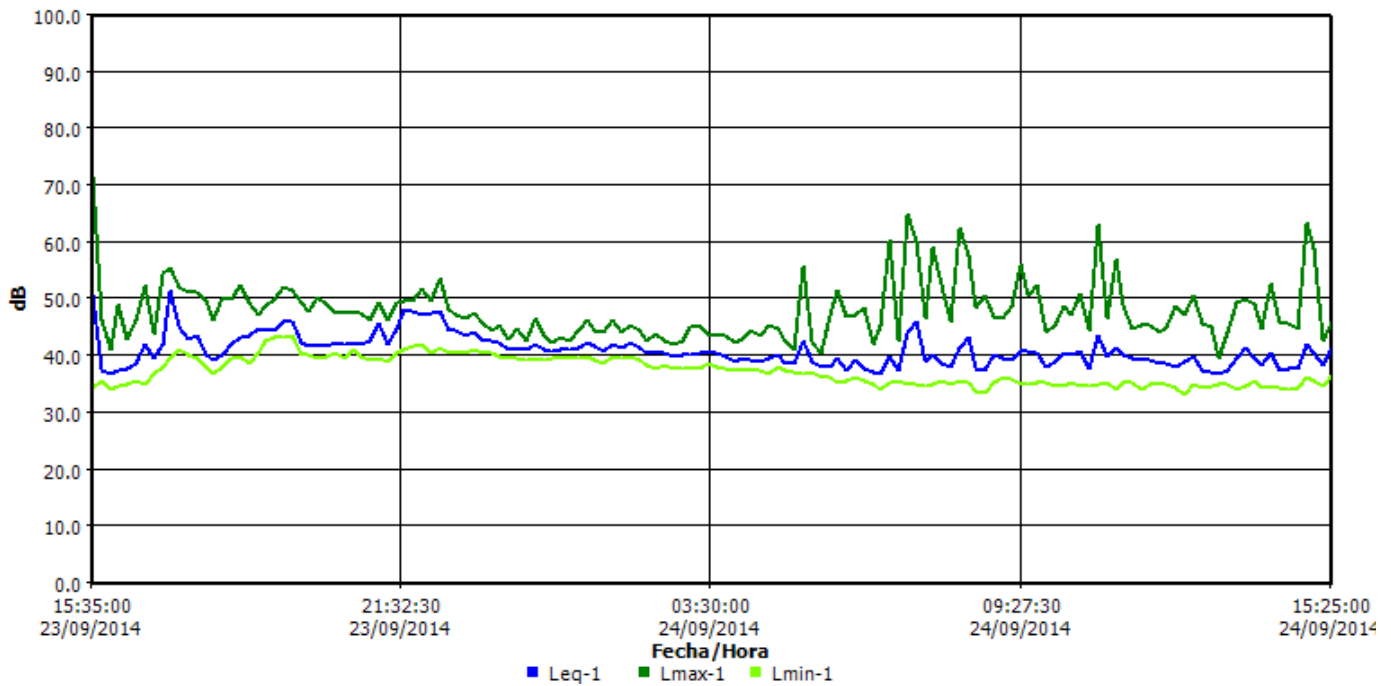
Panel de información

Ubicación Aledaño a Aldea El Fucío
Nombre ER-3
Sesión padre S161
Hora de inicio Martes, 23 de Septiembre de 2014 15:25:00
Hora de paro Miércoles, 24 de Septiembre de 2014 15:25:00
Nombre del usuario Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	33.3 dB	Lmax	1	71.4 dB
Lpk	1	103.2 dB	Leq	1	42.1 dB

Gráfica de datos de registro



ER-7A

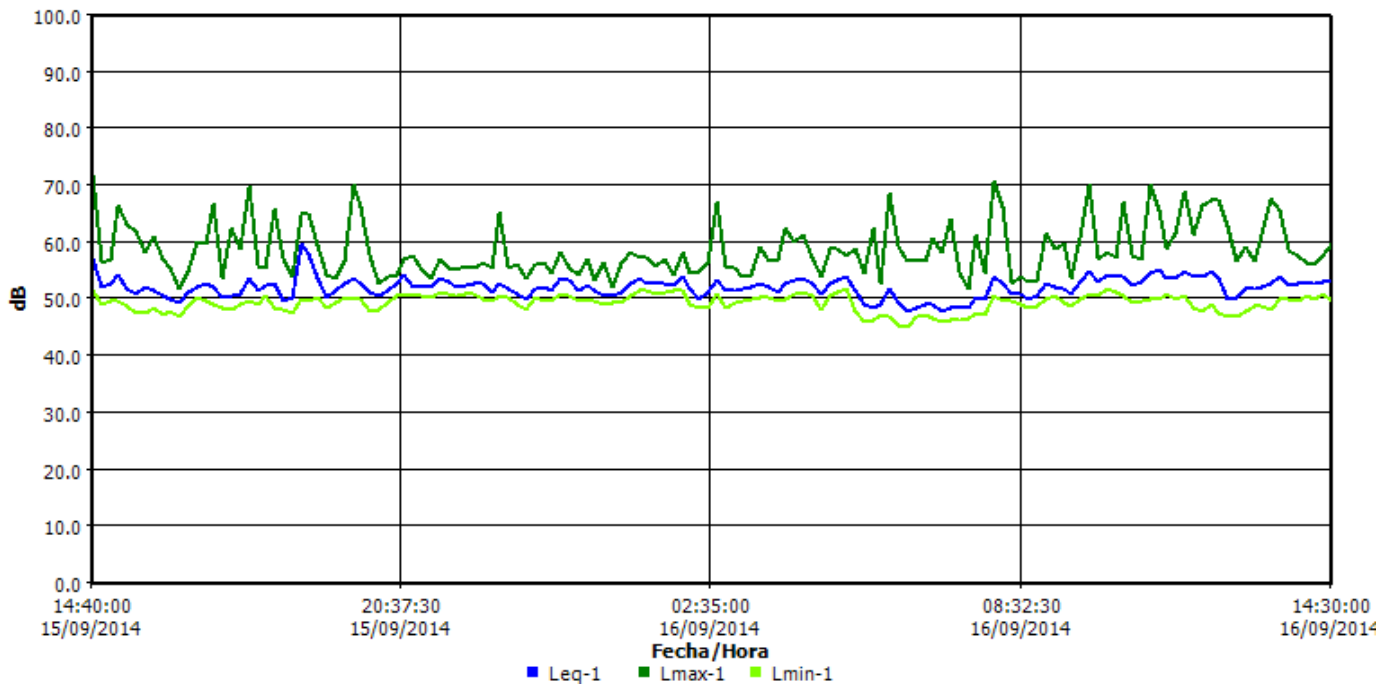
Panel de información

Ubicación Aledaño a Aldea Los Planes
Nombre ER-7A
Sesión padre S159
Hora de inicio Lunes, 15 de Septiembre de 2014 14:30:00
Hora de paro Martes, 16 de Septiembre de 2014 14:30:00
Nombre del usuario Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	45.1 dB	Lmax	1	71.6 dB
Lpk	1	100 dB	Leq	1	52.5 dB

Gráfica de datos de registro



ER-1

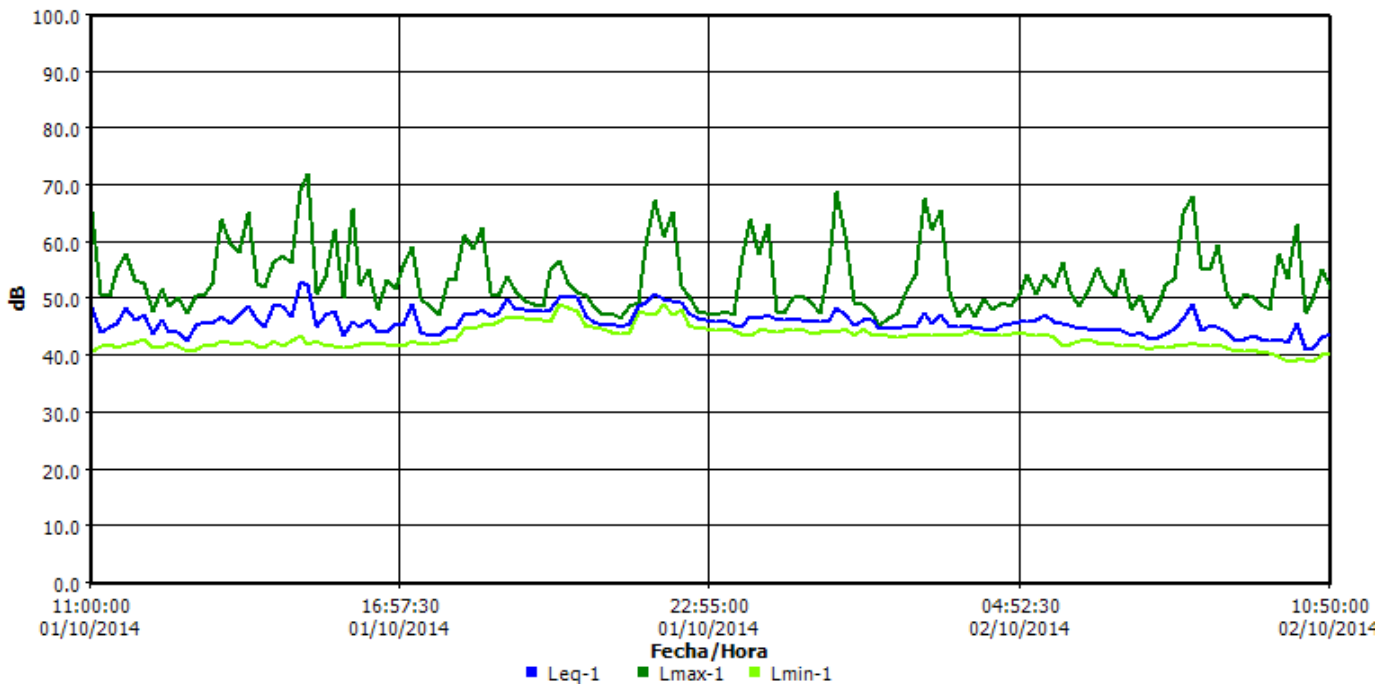
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S050
Hora de inicio Miércoles, 01 de Octubre de 2014 10:50:00
Hora de paro Jueves, 02 de Octubre de 2014 10:50:00
Nombre del usuario Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	39 dB	Lmax	1	72 dB
Lpk	1	98 dB	Leq	1	46.5 dB

Gráfica de datos de registro



ER-2

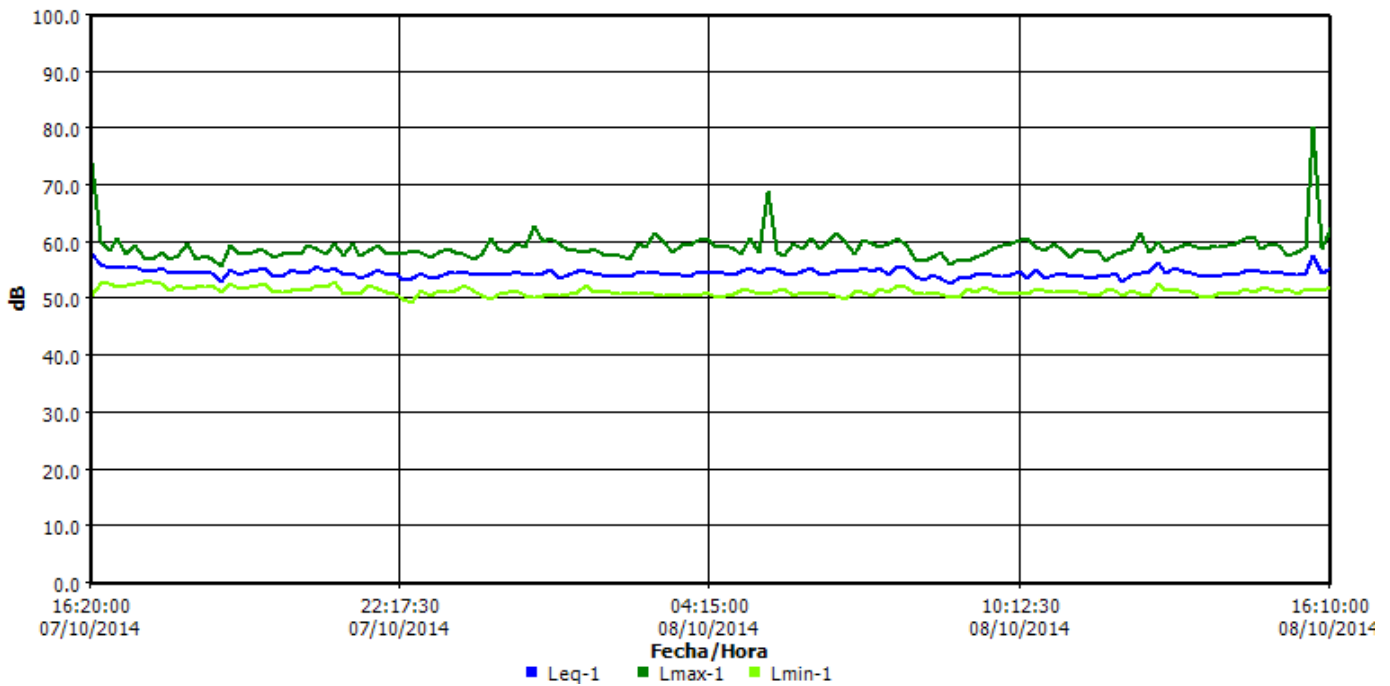
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S150
Hora de inicio Martes, 07 de Octubre de 2014 16:10:00
Hora de paro Miércoles, 08 de Octubre de 2014 16:10:00
Nombre del usuario Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	49.4 dB	Lmax	1	80.3 dB
Lpk	1	104.6 dB	Leq	1	54.6 dB

Gráfica de datos de registro



ER-3

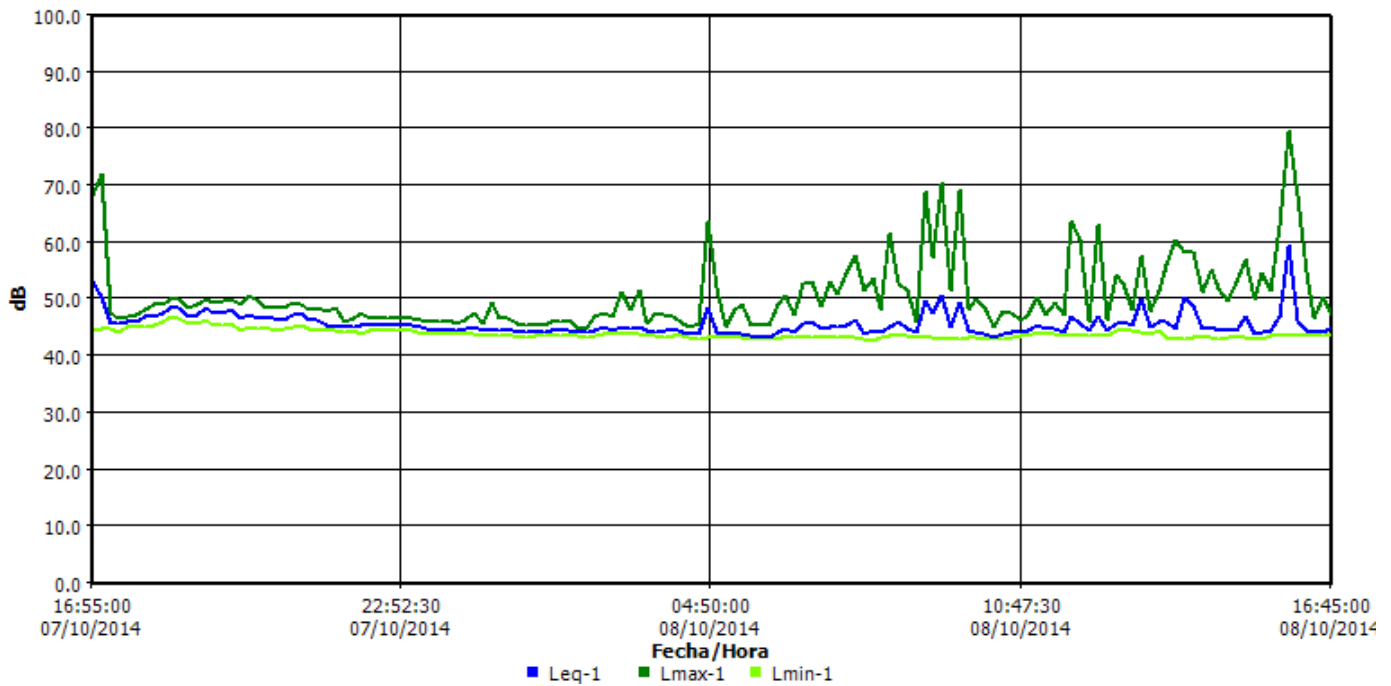
Panel de información

Ubicación Aledaño a Aldea El Fucío
Nombre ER-3
Sesión padre S052
Hora de inicio Martes, 07 de Octubre de 2014 16:45:00
Hora de paro Miércoles, 08 de Octubre de 2014 16:45:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	42.8 dB	Lmax	1	79.6 dB
Lpk	1	113 dB	Leq	1	46.5 dB

Gráfica de datos de registro



ER-7

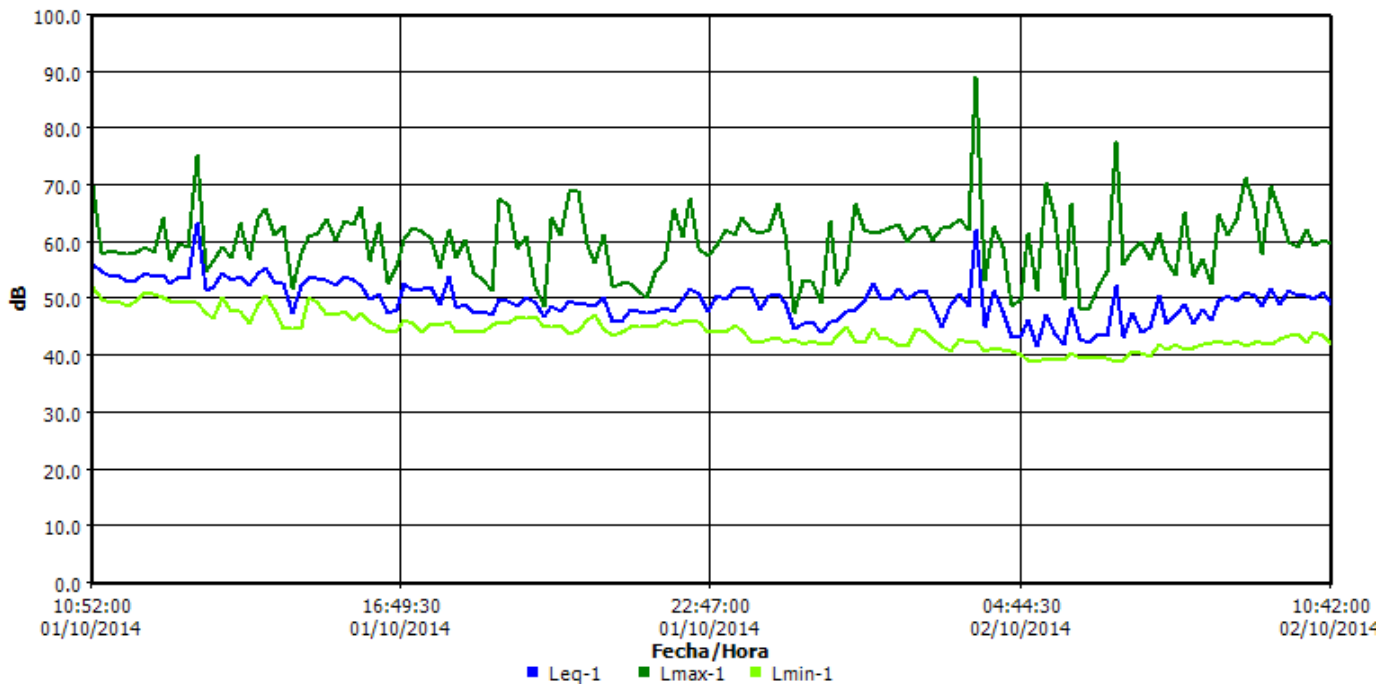
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S148
Hora de inicio Miércoles, 01 de Octubre de 2014 10:42:00
Hora de paro Jueves, 02 de Octubre de 2014 10:42:00
Nombre del usuario Erik von Quednow

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.9 dB	Lmax	1	89.1 dB
Lpk	1	104.9 dB	Leq	1	51.4 dB

Gráfica de datos de registro



11.4 Certificados de verificación de los equipos utilizados

11.4.1 Material Particulado (PM₁₀) y Presión Sonora



Certificate of Calibration

Certificate No: 5504965BGK080007

Submitted By: CTA SA
TRONCO 1 LOT 14E
EL EMCINAL ZONA 7 DE MIXCO, GUATEMALA

Serial Number: BGK080007 Date Received: 4/1/2014
Customer ID: N/A Date Issued: 4/4/2014
Model: SOUNDPRO DL-2 SLM Valid Until: 4/4/2015

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

SubAssemblies:

Description:	Serial Number:
TYPE 2 PREAMP	0811 6065
MICROPHONE QE 7052 1/2 IN. ELECTRET	44610

Calibration Procedure: 53V899

Reference Standard(s):

I.D. Number	Device	Last Calibration Date	Calibration Due
EF000176	QUEST-CAL	12/16/2013	12/16/2014
ET0000556	B&K ENSEMBLE	5/10/2013	5/10/2014

Measurement Uncertainty:

+/- 2.2% ACOUSTIC (0.19DB)
Estimated at 95% Confidence Level (k=2)

Calibrated By: Brian X. Bayer 4/4/2014
BRIAN BAYER Service Technician

Reviewed/Approved By: [Signature] 4/4/2014
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 3M Detection Solutions.

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-Apr-14

Calibration Operator: Brian DeVoe

Critical Venturi Flow Meter: Max Uncertainty = 0.346%
Serial Number: 1 CEESI NVLAP NIST Data File 04BGI151
Serial Number: 2 CEESI NVLAP NIST Data File 04BGI152
Serial Number: 3 CEESI NVLAP NIST Data File 04BGI153

Room Temperature: Uncertainty=0.071% Room Temperature: 21.3 C

Brand: Ever-Safe Serial Number: 016076

NIST Traceability No. 516837

tetraCal:

Ambient Temperature (set): 21.3 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): 763.5 mm of Hg

Results of Venturi Calibration

Flow Rate (Q) vs. Pressure Drop (ΔP).

Where: Q=Lpm, ΔP = Cm of H2O

No. 1 Q = 5.86711 ΔP ^ 0.52262

No. 2 Q = 1.14635 ΔP ^ 0.52677

No. 3 Q = 0.33436 ΔP ^ 0.55734

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

Verificación Equipo PQ200

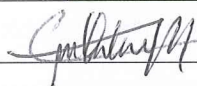
Información del Equipo:					
No. Equipo	AIR-001	N/S	0938	Fecha	01/08/14
Calibrador	Tetracal	N/S	508	Hora	07:27
Caudal (Lpm)					
Equipo	16.72	%dif	1.46	%dif Permitido = 4%	
Calibrador	16.48	Pasa		Falla	
Temperatura Ambiental (°C)					
Equipo	21.8	Diferencia	-0.9	Diferencia Permitido = ± 2 °C	
Calibrador	22.7	Pasa	✓	Falla	
Presión Barométrica (mm de Hg)					
Equipo	649	Diferencia	-2	Diferencia Permitida= ±10mm	
Calibrador	651	Pasa	✓	Falla	
Nombre y Firma de Responsable		Erik von Queckow <i>[Firma]</i>			

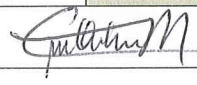
Información del Equipo:					
No. Equipo	AIR-002	N/S	0877	Fecha	01/08/14
Calibrador	Tetracal	N/S	508	Hora	08:17
Caudal (Lpm)					
Equipo	16.70	%dif	2.45	%dif Permitido = 4%	
Calibrador	16.30	Pasa	✓	Falla	
Temperatura Ambiental (°C)					
Equipo	24.6	Diferencia	+0.6	Diferencia Permitido = ± 2 °C	
Calibrador	24.0	Pasa	✓	Falla	
Presión Barométrica (mm de Hg)					
Equipo	649	Diferencia	-2	Diferencia Permitida= ±10mm	
Calibrador	651	Pasa	✓	Falla	
Nombre y Firma de Responsable		Erik von Queckow <i>[Firma]</i>			

Información del Equipo:					
No. Equipo	AIR-003	N/S	083R	Fecha	01/08/14
Calibrador	Tetracal	N/S	508	Hora	08:35
Caudal (Lpm)					
Equipo	16.72	%dif	1.70	%dif Permitido = 4%	
Calibrador	16.44	Pasa	✓	Falla	
Temperatura Ambiental (°C)					
Equipo	25.0	Diferencia	0.4	Diferencia Permitido = ± 2 °C	
Calibrador	24.6	Pasa	✓	Falla	
Presión Barométrica (mm de Hg)					
Equipo	650	Diferencia	-1	Diferencia Permitida= ±10mm	
Calibrador	651	Pasa	✓	Falla	
Nombre y Firma de Responsable		Erik von Queckow <i>[Firma]</i>			

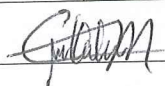
$$\%dif. = [(calibrador - equipo)/calibrador] \times 100$$

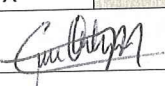
Verificación Equipo PQ200

Información del Equipo:					
No. Equipo	02	N/S	AIR-002	Fecha	04/09/2014
Calibrador	1	N/S	n/d	Hora	8:45
Caudal (Lpm)					
Equipo	16.7	%dif	1.49	%dif Permitido = 4%	
Calibrador	16.45	Pasa	X	Falla	
Temperatura Ambiental (°C)					
Equipo	21.6	Diferencia	0.6	Diferencia Permitido = ± 2 °C	
Calibrador	22.2	Pasa	X	Falla	
Presión Barométrica (mm de Hg)					
Equipo	649	Diferencia	1	Diferencia Permitida= ±10mm	
Calibrador	650	Pasa	X	Falla	
Nombre y Firma de Responsable	Erik von Quednow 				

Información del Equipo:					
No. Equipo	03	N/S	AIR-003	Fecha	09/09/2014
Calibrador	1	N/S		Hora	19:04
Caudal (Lpm)					
Equipo	16.7	%dif	1.73	%dif Permitido = 4%	
Calibrador	16.41	Pasa	X	Falla	
Temperatura Ambiental (°C)					
Equipo	23.8	Diferencia	0.3	Diferencia Permitido = ± 2 °C	
Calibrador	23.5	Pasa	X	Falla	
Presión Barométrica (mm de Hg)					
Equipo	648	Diferencia	1.5	Diferencia Permitida= ±10mm	
Calibrador	649.5	Pasa	X	Falla	
Nombre y Firma de Responsable	Erik von Quednow 				

Verificación Equipo PQ200

Información del Equipo:					
No. Equipo	02	N/S	AIR-002	Fecha	02/10/2014
Calibrador	1	N/S		Hora	9:42
Caudal (Lpm)					
Equipo	16.67	%dif	0.7	%dif Permitido = 4%	
Calibrador	16.54	Pasa	X	Falla	
Temperatura Ambiental (°C)					
Equipo	20.3	Diferencia	-1.4	Diferencia Permitido = ± 2 °C	
Calibrador	21.7	Pasa	X	Falla	
Presión Barométrica (mm de Hg)					
Equipo	650	Diferencia	2	Diferencia Permitida = ± 10 mm	
Calibrador	652	Pasa	X	Falla	
Nombre y Firma de Responsable		Erik von Quednow 			

Información del Equipo:					
No. Equipo	03	N/S	AIR-003	Fecha	02/10/2014
Calibrador	1	N/S		Hora	9:34
Caudal (Lpm)					
Equipo	16.62	%dif	1.6	%dif Permitido = 4%	
Calibrador	16.36	Pasa	X	Falla	
Temperatura Ambiental (°C)					
Equipo	23.8	Diferencia	1.2	Diferencia Permitido = ± 2 °C	
Calibrador	22.6	Pasa	X	Falla	
Presión Barométrica (mm de Hg)					
Equipo	651	Diferencia	-1	Diferencia Permitida = ± 10 mm	
Calibrador	652	Pasa	X	Falla	
Nombre y Firma de Responsable		Erik von Quednow 			

11.5 Informe Original de los Resultados Analíticos Obtenidos de Muestras de Agua del Laboratorio ACZ Laboratories, INC. Correspondiente al Monitoreo de Septiembre 2014.

11.5.1 Muestras de Agua Superficial (SW)

September 26, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20492

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 12, 2014. This project has been assigned to ACZ's project number, L20492. 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 L20492. 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.

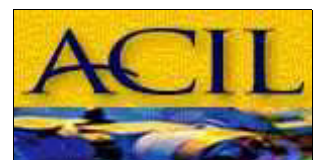
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 26, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

September 26, 2014

Project ID: Escobal

ACZ Project ID: L20492

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on September 12, 2014. 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 L20492. 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 except for parameters flagged with "H" flags (H3, HE), received either after the hold time expired or too close to the hold time.

Sample Analysis

These samples were analyzed for inorganic, organic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L20492-01**
Date Sampled: 09/10/14 10:40
Date Received: 09/12/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 13:54	mpb
Cyanide, WAD	SM4500-CN I- distillation								09/19/14 11:34	jif
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 17:22	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 13:16	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 16:16	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 15:57	las
Total Hot Plate Digestion	M200.2 ICP								09/16/14 12:36	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L20492-01**

Date Sampled: 09/10/14 10:40

Date Received: 09/12/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	09/15/14 21:15	jjc
Aluminum, total	M200.7 ICP	1	2.24		*	mg/L	0.03	0.2	09/17/14 17:44	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/19/14 13:44	las
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/23/14 13:42	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0002	0.001	09/19/14 13:44	las
Arsenic, total	M200.8 ICP-MS	1	0.0020			mg/L	0.0002	0.001	09/24/14 20:43	msh
Barium, dissolved	M200.7 ICP	1	0.077			mg/L	0.003	0.02	09/16/14 10:19	jjc
Barium, total	M200.7 ICP	1	0.097			mg/L	0.003	0.02	09/17/14 17:44	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:15	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:44	jjc
Bismuth, dissolved	M200.7 ICP	1	0.04	B	*	mg/L	0.04	0.2	09/15/14 21:15	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 17:44	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 10:19	jjc
Boron, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/18/14 10:58	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:44	las
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/14 13:42	msh
Calcium, dissolved	M200.7 ICP	1	21			mg/L	0.1	0.5	09/15/14 21:15	jjc
Calcium, total	M200.7 ICP	1	21.7			mg/L	0.1	0.5	09/17/14 17:44	jjc
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/15/14 21:15	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:44	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:15	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:44	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:15	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:44	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 21:15	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:44	jjc
Iron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	09/15/14 21:15	jjc
Iron, total	M200.7 ICP	1	0.82			mg/L	0.02	0.05	09/17/14 17:44	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:44	las
Lead, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	09/24/14 20:43	msh
Lithium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.008	0.04	09/15/14 21:15	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 17:44	jjc
Magnesium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	09/15/14 21:15	jjc
Magnesium, total	M200.7 ICP	1	2.9			mg/L	0.2	1	09/17/14 17:44	jjc
Manganese, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	09/15/14 21:15	jjc
Manganese, total	M200.7 ICP	1	0.024	B		mg/L	0.005	0.03	09/17/14 17:44	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 13:59	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/14 11:40	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 21:15	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 17:44	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 21:15	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 17:44	jjc
Potassium, dissolved	M200.7 ICP	1	3.9			mg/L	0.2	1	09/15/14 21:15	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L20492-01**

Date Sampled: 09/10/14 10:40

Date Received: 09/12/14

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4.3			mg/L	0.2	1	09/17/14 17:44	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 21:15	jjc
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:44	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/19/14 13:44	las
Selenium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	09/24/14 20:43	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/19/14 13:44	las
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/23/14 13:42	msh
Sodium, dissolved	M200.7 ICP	1	7.7			mg/L	0.2	1	09/15/14 21:15	jjc
Sodium, total	M200.7 ICP	1	8.1			mg/L	0.2	1	09/17/14 17:44	jjc
Strontium, dissolved	M200.7 ICP	1	0.106			mg/L	0.005	0.03	09/16/14 10:19	jjc
Strontium, total	M200.7 ICP	1	0.111			mg/L	0.005	0.03	09/17/14 17:44	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:44	las
Thallium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/14 13:42	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/15/14 21:15	jjc
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	09/17/14 17:44	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/15/14 21:15	jjc
Titanium, total	M200.7 ICP	1	0.052			mg/L	0.005	0.03	09/17/14 17:44	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:44	las
Uranium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/23/14 13:42	msh
Vanadium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/15/14 21:15	jjc
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	09/17/14 17:44	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:15	jjc
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:44	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L20492-01**
Date Sampled: 09/10/14 10:40
Date Received: 09/12/14
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	58.0		*	mg/L	2	20	09/16/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Total Alkalinity		1	58.0		*	mg/L	2	20	09/16/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.0			%			09/26/14 11:18	calc
Sum of Anions			1.6			meq/L			09/26/14 11:18	calc
Sum of Cations			1.7			meq/L			09/26/14 11:18	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 13:39	id
Chloride	SM4500Cl-E	1	5		*	mg/L	0.5	2	09/19/14 9:57	mss2
Conductivity @25C	SM2510B	1	178		*	umhos/cm	1	10	09/16/14 5:40	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:05	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 16:04	mpb
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	09/19/14 14:47	enb
Hardness as CaCO3	SM2340B - Calculation		64			mg/L	0.8	4	09/26/14 11:18	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.85		*	mg/L	0.02	0.1	09/19/14 23:58	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/23/14 16:36	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	09/19/14 13:02	mpb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/16/14 0:00	abd
pH measured at		1	20.3		*	C	0.1	0.1	09/16/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	09/26/14 11:18	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/17/14 23:54	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	09/12/14 21:09	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	09/17/14 23:15	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	160		*	mg/L	10	20	09/15/14 15:45	ea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	20		*	mg/L	5	20	09/16/14 11:52	djc
Residue, Total (TS) @ 105C	SM2540B	1	200		*	mg/L	10	20	09/15/14 17:07	ea
Sulfate	D516-02/-07 - Turbidimetric	1	16.0		*	mg/L	1	5	09/25/14 8:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 14:37	enb
TDS (calculated)	Calculation		92			mg/L			09/26/14 11:18	calc
TDS (ratio - measured/calculated)	Calculation		1.74						09/26/14 11:18	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L20492-02**
Date Sampled: 09/10/14 09:55
Date Received: 09/12/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 14:04	mpb
Cyanide, WAD	SM4500-CN I- distillation								09/19/14 11:42	jif
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 17:35	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 13:24	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 16:24	bsu
Total Hot Plate Digestion	M200.2 ICP								09/16/14 13:11	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 16:08	las

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L20492-02**
Date Sampled: 09/10/14 09:55
Date Received: 09/12/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.07	B		mg/L	0.03	0.2	09/15/14 21:25	jjc
Aluminum, total	M200.7 ICP	1	0.16	B	*	mg/L	0.03	0.2	09/17/14 17:54	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	09/19/14 13:47	las
Antimony, total	M200.8 ICP-MS	1	0.0010	B		mg/L	0.0004	0.002	09/23/14 13:45	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0060			mg/L	0.0002	0.001	09/19/14 13:47	las
Arsenic, total	M200.8 ICP-MS	1	0.0071			mg/L	0.0002	0.001	09/24/14 20:47	msh
Barium, dissolved	M200.7 ICP	1	0.053			mg/L	0.003	0.02	09/16/14 10:22	jjc
Barium, total	M200.7 ICP	1	0.057			mg/L	0.003	0.02	09/17/14 17:54	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:25	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:54	jjc
Bismuth, dissolved	M200.7 ICP	1	0.06	B	*	mg/L	0.04	0.2	09/15/14 21:25	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 17:54	jjc
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/16/14 10:22	jjc
Boron, total	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/18/14 11:14	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:47	las
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/14 13:45	msh
Calcium, dissolved	M200.7 ICP	1	199			mg/L	0.1	0.5	09/15/14 21:25	jjc
Calcium, total	M200.7 ICP	1	207			mg/L	0.1	0.5	09/17/14 17:54	jjc
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/15/14 21:25	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:54	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:25	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:54	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:25	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:54	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 21:25	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:54	jjc
Iron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	09/15/14 21:25	jjc
Iron, total	M200.7 ICP	1	0.40			mg/L	0.02	0.05	09/17/14 17:54	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:47	las
Lead, total	M200.8 ICP-MS	1	0.0020			mg/L	0.0001	0.0005	09/24/14 20:47	msh
Lithium, dissolved	M200.7 ICP	1	0.037	B		mg/L	0.008	0.04	09/15/14 21:25	jjc
Lithium, total	M200.7 ICP	1	0.035	B		mg/L	0.008	0.04	09/17/14 17:54	jjc
Magnesium, dissolved	M200.7 ICP	1	14.4			mg/L	0.2	1	09/15/14 21:25	jjc
Magnesium, total	M200.7 ICP	1	14.8			mg/L	0.2	1	09/17/14 17:54	jjc
Manganese, dissolved	M200.7 ICP	1	0.106			mg/L	0.005	0.03	09/15/14 21:25	jjc
Manganese, total	M200.7 ICP	1	0.125			mg/L	0.005	0.03	09/17/14 17:54	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 14:01	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/14 11:42	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 21:25	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 17:54	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 21:25	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 17:54	jjc
Potassium, dissolved	M200.7 ICP	1	4.9			mg/L	0.2	1	09/15/14 21:25	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L20492-02**
Date Sampled: 09/10/14 09:55
Date Received: 09/12/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.2		mg/L	0.2	1	09/17/14 17:54	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 21:25	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/17/14 17:54	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	09/19/14 13:47	las
Selenium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	09/24/14 20:47	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 13:47	las
Silver, total	M200.8 ICP-MS	1	0.00005	B	mg/L	0.00005	0.0003	09/23/14 13:45	msh
Sodium, dissolved	M200.7 ICP	1	29.9		mg/L	0.2	1	09/15/14 21:25	jjc
Sodium, total	M200.7 ICP	1	31.9		mg/L	0.2	1	09/17/14 17:54	jjc
Strontium, dissolved	M200.7 ICP	1	2.130		mg/L	0.005	0.03	09/16/14 10:22	jjc
Strontium, total	M200.7 ICP	1	2.220		mg/L	0.005	0.03	09/17/14 17:54	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/19/14 13:47	las
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/14 13:45	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 21:25	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/17/14 17:54	jjc
Titanium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	09/15/14 21:25	jjc
Titanium, total	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	09/17/14 17:54	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/19/14 13:47	las
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/23/14 13:45	msh
Vanadium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	09/15/14 21:25	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/17/14 17:54	jjc
Zinc, dissolved	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	09/15/14 21:25	jjc
Zinc, total	M200.7 ICP	1	0.02	B	mg/L	0.01	0.05	09/17/14 17:54	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2-E

ACZ Sample ID: **L20492-02**
 Date Sampled: 09/10/14 09:55
 Date Received: 09/12/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	85.3		*	mg/L	2	20	09/16/14 0:00	abd
Carbonate as CaCO3		1	4.9	B	*	mg/L	2	20	09/16/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Total Alkalinity		1	90.2		*	mg/L	2	20	09/16/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.0			%			09/26/14 11:18	calc
Sum of Anions			12			meq/L			09/26/14 11:18	calc
Sum of Cations			13			meq/L			09/26/14 11:18	calc
Chemical Oxygen Demand	M410.4	1	12	B	*	mg/L	10	20	09/16/14 13:45	id
Chloride	SM4500Cl-E	1	19.6		*	mg/L	0.5	2	09/19/14 9:57	mss2
Conductivity @25C	SM2510B	1	1110		*	umhos/cm	1	10	09/16/14 5:49	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:05	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 16:06	mpb
Fluoride	SM4500F-C	1	0.52		*	mg/L	0.05	0.3	09/19/14 14:51	enb
Hardness as CaCO3	SM2340B - Calculation		556			mg/L	0.8	4	09/26/14 11:18	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.74		*	mg/L	0.02	0.1	09/20/14 0:02	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/23/14 16:38	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/19/14 13:03	mpb
pH (lab)	SM4500H+ B									
pH		1	8.4	H	*	units	0.1	0.1	09/16/14 0:00	abd
pH measured at		1	20.5		*	C	0.1	0.1	09/16/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	09/26/14 11:18	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/17/14 23:57	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/12/14 21:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/17/14 23:16	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	860		*	mg/L	10	20	09/15/14 15:49	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	12	B	*	mg/L	5	20	09/16/14 11:57	djc
Residue, Total (TS) @ 105C	SM2540B	1	930		*	mg/L	10	20	09/15/14 17:08	eea
Sulfate	D516-02/-07 - Turbidimetric	50	433		*	mg/L	50	250	09/25/14 8:58	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 14:44	enb
TDS (calculated)	Calculation		759			mg/L			09/26/14 11:18	calc
TDS (ratio - measured/calculated)	Calculation		1.13						09/26/14 11:18	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L20492-03**
Date Sampled: 09/10/14 09:20
Date Received: 09/12/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 14:14	mpb
Cyanide, WAD	SM4500-CN I- distillation								09/19/14 11:49	jif
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 17:47	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 13:31	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 16:33	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 16:19	las
Total Hot Plate Digestion	M200.2 ICP								09/16/14 13:23	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L20492-03**
Date Sampled: 09/10/14 09:20
Date Received: 09/12/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.08	B		mg/L	0.03	0.2	09/15/14 21:28	jjc
Aluminum, total	M200.7 ICP	1	0.07	B	*	mg/L	0.03	0.2	09/17/14 17:57	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0138			mg/L	0.0004	0.002	09/19/14 13:50	las
Antimony, total	M200.8 ICP-MS	1	0.0130			mg/L	0.0004	0.002	09/23/14 13:48	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0079			mg/L	0.0002	0.001	09/19/14 13:50	las
Arsenic, total	M200.8 ICP-MS	1	0.0083			mg/L	0.0002	0.001	09/24/14 20:56	msh
Barium, dissolved	M200.7 ICP	1	0.045			mg/L	0.003	0.02	09/16/14 10:31	jjc
Barium, total	M200.7 ICP	1	0.045			mg/L	0.003	0.02	09/17/14 17:57	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:28	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:57	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 21:28	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 17:57	jjc
Boron, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	09/16/14 10:31	jjc
Boron, total	M200.7 ICP	1	0.09			mg/L	0.01	0.05	09/18/14 11:17	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:50	las
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/14 13:48	msh
Calcium, dissolved	M200.7 ICP	1	320			mg/L	0.1	0.5	09/15/14 21:28	jjc
Calcium, total	M200.7 ICP	1	324			mg/L	0.1	0.5	09/17/14 17:57	jjc
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/15/14 21:28	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:57	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:28	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:57	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:28	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:57	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 21:28	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:57	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/15/14 21:28	jjc
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	09/17/14 17:57	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/19/14 13:50	las
Lead, total	M200.8 ICP-MS	1	0.0009			mg/L	0.0001	0.0005	09/24/14 20:56	msh
Lithium, dissolved	M200.7 ICP	1	0.079			mg/L	0.008	0.04	09/15/14 21:28	jjc
Lithium, total	M200.7 ICP	1	0.077			mg/L	0.008	0.04	09/17/14 17:57	jjc
Magnesium, dissolved	M200.7 ICP	1	18.9			mg/L	0.2	1	09/15/14 21:28	jjc
Magnesium, total	M200.7 ICP	1	19.3			mg/L	0.2	1	09/17/14 17:57	jjc
Manganese, dissolved	M200.7 ICP	1	0.065			mg/L	0.005	0.03	09/15/14 21:28	jjc
Manganese, total	M200.7 ICP	1	0.063			mg/L	0.005	0.03	09/17/14 17:57	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 14:04	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/14 11:44	mfm
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/15/14 21:28	jjc
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	09/17/14 17:57	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 21:28	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 17:57	jjc
Potassium, dissolved	M200.7 ICP	1	11.9			mg/L	0.2	1	09/15/14 21:28	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L20492-03**
Date Sampled: 09/10/14 09:20
Date Received: 09/12/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	12.4		mg/L	0.2	1	09/17/14 17:57	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 21:28	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/17/14 17:57	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0010		mg/L	0.0001	0.0003	09/19/14 13:50	las
Selenium, total	M200.8 ICP-MS	1	0.0010		mg/L	0.0001	0.0003	09/24/14 20:56	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 13:50	las
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/14 13:48	msh
Sodium, dissolved	M200.7 ICP	1	58.5		mg/L	0.2	1	09/15/14 21:28	jjc
Sodium, total	M200.7 ICP	1	61.3		mg/L	0.2	1	09/17/14 17:57	jjc
Strontium, dissolved	M200.7 ICP	1	3.090		mg/L	0.005	0.03	09/16/14 10:31	jjc
Strontium, total	M200.7 ICP	1	3.110		mg/L	0.005	0.03	09/17/14 17:57	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/19/14 13:50	las
Thallium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/23/14 13:48	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 21:28	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/17/14 17:57	jjc
Titanium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	09/15/14 21:28	jjc
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/17/14 17:57	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	09/19/14 13:50	las
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	09/23/14 13:48	msh
Vanadium, dissolved	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	09/15/14 21:28	jjc
Vanadium, total	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	09/17/14 17:57	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 21:28	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/17/14 17:57	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2B-E

ACZ Sample ID: **L20492-03**
 Date Sampled: 09/10/14 09:20
 Date Received: 09/12/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	59.2		*	mg/L	2	20	09/16/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Total Alkalinity		1	59.2		*	mg/L	2	20	09/16/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			7.7			%			09/26/14 11:19	calc
Sum of Anions			18			meq/L			09/26/14 11:19	calc
Sum of Cations			21			meq/L			09/26/14 11:19	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 13:51	id
Chloride	SM4500Cl-E	1	49.3		*	mg/L	0.5	2	09/19/14 9:57	mss2
Conductivity @25C	SM2510B	1	1740		*	umhos/cm	1	10	09/16/14 5:57	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:06	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 16:07	mpb
Fluoride	SM4500F-C	1	1.17		*	mg/L	0.05	0.3	09/19/14 14:54	enb
Hardness as CaCO3	SM2340B - Calculation		877			mg/L	0.8	4	09/26/14 11:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	6.75		*	mg/L	0.08	0.4	09/20/14 0:17	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	1.87		*	mg/L	0.05	0.2	09/23/14 16:43	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.9		*	mg/L	0.1	0.5	09/19/14 13:04	mpb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/16/14 0:00	abd
pH measured at		1	20.5		*	C	0.1	0.1	09/16/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	09/26/14 11:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/17/14 23:58	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	09/12/14 21:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/17/14 23:06	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1380		*	mg/L	10	20	09/15/14 15:51	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5	B	*	mg/L	5	20	09/16/14 12:02	djc
Residue, Total (TS) @ 105C	SM2540B	1	1460		*	mg/L	10	20	09/15/14 17:09	eea
Sulfate	D516-02/-07 - Turbidimetric	100	719		*	mg/L	100	500	09/25/14 8:59	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 14:51	enb
TDS (calculated)	Calculation		1220			mg/L			09/26/14 11:19	calc
TDS (ratio - measured/calculated)	Calculation		1.13						09/26/14 11:19	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20492-01	WG371241	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371457	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371131	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371593	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).
	WG371501	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).
	WG371460	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371521	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).
	WG371665	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).
	WG371483	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).
	WG371131	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
WG371349	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).	
WG371082	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).	
WG371347	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)	Q6	Sample was received above recommended temperature.	
WG371149	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG371197	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).	
WG371155	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

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).
	WG371777	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG371120	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).
	WG371131	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20492-02	WG371241	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371457	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371131	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371593	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).
	WG371501	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).
	WG371460	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371521	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).
	WG371665	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).
	WG371483	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).
	WG371131	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG371349	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).	
WG371082	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).	
WG371347	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)	Q6	Sample was received above recommended temperature.	
WG371149	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
		SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG371197	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

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG371155		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).
WG371777		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG371120		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).
WG371131		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20492-03	WG371241	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371457	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371131	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371593	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).
	WG371501	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).
	WG371460	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371521	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).
	WG371665	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).
	WG371483	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).
	WG371131	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG371349	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).	
WG371082	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).	
WG371347	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)	Q6	Sample was received above recommended temperature.	
WG371149	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
		SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG371197	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).	

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG371155	Residue, Total (TS) @ 105C	SM2540B SM2540B	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).
	WG371777	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG371120	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).
	WG371131	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L20492-01**
Date Sampled: 09/10/14 10:40
Date Received: 09/12/14
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG371279Analyst: itk
Extract Date: 09/15/14 19:57
Analysis Date: 09/16/14 20:24

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	80.1		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L20492-01**
Date Sampled: 09/10/14 10:40
Date Received: 09/12/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG371624

Analyst: DRH

Extract Date:

Analysis Date: 09/23/14 11:43

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L20492-02**

Date Sampled: 09/10/14 9:55

Date Received: 09/12/14

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG371279

Analyst: itk

Extract Date: 09/15/14 21:12

Analysis Date: 09/16/14 20:50

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	81.1		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L20492-02**

Date Sampled: 09/10/14 9:55

Date Received: 09/12/14

Sample Matrix: Surface Water

Oil & Grease, Total RecoverableAnalysis Method: **1664A - Gravimetric**

Extract Method:

Workgroup: WG371624

Analyst: DRH

Extract Date:

Analysis Date: 09/23/14 11:55

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L20492-03**

Date Sampled: 09/10/14 9:20

Date Received: 09/12/14

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG371279

Analyst: itk

Extract Date: 09/15/14 22:28

Analysis Date: 09/16/14 21:16

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	80.8		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L20492-03**

Date Sampled: 09/10/14 9:20

Date Received: 09/12/14

Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**

Extract Method:

Workgroup: WG371624

Analyst: DRH

Extract Date:

Analysis Date: 09/23/14 12:08

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20492-01	WG371279	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371624	Oil and Grease	1664A - Gravimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG371146	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20492-02	WG371279	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371624	Oil and Grease	1664A - Gravimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG371146	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20492-03	WG371279	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371624	Oil and Grease	1664A - Gravimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG371146	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20492**

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: L20492
 Date Received: 09/12/2014 09:54
 Received By: mtb
 Date Printed: 9/12/2014

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?
2881	14.1	5	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

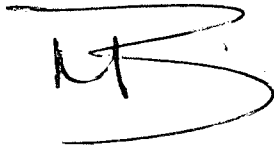
Guatemala September 10th, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected by a horizontal line.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

September 26, 2014

Report to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20461

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 11, 2014. This project has been assigned to ACZ's project number, L20461. 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 L20461. 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.

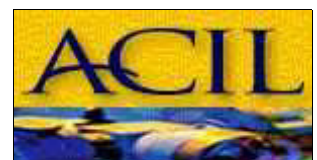
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 26, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

September 26, 2014

Project ID: Escobal

ACZ Project ID: L20461

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on September 11, 2014. 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 L20461. 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 except for parameters flagged with an "HE" flag, received too close to the hold time.

Sample Analysis

These samples were analyzed for inorganic, organic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For TSS flagged with an "N1", the drying oven temperature was out of range over the weekend at 106 degrees C. The oven returned to an in range temperature Monday morning prior to samples being removed.
2. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L20461-01**
Date Sampled: 09/09/14 11:45
Date Received: 09/11/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/16/14 13:06	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/16/14 13:09	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 13:16	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/15/14 12:45	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 16:57	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 13:48	las
Total Hot Plate Digestion	M200.2 ICP								09/15/14 13:01	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L20461-01**
Date Sampled: 09/09/14 11:45
Date Received: 09/11/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/15/14 18:42	aeb
Aluminum, total	M200.7 ICP	1	0.12	B		mg/L	0.03	0.2	09/16/14 19:50	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0068			mg/L	0.0004	0.002	09/19/14 12:38	las
Antimony, total	M200.8 ICP-MS	1	0.0068			mg/L	0.0004	0.002	09/23/14 12:57	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0068			mg/L	0.0002	0.001	09/19/14 12:38	las
Arsenic, total	M200.8 ICP-MS	1	0.0074			mg/L	0.0002	0.001	09/24/14 19:58	msh
Barium, dissolved	M200.7 ICP	1	0.069			mg/L	0.003	0.02	09/15/14 18:42	aeb
Barium, total	M200.7 ICP	1	0.073			mg/L	0.003	0.02	09/16/14 19:50	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:42	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:50	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 18:42	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/14 19:50	aeb
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	09/15/14 18:42	aeb
Boron, total	M200.7 ICP	1	0.06			mg/L	0.01	0.05	09/16/14 19:50	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 12:38	las
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/14 12:57	msh
Calcium, dissolved	M200.7 ICP	1	314		*	mg/L	0.1	0.5	09/15/14 18:42	aeb
Calcium, total	M200.7 ICP	1	316			mg/L	0.1	0.5	09/16/14 19:50	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:42	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:50	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:42	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:50	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:42	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:50	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 18:42	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 15:49	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/15/14 18:42	aeb
Iron, total	M200.7 ICP	1	0.08			mg/L	0.02	0.05	09/16/14 19:50	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/19/14 12:38	las
Lead, total	M200.8 ICP-MS	1	0.0023			mg/L	0.0001	0.0005	09/24/14 19:58	msh
Lithium, dissolved	M200.7 ICP	1	0.059			mg/L	0.008	0.04	09/15/14 18:42	aeb
Lithium, total	M200.7 ICP	1	0.064			mg/L	0.008	0.04	09/16/14 19:50	aeb
Magnesium, dissolved	M200.7 ICP	1	18.5			mg/L	0.2	1	09/15/14 18:42	aeb
Magnesium, total	M200.7 ICP	1	19.2			mg/L	0.2	1	09/16/14 19:50	aeb
Manganese, dissolved	M200.7 ICP	1	0.152			mg/L	0.005	0.03	09/15/14 18:42	aeb
Manganese, total	M200.7 ICP	1	0.170			mg/L	0.005	0.03	09/16/14 19:50	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 10:42	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 12:19	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 18:42	aeb
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	09/16/14 19:50	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 18:42	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/14 19:50	aeb
Potassium, dissolved	M200.7 ICP	1	8.8			mg/L	0.2	1	09/15/14 18:42	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L20461-01**
Date Sampled: 09/09/14 11:45
Date Received: 09/11/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	8.9		mg/L	0.2	1	09/16/14 19:50	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 18:42	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/16/14 19:50	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	09/19/14 12:38	las
Selenium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	09/24/14 19:58	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 12:38	las
Silver, total	M200.8 ICP-MS	1	0.00011	B	mg/L	0.00005	0.0003	09/23/14 12:57	msh
Sodium, dissolved	M200.7 ICP	1	52.5		mg/L	0.2	1	09/15/14 18:42	aeb
Sodium, total	M200.7 ICP	1	52.7		mg/L	0.2	1	09/16/14 19:50	aeb
Strontium, dissolved	M200.7 ICP	1	3.410	*	mg/L	0.005	0.03	09/15/14 18:42	aeb
Strontium, total	M200.7 ICP	1	3.410		mg/L	0.005	0.03	09/16/14 19:50	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/19/14 12:38	las
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/23/14 12:57	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 18:42	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/16/14 19:50	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:42	aeb
Titanium, total	M200.7 ICP	1	0.020	B	mg/L	0.005	0.03	09/16/14 19:50	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/19/14 12:38	las
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	09/23/14 12:57	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:42	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/16/14 19:50	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 18:42	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/16/14 19:50	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2A-E

ACZ Sample ID: **L20461-01**
 Date Sampled: 09/09/14 11:45
 Date Received: 09/11/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	81.7		*	mg/L	2	20	09/15/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Total Alkalinity		1	81.7		*	mg/L	2	20	09/15/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.6			%			09/26/14 10:19	calc
Sum of Anions			19			meq/L			09/26/14 10:19	calc
Sum of Cations			20			meq/L			09/26/14 10:19	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 12:01	id
Chloride	SM4500Cl-E	1	39.1		*	mg/L	0.5	2	09/22/14 12:34	jlf
Conductivity @25C	SM2510B	1	1670		*	umhos/cm	1	10	09/13/14 2:01	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:13	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:57	mpb
Fluoride	SM4500F-C	1	0.88		*	mg/L	0.05	0.3	09/18/14 19:56	enb
Hardness as CaCO3	SM2340B - Calculation		860			mg/L	0.8	4	09/26/14 10:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.04		*	mg/L	0.02	0.1	09/19/14 23:12	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.28		*	mg/L	0.05	0.2	09/18/14 16:18	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	09/19/14 12:35	mpb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	09/13/14 0:00	id
pH measured at		1	20.0		*	C	0.1	0.1	09/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	09/26/14 10:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/15/14 16:13	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/11/14 23:10	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/17/14 22:23	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1370		*	mg/L	10	20	09/12/14 15:34	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/12/14 16:03	eea
Residue, Total (TS) @ 105C	SM2540B	1	1420		*	mg/L	10	20	09/12/14 12:04	abd
Sulfate	D516-02/-07 - Turbidimetric	50	778		*	mg/L	50	250	09/22/14 13:52	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 13:33	enb
TDS (calculated)	Calculation		1270			mg/L			09/26/14 10:19	calc
TDS (ratio - measured/calculated)	Calculation		1.08						09/26/14 10:19	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L20461-02**
Date Sampled: 09/09/14 12:20
Date Received: 09/11/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/16/14 13:16	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/16/14 13:16	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 13:41	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/15/14 12:52	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 17:06	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 13:58	las
Total Hot Plate Digestion	M200.2 ICP								09/15/14 13:23	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L20461-02**
Date Sampled: 09/09/14 12:20
Date Received: 09/11/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/15/14 18:45	aeb
Aluminum, total	M200.7 ICP	1	5.14			mg/L	0.03	0.2	09/16/14 19:54	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/19/14 12:47	las
Antimony, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	09/23/14 13:00	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0102			mg/L	0.0002	0.001	09/19/14 12:47	las
Arsenic, total	M200.8 ICP-MS	1	0.0125			mg/L	0.0002	0.001	09/24/14 20:01	msh
Barium, dissolved	M200.7 ICP	1	0.068			mg/L	0.003	0.02	09/15/14 18:45	aeb
Barium, total	M200.7 ICP	1	0.120			mg/L	0.003	0.02	09/16/14 19:54	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:45	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:54	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 18:45	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/14 19:54	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:45	aeb
Boron, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/16/14 19:54	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 12:47	las
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/14 13:00	msh
Calcium, dissolved	M200.7 ICP	1	21		*	mg/L	0.1	0.5	09/15/14 18:45	aeb
Calcium, total	M200.7 ICP	1	21.4			mg/L	0.1	0.5	09/16/14 19:54	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:45	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:54	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:45	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:54	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:45	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:54	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 18:45	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 15:53	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/15/14 18:45	aeb
Iron, total	M200.7 ICP	1	2.28			mg/L	0.02	0.05	09/16/14 19:54	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 12:47	las
Lead, total	M200.8 ICP-MS	1	0.0018			mg/L	0.0001	0.0005	09/24/14 20:01	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 18:45	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/14 19:54	aeb
Magnesium, dissolved	M200.7 ICP	1	2			mg/L	0.2	1	09/15/14 18:45	aeb
Magnesium, total	M200.7 ICP	1	2.1			mg/L	0.2	1	09/16/14 19:54	aeb
Manganese, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.005	0.03	09/15/14 18:45	aeb
Manganese, total	M200.7 ICP	1	0.109			mg/L	0.005	0.03	09/16/14 19:54	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 10:44	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 12:21	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 18:45	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/16/14 19:54	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 18:45	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/14 19:54	aeb
Potassium, dissolved	M200.7 ICP	1	3.9			mg/L	0.2	1	09/15/14 18:45	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L20461-02**
Date Sampled: 09/09/14 12:20
Date Received: 09/11/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4.4		mg/L	0.2	1	09/16/14 19:54	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 18:45	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/16/14 19:54	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/19/14 12:47	las
Selenium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	09/24/14 20:01	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 12:47	las
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/14 13:00	msh
Sodium, dissolved	M200.7 ICP	1	9.1		mg/L	0.2	1	09/15/14 18:45	aeb
Sodium, total	M200.7 ICP	1	9.1		mg/L	0.2	1	09/16/14 19:54	aeb
Strontium, dissolved	M200.7 ICP	1	0.140		mg/L	0.005	0.03	09/15/14 18:45	aeb
Strontium, total	M200.7 ICP	1	0.148		mg/L	0.005	0.03	09/16/14 19:54	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/19/14 12:47	las
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/14 13:00	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 18:45	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/16/14 19:54	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:45	aeb
Titanium, total	M200.7 ICP	1	0.123		mg/L	0.005	0.03	09/16/14 19:54	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/19/14 12:47	las
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/23/14 13:00	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:45	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/16/14 19:54	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 18:45	aeb
Zinc, total	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	09/16/14 19:54	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW3-E

ACZ Sample ID: **L20461-02**
 Date Sampled: 09/09/14 12:20
 Date Received: 09/11/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	65.1		*	mg/L	2	20	09/15/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Total Alkalinity		1	65.1		*	mg/L	2	20	09/15/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/26/14 10:19	calc
Sum of Anions			1.7			meq/L			09/26/14 10:19	calc
Sum of Cations			1.7			meq/L			09/26/14 10:19	calc
Chemical Oxygen Demand	M410.4	1	15	B	*	mg/L	10	20	09/16/14 12:07	id
Chloride	SM4500Cl-E	1	2.4		*	mg/L	0.5	2	09/22/14 12:34	jlf
Conductivity @25C	SM2510B	1	173		*	umhos/cm	1	10	09/13/14 2:10	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:14	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:58	mpb
Fluoride	SM4500F-C	1	0.11	B	*	mg/L	0.05	0.3	09/18/14 20:18	enb
Hardness as CaCO3	SM2340B - Calculation		61			mg/L	0.8	4	09/26/14 10:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.58		*	mg/L	0.02	0.1	09/19/14 23:13	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/18/14 16:19	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	09/19/14 12:37	mpb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	09/13/14 0:00	id
pH measured at		1	19.9		*	C	0.1	0.1	09/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	09/26/14 10:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/15/14 16:14	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/11/14 23:11	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	09/17/14 22:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	180		*	mg/L	10	20	09/12/14 15:36	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	36		*	mg/L	5	20	09/12/14 16:05	eea
Residue, Total (TS) @ 105C	SM2540B	1	220		*	mg/L	10	20	09/12/14 12:05	abd
Sulfate	D516-02/-07 - Turbidimetric	1	13.7		*	mg/L	1	5	09/22/14 13:47	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 13:40	enb
TDS (calculated)	Calculation		92.1			mg/L			09/26/14 10:19	calc
TDS (ratio - measured/calculated)	Calculation		1.95						09/26/14 10:19	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L20461-03**
Date Sampled: 09/09/14 11:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/16/14 13:27	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/16/14 13:24	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 13:53	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/15/14 13:00	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 17:15	bsu
Total Hot Plate Digestion	M200.2 ICP								09/15/14 13:45	aeb
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 14:09	las

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L20461-03**
Date Sampled: 09/09/14 11:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/15/14 18:48	aeb
Aluminum, total	M200.7 ICP	1	3.10			mg/L	0.03	0.2	09/16/14 19:57	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0027			mg/L	0.0004	0.002	09/19/14 12:50	las
Antimony, total	M200.8 ICP-MS	1	0.0025			mg/L	0.0004	0.002	09/23/14 13:03	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0081			mg/L	0.0002	0.001	09/19/14 12:50	las
Arsenic, total	M200.8 ICP-MS	1	0.0096			mg/L	0.0002	0.001	09/24/14 20:04	msh
Barium, dissolved	M200.7 ICP	1	0.110			mg/L	0.003	0.02	09/15/14 18:48	aeb
Barium, total	M200.7 ICP	1	0.133			mg/L	0.003	0.02	09/16/14 19:57	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:48	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:57	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 18:48	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/14 19:57	aeb
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/15/14 18:48	aeb
Boron, total	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/16/14 19:57	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 12:50	las
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/14 13:03	msh
Calcium, dissolved	M200.7 ICP	1	142			mg/L	0.1	0.5	09/15/14 18:48	aeb
Calcium, total	M200.7 ICP	1	143			mg/L	0.1	0.5	09/16/14 19:57	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:48	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:57	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:48	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:57	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:48	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:57	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 18:48	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 15:56	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/15/14 18:48	aeb
Iron, total	M200.7 ICP	1	1.43			mg/L	0.02	0.05	09/16/14 19:57	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 12:50	las
Lead, total	M200.8 ICP-MS	1	0.0029			mg/L	0.0001	0.0005	09/24/14 20:04	msh
Lithium, dissolved	M200.7 ICP	1	0.021	B		mg/L	0.008	0.04	09/15/14 18:48	aeb
Lithium, total	M200.7 ICP	1	0.024	B		mg/L	0.008	0.04	09/16/14 19:57	aeb
Magnesium, dissolved	M200.7 ICP	1	9.9			mg/L	0.2	1	09/15/14 18:48	aeb
Magnesium, total	M200.7 ICP	1	10.2			mg/L	0.2	1	09/16/14 19:57	aeb
Manganese, dissolved	M200.7 ICP	1	0.143			mg/L	0.005	0.03	09/15/14 18:48	aeb
Manganese, total	M200.7 ICP	1	0.203			mg/L	0.005	0.03	09/16/14 19:57	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 10:46	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 12:32	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 18:48	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/16/14 19:57	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 18:48	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/14 19:57	aeb
Potassium, dissolved	M200.7 ICP	1	7.4			mg/L	0.2	1	09/15/14 18:48	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L20461-03**
Date Sampled: 09/09/14 11:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	7.5		mg/L	0.2	1	09/16/14 19:57	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 18:48	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/16/14 19:57	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	09/19/14 12:50	las
Selenium, total	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	09/24/14 20:04	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 12:50	las
Silver, total	M200.8 ICP-MS	1	0.00006	B	mg/L	0.00005	0.0003	09/23/14 13:03	msh
Sodium, dissolved	M200.7 ICP	1	26.7		mg/L	0.2	1	09/15/14 18:48	aeb
Sodium, total	M200.7 ICP	1	26.9		mg/L	0.2	1	09/16/14 19:57	aeb
Strontium, dissolved	M200.7 ICP	1	1.360		mg/L	0.005	0.03	09/15/14 18:48	aeb
Strontium, total	M200.7 ICP	1	1.380		mg/L	0.005	0.03	09/16/14 19:57	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/19/14 12:50	las
Thallium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/23/14 13:03	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 18:48	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/16/14 19:57	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:48	aeb
Titanium, total	M200.7 ICP	1	0.085		mg/L	0.005	0.03	09/16/14 19:57	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/19/14 12:50	las
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/23/14 13:03	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:48	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/16/14 19:57	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 18:48	aeb
Zinc, total	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	09/16/14 19:57	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4A-E

ACZ Sample ID: **L20461-03**
 Date Sampled: 09/09/14 11:15
 Date Received: 09/11/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	79.1		*	mg/L	2	20	09/15/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Total Alkalinity		1	79.1		*	mg/L	2	20	09/15/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.1			%			09/26/14 10:19	calc
Sum of Anions			9.1			meq/L			09/26/14 10:19	calc
Sum of Cations			9.3			meq/L			09/26/14 10:19	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 12:25	id
Chloride	SM4500Cl-E	1	18.4		*	mg/L	0.5	2	09/22/14 12:34	jlf
Conductivity @25C	SM2510B	1	868		*	umhos/cm	1	10	09/13/14 2:18	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:15	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 18:01	mpb
Fluoride	SM4500F-C	1	0.35		*	mg/L	0.05	0.3	09/18/14 20:26	enb
Hardness as CaCO3	SM2340B - Calculation		395			mg/L	0.8	4	09/26/14 10:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.95		*	mg/L	0.02	0.1	09/19/14 23:17	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.05	B	*	mg/L	0.05	0.2	09/18/14 16:21	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	09/19/14 12:39	mpb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/13/14 0:00	id
pH measured at		1	19.7		*	C	0.1	0.1	09/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.47			mg/L	0.03	0.2	09/26/14 10:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.01	0.05	09/15/14 16:15	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.18	H	*	mg/L	0.01	0.05	09/11/14 23:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.16		*	mg/L	0.01	0.05	09/17/14 22:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	660		*	mg/L	10	20	09/12/14 15:37	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	35		*	mg/L	5	20	09/12/14 16:07	eea
Residue, Total (TS) @ 105C	SM2540B	1	730		*	mg/L	10	20	09/12/14 12:06	abd
Sulfate	D516-02/-07 - Turbidimetric	20	334		*	mg/L	20	100	09/22/14 13:53	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 14:01	enb
TDS (calculated)	Calculation		589			mg/L			09/26/14 10:19	calc
TDS (ratio - measured/calculated)	Calculation		1.12						09/26/14 10:19	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20461-01	WG371138	Calcium, 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.
		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.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371561	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG371062	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371497	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).
	WG371499	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).
	WG371373	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371518	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371420	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).
	WG371483	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).
	WG371062	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG371150	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).
	WG371016	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).
	WG371346	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).
	WG371074	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG371073	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
WG371052		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG371577		Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG371119		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	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).
WG371131		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20461-02	WG371138	Calcium, 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.
		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.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371561	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG371062	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371497	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).
	WG371499	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).
	WG371373	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371518	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371420	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).
	WG371483	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).
	WG371062	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG371150	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).
	WG371016	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).
	WG371346	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).
	WG371074	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG371073	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
WG371052		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG371577		Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG371119		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	Q6	Sample was received above recommended temperature.
			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).
WG371131		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20461-03	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371561	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371062	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371497	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).
WG371499	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).	
	WG371373	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371518	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
WG371420	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).	
WG371483	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).	
WG371062	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		pH measured at SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG371150	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).	
WG371016	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).	
WG371346	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).	
WG371074	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG371073	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.	
		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).	
WG371052	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG371577	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike	

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG371119	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	Q6	Sample was received above recommended temperature.
			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).
	WG371131	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L20461-01**
Date Sampled: 09/09/14 11:45
Date Received: 09/11/14
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG371244

Analyst: itk
Extract Date: 09/12/14 1:49
Analysis Date: 09/15/14 15:01

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	79.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L20461-01**
Date Sampled: 09/09/14 11:45
Date Received: 09/11/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG371268

Analyst: DRH

Extract Date:

Analysis Date: 09/17/14 13:13

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L20461-02**
Date Sampled: 09/09/14 12:20
Date Received: 09/11/14
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG371244

Analyst: itk
Extract Date: 09/12/14 2:46
Analysis Date: 09/15/14 15:27

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	77.6		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L20461-02**
Date Sampled: 09/09/14 12:20
Date Received: 09/11/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG371268

Analyst: DRH

Extract Date:

Analysis Date: 09/17/14 13:29

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L20461-03**
Date Sampled: 09/09/14 11:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG371244

Analyst: itk
Extract Date: 09/12/14 3:44
Analysis Date: 09/15/14 15:53

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	80		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L20461-03**
Date Sampled: 09/09/14 11:15
Date Received: 09/11/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG371268

Analyst: DRH

Extract Date:

Analysis Date: 09/17/14 13:45

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.02	*	mg/L	2	10.2

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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20461-01	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20461-02	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20461-03	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20461**

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: L20461
 Date Received: 09/11/2014 09:48
 Received By: mtb
 Date Printed: 9/11/2014

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?
2761	14.2	7	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc. 20461

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza, Company: Tahoe Resources inc, E-mail: M.Berganza@smrtafac.com.gt, Address: Bisipuar las pinces 19 calle 24-69 zona 10 Empressarial, Zona Progreso, Torre 14 of 300 1404, Telephone: (502) 59515243

Copy of Report to:

Name: Charlie Murchhoff, Company: Tahoe Resources inc, E-mail: charlie.murchhoff@tahoeresourcesinc.com, Telephone:

Invoice to:

Name: Miguel Berganza, Company: Tahoe Resources inc, E-mail: M.Berganza@smrtafac.com.gt, Address:, 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

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

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: LF, Sampler's Site Information, State, Zip code, Time Zone

*Sampler's Signature: [Signature] I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote # (Water Quality), PO# (Escobal), Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers (3), and analysis results grid.

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

REMARKS

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

Table with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME. Includes signatures and dates.

L20461 Chain of Custody

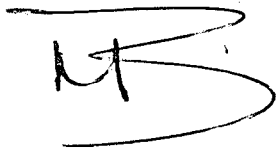
Guatemala September 9th, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together, with a horizontal line above and a curved line below.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

September 25, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Charlie Muerhoff

Tahoe Resources, Inc.

5310 Kietzke Lane

Suite 200

Reno, NV 89511

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20495

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 12, 2014. This project has been assigned to ACZ's project number, L20495. 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 L20495. 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.

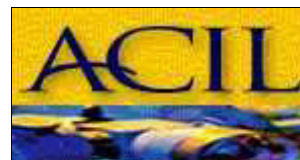
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 25, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

September 25, 2014

Project ID: Escobal

ACZ Project ID: L20495

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on September 12, 2014. 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 L20495. 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 except for parameters flagged with an "H3", received after the hold time had expired.

Sample Analysis

These samples were analyzed for inorganic, organic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For the sample with a TDS ratio over 1.2 and a value over 150 mg/L, the sample was not retested based on historical re-analysis data and the sample matrix.
2. For sample L120495-02, the dissolved and total strontium values were verified by re-digestion and re-analysis with no significant change.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L20495-01**
Date Sampled: 09/10/14 08:30
Date Received: 09/12/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 14:56	mpb
Cyanide, WAD	SM4500-CN I- distillation								09/19/14 12:10	jlf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/22/14 12:57	jlf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 13:52	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 16:58	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 18:35	las
Total Hot Plate Digestion	M200.2 ICP								09/16/14 13:57	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L20495-01**
Date Sampled: 09/10/14 08:30
Date Received: 09/12/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.08	B		mg/L	0.03	0.2	09/15/14 21:31	jjc
Aluminum, total	M200.7 ICP	1	0.71		*	mg/L	0.03	0.2	09/17/14 18:12	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0037			mg/L	0.0004	0.002	09/20/14 5:26	pmc
Antimony, total	M200.8 ICP-MS	1	0.0038			mg/L	0.0004	0.002	09/24/14 8:13	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0079			mg/L	0.0002	0.001	09/20/14 5:26	pmc
Arsenic, total	M200.8 ICP-MS	1	0.0079			mg/L	0.0002	0.001	09/24/14 8:13	pmc
Barium, dissolved	M200.7 ICP	1	0.114			mg/L	0.003	0.02	09/16/14 10:35	jjc
Barium, total	M200.7 ICP	1	0.116			mg/L	0.003	0.02	09/17/14 18:12	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:31	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:12	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 21:31	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 18:12	jjc
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/16/14 10:35	jjc
Boron, total	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/18/14 11:26	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/20/14 5:26	pmc
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/14 8:13	pmc
Calcium, dissolved	M200.7 ICP	1	185			mg/L	0.1	0.5	09/15/14 21:31	jjc
Calcium, total	M200.7 ICP	1	182			mg/L	0.1	0.5	09/17/14 18:12	jjc
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/15/14 21:31	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:12	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:31	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:12	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:31	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:12	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 21:31	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 18:12	jjc
Iron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	09/15/14 21:31	jjc
Iron, total	M200.7 ICP	1	0.41			mg/L	0.02	0.05	09/17/14 18:12	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/20/14 5:26	pmc
Lead, total	M200.8 ICP-MS	1	0.0016			mg/L	0.0001	0.0005	09/24/14 8:13	pmc
Lithium, dissolved	M200.7 ICP	1	0.037	B		mg/L	0.008	0.04	09/15/14 21:31	jjc
Lithium, total	M200.7 ICP	1	0.033	B		mg/L	0.008	0.04	09/17/14 18:12	jjc
Magnesium, dissolved	M200.7 ICP	1	12.6			mg/L	0.2	1	09/15/14 21:31	jjc
Magnesium, total	M200.7 ICP	1	12.6			mg/L	0.2	1	09/17/14 18:12	jjc
Manganese, dissolved	M200.7 ICP	1	0.206			mg/L	0.005	0.03	09/15/14 21:31	jjc
Manganese, total	M200.7 ICP	1	0.213			mg/L	0.005	0.03	09/17/14 18:12	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 14:10	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/14 11:59	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 21:31	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 18:12	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 21:31	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 18:12	jjc
Potassium, dissolved	M200.7 ICP	1	7.6			mg/L	0.2	1	09/15/14 21:31	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L20495-01**
Date Sampled: 09/10/14 08:30
Date Received: 09/12/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	7.9		mg/L	0.2	1	09/17/14 18:12	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 21:31	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/17/14 18:12	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	09/20/14 5:26	pmc
Selenium, total	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	09/24/14 8:13	pmc
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	09/20/14 5:26	pmc
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/24/14 8:13	pmc
Sodium, dissolved	M200.7 ICP	1	33.4		mg/L	0.2	1	09/15/14 21:31	jjc
Sodium, total	M200.7 ICP	1	34.1		mg/L	0.2	1	09/17/14 18:12	jjc
Strontium, dissolved	M200.7 ICP	1	1.760		mg/L	0.005	0.03	09/16/14 10:35	jjc
Strontium, total	M200.7 ICP	1	1.730		mg/L	0.005	0.03	09/17/14 18:12	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/20/14 5:26	pmc
Thallium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/24/14 8:13	pmc
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 21:31	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/17/14 18:12	jjc
Titanium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	09/15/14 21:31	jjc
Titanium, total	M200.7 ICP	1	0.021	B	mg/L	0.005	0.03	09/17/14 18:12	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/20/14 5:26	pmc
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/24/14 8:13	pmc
Vanadium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	09/15/14 21:31	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/17/14 18:12	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 21:31	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/17/14 18:12	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4-E

ACZ Sample ID: **L20495-01**
 Date Sampled: 09/10/14 08:30
 Date Received: 09/12/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	85.5		*	mg/L	2	20	09/16/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Total Alkalinity		1	85.5		*	mg/L	2	20	09/16/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/25/14 13:06	calc
Sum of Anions			12			meq/L			09/25/14 13:06	calc
Sum of Cations			12			meq/L			09/25/14 13:06	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 14:34	id
Chloride	SM4500Cl-E	1	25		*	mg/L	0.5	2	09/19/14 11:30	mss2
Conductivity @25C	SM2510B	1	1090		*	umhos/cm	1	10	09/16/14 6:21	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:10	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 16:10	mpb
Fluoride	SM4500F-C	1	0.55		*	mg/L	0.05	0.3	09/19/14 15:30	enb
Hardness as CaCO3	SM2340B - Calculation		514			mg/L	0.8	4	09/25/14 13:06	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.83		*	mg/L	0.02	0.1	09/20/14 0:07	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.62		*	mg/L	0.05	0.2	09/23/14 16:46	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.8		*	mg/L	0.1	0.5	09/24/14 0:45	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/16/14 0:00	abd
pH measured at		1	20.8		*	C	0.1	0.1	09/16/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	09/25/14 13:06	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/18/14 0:02	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/12/14 21:20	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	09/17/14 23:10	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	830		*	mg/L	10	20	09/15/14 15:56	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8	B	*	mg/L	5	20	09/16/14 12:18	djc
Residue, Total (TS) @ 105C	SM2540B	1	880		*	mg/L	10	20	09/15/14 17:13	eea
Sulfate	D516-02/-07 - Turbidimetric	20	434		*	mg/L	20	100	09/25/14 9:01	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 15:12	enb
TDS (calculated)	Calculation		753			mg/L			09/25/14 13:06	calc
TDS (ratio - measured/calculated)	Calculation		1.10						09/25/14 13:06	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L20495-02**
Date Sampled: 09/10/14 07:45
Date Received: 09/12/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 15:17	mpb
Cyanide, WAD	SM4500-CN I- distillation								09/19/14 12:25	jlf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/22/14 13:16	jlf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 14:00	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 17:06	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 19:08	las
Total Hot Plate Digestion	M200.2 ICP								09/22/14 11:03	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L20495-02**

Date Sampled: 09/10/14 07:45

Date Received: 09/12/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.12	B		mg/L	0.03	0.2	09/15/14 21:34	jjc
Aluminum, total	M200.7 ICP	1	3.65		*	mg/L	0.03	0.2	09/17/14 18:16	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/20/14 5:29	pmc
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/24/14 8:29	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	09/20/14 5:29	pmc
Arsenic, total	M200.8 ICP-MS	1	0.0028			mg/L	0.0002	0.001	09/24/14 8:29	pmc
Barium, dissolved	M200.7 ICP	1	0.034			mg/L	0.003	0.02	09/16/14 10:38	jjc
Barium, total	M200.7 ICP	1	0.064			mg/L	0.003	0.02	09/17/14 18:16	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:34	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:16	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 21:34	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 18:16	jjc
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/16/14 10:38	jjc
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/18/14 11:29	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/20/14 5:29	pmc
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/24/14 8:29	pmc
Calcium, dissolved	M200.7 ICP	1	8.5			mg/L	0.1	0.5	09/15/14 21:34	jjc
Calcium, total	M200.7 ICP	1	5.2			mg/L	0.1	0.5	09/17/14 18:16	jjc
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/15/14 21:34	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:16	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:34	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:16	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:34	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:16	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 21:34	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 18:16	jjc
Iron, dissolved	M200.7 ICP	1	0.07			mg/L	0.02	0.05	09/15/14 21:34	jjc
Iron, total	M200.7 ICP	1	1.67			mg/L	0.02	0.05	09/17/14 18:16	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/20/14 5:29	pmc
Lead, total	M200.8 ICP-MS	1	0.0015			mg/L	0.0001	0.0005	09/24/14 8:29	pmc
Lithium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.008	0.04	09/15/14 21:34	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 18:16	jjc
Magnesium, dissolved	M200.7 ICP	1	1.6			mg/L	0.2	1	09/22/14 17:35	aeb
Magnesium, total	M200.7 ICP	1	1.3			mg/L	0.2	1	09/23/14 12:08	jjc
Manganese, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.005	0.03	09/15/14 21:34	jjc
Manganese, total	M200.7 ICP	1	0.053			mg/L	0.005	0.03	09/17/14 18:16	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 14:12	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/14 12:01	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 21:34	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 18:16	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 21:34	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 18:16	jjc
Potassium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	09/15/14 21:34	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L20495-02**
Date Sampled: 09/10/14 07:45
Date Received: 09/12/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	2.8		mg/L	0.2	1	09/17/14 18:16	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 21:34	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/17/14 18:16	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/20/14 5:29	pmc
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/24/14 8:29	pmc
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	09/20/14 5:29	pmc
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/24/14 8:29	pmc
Sodium, dissolved	M200.7 ICP	1	4.6		mg/L	0.2	1	09/15/14 21:34	jjc
Sodium, total	M200.7 ICP	1	3.8		mg/L	0.2	1	09/17/14 18:16	jjc
Strontium, dissolved	M200.7 ICP	1	0.072		mg/L	0.005	0.03	09/22/14 17:35	aeb
Strontium, total	M200.7 ICP	1	0.044		mg/L	0.005	0.03	09/23/14 12:08	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/20/14 5:29	pmc
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/24/14 8:29	pmc
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 21:34	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/17/14 18:16	jjc
Titanium, dissolved	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	09/15/14 21:34	jjc
Titanium, total	M200.7 ICP	1	0.080		mg/L	0.005	0.03	09/17/14 18:16	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/20/14 5:29	pmc
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/24/14 8:29	pmc
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 21:34	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/17/14 18:16	jjc
Zinc, dissolved	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	09/15/14 21:34	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/17/14 18:16	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L20495-02**
 Date Sampled: 09/10/14 07:45
 Date Received: 09/12/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	16.8	B	*	mg/L	2	20	09/16/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Total Alkalinity		1	16.8	B	*	mg/L	2	20	09/16/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.7			%			09/25/14 13:06	calc
Sum of Anions			0.797			meq/L			09/25/14 13:06	calc
Sum of Cations			0.841			meq/L			09/25/14 13:06	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 14:52	id
Chloride	SM4500Cl-E	1	2.4		*	mg/L	0.5	2	09/19/14 11:30	mss2
Conductivity @25C	SM2510B	1	63.6		*	umhos/cm	1	10	09/16/14 6:29	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:12	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 16:11	mpb
Fluoride	SM4500F-C	1	0.10	B	*	mg/L	0.05	0.3	09/19/14 15:35	enb
Hardness as CaCO3	SM2340B - Calculation		28			mg/L	0.8	4	09/25/14 13:06	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.32		*	mg/L	0.02	0.1	09/20/14 0:10	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/23/14 16:47	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	09/24/14 0:47	pjb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	09/16/14 0:00	abd
pH measured at		1	20.8		*	C	0.1	0.1	09/16/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	09/25/14 13:06	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/18/14 0:03	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	09/12/14 21:21	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/17/14 23:11	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	80		*	mg/L	10	20	09/15/14 15:57	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	15	B	*	mg/L	5	20	09/16/14 12:28	djc
Residue, Total (TS) @ 105C	SM2540B	1	120		*	mg/L	10	20	09/15/14 17:14	eea
Sulfate	D516-02/-07 - Turbidimetric	1	18.5		*	mg/L	1	5	09/25/14 8:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 15:20	enb
TDS (calculated)	Calculation		48.6			mg/L			09/25/14 13:06	calc
TDS (ratio - measured/calculated)	Calculation		1.65						09/25/14 13:06	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW7-E

ACZ Sample ID: **L20495-03**
 Date Sampled: 09/10/14 07:55
 Date Received: 09/12/14
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 15:27	mpb
Cyanide, WAD	SM4500-CN I- distillation								09/19/14 12:39	jif
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/22/14 13:25	jif
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/14 15:27	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 17:15	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 19:18	las
Total Hot Plate Digestion	M200.2 ICP								09/16/14 14:21	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L20495-03**

Date Sampled: 09/10/14 07:55

Date Received: 09/12/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.09	B		mg/L	0.03	0.2	09/15/14 21:37	jjc
Aluminum, total	M200.7 ICP	1	4.43		*	mg/L	0.03	0.2	09/17/14 18:19	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/20/14 5:32	pmc
Antimony, total	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	09/24/14 8:32	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0029			mg/L	0.0002	0.001	09/20/14 5:32	pmc
Arsenic, total	M200.8 ICP-MS	1	0.0037			mg/L	0.0002	0.001	09/24/14 8:32	pmc
Barium, dissolved	M200.7 ICP	1	0.068			mg/L	0.003	0.02	09/16/14 10:41	jjc
Barium, total	M200.7 ICP	1	0.099			mg/L	0.003	0.02	09/17/14 18:19	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:37	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:19	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 21:37	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 18:19	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 10:41	jjc
Boron, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/18/14 11:32	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/20/14 5:32	pmc
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/14 8:32	pmc
Calcium, dissolved	M200.7 ICP	1	14.8			mg/L	0.1	0.5	09/15/14 21:37	jjc
Calcium, total	M200.7 ICP	1	14.8			mg/L	0.1	0.5	09/17/14 18:19	jjc
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/15/14 21:37	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:19	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:37	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:19	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 21:37	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:19	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 21:37	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 18:19	jjc
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	09/15/14 21:37	jjc
Iron, total	M200.7 ICP	1	1.66			mg/L	0.02	0.05	09/17/14 18:19	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/20/14 5:32	pmc
Lead, total	M200.8 ICP-MS	1	0.0014			mg/L	0.0001	0.0005	09/24/14 8:32	pmc
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	09/15/14 21:37	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 18:19	jjc
Magnesium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	09/15/14 21:37	jjc
Magnesium, total	M200.7 ICP	1	2.8			mg/L	0.2	1	09/17/14 18:19	jjc
Manganese, dissolved	M200.7 ICP	1	0.031			mg/L	0.005	0.03	09/15/14 21:37	jjc
Manganese, total	M200.7 ICP	1	0.050			mg/L	0.005	0.03	09/17/14 18:19	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 14:23	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/14 12:03	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 21:37	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 18:19	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 21:37	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 18:19	jjc
Potassium, dissolved	M200.7 ICP	1	3.2			mg/L	0.2	1	09/15/14 21:37	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L20495-03**

Date Sampled: 09/10/14 07:55

Date Received: 09/12/14

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.7		mg/L	0.2	1	09/17/14 18:19	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 21:37	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/17/14 18:19	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/20/14 5:32	pmc
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/24/14 8:32	pmc
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	09/20/14 5:32	pmc
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/24/14 8:32	pmc
Sodium, dissolved	M200.7 ICP	1	7.7		mg/L	0.2	1	09/15/14 21:37	jjc
Sodium, total	M200.7 ICP	1	7.9		mg/L	0.2	1	09/17/14 18:19	jjc
Strontium, dissolved	M200.7 ICP	1	0.106		mg/L	0.005	0.03	09/16/14 10:41	jjc
Strontium, total	M200.7 ICP	1	0.109		mg/L	0.005	0.03	09/17/14 18:19	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/20/14 5:32	pmc
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/24/14 8:32	pmc
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 21:37	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/17/14 18:19	jjc
Titanium, dissolved	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	09/15/14 21:37	jjc
Titanium, total	M200.7 ICP	1	0.085		mg/L	0.005	0.03	09/17/14 18:19	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/20/14 5:32	pmc
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/24/14 8:32	pmc
Vanadium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	09/15/14 21:37	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/17/14 18:19	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 21:37	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/17/14 18:19	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW7-E

ACZ Sample ID: **L20495-03**
 Date Sampled: 09/10/14 07:55
 Date Received: 09/12/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	50.8		*	mg/L	2	20	09/16/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/14 0:00	abd
Total Alkalinity		1	50.8		*	mg/L	2	20	09/16/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.7			%			09/25/14 13:07	calc
Sum of Anions			1.3			meq/L			09/25/14 13:07	calc
Sum of Cations			1.4			meq/L			09/25/14 13:07	calc
Chemical Oxygen Demand	M410.4	1	10	B	*	mg/L	10	20	09/16/14 14:58	id
Chloride	SM4500Cl-E	1	2.6		*	mg/L	0.5	2	09/19/14 11:30	mss2
Conductivity @25C	SM2510B	1	136		*	umhos/cm	1	10	09/16/14 6:38	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:14	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 16:13	mpb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	09/19/14 15:39	enb
Hardness as CaCO3	SM2340B - Calculation		48			mg/L	0.8	4	09/25/14 13:07	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.54		*	mg/L	0.02	0.1	09/20/14 0:11	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/23/14 16:48	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	09/24/14 0:48	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/16/14 0:00	abd
pH measured at		1	20.6		*	C	0.1	0.1	09/16/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	09/25/14 13:07	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/23/14 22:26	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/12/14 21:22	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	09/17/14 23:12	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	160		*	mg/L	10	20	09/15/14 15:59	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	7	B	*	mg/L	5	20	09/16/14 12:34	djc
Residue, Total (TS) @ 105C	SM2540B	1	190		*	mg/L	10	20	09/15/14 17:15	eea
Sulfate	D516-02/-07 - Turbidimetric	1	10.2		*	mg/L	1	5	09/25/14 8:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 15:41	enb
TDS (calculated)	Calculation		72.6			mg/L			09/25/14 13:07	calc
TDS (ratio - measured/calculated)	Calculation		2.20						09/25/14 13:07	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20495-01	WG371241	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG371519	Silver, dissolved	M200.8 ICP-MS M200.8 ICP-MS	M2 RF	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Relative Percent Difference (RPD) for Ag in spiked samples exceeded limit. In the absence of HCl, precipitation of Ag may occur at different rates.
	WG371131	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration SM2320B - Titration	Q6 Q6	Sample was received above recommended temperature. Sample was received above recommended temperature.
	WG371192	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).
	WG371458	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371131	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371593	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).
	WG371501	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation	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).
	WG371460	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371521	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371665	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).
	WG371700	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).
	WG371131	pH pH measured at	SM4500H+ B SM4500H+ B	Q6 Q6	Sample was received above recommended temperature. Sample was received above recommended temperature.
	WG371349	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).
	WG371082	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).
	WG371347	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	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.
	WG371149	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG371197	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).
WG371155	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).
WG371777	Sulfate		D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG371120	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).
WG371131	Total Alkalinity		SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20495-02	WG371241	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG371519	Silver, dissolved	M200.8 ICP-MS M200.8 ICP-MS	M2 RF	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Relative Percent Difference (RPD) for Ag in spiked samples exceeded limit. In the absence of HCl, precipitation of Ag may occur at different rates.
	WG371131	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration SM2320B - Titration	Q6 Q6	Sample was received above recommended temperature. Sample was received above recommended temperature.
	WG371192	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).
	WG371458	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371131	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371593	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).
	WG371501	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation	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).
	WG371460	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371521	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371665	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).
	WG371700	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).
	WG371131	pH pH measured at	SM4500H+ B SM4500H+ B	Q6 Q6	Sample was received above recommended temperature. Sample was received above recommended temperature.
	WG371349	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).
	WG371082	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).
	WG371347	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	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.
	WG371149	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG371197	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).
	WG371155	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).
	WG371777	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG371120	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).
	WG371131	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20495-03	WG371241	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG371519	Silver, dissolved	M200.8 ICP-MS M200.8 ICP-MS	M2 RF	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Relative Percent Difference (RPD) for Ag in spiked samples exceeded limit. In the absence of HCl, precipitation of Ag may occur at different rates.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371458	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371131	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371593	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).
	WG371501	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation	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).
	WG371460	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371521	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371665	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).
	WG371700	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).
	WG371131	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG371695	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).
	WG371082	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).
	WG371347	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	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.
	WG371149	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG371197	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).
	WG371155	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).
	WG371777	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG371120	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			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).
	WG371131	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L20495-01**

Date Sampled: 09/10/14 8:30

Date Received: 09/12/14

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG371279

Analyst: itk

Extract Date: 09/16/14 2:15

Analysis Date: 09/16/14 22:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	81.1		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L20495-01**

Date Sampled: 09/10/14 8:30

Date Received: 09/12/14

Sample Matrix: Surface Water

Oil & Grease, Total RecoverableAnalysis Method: **1664A - Gravimetric**

Extract Method:

Workgroup: WG371624

Analyst: DRH

Extract Date:

Analysis Date: 09/23/14 12:46

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L20495-02**

Date Sampled: 09/10/14 7:45

Date Received: 09/12/14

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG371279

Analyst: itk

Extract Date: 09/16/14 3:31

Analysis Date: 09/16/14 23:00

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	81.6		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L20495-02**

Date Sampled: 09/10/14 7:45

Date Received: 09/12/14

Sample Matrix: Surface Water

Oil & Grease, Total RecoverableAnalysis Method: **1664A - Gravimetric**

Extract Method:

Workgroup: WG371624

Analyst: DRH

Extract Date:

Analysis Date: 09/23/14 12:58

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L20495-03**

Date Sampled: 09/10/14 7:55

Date Received: 09/12/14

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG371279

Analyst: itk

Extract Date: 09/16/14 4:46

Analysis Date: 09/16/14 23:53

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	76.1		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L20495-03**

Date Sampled: 09/10/14 7:55

Date Received: 09/12/14

Sample Matrix: Surface Water

Oil & Grease, Total RecoverableAnalysis Method: **1664A - Gravimetric**

Extract Method:

Workgroup: WG371624

Analyst: DRH

Extract Date:

Analysis Date: 09/23/14 13:11

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20495-01	WG371279	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371624	Oil and Grease	1664A - Gravimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG371146	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20495-02	WG371279	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371624	Oil and Grease	1664A - Gravimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG371146	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20495-03	WG371279	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371624	Oil and Grease	1664A - Gravimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG371146	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20495**

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: L20495
 Date Received: 09/12/2014 10:14
 Received By: mtb
 Date Printed: 9/12/2014

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?
4232	12.2	8	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

October 01, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20464

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 11, 2014. This project has been assigned to ACZ's project number, L20464. 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 L20464. 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.

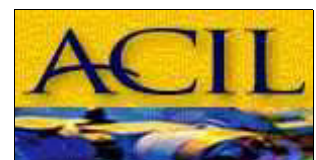
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 31, 2014. 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.



Scott Habermehl has reviewed
and approved this report.



Tahoe Resources, Inc.

October 01, 2014

Project ID: Escobal

ACZ Project ID: L20464

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on September 11, 2014. 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 L20464. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

Any analyses not performed within EPA recommended holding times have been qualified with an "H" flag.

The hold times for TDS, TSS and TS on L20464-01 were exceeded due to a required re-analysis based on their relationships.

Sample Analysis

These samples were analyzed for inorganic, 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. (N1) Drying oven temperature out of range over weekend at 106. Oven returned to an in range temperature Monday morning prior to samples being removed.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L20464-01**
Date Sampled: 09/09/14 08:10
Date Received: 09/11/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/16/14 13:38	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/16/14 13:31	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 14:30	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 12:04	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 14:43	bsu
Total Hot Plate Digestion	M200.2 ICP								09/16/14 10:52	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 14:42	las

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L20464-01**
Date Sampled: 09/09/14 08:10
Date Received: 09/11/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/15/14 18:58	aeb
Aluminum, total	M200.7 ICP	1	34.20		*	mg/L	0.03	0.2	09/17/14 17:11	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/19/14 13:06	las
Antimony, total	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	09/23/14 13:13	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0010			mg/L	0.0002	0.001	09/19/14 13:06	las
Arsenic, total	M200.8 ICP-MS	1	0.0130			mg/L	0.0002	0.001	09/24/14 20:21	msh
Barium, dissolved	M200.7 ICP	1	0.029			mg/L	0.003	0.02	09/15/14 18:58	aeb
Barium, total	M200.7 ICP	1	0.382			mg/L	0.003	0.02	09/17/14 17:11	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:58	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:11	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 18:58	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 17:11	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:58	aeb
Boron, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/18/14 10:40	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:06	las
Cadmium, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	09/23/14 13:13	msh
Calcium, dissolved	M200.7 ICP	1	5.4			mg/L	0.1	0.5	09/15/14 18:58	aeb
Calcium, total	M200.7 ICP	1	8			mg/L	0.1	0.5	09/17/14 17:11	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:58	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:11	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:58	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:11	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:58	aeb
Copper, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/17/14 17:11	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 18:58	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:11	jjc
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	09/15/14 18:58	aeb
Iron, total	M200.7 ICP	1	20.0		*	mg/L	0.02	0.05	09/17/14 17:11	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:06	las
Lead, total	M200.8 ICP-MS	1	0.0138			mg/L	0.0001	0.0005	09/24/14 20:21	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 18:58	aeb
Lithium, total	M200.7 ICP	1	0.012	B		mg/L	0.008	0.04	09/17/14 17:11	jjc
Magnesium, dissolved	M200.7 ICP	1	1.3			mg/L	0.2	1	09/15/14 18:58	aeb
Magnesium, total	M200.7 ICP	1	2.3			mg/L	0.2	1	09/17/14 17:11	jjc
Manganese, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.005	0.03	09/15/14 18:58	aeb
Manganese, total	M200.7 ICP	1	1.020			mg/L	0.005	0.03	09/17/14 17:11	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 10:48	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 12:39	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 18:58	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 17:11	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 18:58	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 17:11	jjc
Potassium, dissolved	M200.7 ICP	1	3.2			mg/L	0.2	1	09/15/14 18:58	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L20464-01**
Date Sampled: 09/09/14 08:10
Date Received: 09/11/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	6.5		mg/L	0.2	1	09/17/14 17:11	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 18:58	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/17/14 17:11	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/19/14 13:06	las
Selenium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	09/24/14 20:21	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 13:06	las
Silver, total	M200.8 ICP-MS	1	0.00009	B	mg/L	0.00005	0.0003	09/23/14 13:13	msh
Sodium, dissolved	M200.7 ICP	1	4.2		mg/L	0.2	1	09/15/14 18:58	aeb
Sodium, total	M200.7 ICP	1	4.5		mg/L	0.2	1	09/17/14 17:11	jjc
Strontium, dissolved	M200.7 ICP	1	0.038		mg/L	0.005	0.03	09/15/14 18:58	aeb
Strontium, total	M200.7 ICP	1	0.070		mg/L	0.005	0.03	09/17/14 17:11	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/19/14 13:06	las
Thallium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	09/23/14 13:13	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 18:58	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/17/14 17:11	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:58	aeb
Titanium, total	M200.7 ICP	1	0.905		mg/L	0.005	0.03	09/17/14 17:11	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/19/14 13:06	las
Uranium, total	M200.8 ICP-MS	1	0.0012		mg/L	0.0001	0.0005	09/23/14 13:13	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:58	aeb
Vanadium, total	M200.7 ICP	1	0.040		mg/L	0.005	0.03	09/17/14 17:11	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 18:58	aeb
Zinc, total	M200.7 ICP	1	0.05		mg/L	0.01	0.05	09/17/14 17:11	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW6-E

ACZ Sample ID: **L20464-01**
 Date Sampled: 09/09/14 08:10
 Date Received: 09/11/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	17.7	B	*	mg/L	2	20	09/15/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Total Alkalinity		1	17.7	B	*	mg/L	2	20	09/15/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			8.2			%			10/01/14 0:00	calc
Sum of Anions			0.554			meq/L			10/01/14 0:00	calc
Sum of Cations			0.653			meq/L			10/01/14 0:00	calc
Chemical Oxygen Demand	M410.4	1	180		*	mg/L	10	20	09/16/14 12:56	id
Chloride	SM4500Cl-E	1	2.3		*	mg/L	0.5	2	09/22/14 12:35	jlf
Conductivity @25C	SM2510B	1	69.3		*	umhos/cm	1	10	09/13/14 2:44	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:16	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 18:02	mpb
Fluoride	SM4500F-C	1	0.07	B	*	mg/L	0.05	0.3	09/18/14 20:48	enb
Hardness as CaCO3	SM2340B - Calculation		19			mg/L	0.8	4	10/01/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.31		*	mg/L	0.02	0.1	09/19/14 23:20	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.06	B	*	mg/L	0.05	0.2	09/18/14 16:28	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2.4		*	mg/L	0.1	0.5	09/19/14 12:44	mpb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	09/13/14 0:00	id
pH measured at		1	19.5		*	C	0.1	0.1	09/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	10/01/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/17/14 23:40	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/11/14 23:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.41		*	mg/L	0.01	0.05	09/17/14 22:47	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	130	H	*	mg/L	10	20	09/26/14 13:35	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	2	680	H	*	mg/L	10	40	09/27/14 10:54	eea
Residue, Total (TS) @ 105C	SM2540B	1	790	H	*	mg/L	10	20	09/26/14 15:32	eea
Sulfate	D516-02/-07 - Turbidimetric	1	6.3		*	mg/L	1	5	09/22/14 13:50	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	09/15/14 14:35	enb
TDS (calculated)	Calculation		33.7			mg/L			10/01/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		3.86						10/01/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L20464-02**
Date Sampled: 09/09/14 10:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/16/14 13:49	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/16/14 13:38	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 14:42	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 12:12	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 14:52	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 14:52	las
Total Hot Plate Digestion	M200.2 ICP								09/16/14 11:27	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L20464-02**
Date Sampled: 09/09/14 10:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.15	B		mg/L	0.03	0.2	09/15/14 19:01	aeb
Aluminum, total	M200.7 ICP	1	16.40		*	mg/L	0.03	0.2	09/17/14 17:20	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	09/19/14 13:09	las
Antimony, total	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	09/23/14 13:16	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0033			mg/L	0.0002	0.001	09/19/14 13:09	las
Arsenic, total	M200.8 ICP-MS	1	0.0115			mg/L	0.0002	0.001	09/24/14 20:24	msh
Barium, dissolved	M200.7 ICP	1	0.097			mg/L	0.003	0.02	09/15/14 19:01	aeb
Barium, total	M200.7 ICP	1	0.242			mg/L	0.003	0.02	09/17/14 17:20	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:01	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:20	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 19:01	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 17:20	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:01	aeb
Boron, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/18/14 10:49	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:09	las
Cadmium, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/23/14 13:16	msh
Calcium, dissolved	M200.7 ICP	1	38.5			mg/L	0.1	0.5	09/15/14 19:01	aeb
Calcium, total	M200.7 ICP	1	38.9			mg/L	0.1	0.5	09/17/14 17:20	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:01	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:20	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:01	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:20	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:01	aeb
Copper, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/17/14 17:20	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 19:01	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:20	jjc
Iron, dissolved	M200.7 ICP	1	0.12			mg/L	0.02	0.05	09/15/14 19:01	aeb
Iron, total	M200.7 ICP	1	8.46		*	mg/L	0.02	0.05	09/17/14 17:20	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0008			mg/L	0.0001	0.0005	09/19/14 13:09	las
Lead, total	M200.8 ICP-MS	1	0.0162			mg/L	0.0001	0.0005	09/24/14 20:24	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 19:01	aeb
Lithium, total	M200.7 ICP	1	0.012	B		mg/L	0.008	0.04	09/17/14 17:20	jjc
Magnesium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	09/15/14 19:01	aeb
Magnesium, total	M200.7 ICP	1	4.8			mg/L	0.2	1	09/17/14 17:20	jjc
Manganese, dissolved	M200.7 ICP	1	0.109			mg/L	0.005	0.03	09/15/14 19:01	aeb
Manganese, total	M200.7 ICP	1	0.362			mg/L	0.005	0.03	09/17/14 17:20	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 10:58	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 12:41	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 19:01	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 17:20	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 19:01	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 17:20	jjc
Potassium, dissolved	M200.7 ICP	1	7			mg/L	0.2	1	09/15/14 19:01	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L20464-02**
Date Sampled: 09/09/14 10:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	10.1			mg/L	0.2	1	09/17/14 17:20	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 19:01	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:20	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/19/14 13:09	las
Selenium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	09/24/14 20:24	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/19/14 13:09	las
Silver, total	M200.8 ICP-MS	1	0.00018	B		mg/L	0.00005	0.0003	09/23/14 13:16	msh
Sodium, dissolved	M200.7 ICP	1	14.9			mg/L	0.2	1	09/15/14 19:01	aeb
Sodium, total	M200.7 ICP	1	15			mg/L	0.2	1	09/17/14 17:20	jjc
Strontium, dissolved	M200.7 ICP	1	0.350			mg/L	0.005	0.03	09/15/14 19:01	aeb
Strontium, total	M200.7 ICP	1	0.364			mg/L	0.005	0.03	09/17/14 17:20	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:09	las
Thallium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/23/14 13:16	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/15/14 19:01	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	09/17/14 17:20	jjc
Titanium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	09/15/14 19:01	aeb
Titanium, total	M200.7 ICP	1	0.289			mg/L	0.005	0.03	09/17/14 17:20	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/19/14 13:09	las
Uranium, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	09/23/14 13:16	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/15/14 19:01	aeb
Vanadium, total	M200.7 ICP	1	0.014	B		mg/L	0.005	0.03	09/17/14 17:20	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:01	aeb
Zinc, total	M200.7 ICP	1	0.06			mg/L	0.01	0.05	09/17/14 17:20	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW8-E

ACZ Sample ID: **L20464-02**
 Date Sampled: 09/09/14 10:15
 Date Received: 09/11/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	60.5		*	mg/L	2	20	09/15/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Total Alkalinity		1	60.5		*	mg/L	2	20	09/15/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.2			%			10/01/14 0:00	calc
Sum of Anions			3.0			meq/L			10/01/14 0:00	calc
Sum of Cations			3.2			meq/L			10/01/14 0:00	calc
Chemical Oxygen Demand	M410.4	1	90		*	mg/L	10	20	09/16/14 13:02	id
Chloride	SM4500Cl-E	1	8.3		*	mg/L	0.5	2	09/22/14 12:35	jlf
Conductivity @25C	SM2510B	1	321		*	umhos/cm	1	10	09/13/14 2:52	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:17	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 18:02	mpb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	09/18/14 20:56	enb
Hardness as CaCO3	SM2340B - Calculation		114			mg/L	0.8	4	10/01/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.80		*	mg/L	0.02	0.1	09/19/14 23:22	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.37		*	mg/L	0.05	0.2	09/18/14 16:29	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.9		*	mg/L	0.1	0.5	09/19/14 12:45	mpb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	09/13/14 0:00	id
pH measured at		1	19.5		*	C	0.1	0.1	09/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.31			mg/L	0.03	0.2	10/01/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.10		*	mg/L	0.01	0.05	09/17/14 23:44	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.12	H	*	mg/L	0.01	0.05	09/11/14 23:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.29		*	mg/L	0.01	0.05	09/17/14 22:48	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	310		*	mg/L	10	20	09/12/14 15:41	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	237		*	mg/L	5	20	09/12/14 16:10	eea
Residue, Total (TS) @ 105C	SM2540B	1	520		*	mg/L	10	20	09/12/14 12:09	abd
Sulfate	D516-02/-07 - Turbidimetric	5	74.9		*	mg/L	5	25	09/22/14 13:56	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	09/15/14 14:42	enb
TDS (calculated)	Calculation		186			mg/L			10/01/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.67						10/01/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L20464-03**
Date Sampled: 09/09/14 09:10
Date Received: 09/11/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/16/14 14:00	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/16/14 13:45	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 14:55	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 12:19	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 15:00	bsu
Total Hot Plate Digestion	M200.2 ICP								09/16/14 11:39	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 15:03	las

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L20464-03**
Date Sampled: 09/09/14 09:10
Date Received: 09/11/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/15/14 19:04	aeb
Aluminum, total	M200.7 ICP	1	28.90		*	mg/L	0.03	0.2	09/17/14 17:23	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/19/14 13:12	las
Antimony, total	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	09/23/14 13:19	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0019			mg/L	0.0002	0.001	09/19/14 13:12	las
Arsenic, total	M200.8 ICP-MS	1	0.0102			mg/L	0.0002	0.001	09/24/14 20:27	msh
Barium, dissolved	M200.7 ICP	1	0.063			mg/L	0.003	0.02	09/15/14 19:04	aeb
Barium, total	M200.7 ICP	1	0.314			mg/L	0.003	0.02	09/17/14 17:23	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:04	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:23	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 19:04	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 17:23	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:04	aeb
Boron, total	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	09/18/14 10:52	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:12	las
Cadmium, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	09/23/14 13:19	msh
Calcium, dissolved	M200.7 ICP	1	18.1			mg/L	0.1	0.5	09/15/14 19:04	aeb
Calcium, total	M200.7 ICP	1	25.8			mg/L	0.1	0.5	09/17/14 17:23	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:04	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:23	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:04	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 17:23	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:04	aeb
Copper, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/17/14 17:23	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 19:04	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 17:23	jjc
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	09/15/14 19:04	aeb
Iron, total	M200.7 ICP	1	15.60		*	mg/L	0.02	0.05	09/17/14 17:23	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 13:12	las
Lead, total	M200.8 ICP-MS	1	0.0198			mg/L	0.0001	0.0005	09/24/14 20:27	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 19:04	aeb
Lithium, total	M200.7 ICP	1	0.017	B		mg/L	0.008	0.04	09/17/14 17:23	jjc
Magnesium, dissolved	M200.7 ICP	1	2.8			mg/L	0.2	1	09/15/14 19:04	aeb
Magnesium, total	M200.7 ICP	1	4.4			mg/L	0.2	1	09/17/14 17:23	jjc
Manganese, dissolved	M200.7 ICP	1	0.028	B		mg/L	0.005	0.03	09/15/14 19:04	aeb
Manganese, total	M200.7 ICP	1	0.835			mg/L	0.005	0.03	09/17/14 17:23	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 11:00	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 12:43	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 19:04	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 17:23	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 19:04	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 17:23	jjc
Potassium, dissolved	M200.7 ICP	1	5.1			mg/L	0.2	1	09/15/14 19:04	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L20464-03**
Date Sampled: 09/09/14 09:10
Date Received: 09/11/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	8		mg/L	0.2	1	09/17/14 17:23	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 19:04	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/17/14 17:23	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/19/14 13:12	las
Selenium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	09/24/14 20:27	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 13:12	las
Silver, total	M200.8 ICP-MS	1	0.00027	B	mg/L	0.00005	0.0003	09/23/14 13:19	msh
Sodium, dissolved	M200.7 ICP	1	9		mg/L	0.2	1	09/15/14 19:04	aeb
Sodium, total	M200.7 ICP	1	10.7		mg/L	0.2	1	09/17/14 17:23	jjc
Strontium, dissolved	M200.7 ICP	1	0.142		mg/L	0.005	0.03	09/15/14 19:04	aeb
Strontium, total	M200.7 ICP	1	0.219		mg/L	0.005	0.03	09/17/14 17:23	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/19/14 13:12	las
Thallium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/23/14 13:19	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 19:04	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/17/14 17:23	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 19:04	aeb
Titanium, total	M200.7 ICP	1	0.798		mg/L	0.005	0.03	09/17/14 17:23	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/19/14 13:12	las
Uranium, total	M200.8 ICP-MS	1	0.0008		mg/L	0.0001	0.0005	09/23/14 13:19	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 19:04	aeb
Vanadium, total	M200.7 ICP	1	0.032		mg/L	0.005	0.03	09/17/14 17:23	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/15/14 19:04	aeb
Zinc, total	M200.7 ICP	1	0.07		mg/L	0.01	0.05	09/17/14 17:23	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW9-E

ACZ Sample ID: **L20464-03**
 Date Sampled: 09/09/14 09:10
 Date Received: 09/11/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	47.7		*	mg/L	2	20	09/15/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Total Alkalinity		1	47.7		*	mg/L	2	20	09/15/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-5.6			%			10/01/14 0:00	calc
Sum of Anions			1.9			meq/L			10/01/14 0:00	calc
Sum of Cations			1.7			meq/L			10/01/14 0:00	calc
Chemical Oxygen Demand	M410.4	1	126		*	mg/L	10	20	09/16/14 13:08	id
Chloride	SM4500Cl-E	1	5.7		*	mg/L	0.5	2	09/19/14 9:56	mss2
Conductivity @25C	SM2510B	1	217		*	umhos/cm	1	10	09/13/14 3:00	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 17:18	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 18:03	mpb
Fluoride	SM4500F-C	1	0.10	B	*	mg/L	0.05	0.3	09/18/14 21:04	enb
Hardness as CaCO3	SM2340B - Calculation		57			mg/L	0.8	4	10/01/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.0		*	mg/L	0.02	0.1	09/19/14 23:24	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.10	B	*	mg/L	0.05	0.2	09/18/14 16:30	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2.1		*	mg/L	0.1	0.5	09/19/14 12:46	mpb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/13/14 0:00	id
pH measured at		1	19.4		*	C	0.1	0.1	09/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.31			mg/L	0.03	0.2	10/01/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.10		*	mg/L	0.01	0.05	09/17/14 23:45	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	09/11/14 23:23	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.34		*	mg/L	0.01	0.05	09/17/14 22:49	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	250		*	mg/L	10	20	09/12/14 15:43	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	2	390		*	mg/L	10	40	09/12/14 16:12	eea
Residue, Total (TS) @ 105C	SM2540B	1	650		*	mg/L	10	20	09/12/14 12:11	abd
Sulfate	D516-02/-07 - Turbidimetric	1	38.9		*	mg/L	1	5	09/22/14 13:50	jlf
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	09/15/14 14:49	enb
TDS (calculated)	Calculation		109			mg/L			10/01/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		2.29						10/01/14 0:00	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20464-01	WG371241	Aluminum, total	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.
		Iron, total	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.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371561	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG371062	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.
	WG371497	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).
	WG371499	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).
	WG371373	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371518	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371420	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).
	WG371483	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).
	WG371062	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
	WG371349	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).
	WG371016	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.
	WG371347	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).
	WG371909	Residue, Filterable (TDS) @180C	SM2540C	H2	Initial analysis within holding time. Reanalysis for the

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					required dilution was past holding time.
			SM2540C	Q6	Sample was received above recommended temperature.
WG371942		Residue, Non-Filterable (TSS) @105C	SM2540D	C5	Confirmatory analysis was past holding time. Original result not confirmed.
			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).
WG371921		Residue, Total (TS) @ 105C	SM2540B	C5	Confirmatory analysis was past holding time. Original result not confirmed.
			SM2540B	Q6	Sample was received above recommended temperature.
WG371577		Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG371119		Sulfide as S	SM4500S2-D	DF	Sample required dilution due to high sediment.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			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).
WG371131		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.

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20464-02	WG371241	Aluminum, total	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.
		Iron, total	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.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371561	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG371062	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.
	WG371497	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).
	WG371499	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).
	WG371373	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371518	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371420	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).
	WG371483	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).
	WG371062	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.
	WG371349	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).
	WG371016	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.
	WG371347	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).

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG371074	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG371073	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			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).
	WG371052	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG371577	Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG371119	Sulfide as S	SM4500S2-D	DF	Sample required dilution due to high sediment.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			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).
	WG371131	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.

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20464-03	WG371241	Aluminum, total	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.
		Iron, total	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.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371457	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG371062	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.
	WG371497	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).
	WG371499	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).
	WG371373	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371518	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371420	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).
	WG371483	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).
	WG371062	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.
	WG371349	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).
	WG371016	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.
	WG371347	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).
	WG371074	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG371073	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			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).
	WG371052	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG371577	Sulfate	D516-02/-07 - 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.
	WG371119	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	D1	Sample required dilution due to matrix.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
	WG371131	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.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L20464-01**

Date Sampled: 09/09/14 8:10

Date Received: 09/11/14

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG371244

Analyst: itk

Extract Date: 09/12/14 6:38

Analysis Date: 09/15/14 17:11

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	70.4		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L20464-01**

Date Sampled: 09/09/14 8:10

Date Received: 09/11/14

Sample Matrix: Surface Water

Oil & Grease, Total RecoverableAnalysis Method: **1664A - Gravimetric**

Extract Method:

Workgroup: WG371268

Analyst: DRH

Extract Date:

Analysis Date: 09/17/14 14:33

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW8-EACZ Sample ID: **L20464-02**
Date Sampled: 09/09/14 10:15
Date Received: 09/11/14
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG371244Analyst: itk
Extract Date: 09/12/14 7:36
Analysis Date: 09/15/14 17:37

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	60.3		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW8-EACZ Sample ID: **L20464-02**
Date Sampled: 09/09/14 10:15
Date Received: 09/11/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG371268

Analyst: DRH

Extract Date:

Analysis Date: 09/17/14 14:49

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.02	*	mg/L	2	10.2

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L20464-03**

Date Sampled: 09/09/14 9:10

Date Received: 09/11/14

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG371244

Analyst: itk

Extract Date: 09/12/14 8:34

Analysis Date: 09/15/14 18:03

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	72		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L20464-03**

Date Sampled: 09/09/14 9:10

Date Received: 09/11/14

Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**

Extract Method:

Workgroup: WG371268

Analyst: DRH

Extract Date:

Analysis Date: 09/17/14 15:05

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20464-01	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20464-02	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			OTP	M8015D GC/FID	S7
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20464-03	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20464**

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: L20464
 Date Received: 09/11/2014 09:50
 Received By: mtb
 Date Printed: 9/11/2014

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?
2923	16.1	8	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

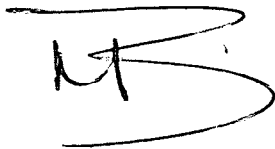
Guatemala September 9th, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, appearing to be the initials 'MB' followed by a large, stylized flourish that loops back to the left.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

September 26, 2014

Report to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20493

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 12, 2014. This project has been assigned to ACZ's project number, L20493. 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 L20493. 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.

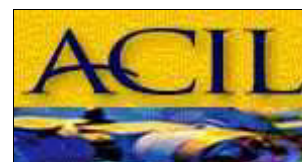
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 26, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L20493-01**
Date Sampled: 09/10/14 12:00
Date Received: 09/12/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 14:25	mpb
Cyanide, WAD	SM4500-CN I- distillation								09/19/14 11:56	jif
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/18/14 17:59	mpb
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/17/14 13:38	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 16:41	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 16:30	las
Total Hot Plate Digestion	M200.2 ICP								09/16/14 13:34	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L20493-01**

Date Sampled: 09/10/14 12:00

Date Received: 09/12/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/15/14 19:25	aeb
Aluminum, total	M200.7 ICP	1		U	*	mg/L	0.03	0.2	09/17/14 18:00	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/24/14 2:37	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/23/14 13:52	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	09/24/14 2:37	msh
Arsenic, total	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	09/24/14 21:00	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	09/15/14 19:25	aeb
Barium, total	M200.7 ICP	1		U		mg/L	0.003	0.02	09/17/14 18:00	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:25	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:00	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 19:25	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/17/14 18:00	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:25	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/14 11:20	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/14 2:37	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/14 13:52	msh
Calcium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.1	0.5	09/15/14 19:25	aeb
Calcium, total	M200.7 ICP	1	0.1	B		mg/L	0.1	0.5	09/17/14 18:00	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:25	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:00	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:25	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:00	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 19:25	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/17/14 18:00	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 19:25	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 18:00	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/15/14 19:25	aeb
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	09/17/14 18:00	jjc
Lead, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	09/24/14 2:37	msh
Lead, total	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	09/23/14 13:52	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 19:25	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 18:00	jjc
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/15/14 19:25	aeb
Magnesium, total	M200.7 ICP	1	0.2	B		mg/L	0.2	1	09/17/14 18:00	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/15/14 19:25	aeb
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	09/17/14 18:00	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 14:06	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/14 11:46	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 19:25	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/17/14 18:00	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 19:25	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/17/14 18:00	jjc
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/15/14 19:25	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW10-E

ACZ Sample ID: **L20493-01**

Date Sampled: 09/10/14 12:00

Date Received: 09/12/14

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	U	mg/L	0.2	1	09/17/14 18:00	jjc
Scandium, dissolved	M200.7 ICP	1	U *	mg/L	0.1	0.5	09/15/14 19:25	aeb
Scandium, total	M200.7 ICP	1	U *	mg/L	0.1	0.5	09/17/14 18:00	jjc
Selenium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0003	09/24/14 22:26	msh
Selenium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0003	09/24/14 21:00	msh
Silver, dissolved	M200.8 ICP-MS	1	U *	mg/L	0.00005	0.0003	09/24/14 2:37	msh
Silver, total	M200.8 ICP-MS	1	U	mg/L	0.00005	0.0003	09/23/14 13:52	msh
Sodium, dissolved	M200.7 ICP	1	U	mg/L	0.2	1	09/15/14 19:25	aeb
Sodium, total	M200.7 ICP	1	U	mg/L	0.2	1	09/17/14 18:00	jjc
Strontium, dissolved	M200.7 ICP	1	U	mg/L	0.005	0.03	09/15/14 19:25	aeb
Strontium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	09/17/14 18:00	jjc
Thallium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	09/24/14 22:26	msh
Thallium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	09/23/14 13:52	msh
Tin, dissolved	M200.7 ICP	1	U	mg/L	0.04	0.2	09/15/14 19:25	aeb
Tin, total	M200.7 ICP	1	U	mg/L	0.04	0.2	09/17/14 18:00	jjc
Titanium, dissolved	M200.7 ICP	1	U	mg/L	0.005	0.03	09/15/14 19:25	aeb
Titanium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	09/17/14 18:00	jjc
Uranium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	09/24/14 2:37	msh
Uranium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	09/23/14 13:52	msh
Vanadium, dissolved	M200.7 ICP	1	U	mg/L	0.005	0.03	09/15/14 19:25	aeb
Vanadium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	09/17/14 18:00	jjc
Zinc, dissolved	M200.7 ICP	1	U	mg/L	0.01	0.05	09/15/14 19:25	aeb
Zinc, total	M200.7 ICP	1	U	mg/L	0.01	0.05	09/17/14 18:00	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW10-E

ACZ Sample ID: **L20493-01**
 Date Sampled: 09/10/14 12:00
 Date Received: 09/12/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U		mg/L	2	20	09/16/14 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	09/16/14 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	09/16/14 0:00	abd
Total Alkalinity		1		U		mg/L	2	20	09/16/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			09/26/14 11:28	calc
Sum of Anions			N/A			meq/L			09/26/14 11:28	calc
Sum of Cations				U		meq/L			09/26/14 11:28	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 13:57	id
Chloride	SM4500Cl-E	1		U		mg/L	0.5	2	09/19/14 9:57	mss2
Conductivity @25C	SM2510B	1	2.5	B		umhos/cm	1	10	09/16/14 6:04	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:07	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/19/14 16:08	mpb
Fluoride	SM4500F-C	1		U		mg/L	0.05	0.3	09/19/14 15:02	enb
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	09/26/14 11:28	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/20/14 0:04	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/23/14 16:44	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/19/14 13:06	mpb
pH (lab)	SM4500H+ B									
pH		1	6.2	H		units	0.1	0.1	09/16/14 0:00	abd
pH measured at		1	20.6			C	0.1	0.1	09/16/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/26/14 11:28	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/17/14 23:59	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	09/12/14 21:15	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/17/14 23:07	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	09/15/14 15:52	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/16/14 12:07	djc
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	09/15/14 17:10	eea
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/22/14 14:44	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 14:58	enb
TDS (calculated)	Calculation		0.3			mg/L			09/26/14 11:28	calc
TDS (ratio - measured/calculated)	Calculation		n/a						09/26/14 11:28	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20493**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION	
L20493-01	WG371241	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.	
	WG371687	Lead, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].	
	WG371641	Lead, total	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].	
	WG371687	Silver, dissolved		M200.8 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
				M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG371192	Chemical Oxygen Demand	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).	
	WG371593	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).	
	WG371501	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).	
	WG371521	Nitrate/Nitrite as N	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).	
	WG371665	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).	
	WG371483	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).	
	WG371349	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)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG371082	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	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG371347	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.	
	WG371149	Residue, Filterable (TDS) @180C	SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).	
	WG371197	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).	
	WG371155	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).	
	WG371579	Sulfate	D516-02/-07 - 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.	
WG371120	Sulfide as S	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.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L20493-01**
Date Sampled: 09/10/14 12:00
Date Received: 09/12/14
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG371279Analyst: itk
Extract Date: 09/15/14 23:44
Analysis Date: 09/16/14 21:42

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	80.7		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L20493-01**
Date Sampled: 09/10/14 12:00
Date Received: 09/12/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG371624

Analyst: DRH

Extract Date:

Analysis Date: 09/23/14 12:20

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20493**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20493-01	WG371279	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371624	Oil and Grease	1664A - Gravimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG371146	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20493**

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: L20493
 Date Received: 09/12/2014 10:16
 Received By: mtb
 Date Printed: 9/12/2014

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? A change was made in the Relinquished Date:Time section prior to ACZ custody.	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?
3711	5.2	7	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L20493
Date Received: 09/12/2014 10:16
Received By: mtb
Date Printed: 9/12/2014



Laboratories, Inc. *L20493*

CHAIN of CUSTODY

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

Report to:

Name: *Miguel Berganza*
Company: *Tahoe Resources inc*
E-mail: *M.Berganza@sanrafael.com.gt*

Address: *Bulevar 105 P.O. Box 518 Calle 24-68 Zona 10*
Empresarial, Zona parque Torre II, oficina 1406
Telephone: *(502) 59515248*

Copy of Report to:

Name: *Charlie Muerhoff*
Company: *Tahoe Resources inc*

E-mail: *cmuerhoff@tahoeresourcesinc.com*
Telephone:

Invoice to:

Name: *Miguel Berganza*
Company: *Tahoe Resources inc*
E-mail: *M.Berganza@sanrafael.com.gt*

Address:
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

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

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: *LF* Sampler's Site Information State _____ Zip code _____ Time Zone _____

*Sampler's Signature: *[Signature]* *I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <i>water Quality</i>	# of Containers	<i>SW</i>																		
PO#: <i>Escobal</i>																				
Reporting state for compliance testing:																				
Check box if samples include NRC licensed material?																				
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers																	
<i>SW10-E</i>	<i>10/09/14 12:00</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>																
<i>WW6</i>	<i>10/09/14 11:30</i>	<i>WW</i>	<i>10</i>	<input checked="" type="checkbox"/>																

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

REMARKS

Report results of WW6 in a different document.

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>10-09-2014 17:00</i>	<i>[Signature]</i>	<i>10/9/14 17:00</i>
		<i>[Signature]</i>	<i>9-12-14 10/10</i>

L20493 Chain of Custody

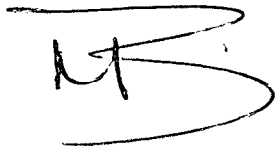
Guatemala September 10th, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together, with a horizontal line above and a curved line below.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

September 26, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20459

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 11, 2014. This project has been assigned to ACZ's project number, L20459. 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 L20459. 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.

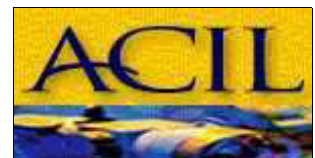
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 26, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

September 26, 2014

Project ID: Escobal

ACZ Project ID: L20459

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 1 miscellaneous sample from Tahoe Resources, Inc. on September 11, 2014. The sample was received in good condition. Upon receipt, the sample custodian removed the sample from the cooler, inspected the contents, and logged the sample into ACZ's computerized Laboratory Information Management System (LIMS). The sample was assigned ACZ LIMS project number L20459. 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 except for parameters flagged with an "HE" flag, received too close to the hold time.

Sample Analysis

This sample was analyzed for inorganic, organic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For TSS flagged with an "N1", the drying oven temperature was out of range over the weekend at 106 degrees C. The oven returned to an in range temperature Monday morning prior to samples being removed.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW11-EACZ Sample ID: **L20459-01**
Date Sampled: 09/09/14 12:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 12:51	mpb
Cyanide, WAD	SM4500-CN I- distillation		-						09/15/14 14:28	mpb
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/22/14 12:30	jlf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/15/14 12:24	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/14 16:30	bsu
Total Hot Plate Digestion	M200.2 ICP								09/15/14 11:09	aeb
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/14 12:54	las

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L20459-01**
Date Sampled: 09/09/14 12:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/15/14 18:20	aeb
Aluminum, total	M200.7 ICP	1	0.12	B		mg/L	0.03	0.2	09/16/14 19:34	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0073			mg/L	0.0004	0.002	09/19/14 12:28	las
Antimony, total	M200.8 ICP-MS	1	0.0067			mg/L	0.0004	0.002	09/23/14 12:34	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0070			mg/L	0.0002	0.001	09/19/14 12:28	las
Arsenic, total	M200.8 ICP-MS	1	0.0075			mg/L	0.0002	0.001	09/24/14 19:42	msh
Barium, dissolved	M200.7 ICP	1	0.069			mg/L	0.003	0.02	09/15/14 18:20	aeb
Barium, total	M200.7 ICP	1	0.074			mg/L	0.003	0.02	09/16/14 19:34	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:20	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:34	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/15/14 18:20	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/14 19:34	aeb
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	09/15/14 18:20	aeb
Boron, total	M200.7 ICP	1	0.07			mg/L	0.01	0.05	09/16/14 19:34	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/19/14 12:28	las
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/14 12:34	msh
Calcium, dissolved	M200.7 ICP	1	315		*	mg/L	0.1	0.5	09/15/14 18:20	aeb
Calcium, total	M200.7 ICP	1	319			mg/L	0.1	0.5	09/16/14 19:34	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:20	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:34	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:20	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:34	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/15/14 18:20	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/14 19:34	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/15/14 18:20	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/17/14 15:34	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/15/14 18:20	aeb
Iron, total	M200.7 ICP	1	0.08			mg/L	0.02	0.05	09/16/14 19:34	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/19/14 12:28	las
Lead, total	M200.8 ICP-MS	1	0.0025			mg/L	0.0001	0.0005	09/23/14 12:34	msh
Lithium, dissolved	M200.7 ICP	1	0.060			mg/L	0.008	0.04	09/15/14 18:20	aeb
Lithium, total	M200.7 ICP	1	0.065			mg/L	0.008	0.04	09/16/14 19:34	aeb
Magnesium, dissolved	M200.7 ICP	1	18.5			mg/L	0.2	1	09/15/14 18:20	aeb
Magnesium, total	M200.7 ICP	1	19.3			mg/L	0.2	1	09/16/14 19:34	aeb
Manganese, dissolved	M200.7 ICP	1	0.155			mg/L	0.005	0.03	09/15/14 18:20	aeb
Manganese, total	M200.7 ICP	1	0.171			mg/L	0.005	0.03	09/16/14 19:34	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 10:40	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/18/14 12:12	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/15/14 18:20	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/16/14 19:34	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/15/14 18:20	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/14 19:34	aeb
Potassium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	09/15/14 18:20	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L20459-01**
Date Sampled: 09/09/14 12:15
Date Received: 09/11/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	9		mg/L	0.2	1	09/16/14 19:34	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/15/14 18:20	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/16/14 19:34	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	09/19/14 12:28	las
Selenium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	09/24/14 19:42	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/19/14 12:28	las
Silver, total	M200.8 ICP-MS	1	0.00008	B	mg/L	0.00005	0.0003	09/23/14 12:34	msh
Sodium, dissolved	M200.7 ICP	1	52.9		mg/L	0.2	1	09/15/14 18:20	aeb
Sodium, total	M200.7 ICP	1	53.3		mg/L	0.2	1	09/16/14 19:34	aeb
Strontium, dissolved	M200.7 ICP	1	3.380	*	mg/L	0.005	0.03	09/15/14 18:20	aeb
Strontium, total	M200.7 ICP	1	3.450		mg/L	0.005	0.03	09/16/14 19:34	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/19/14 12:28	las
Thallium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/23/14 12:34	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/15/14 18:20	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/16/14 19:34	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:20	aeb
Titanium, total	M200.7 ICP	1	0.020	B	mg/L	0.005	0.03	09/16/14 19:34	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/19/14 12:28	las
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/23/14 12:34	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/15/14 18:20	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/16/14 19:34	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B	mg/L	0.01	0.05	09/15/14 18:20	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/16/14 19:34	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW11-E

ACZ Sample ID: **L20459-01**
 Date Sampled: 09/09/14 12:15
 Date Received: 09/11/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	73.6		*	mg/L	2	20	09/15/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/14 0:00	abd
Total Alkalinity		1	73.6		*	mg/L	2	20	09/15/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/26/14 9:54	calc
Sum of Anions			20			meq/L			09/26/14 9:54	calc
Sum of Cations			20			meq/L			09/26/14 9:54	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/16/14 11:42	id
Chloride	SM4500Cl-E	1	39.3		*	mg/L	0.5	2	09/22/14 12:34	jlf
Conductivity @25C	SM2510B	1	1670		*	umhos/cm	1	10	09/13/14 1:28	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 17:58	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/17/14 0:05	pjb
Fluoride	SM4500F-C	1	0.89		*	mg/L	0.05	0.3	09/18/14 19:18	enb
Hardness as CaCO3	SM2340B - Calculation		863			mg/L	0.8	4	09/26/14 9:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.04		*	mg/L	0.02	0.1	09/19/14 23:06	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.24		*	mg/L	0.05	0.2	09/18/14 16:15	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.6		*	mg/L	0.1	0.5	09/24/14 0:41	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	09/13/14 0:00	id
pH measured at		1	19.5		*	C	0.1	0.1	09/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	09/26/14 9:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/15/14 16:09	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/11/14 23:04	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/17/14 22:20	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1360		*	mg/L	10	20	09/12/14 15:29	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8	B	*	mg/L	5	20	09/12/14 15:58	eea
Residue, Total (TS) @ 105C	SM2540B	1	1410		*	mg/L	10	20	09/12/14 12:01	abd
Sulfate	D516-02/-07 - Turbidimetric	50	806		*	mg/L	50	250	09/22/14 13:53	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/14 13:12	enb
TDS (calculated)	Calculation		1290			mg/L			09/26/14 9:54	calc
TDS (ratio - measured/calculated)	Calculation		1.05						09/26/14 9:54	calc



Report Header Explanations

Table with 2 columns: Term and Definition. Includes terms like Batch, Found, Limit, Lower, MDL, PCN/SCN, PQL, QC, Rec, RPD, Upper, and Sample.

QC Sample Types

Table with 4 columns: Code, Description, Code, Description. Lists various QC sample types such as AS, ASD, CCB, CCV, DUP, ICB, ICV, ICSAB, LCSS, LCSSD, LCSW, LCSWD, LFB, LFM, LFMD, LRB, MS, MSD, PBS, PBW, PQV, and SDL.

QC Sample Type Explanations

Table with 2 columns: Type and Explanation. Explains Blanks, Control Samples, Duplicates, Spikes/Fortified Matrix, and Standard.

ACZ Qualifiers (Qual)

Table with 2 columns: Qualifier and Description. Lists qualifiers B, H, L, and U with their respective meanings.

Method References

- List of 5 method references including EPA 600/4-83-020, EPA 600/R-93-100, EPA 600/R-94-111, EPA SW-846, and Standard Methods for the Examination of Water and Wastewater.

Comments

- List of 5 comments regarding QC results, reporting basis (dry weight vs as received), asterisks in XQ column, and MDL/PQL reporting.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20459**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20459-01	WG371138	Calcium, 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.
		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.
	WG371131	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371192	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).
	WG371561	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG371062	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG371593	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).
	WG371255	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).
	WG371373	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).
	WG371131	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371518	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG371420	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).
	WG371700	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).
	WG371062	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG371150	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).
	WG371016	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).
	WG371346	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).

Tahoe Resources, Inc.

ACZ Project ID: **L20459**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG371074	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG371073	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			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).
	WG371052	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG371577	Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG371119	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	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).
	WG371131	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SW11-E

ACZ Sample ID: **L20459-01**

Date Sampled: 09/09/14 12:15

Date Received: 09/11/14

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG371244

Analyst: itk

Extract Date: 09/11/14 22:55

Analysis Date: 09/15/14 13:16

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	114.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW11-EACZ Sample ID: **L20459-01**
Date Sampled: 09/09/14 12:15
Date Received: 09/11/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG371268

Analyst: DRH

Extract Date:

Analysis Date: 09/17/14 12:24

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.01	*	mg/L	2	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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20459**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20459-01	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20459**

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: L20459
 Date Received: 09/11/2014 09:53
 Received By: mtb
 Date Printed: 9/11/2014

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?
2744	15.6	9	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc.

20459

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@samrafael.com.gt

Address: Barrio Los Prados 12 calle 24-69 zona 12
Empresarial, zona pradera, Torre W. oficina 1406
Telephone: (502) 59515248

Copy of Report to:

Name: Charlie Muechoff.com.gt
Company: Tahoe Resources inc

E-mail: cmuechoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@samrafael.com.gt

Address:
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

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

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: LF Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results.

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

REMARKS

Report SW11-E in a different report.

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

Table with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME

20459 Chain of Custody

REG 016 Resultados de Análisis

Muestra: 7 muestras 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 muestreo: 100914
Fecha de ingreso de muestras: 100914
Fecha de análisis: 100914-230914
Fecha de informe: 230914

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 ₅ mg/L	* Demanda Química de Oxígeno DQO mg/L	Cromo Hexavalente Cr(VI) mg/L	** Coliformes Fecales (NMP/100ml)
2394	SW1-E	104	12	< 10	< 25	N.D.	940
2395	SW2-E	23	< 1	< 10	< 25	N.D.	700
2396	SW2B-E	< 1	< 1	< 10	< 25	N.D.	49
2397	SW4-E	29	< 1	< 10	< 25	N.D.	4.9 x 10 ³
2398	SW5-E	192	37	< 10	< 25	N.D.	540
2399	SW7-E	251	13	< 10	< 25	N.D.	1.6 x 10 ³
2400	SW10-E	< 1	< 1	< 10	< 25	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas Proyectos Ambientales.

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 total o 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 referido.



Ing. Fernando Fuentes
Gerente Técnico

REG 016 Resultados de Análisis

Muestra: 7 muestras 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 muestreo: 090914
Fecha de ingreso de muestras: 090914
Fecha de análisis: 090914-220914
Fecha de informe: 220914

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 ₅ mg/L	* Demanda Química de Oxígeno DQO mg/L	Cromo Hexavalente Cr(VI) mg/L	** Coliformes Fecales (NMP/100ml)
2366	SW2A-E	< 1	< 1	< 10	< 25	N.D.	2.4 x 10 ³
2367	SW3-E	269	29	< 10	< 25	N.D.	5.4 x 10 ³
2368	SW4A-E	153	< 1	< 10	< 25	N.D.	1.3 x 10 ⁴
2369	SW6-E	1502	50	< 10	33	N.D.	5.4 x 10 ⁴
2370	SW8-E	1118	29	< 10	< 25	N.D.	2.4 x 10 ⁶
2371	SW9-E	1262	28	< 10	26	N.D.	1.6 x 10 ⁷
2372	SW11-E	3	< 1	< 10	< 25	N.D.	2.4 x 10 ³

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas Proyectos Ambientales.

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 total o 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 referido.*



Ing. Fernando Fuentes
Gerente Técnico

11.5.2 Muestras de Agua Subterránea (GW) pozos de monitoreo y suministro

September 19, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20303

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 04, 2014. This project has been assigned to ACZ's project number, L20303. 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 L20303. 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.

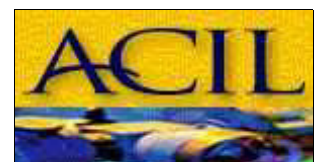
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 19, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L20303-01**
 Date Sampled: 09/02/14 06:06
 Date Received: 09/04/14
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 10:26	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/08/14 15:07	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/08/14 13:48	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 15:13	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/08/14 14:57	mpb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/05/14 17:48	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/12/14 0:09	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	09/12/14 0:09	msh
Barium, dissolved	M200.7 ICP	1	0.052			mg/L	0.003	0.02	09/05/14 17:48	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:48	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/05/14 17:48	aeb
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/08/14 13:01	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:09	msh
Calcium, dissolved	M200.7 ICP	1	10.9			mg/L	0.1	0.5	09/05/14 17:48	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:48	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:48	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:48	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 16:28	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/05/14 17:48	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:09	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 17:48	aeb
Magnesium, dissolved	M200.7 ICP	1	3			mg/L	0.2	1	09/05/14 17:48	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 13:01	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/10/14 13:19	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/05/14 17:48	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 17:48	aeb
Potassium, dissolved	M200.7 ICP	1	6.4			mg/L	0.2	1	09/05/14 17:48	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/05/14 17:48	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/12/14 0:09	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/12/14 22:21	msh
Sodium, dissolved	M200.7 ICP	1	15.2			mg/L	0.2	1	09/05/14 17:48	aeb
Strontium, dissolved	M200.7 ICP	1	0.080			mg/L	0.005	0.03	09/05/14 17:48	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 22:21	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/05/14 17:48	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 17:48	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:09	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 17:48	aeb
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	09/05/14 17:48	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L20303-01**
 Date Sampled: 09/02/14 06:06
 Date Received: 09/04/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	61.7		*	mg/L	2	20	09/08/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Total Alkalinity		1	61.7		*	mg/L	2	20	09/08/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.2			%			09/19/14 0:00	calc
Sum of Anions			1.5			meq/L			09/19/14 0:00	calc
Sum of Cations			1.6			meq/L			09/19/14 0:00	calc
Chloride	SM4500Cl-E	1	9.8		*	mg/L	0.5	2	09/08/14 14:51	mss2
Conductivity @25C	SM2510B	1	167		*	umhos/cm	1	10	09/08/14 21:31	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:14	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:13	mpb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	09/05/14 17:28	enb
Hardness as CaCO3	SM2340B - Calculation		40			mg/L	0.8	4	09/19/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.94		*	mg/L	0.02	0.1	09/12/14 0:15	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/05/14 15:46	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	09/09/14 10:38	bsu
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	09/08/14 0:00	enb
pH measured at		1	20.5		*	C	0.1	0.1	09/08/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/19/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/10/14 23:36	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/04/14 22:07	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	09/09/14 14:26	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	180		*	mg/L	10	20	09/04/14 15:23	djc
Residue, Non-Filterable (TSS) @105C	SM2540D	1	9	B	*	mg/L	5	20	09/04/14 12:32	djc
Residue, Total (TS) @ 105C	SM2540B	1	190		*	mg/L	10	20	09/05/14 14:02	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/09/14 14:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 12:52	enb
TDS (calculated)	Calculation		83.2			mg/L			09/19/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		2.16						09/19/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L20303-02**

Date Sampled: 09/02/14 08:20

Date Received: 09/04/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 10:33	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/08/14 15:14	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/08/14 14:06	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 15:26	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/08/14 15:14	mpb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	09/05/14 17:57	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	09/12/14 0:26	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0106			mg/L	0.0002	0.001	09/12/14 0:26	msh
Barium, dissolved	M200.7 ICP	1	0.163			mg/L	0.003	0.02	09/05/14 17:57	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:57	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/05/14 17:57	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 13:16	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:26	msh
Calcium, dissolved	M200.7 ICP	1	21			mg/L	0.1	0.5	09/05/14 17:57	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:57	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:57	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:57	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 16:31	aeb
Iron, dissolved	M200.7 ICP	1	0.07			mg/L	0.02	0.05	09/05/14 17:57	aeb
Lead, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	09/12/14 0:26	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 17:57	aeb
Magnesium, dissolved	M200.7 ICP	1	3.8			mg/L	0.2	1	09/05/14 17:57	aeb
Manganese, dissolved	M200.7 ICP	1	0.076			mg/L	0.005	0.03	09/08/14 13:16	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/10/14 13:26	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/05/14 17:57	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 17:57	aeb
Potassium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	09/05/14 17:57	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/05/14 17:57	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/12/14 0:26	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/12/14 22:24	msh
Sodium, dissolved	M200.7 ICP	1	10.6			mg/L	0.2	1	09/05/14 17:57	aeb
Strontium, dissolved	M200.7 ICP	1	0.173			mg/L	0.005	0.03	09/05/14 17:57	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 22:24	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/05/14 17:57	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 17:57	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:26	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 17:57	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 17:57	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-2

ACZ Sample ID: **L20303-02**
 Date Sampled: 09/02/14 08:20
 Date Received: 09/04/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	62.9		*	mg/L	2	20	09/08/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Total Alkalinity		1	62.9		*	mg/L	2	20	09/08/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/19/14 0:00	calc
Sum of Anions			1.9			meq/L			09/19/14 0:00	calc
Sum of Cations			1.9			meq/L			09/19/14 0:00	calc
Chloride	SM4500Cl-E	1	5.2		*	mg/L	0.5	2	09/10/14 9:59	mss2
Conductivity @25C	SM2510B	1	192		*	umhos/cm	1	10	09/08/14 21:39	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:15	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:14	mpb
Fluoride	SM4500F-C	1	0.21	B	*	mg/L	0.05	0.3	09/05/14 17:35	enb
Hardness as CaCO3	SM2340B - Calculation		68			mg/L	0.8	4	09/19/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.03	B	*	mg/L	0.02	0.1	09/11/14 23:47	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/05/14 15:48	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/09/14 10:03	bsu
pH (lab)	SM4500H+ B									
pH		1	7.3	H	*	units	0.1	0.1	09/08/14 0:00	enb
pH measured at		1	20.6		*	C	0.1	0.1	09/08/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	09/19/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	09/10/14 23:38	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	09/04/14 22:09	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.10		*	mg/L	0.01	0.05	09/09/14 14:29	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	170		*	mg/L	10	20	09/04/14 15:26	djc
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8	B	*	mg/L	5	20	09/04/14 12:35	djc
Residue, Total (TS) @ 105C	SM2540B	1	200		*	mg/L	10	20	09/05/14 14:04	id
Sulfate	D516-02/-07 - Turbidimetric	1	23.6		*	mg/L	1	5	09/09/14 14:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:00	enb
TDS (calculated)	Calculation		106			mg/L			09/19/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.60						09/19/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-3

ACZ Sample ID: **L20303-03**
Date Sampled: 09/02/14 11:30
Date Received: 09/04/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 10:40	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/08/14 15:21	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/08/14 14:14	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 15:39	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/08/14 15:31	mpb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/05/14 18:07	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/12/14 0:29	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0018			mg/L	0.0002	0.001	09/12/14 0:29	msh
Barium, dissolved	M200.7 ICP	1	0.151			mg/L	0.003	0.02	09/05/14 18:07	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:07	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/05/14 18:07	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 13:19	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:29	msh
Calcium, dissolved	M200.7 ICP	1	95.3			mg/L	0.1	0.5	09/05/14 18:07	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:07	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:07	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:07	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 16:34	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/05/14 18:07	aeb
Lead, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	09/12/14 0:29	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:07	aeb
Magnesium, dissolved	M200.7 ICP	1	21.4			mg/L	0.2	1	09/05/14 18:07	aeb
Manganese, dissolved	M200.7 ICP	1	0.168			mg/L	0.005	0.03	09/08/14 13:19	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/10/14 13:28	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/05/14 18:07	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:07	aeb
Potassium, dissolved	M200.7 ICP	1	10.1			mg/L	0.2	1	09/05/14 18:07	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/05/14 18:07	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	09/12/14 0:29	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/12/14 22:34	msh
Sodium, dissolved	M200.7 ICP	1	24.9			mg/L	0.2	1	09/05/14 18:07	aeb
Strontium, dissolved	M200.7 ICP	1	0.513			mg/L	0.005	0.03	09/05/14 18:07	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 22:34	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/05/14 18:07	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	09/05/14 18:07	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:29	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:07	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:07	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-3

ACZ Sample ID: **L20303-03**
 Date Sampled: 09/02/14 11:30
 Date Received: 09/04/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	86.9		*	mg/L	2	20	09/08/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Total Alkalinity		1	86.9		*	mg/L	2	20	09/08/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.9			%			09/19/14 0:00	calc
Sum of Anions			7.6			meq/L			09/19/14 0:00	calc
Sum of Cations			7.9			meq/L			09/19/14 0:00	calc
Chloride	SM4500Cl-E	1	12.5		*	mg/L	0.5	2	09/10/14 9:59	mss2
Conductivity @25C	SM2510B	1	755		*	umhos/cm	1	10	09/08/14 21:49	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:15	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:16	mpb
Fluoride	SM4500F-C	1	0.28	B	*	mg/L	0.05	0.3	09/05/14 17:43	enb
Hardness as CaCO3	SM2340B - Calculation		326			mg/L	0.8	4	09/19/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.87		*	mg/L	0.02	0.1	09/11/14 23:49	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/05/14 15:53	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/09/14 13:00	bsu
pH (lab)	SM4500H+ B									
pH		1	7.4	H	*	units	0.1	0.1	09/08/14 0:00	enb
pH measured at		1	20.4		*	C	0.1	0.1	09/08/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	09/19/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/10/14 23:40	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	09/04/14 22:10	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/09/14 14:31	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	620		*	mg/L	10	20	09/04/14 15:29	djc
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/04/14 12:38	djc
Residue, Total (TS) @ 105C	SM2540B	1	640		*	mg/L	10	20	09/05/14 14:06	id
Sulfate	D516-02/-07 - Turbidimetric	20	262		*	mg/L	20	100	09/09/14 14:58	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:08	enb
TDS (calculated)	Calculation		480			mg/L			09/19/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.29						09/19/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-4

ACZ Sample ID: **L20303-04**

Date Sampled: 09/02/14 09:30

Date Received: 09/04/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 10:55	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/08/14 15:27	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/08/14 14:23	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 15:46	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/08/14 15:39	mpb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.19	B		mg/L	0.03	0.2	09/05/14 18:10	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/12/14 0:32	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0002	0.001	09/12/14 0:32	msh
Barium, dissolved	M200.7 ICP	1	0.119			mg/L	0.003	0.02	09/05/14 18:10	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:10	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/05/14 18:10	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 13:22	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:32	msh
Calcium, dissolved	M200.7 ICP	1	4.8			mg/L	0.1	0.5	09/05/14 18:10	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:10	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:10	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:10	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 16:43	aeb
Iron, dissolved	M200.7 ICP	1	0.21			mg/L	0.02	0.05	09/05/14 18:10	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	09/12/14 22:37	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:10	aeb
Magnesium, dissolved	M200.7 ICP	1	2.9			mg/L	0.2	1	09/05/14 18:10	aeb
Manganese, dissolved	M200.7 ICP	1	0.248			mg/L	0.005	0.03	09/08/14 13:22	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/10/14 13:30	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/05/14 18:10	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:10	aeb
Potassium, dissolved	M200.7 ICP	1	5.1			mg/L	0.2	1	09/05/14 18:10	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/05/14 18:10	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/12/14 0:32	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/12/14 22:37	msh
Sodium, dissolved	M200.7 ICP	1	10.8			mg/L	0.2	1	09/05/14 18:10	aeb
Strontium, dissolved	M200.7 ICP	1	0.045			mg/L	0.005	0.03	09/05/14 18:10	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 22:37	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/05/14 18:10	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/05/14 18:10	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:32	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:10	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:10	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-4

ACZ Sample ID: **L20303-04**
Date Sampled: 09/02/14 09:30
Date Received: 09/04/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	40.4		*	mg/L	2	20	09/08/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Total Alkalinity		1	40.4		*	mg/L	2	20	09/08/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-8.3			%			09/19/14 0:00	calc
Sum of Anions			1.3			meq/L			09/19/14 0:00	calc
Sum of Cations			1.1			meq/L			09/19/14 0:00	calc
Chloride	SM4500Cl-E	1	4		*	mg/L	0.5	2	09/10/14 9:59	mss2
Conductivity @25C	SM2510B	1	112		*	umhos/cm	1	10	09/08/14 22:05	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:17	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:17	mpb
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	09/05/14 17:49	enb
Hardness as CaCO3	SM2340B - Calculation		24			mg/L	0.8	4	09/19/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.04	B	*	mg/L	0.02	0.1	09/11/14 23:52	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/05/14 15:54	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.8		*	mg/L	0.1	0.5	09/09/14 13:01	bsu
pH (lab)	SM4500H+ B									
pH		1	7.1	H	*	units	0.1	0.1	09/08/14 0:00	enb
pH measured at		1	19.8		*	C	0.1	0.1	09/08/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	09/19/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/10/14 23:41	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/04/14 22:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/09/14 14:32	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	430	H	*	mg/L	10	20	09/16/14 15:52	djc
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/04/14 12:40	djc
Residue, Total (TS) @ 105C	SM2540B	1	440		*	mg/L	10	20	09/05/14 14:08	id
Sulfate	D516-02/-07 - Turbidimetric	1	15.5		*	mg/L	1	5	09/09/14 14:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:15	enb
TDS (calculated)	Calculation		68.6			mg/L			09/19/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		6.27						09/19/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-5

ACZ Sample ID: **L20303-05**
Date Sampled: 09/02/14 10:30
Date Received: 09/04/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 11:09	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/08/14 15:34	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 9:24	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 15:52	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/08/14 15:48	mpb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.38			mg/L	0.03	0.2	09/05/14 18:13	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/12/14 0:36	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0002	0.001	09/12/14 0:36	msh
Barium, dissolved	M200.7 ICP	1	0.073			mg/L	0.003	0.02	09/05/14 18:13	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:13	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/05/14 18:13	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 13:26	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:36	msh
Calcium, dissolved	M200.7 ICP	1	4.3			mg/L	0.1	0.5	09/05/14 18:13	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:13	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:13	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:13	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 16:46	aeb
Iron, dissolved	M200.7 ICP	1	0.13			mg/L	0.02	0.05	09/05/14 18:13	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0011			mg/L	0.0001	0.0005	09/12/14 22:47	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:13	aeb
Magnesium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	09/05/14 18:13	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 13:26	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/10/14 13:37	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/05/14 18:13	aeb
Nickel, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.008	0.04	09/05/14 18:13	aeb
Potassium, dissolved	M200.7 ICP	1	6			mg/L	0.2	1	09/05/14 18:13	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/05/14 18:13	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/12/14 0:36	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/12/14 22:47	msh
Sodium, dissolved	M200.7 ICP	1	10.9			mg/L	0.2	1	09/05/14 18:13	aeb
Strontium, dissolved	M200.7 ICP	1	0.035			mg/L	0.005	0.03	09/05/14 18:13	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 22:47	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/05/14 18:13	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:13	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/12/14 0:36	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:13	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:13	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-5

ACZ Sample ID: **L20303-05**
 Date Sampled: 09/02/14 10:30
 Date Received: 09/04/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.1		*	mg/L	2	20	09/08/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Total Alkalinity		1	39.1		*	mg/L	2	20	09/08/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/19/14 0:00	calc
Sum of Anions			1.1			meq/L			09/19/14 0:00	calc
Sum of Cations			1.1			meq/L			09/19/14 0:00	calc
Chloride	SM4500Cl-E	1	3.7		*	mg/L	0.5	2	09/10/14 9:59	mss2
Conductivity @25C	SM2510B	1	108		*	umhos/cm	1	10	09/08/14 22:12	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:19	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:18	mpb
Fluoride	SM4500F-C	1	0.22	B	*	mg/L	0.05	0.3	09/05/14 17:58	enb
Hardness as CaCO3	SM2340B - Calculation		22			mg/L	0.8	4	09/19/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.50		*	mg/L	0.02	0.1	09/11/14 23:53	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.10	B	*	mg/L	0.05	0.2	09/11/14 13:54	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.8		*	mg/L	0.1	0.5	09/13/14 14:23	pjb
pH (lab)	SM4500H+ B									
pH		1	7.3	H	*	units	0.1	0.1	09/08/14 0:00	enb
pH measured at		1	19.5		*	C	0.1	0.1	09/08/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	09/19/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/10/14 23:42	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	09/04/14 22:13	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/09/14 14:35	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	420		*	mg/L	10	20	09/04/14 15:34	djc
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8	B	*	mg/L	5	20	09/04/14 12:43	djc
Residue, Total (TS) @ 105C	SM2540B	1	450		*	mg/L	10	20	09/05/14 14:10	id
Sulfate	D516-02/-07 - Turbidimetric	1	10.3		*	mg/L	1	5	09/09/14 14:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:39	enb
TDS (calculated)	Calculation		62.6			mg/L			09/19/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		6.71						09/19/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L20303-06**
Date Sampled: 09/02/14 12:00
Date Received: 09/04/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 11:16	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/08/14 15:40	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/08/14 14:32	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 15:59	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/08/14 15:56	mpb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/05/14 18:16	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/12/14 0:39	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	09/12/14 0:39	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	09/05/14 18:16	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:16	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/05/14 18:16	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 13:29	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:39	msh
Calcium, dissolved	M200.7 ICP	1	0.1	B		mg/L	0.1	0.5	09/05/14 18:16	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:16	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:16	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:16	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 16:49	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/05/14 18:16	aeb
Lead, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	09/12/14 0:39	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:16	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/05/14 18:16	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 13:29	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/10/14 13:39	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/05/14 18:16	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:16	aeb
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/05/14 18:16	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/05/14 18:16	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/12/14 0:39	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/12/14 22:50	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/05/14 18:16	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:16	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 22:50	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/05/14 18:16	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:16	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:39	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:16	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:16	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L20303-06**
Date Sampled: 09/02/14 12:00
Date Received: 09/04/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Total Alkalinity		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			09/19/14 0:00	calc
Sum of Anions			N/A			meq/L			09/19/14 0:00	calc
Sum of Cations				U		meq/L			09/19/14 0:00	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	09/10/14 9:59	mss2
Conductivity @25C	SM2510B	1	1.6	B	*	umhos/cm	1	10	09/08/14 22:19	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:20	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:19	mpb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	09/05/14 18:22	enb
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	09/19/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/11/14 23:56	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/05/14 15:56	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/09/14 10:09	bsu
pH (lab)	SM4500H+ B									
pH		1	5.5	H	*	units	0.1	0.1	09/08/14 0:00	enb
pH measured at		1	19.7		*	C	0.1	0.1	09/08/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/19/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/10/14 23:43	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	09/04/14 22:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/09/14 14:36	mpb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	09/04/14 15:36	djc
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/04/14 12:45	djc
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	09/05/14 14:12	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/09/14 15:16	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:47	enb
TDS (calculated)	Calculation		0.1			mg/L			09/19/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		n/a						09/19/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-11

ACZ Sample ID: **L20303-07**
Date Sampled: 09/02/14 12:00
Date Received: 09/04/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 11:24	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/08/14 15:47	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/08/14 14:41	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:06	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/08/14 16:04	mpb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/05/14 18:19	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/12/14 0:42	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0019			mg/L	0.0002	0.001	09/12/14 0:42	msh
Barium, dissolved	M200.7 ICP	1	0.151			mg/L	0.003	0.02	09/05/14 18:19	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:19	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/05/14 18:19	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 13:32	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:42	msh
Calcium, dissolved	M200.7 ICP	1	94.9			mg/L	0.1	0.5	09/05/14 18:19	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:19	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:19	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:19	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 16:59	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/05/14 18:19	aeb
Lead, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	09/12/14 0:42	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:19	aeb
Magnesium, dissolved	M200.7 ICP	1	21.3			mg/L	0.2	1	09/05/14 18:19	aeb
Manganese, dissolved	M200.7 ICP	1	0.159			mg/L	0.005	0.03	09/08/14 13:32	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/10/14 13:41	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/05/14 18:19	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/05/14 18:19	aeb
Potassium, dissolved	M200.7 ICP	1	10.1			mg/L	0.2	1	09/05/14 18:19	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/05/14 18:19	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	09/12/14 0:42	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/12/14 22:54	msh
Sodium, dissolved	M200.7 ICP	1	24.9			mg/L	0.2	1	09/05/14 18:19	aeb
Strontium, dissolved	M200.7 ICP	1	0.514			mg/L	0.005	0.03	09/05/14 18:19	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 22:54	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/05/14 18:19	aeb
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	09/05/14 18:19	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/12/14 0:42	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/05/14 18:19	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/05/14 18:19	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-11

ACZ Sample ID: **L20303-07**
Date Sampled: 09/02/14 12:00
Date Received: 09/04/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	77.7		*	mg/L	2	20	09/08/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/08/14 0:00	enb
Total Alkalinity		1	77.7		*	mg/L	2	20	09/08/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.9			%			09/19/14 0:00	calc
Sum of Anions			7.3			meq/L			09/19/14 0:00	calc
Sum of Cations			7.9			meq/L			09/19/14 0:00	calc
Chloride	SM4500Cl-E	1	11.9		*	mg/L	0.5	2	09/10/14 9:59	mss2
Conductivity @25C	SM2510B	1	754		*	umhos/cm	1	10	09/08/14 22:27	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:35	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:20	mpb
Fluoride	SM4500F-C	1	0.27	B	*	mg/L	0.05	0.3	09/05/14 18:30	enb
Hardness as CaCO3	SM2340B - Calculation		325			mg/L	0.8	4	09/19/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.92		*	mg/L	0.02	0.1	09/11/14 23:58	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/05/14 15:57	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/09/14 10:10	bsu
pH (lab)	SM4500H+ B									
pH		1	7.4	H	*	units	0.1	0.1	09/08/14 0:00	enb
pH measured at		1	20.1		*	C	0.1	0.1	09/08/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	09/19/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/10/14 23:47	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	09/04/14 22:22	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/09/14 14:37	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	620		*	mg/L	10	20	09/04/14 15:39	djc
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/04/14 12:48	djc
Residue, Total (TS) @ 105C	SM2540B	1	640		*	mg/L	10	20	09/05/14 14:14	id
Sulfate	D516-02/-07 - Turbidimetric	20	255		*	mg/L	20	100	09/09/14 15:48	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:55	enb
TDS (calculated)	Calculation		466			mg/L			09/19/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.33						09/19/14 0:00	calc

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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20303-01	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370754	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG370919	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).
	WG370664	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371017	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370661	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).
	WG370784	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	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.
			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).
WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		pH measured at SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG370927	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).	
WG370600	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).	
WG370814	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG370578	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG370557	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).	
WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	

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Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG370820	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370789	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).
	WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20303-02	WG371005	Lead, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG370746	Bicarbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370862	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG370919	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).
	WG370664	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG370746	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371017	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370661	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).
	WG370784	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	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.
			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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370600	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).	
WG370814	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG370578	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG370557	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data	

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG370662		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG370820		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG370789		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).
WG370746		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20303-03	WG371005	Lead, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG370746	Bicarbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370862	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG370919	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).
	WG370664	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG370746	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371017	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG370661	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).
	WG370784	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	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.
			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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370600	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).
	WG370814	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370578	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370557	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG370662		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG370820		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG370789		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).
WG370746		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20303-04	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370862	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG370919	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).
	WG370664	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371017	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370661	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).
	WG370784	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	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.
			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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG370927	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).
	WG370600	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).
	WG370814	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG371230	Residue, Filterable (TDS) @180C	SM2540C	C4	Confirmatory analysis was past holding time.
			SM2540C	Q6	Sample was received above recommended temperature.
	WG370557	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG370820	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370789	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			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).
	WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20303-05	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370862	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG370919	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).
	WG370664	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).
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371017	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).	
WG370600	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).	
WG370814	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG370578	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG370557	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).	
WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG370820	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG370789	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.	
		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).	

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20303-06	WG371005	Lead, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG370746	Bicarbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370862	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG370919	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).
	WG370664	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).
	WG370746	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371017	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG370661	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).
	WG370784	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	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.
			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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370600	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).	
WG370814	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG370578	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG370557	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).	

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG370789	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).
	WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20303-07	WG371005	Lead, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG370746	Bicarbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370862	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG370919	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).
	WG370664	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).
	WG370746	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371017	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG370661	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).
	WG370784	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	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.
			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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370600	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).
	WG370814	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370578	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370557	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).

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG370789	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).
	WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20303**

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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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L20303
 Date Received: 09/04/2014 10:33
 Received By: mtb
 Date Printed: 9/4/2014

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?
3921	15.7	8	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

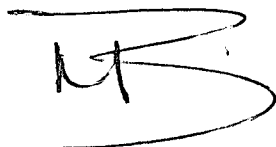
Guatemala September 2nd, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected by a horizontal line.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

REG 016 Resultados de Análisis

Ref 1653-14

Pág 1/1

Muestras: 7 muestras 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 muestreo: 020914
Fecha de ingreso de muestras: 020914
Fecha de análisis: 020914-160914
Fecha de informe: 160914

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)
2277	GW-1A	69	< 1	N.D.	4.5
2278	GW-2	25	< 1	N.D.	49
2279	GW-3	< 1	< 1	N.D.	< 2
2280	GW-4	823	461	N.D.	540
2281	GW-5	966	547	N.D.	23
2282	GW-10	< 1	< 1	N.D.	< 2
2283	GW-11	< 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.

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 total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Fernando Fuentes
Gerente Técnico

September 15, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20330

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 05, 2014. This project has been assigned to ACZ's project number, L20330. 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 L20330. 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.

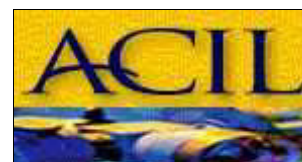
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 15, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

September 15, 2014

Project ID: Escobal

ACZ Project ID: L20330

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 ground water samples from Tahoe Resources, Inc. on September 5, 2014. 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 L20330. 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 except for parameters flagged with "H" flags (H3, HE), received either after the hold time expired or too close to the hold time.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-3

ACZ Sample ID: **L20330-01**
Date Sampled: 09/03/14 11:10
Date Received: 09/05/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 11:31	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 12:58	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 9:49	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:12	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:06	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	09/08/14 20:30	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:03	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	09/13/14 0:03	msh
Barium, dissolved	M200.7 ICP	1	0.040			mg/L	0.003	0.02	09/09/14 13:22	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:30	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 20:30	jjc
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	09/09/14 13:22	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:03	msh
Calcium, dissolved	M200.7 ICP	1	75.5			mg/L	0.1	0.5	09/08/14 20:30	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:30	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:30	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:30	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:30	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/08/14 20:30	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:03	msh
Lithium, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.008	0.04	09/08/14 20:30	jjc
Magnesium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	09/08/14 20:30	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:30	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:04	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 20:30	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:30	jjc
Potassium, dissolved	M200.7 ICP	1	4			mg/L	0.2	1	09/08/14 20:30	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:30	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	09/13/14 0:03	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:03	msh
Sodium, dissolved	M200.7 ICP	1	27.3			mg/L	0.2	1	09/08/14 20:30	jjc
Strontium, dissolved	M200.7 ICP	1	0.720		*	mg/L	0.005	0.03	09/08/14 20:30	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:03	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 20:30	jjc
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	09/08/14 20:30	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/13/14 0:03	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	09/08/14 20:30	jjc
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	09/08/14 20:30	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-3

ACZ Sample ID: **L20330-01**
Date Sampled: 09/03/14 11:10
Date Received: 09/05/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	79.6		*	mg/L	2	20	09/09/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Total Alkalinity		1	79.6		*	mg/L	2	20	09/09/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.6			%			09/15/14 14:31	calc
Sum of Anions			5.6			meq/L			09/15/14 14:31	calc
Sum of Cations			5.9			meq/L			09/15/14 14:31	calc
Chloride	SM4500Cl-E	1	16.4		*	mg/L	0.5	2	09/10/14 10:54	mss2
Conductivity @25C	SM2510B	1	583		*	umhos/cm	1	10	09/09/14 4:43	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:36	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:27	pjb
Fluoride	SM4500F-C	1	0.69		*	mg/L	0.05	0.3	09/11/14 14:42	abd
Hardness as CaCO3	SM2340B - Calculation		226			mg/L	0.8	4	09/15/14 14:31	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.23		*	mg/L	0.02	0.1	09/12/14 23:22	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:17	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:25	pjb
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	09/09/14 0:00	enb
pH measured at		1	20.2		*	C	0.1	0.1	09/09/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	09/15/14 14:31	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/10/14 23:48	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.09	H	*	mg/L	0.01	0.05	09/06/14 15:18	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/12/14 0:10	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	480		*	mg/L	10	20	09/05/14 14:10	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/05/14 15:13	eea
Residue, Total (TS) @ 105C	SM2540B	1	490		*	mg/L	10	20	09/05/14 14:16	id
Sulfate	D516-02/-07 - Turbidimetric	5	166		*	mg/L	5	25	09/09/14 15:48	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 11:41	enb
TDS (calculated)	Calculation		348			mg/L			09/15/14 14:31	calc
TDS (ratio - measured/calculated)	Calculation		1.38						09/15/14 14:31	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-5

ACZ Sample ID: **L20330-02**
Date Sampled: 09/03/14 10:10
Date Received: 09/05/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 11:38	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 13:12	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 10:13	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:19	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:12	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	09/08/14 20:33	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:06	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0002	0.001	09/13/14 0:06	msh
Barium, dissolved	M200.7 ICP	1	0.052			mg/L	0.003	0.02	09/09/14 13:25	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:33	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 20:33	jjc
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	09/09/14 13:25	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:06	msh
Calcium, dissolved	M200.7 ICP	1	181			mg/L	0.1	0.5	09/08/14 20:33	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:33	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:33	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:33	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:33	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/08/14 20:33	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:06	msh
Lithium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.008	0.04	09/08/14 20:33	jjc
Magnesium, dissolved	M200.7 ICP	1	24.3			mg/L	0.2	1	09/08/14 20:33	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:33	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:07	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 20:33	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:33	jjc
Potassium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	09/08/14 20:33	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:33	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0004			mg/L	0.0001	0.0003	09/13/14 0:06	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:06	msh
Sodium, dissolved	M200.7 ICP	1	34.8			mg/L	0.2	1	09/08/14 20:33	jjc
Strontium, dissolved	M200.7 ICP	1	0.633		*	mg/L	0.005	0.03	09/08/14 20:33	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:06	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 20:33	jjc
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/08/14 20:33	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/13/14 0:06	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:33	jjc
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/08/14 20:33	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-5

ACZ Sample ID: **L20330-02**
 Date Sampled: 09/03/14 10:10
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	74.5		*	mg/L	2	20	09/09/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Total Alkalinity		1	74.5		*	mg/L	2	20	09/09/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			8.3			%			09/15/14 14:31	calc
Sum of Anions			11			meq/L			09/15/14 14:31	calc
Sum of Cations			13			meq/L			09/15/14 14:31	calc
Chloride	SM4500Cl-E	1	34.8		*	mg/L	0.5	2	09/10/14 10:54	mss2
Conductivity @25C	SM2510B	1	1160		*	umhos/cm	1	10	09/09/14 4:51	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:37	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:28	pjb
Fluoride	SM4500F-C	1	0.19	B	*	mg/L	0.05	0.3	09/11/14 14:45	abd
Hardness as CaCO3	SM2340B - Calculation		552			mg/L	0.8	4	09/15/14 14:31	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.16		*	mg/L	0.06	0.3	09/12/14 23:42	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:18	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:27	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	09/09/14 0:00	enb
pH measured at		1	20.1		*	C	0.1	0.1	09/09/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	09/15/14 14:31	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/10/14 23:49	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/06/14 15:20	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/12/14 0:11	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	960		*	mg/L	10	20	09/05/14 14:12	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	33		*	mg/L	5	20	09/05/14 15:14	eea
Residue, Total (TS) @ 105C	SM2540B	1	1030		*	mg/L	10	20	09/05/14 14:18	id
Sulfate	D516-02/-07 - Turbidimetric	50	425		*	mg/L	50	250	09/09/14 15:51	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 11:49	enb
TDS (calculated)	Calculation		755			mg/L			09/15/14 14:31	calc
TDS (ratio - measured/calculated)	Calculation		1.27						09/15/14 14:31	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-6

ACZ Sample ID: **L20330-03**

Date Sampled: 09/03/14 09:30

Date Received: 09/05/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 11:45	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/12/14 12:19	mpb
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 10:26	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:25	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:19	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	09/08/14 20:36	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:10	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0026			mg/L	0.0002	0.001	09/13/14 0:10	msh
Barium, dissolved	M200.7 ICP	1	0.131			mg/L	0.003	0.02	09/09/14 13:28	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:36	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 20:36	jjc
Boron, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	09/09/14 13:28	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:10	msh
Calcium, dissolved	M200.7 ICP	1	163			mg/L	0.1	0.5	09/08/14 20:36	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:36	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:36	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:36	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:36	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/08/14 20:36	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:10	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:36	jjc
Magnesium, dissolved	M200.7 ICP	1	17.6			mg/L	0.2	1	09/08/14 20:36	jjc
Manganese, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/08/14 20:36	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:14	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 20:36	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:36	jjc
Potassium, dissolved	M200.7 ICP	1	9.6			mg/L	0.2	1	09/08/14 20:36	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:36	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0008			mg/L	0.0001	0.0003	09/13/14 0:10	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:10	msh
Sodium, dissolved	M200.7 ICP	1	34.1			mg/L	0.2	1	09/08/14 20:36	jjc
Strontium, dissolved	M200.7 ICP	1	0.671			mg/L	0.005	0.03	09/08/14 20:36	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:10	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 20:36	jjc
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/08/14 20:36	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	09/13/14 0:10	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:36	jjc
Zinc, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	09/08/14 20:36	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-6

ACZ Sample ID: **L20330-03**
 Date Sampled: 09/03/14 09:30
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	121		*	mg/L	2	20	09/09/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Total Alkalinity		1	121		*	mg/L	2	20	09/09/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.8			%			09/15/14 14:32	calc
Sum of Anions			10			meq/L			09/15/14 14:32	calc
Sum of Cations			11			meq/L			09/15/14 14:32	calc
Chloride	SM4500Cl-E	1	22.9		*	mg/L	0.5	2	09/10/14 10:54	mss2
Conductivity @25C	SM2510B	1	1050		*	umhos/cm	1	10	09/09/14 4:59	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:38	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 23:50	pjb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	09/11/14 14:49	abd
Hardness as CaCO3	SM2340B - Calculation		479			mg/L	0.8	4	09/15/14 14:32	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	10	4.1		*	mg/L	0.2	1	09/12/14 23:43	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:20	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:28	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	09/09/14 0:00	enb
pH measured at		1	20.0		*	C	0.1	0.1	09/09/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	09/15/14 14:32	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/10/14 23:50	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	09/06/14 15:23	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/12/14 0:13	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	870		*	mg/L	10	20	09/05/14 14:14	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/05/14 15:16	eea
Residue, Total (TS) @ 105C	SM2540B	1	890		*	mg/L	10	20	09/05/14 14:20	id
Sulfate	D516-02/-07 - Turbidimetric	20	339		*	mg/L	20	100	09/09/14 15:58	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 12:15	enb
TDS (calculated)	Calculation		661			mg/L			09/15/14 14:32	calc
TDS (ratio - measured/calculated)	Calculation		1.32						09/15/14 14:32	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-7

ACZ Sample ID: **L20330-04**
Date Sampled: 09/03/14 08:30
Date Received: 09/05/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 11:52	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 13:26	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 10:38	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:32	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:25	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	09/08/14 20:45	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:20	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0002	0.001	09/13/14 0:20	msh
Barium, dissolved	M200.7 ICP	1	0.373			mg/L	0.003	0.02	09/09/14 13:37	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:45	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 20:45	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/09/14 13:37	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:20	msh
Calcium, dissolved	M200.7 ICP	1	33.4			mg/L	0.1	0.5	09/08/14 20:45	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:45	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:45	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:45	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:45	jjc
Iron, dissolved	M200.7 ICP	1	1.39			mg/L	0.02	0.05	09/08/14 20:45	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:20	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:45	jjc
Magnesium, dissolved	M200.7 ICP	1	8.6			mg/L	0.2	1	09/08/14 20:45	jjc
Manganese, dissolved	M200.7 ICP	1	0.038			mg/L	0.005	0.03	09/08/14 20:45	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:17	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 20:45	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:45	jjc
Potassium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	09/08/14 20:45	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:45	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:20	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:20	msh
Sodium, dissolved	M200.7 ICP	1	19.3			mg/L	0.2	1	09/08/14 20:45	jjc
Strontium, dissolved	M200.7 ICP	1	0.250			mg/L	0.005	0.03	09/08/14 20:45	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:20	msh
Tin, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.04	0.2	09/08/14 20:45	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:45	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:20	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:45	jjc
Zinc, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	09/08/14 20:45	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-7

ACZ Sample ID: **L20330-04**
 Date Sampled: 09/03/14 08:30
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	71.2		*	mg/L	2	20	09/09/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Total Alkalinity		1	71.2		*	mg/L	2	20	09/09/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.3			%			09/15/14 14:32	calc
Sum of Anions			3.3			meq/L			09/15/14 14:32	calc
Sum of Cations			3.6			meq/L			09/15/14 14:32	calc
Chloride	SM4500Cl-E	1	19.9		*	mg/L	0.5	2	09/10/14 10:54	mss2
Conductivity @25C	SM2510B	1	393		*	umhos/cm	1	10	09/09/14 5:07	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:39	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:30	pjb
Fluoride	SM4500F-C	1	0.10	B	*	mg/L	0.05	0.3	09/11/14 14:55	abd
Hardness as CaCO3	SM2340B - Calculation		119			mg/L	0.8	4	09/15/14 14:32	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.71		*	mg/L	0.02	0.1	09/12/14 23:25	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:22	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	09/13/14 14:29	pjb
pH (lab)	SM4500H+ B									
pH		1	7.2	H	*	units	0.1	0.1	09/09/14 0:00	enb
pH measured at		1	19.7		*	C	0.1	0.1	09/09/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/15/14 14:32	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/10/14 23:51	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/06/14 15:24	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/12/14 0:14	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	340		*	mg/L	10	20	09/05/14 14:16	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	9	B	*	mg/L	5	20	09/05/14 15:17	eea
Residue, Total (TS) @ 105C	SM2540B	1	320		*	mg/L	10	20	09/05/14 14:24	id
Sulfate	D516-02/-07 - Turbidimetric	5	63.9		*	mg/L	5	25	09/09/14 15:48	bsu
Sulfide as S	SM4500S2-D	1	0.15		*	mg/L	0.02	0.1	09/09/14 12:40	enb
TDS (calculated)	Calculation		200			mg/L			09/15/14 14:32	calc
TDS (ratio - measured/calculated)	Calculation		1.70						09/15/14 14:32	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-8

ACZ Sample ID: **L20330-05**
Date Sampled: 09/03/14 10:00
Date Received: 09/05/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/08/14 12:00	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 13:33	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 10:50	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:45	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:32	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	09/08/14 20:48	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	09/13/14 0:23	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0012			mg/L	0.0002	0.001	09/13/14 0:23	msh
Barium, dissolved	M200.7 ICP	1	0.095			mg/L	0.003	0.02	09/09/14 13:47	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:48	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 20:48	jjc
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	09/09/14 13:47	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:23	msh
Calcium, dissolved	M200.7 ICP	1	149			mg/L	0.1	0.5	09/08/14 20:48	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:48	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:48	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:48	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:48	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/08/14 20:48	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:23	msh
Lithium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.008	0.04	09/08/14 20:48	jjc
Magnesium, dissolved	M200.7 ICP	1	23.3			mg/L	0.2	1	09/08/14 20:48	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:48	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:23	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 20:48	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:48	jjc
Potassium, dissolved	M200.7 ICP	1	7.7			mg/L	0.2	1	09/08/14 20:48	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:48	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	09/13/14 0:23	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:23	msh
Sodium, dissolved	M200.7 ICP	1	30.9			mg/L	0.2	1	09/08/14 20:48	jjc
Strontium, dissolved	M200.7 ICP	1	0.558			mg/L	0.005	0.03	09/08/14 20:48	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:23	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 20:48	jjc
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/08/14 20:48	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/13/14 0:23	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:48	jjc
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/08/14 20:48	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-8

ACZ Sample ID: **L20330-05**
Date Sampled: 09/03/14 10:00
Date Received: 09/05/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	71.4		*	mg/L	2	20	09/09/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Total Alkalinity		1	71.4		*	mg/L	2	20	09/09/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/15/14 14:32	calc
Sum of Anions			11			meq/L			09/15/14 14:32	calc
Sum of Cations			11			meq/L			09/15/14 14:32	calc
Chloride	SM4500Cl-E	1	30.1		*	mg/L	0.5	2	09/10/14 10:55	mss2
Conductivity @25C	SM2510B	1	1020		*	umhos/cm	1	10	09/09/14 5:16	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 16:39	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:31	pjb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	09/11/14 14:59	abd
Hardness as CaCO3	SM2340B - Calculation		468			mg/L	0.8	4	09/15/14 14:32	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	4.60		*	mg/L	0.06	0.3	09/12/14 23:44	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:27	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:30	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	09/09/14 0:00	enb
pH measured at		1	19.8		*	C	0.1	0.1	09/09/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	09/15/14 14:32	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/10/14 23:53	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	09/06/14 15:25	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/12/14 0:15	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	840		*	mg/L	10	20	09/05/14 14:20	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/05/14 15:19	eea
Residue, Total (TS) @ 105C	SM2540B	1	880		*	mg/L	10	20	09/05/14 14:26	id
Sulfate	D516-02/-07 - Turbidimetric	20	394		*	mg/L	20	100	09/09/14 16:10	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 12:49	enb
TDS (calculated)	Calculation		679			mg/L			09/15/14 14:32	calc
TDS (ratio - measured/calculated)	Calculation		1.24						09/15/14 14:32	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-9

ACZ Sample ID: **L20330-06**
Date Sampled: 09/03/14 13:30
Date Received: 09/05/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/14 10:46	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 13:39	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 11:03	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:58	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:45	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.03	0.2	09/08/14 20:51	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:26	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	09/13/14 0:26	msh
Barium, dissolved	M200.7 ICP	1	0.061			mg/L	0.003	0.02	09/09/14 13:50	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:51	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 20:51	jjc
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	09/09/14 13:50	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:26	msh
Calcium, dissolved	M200.7 ICP	1	54.2			mg/L	0.1	0.5	09/08/14 20:51	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:51	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:51	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:51	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:51	jjc
Iron, dissolved	M200.7 ICP	1	11.50			mg/L	0.02	0.05	09/08/14 20:51	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:26	msh
Lithium, dissolved	M200.7 ICP	1	0.017	B		mg/L	0.008	0.04	09/08/14 20:51	jjc
Magnesium, dissolved	M200.7 ICP	1	9.3			mg/L	0.2	1	09/08/14 20:51	jjc
Manganese, dissolved	M200.7 ICP	1	0.166			mg/L	0.005	0.03	09/08/14 20:51	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:26	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 20:51	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 20:51	jjc
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	09/08/14 20:51	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 20:51	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:26	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:26	msh
Sodium, dissolved	M200.7 ICP	1	26.8			mg/L	0.2	1	09/08/14 20:51	jjc
Strontium, dissolved	M200.7 ICP	1	0.408			mg/L	0.005	0.03	09/08/14 20:51	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:26	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 20:51	jjc
Titanium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	09/08/14 20:51	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:26	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 20:51	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 20:51	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-9

ACZ Sample ID: **L20330-06**
Date Sampled: 09/03/14 13:30
Date Received: 09/05/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	130		*	mg/L	2	20	09/09/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	enb
Total Alkalinity		1	130		*	mg/L	2	20	09/09/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.9			%			09/15/14 0:00	calc
Sum of Anions			4.9			meq/L			09/15/14 0:00	calc
Sum of Cations			5.4			meq/L			09/15/14 0:00	calc
Chloride	SM4500Cl-E	1	10.2		*	mg/L	0.5	2	09/10/14 10:55	mss2
Conductivity @25C	SM2510B	1	465		*	umhos/cm	1	10	09/09/14 5:32	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:51	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:32	pjb
Fluoride	SM4500F-C	1	0.61		*	mg/L	0.05	0.3	09/11/14 15:12	abd
Hardness as CaCO3	SM2340B - Calculation		174			mg/L	0.8	4	09/15/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/12/14 23:30	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:28	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:34	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	09/09/14 0:00	enb
pH measured at		1	20.6		*	C	0.1	0.1	09/09/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	09/15/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/10/14 23:56	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	09/06/14 15:26	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.20		*	mg/L	0.01	0.05	09/12/14 0:17	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	350		*	mg/L	10	20	09/05/14 14:22	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	25		*	mg/L	5	20	09/05/14 15:20	eea
Residue, Total (TS) @ 105C	SM2540B	1	390		*	mg/L	10	20	09/05/14 14:28	id
Sulfate	D516-02/-07 - Turbidimetric	5	93.1		*	mg/L	5	25	09/09/14 15:46	bsu
Sulfide as S	SM4500S2-D	1	0.11		*	mg/L	0.02	0.1	09/09/14 12:57	enb
TDS (calculated)	Calculation		290			mg/L			09/15/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.21						09/15/14 0:00	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20330-01	WG370730	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.
	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	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).
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG370790		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).
WG370746		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20330-02	WG370730	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.
	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	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).
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG370790		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).
WG370746		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20330-03	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG371089	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).
	WG370951	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).	
WG371020	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).	
WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG370668	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).	
WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG370830	Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
		D516-02/-07 - Turbidimetric	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 Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG370790	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).
	WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20330-04	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370746	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	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).
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370790	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).
	WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20330-05	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370746	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370913	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370746	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG370668	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).	
WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG370790	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).	
WG370746	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION	
L20330-06	WG370746	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.	
	WG370746	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.
	WG370921	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.	
	WG370746	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.	
	WG370964	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).
	WG371091	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).
	WG370746	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.
	WG370927	pH measured at Phosphorus, dissolved		SM4500H+ B	Q6	Sample was received above recommended temperature.
				M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370693	Phosphorus, ortho 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).
				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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG370790	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).	
WG370746	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.	

Tahoe Resources, Inc.

ACZ Project ID: **L20330**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
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Tahoe Resources, Inc.

ACZ Project ID: **L20330**

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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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L20330
 Date Received: 09/05/2014 09:56
 Received By: mtb
 Date Printed: 9/5/2014

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?
4104	16.2	8	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.



Laboratories, Inc. **L20330**

CHAIN of CUSTODY

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

Report to:

Name: <u>Miguel Berganza</u>	Address: <u>Bulevar Los Pinos 18 calle 24-69 zona 10</u>
Company: <u>Tahoe Resources inc</u>	<u>Empresarial, Zona Progreso, Tercer W. Av. 1406</u>
E-mail: <u>M.Berganza@samrafiel.com.gt</u>	Telephone: <u>(502) 59515248</u>

Copy of Report to:

Name: <u>Charlie Muerhoff</u>	E-mail: <u>Cmuerhoff@TahoeResourcesInc.com</u>
Company: <u>Tahoe Resources inc</u>	Telephone:

Invoice to:

Name: <u>Miguel Berganza</u>	Address:
Company: <u>Tahoe Resources inc</u>	
E-mail: <u>M.Berganza@samrafiel.com.gt</u>	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

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

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: LF Sampler's Site Information State _____ Zip code _____ Time Zone _____

*Sampler's Signature: [Signature] I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers								
MW-3	03/09/14 11:10	GW	7	✓							
MW-5	03/09/14 10:10	GW	7	✓							
MW-6	03/09/14 09:30	GW	7	✓							
MW-7	03/09/14 08:30	GW	7	✓							
MW-8	03/09/14 10:00	GW	7	✓							
MW-9	03/09/14 13:30	GW	7	✓							

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

REMARKS

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<u>[Signature]</u>	<u>03-09-2014 18:52</u>	<u>[Signature]</u>	<u>3/9/14 18:52</u>
		<u>[Signature]</u>	<u>9-5-14 0956</u>

20330 Chain of Custody

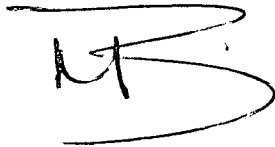
Guatemala September 3rd, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, consisting of a large, stylized 'M' and 'B' intertwined.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

October 13, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20847

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 01, 2014. This project has been assigned to ACZ's project number, L20847. 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 L20847. 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.

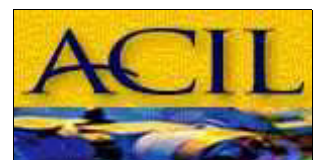
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 12, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-2

ACZ Sample ID: **L20847-01**

Date Sampled: 09/29/14 11:30

Date Received: 10/01/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								10/07/14 13:40	mss2
Cyanide, WAD	SM4500-CN I- distillation								10/07/14 14:18	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								10/07/14 16:49	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/09/14 14:04	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/07/14 12:03	tcd

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	10/06/14 20:07	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/06/14 23:19	las
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	10/06/14 23:19	las
Barium, dissolved	M200.7 ICP	1	0.064			mg/L	0.003	0.02	10/06/14 20:07	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:07	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	10/06/14 20:07	aeb
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	10/06/14 20:07	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/06/14 23:19	las
Calcium, dissolved	M200.7 ICP	1	7.4			mg/L	0.1	0.5	10/06/14 20:07	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:07	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:07	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:07	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	10/06/14 20:07	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	10/06/14 20:07	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	10/06/14 23:19	las
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	10/06/14 20:07	aeb
Magnesium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	10/06/14 20:07	aeb
Manganese, dissolved	M200.7 ICP	1	0.678			mg/L	0.005	0.03	10/06/14 20:07	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/06/14 14:53	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	10/06/14 20:07	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	10/07/14 16:03	jjc
Potassium, dissolved	M200.7 ICP	1	3			mg/L	0.2	1	10/06/14 20:07	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	10/06/14 20:07	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	10/06/14 23:19	las
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	10/06/14 23:19	las
Sodium, dissolved	M200.7 ICP	1	14			mg/L	0.2	1	10/06/14 20:07	aeb
Strontium, dissolved	M200.7 ICP	1	0.056			mg/L	0.005	0.03	10/06/14 20:07	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/06/14 23:19	las
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	10/06/14 20:07	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	10/06/14 20:07	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	10/06/14 23:19	las
Vanadium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.005	0.03	10/06/14 20:07	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:07	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-2

ACZ Sample ID: **L20847-01**
 Date Sampled: 09/29/14 11:30
 Date Received: 10/01/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	46.4		*	mg/L	2	20	10/02/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	10/02/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	10/02/14 0:00	enb
Total Alkalinity		1	46.4		*	mg/L	2	20	10/02/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			10/13/14 9:59	calc
Sum of Anions			1.3			meq/L			10/13/14 9:59	calc
Sum of Cations			1.3			meq/L			10/13/14 9:59	calc
Chloride	SM4500Cl-E	1	3.6		*	mg/L	0.5	2	10/06/14 14:45	bsu
Conductivity @25C	SM2510B	1	143		*	umhos/cm	1	10	10/02/14 3:55	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	10/08/14 13:33	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	10/08/14 15:01	mss2
Fluoride	SM4500F-C	1	0.50		*	mg/L	0.05	0.3	10/03/14 18:56	enb
Hardness as CaCO3	SM2340B - Calculation		28			mg/L	0.8	4	10/13/14 9:59	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.77		*	mg/L	0.02	0.1	10/08/14 23:19	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.22		*	mg/L	0.05	0.2	10/07/14 13:40	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2.3		*	mg/L	0.1	0.5	10/09/14 8:50	mpb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	10/02/14 0:00	enb
pH measured at		1	20.6		*	C	0.1	0.1	10/02/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	10/13/14 9:59	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	10/10/14 13:52	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	10/01/14 21:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.43		*	mg/L	0.01	0.05	10/08/14 1:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	270		*	mg/L	10	20	10/06/14 13:57	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	4	1090		*	mg/L	20	80	10/03/14 10:35	djc
Residue, Total (TS) @ 105C	SM2540B	2	1420		*	mg/L	20	40	10/02/14 16:26	eea
Sulfate	D516-02/-07 - Turbidimetric	1	9.5		*	mg/L	1	5	10/07/14 13:09	bsu
Sulfide as S	SM4500S2-D	37.5		U	*	mg/L	0.8	4	10/06/14 10:48	enb
TDS (calculated)	Calculation		69.7			mg/L			10/13/14 9:59	calc
TDS (ratio - measured/calculated)	Calculation		3.87						10/13/14 9:59	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-4

ACZ Sample ID: **L20847-02**
Date Sampled: 09/29/14 08:10
Date Received: 10/01/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								10/07/14 13:50	mss2
Cyanide, WAD	SM4500-CN I- distillation								10/07/14 14:32	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								10/07/14 17:00	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/09/14 14:18	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/07/14 12:03	tcd

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	10/06/14 20:10	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/06/14 23:22	las
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	10/06/14 23:22	las
Barium, dissolved	M200.7 ICP	1	0.037			mg/L	0.003	0.02	10/06/14 20:10	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:10	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	10/06/14 20:10	aeb
Boron, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	10/06/14 20:10	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/06/14 23:22	las
Calcium, dissolved	M200.7 ICP	1	80.7			mg/L	0.1	0.5	10/06/14 20:10	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:10	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:10	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/06/14 20:10	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	10/06/14 20:10	aeb
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	10/06/14 20:10	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/06/14 23:22	las
Lithium, dissolved	M200.7 ICP	1	0.018	B		mg/L	0.008	0.04	10/06/14 20:10	aeb
Magnesium, dissolved	M200.7 ICP	1	8.8			mg/L	0.2	1	10/06/14 20:10	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	10/06/14 20:10	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/06/14 14:55	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	10/06/14 20:10	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	10/07/14 16:12	jjc
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	10/06/14 20:10	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	10/06/14 20:10	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	10/06/14 23:22	las
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	10/06/14 23:22	las
Sodium, dissolved	M200.7 ICP	1	27			mg/L	0.2	1	10/06/14 20:10	aeb
Strontium, dissolved	M200.7 ICP	1	0.750			mg/L	0.005	0.03	10/06/14 20:10	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/06/14 23:22	las
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	10/06/14 20:10	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	10/06/14 20:10	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	10/06/14 23:22	las
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	10/06/14 20:10	aeb
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	10/06/14 20:10	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-4

ACZ Sample ID: **L20847-02**
 Date Sampled: 09/29/14 08:10
 Date Received: 10/01/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	87.0		*	mg/L	2	20	10/02/14 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	10/02/14 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	10/02/14 0:00	enb
Total Alkalinity		1	87.0		*	mg/L	2	20	10/02/14 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.8			%			10/13/14 9:59	calc
Sum of Anions			6.2			meq/L			10/13/14 9:59	calc
Sum of Cations			6.1			meq/L			10/13/14 9:59	calc
Chloride	SM4500Cl-E	1	16.8		*	mg/L	0.5	2	10/06/14 14:45	bsu
Conductivity @25C	SM2510B	1	632		*	umhos/cm	1	10	10/02/14 4:03	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	10/08/14 13:34	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	10/08/14 15:02	mss2
Fluoride	SM4500F-C	1	0.94		*	mg/L	0.05	0.3	10/03/14 19:00	enb
Hardness as CaCO3	SM2340B - Calculation		238			mg/L	0.8	4	10/13/14 9:59	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.49		*	mg/L	0.02	0.1	10/08/14 23:21	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	10/07/14 13:42	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	10/09/14 8:51	mpb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	10/02/14 0:00	enb
pH measured at		1	20.5		*	C	0.1	0.1	10/02/14 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	10/13/14 9:59	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	10/10/14 13:56	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	10/01/14 21:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	10/08/14 1:23	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	470		*	mg/L	10	20	10/06/14 13:59	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	10/03/14 10:38	djc
Residue, Total (TS) @ 105C	SM2540B	1	490		*	mg/L	10	20	10/02/14 16:28	eea
Sulfate	D516-02/-07 - Turbidimetric	5	188		*	mg/L	5	25	10/07/14 13:17	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	10/06/14 10:55	enb
TDS (calculated)	Calculation		380			mg/L			10/13/14 9:59	calc
TDS (ratio - measured/calculated)	Calculation		1.24						10/13/14 9:59	calc

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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20847**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20847-01	WG372353	Silver, dissolved	M200.8 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG372145	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG372381	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).
	WG372145	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.
	WG372527	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).
	WG372534	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG372295	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).
	WG372145	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG372550	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).
	WG372459	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
	WG372535	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).
	WG372145	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.
	WG372659	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).
	WG372170	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).
	WG372496	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).
	WG372375	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG372271	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

Tahoe Resources, Inc.

ACZ Project ID: **L20847**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG372240		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG372464		Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG372357		Sulfide as S	SM4500S2-D	DF	Sample required dilution due to high sediment.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			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).
WG372145		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.

Tahoe Resources, Inc.

ACZ Project ID: **L20847**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20847-02	WG372353	Silver, dissolved	M200.8 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG372145	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG372381	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).
	WG372145	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG372527	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).
	WG372534	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG372295	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).
	WG372145	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG372550	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).
	WG372459	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).
	WG372535	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).
	WG372145	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG372659	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).
	WG372170	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).
	WG372496	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).
	WG372375	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG372271	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).
	WG372240	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG372464	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L20847**

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.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG372357	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).
	WG372145	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20847**

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
--------------	------------

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L20847
 Date Received: 10/01/2014 09:57
 Received By: ear
 Date Printed: 10/1/2014

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?
3050	14.3	8	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc. 20847

CHAIN of CUSTODY

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

Report to:

Name: <u>Miguel Berganza</u>	Address: <u>BUSIENAR 125 Proceres 18 Calle 24-69-1-10</u>
Company: <u>Tahoe Resources Inc</u>	Empresarial Zona Pradera Torre IV oficina 1406
E-mail: <u>M Berganza @sanrafael.com.gt</u>	Telephone: <u>(502) 59-51-52-48</u>

Copy of Report to:

Name: <u>charlie mverhoff</u>	E-mail: <u>cmverhoff@tahoe-resources-inc.com</u>
Company: <u>Tahoe Resources Inc</u>	Telephone:

Invoice to:

Name: <u>miguel Berganza</u>	Address:
Company: <u>Tahoe Resources Inc</u>	
E-mail: <u>M Berganza @sanrafael.com.gt</u>	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

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

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: EVA Sampler's Site Information State _____ Zip code _____ Time Zone _____

*Sampler's Signature: [Signature] I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <u>Water quality</u>	# of Containers	SW	GW	total	CN							
PO#: <u>Escobal</u>												
Reporting state for compliance testing:												
Check box if samples include NRC licensed material? <input type="checkbox"/>												
SAMPLE IDENTIFICATION	DATE:TIME	Matrix										
<u>PSA-1</u>	<u>29/09/14 11:00</u>	<u>GW</u>	<u>10</u>	<input checked="" type="checkbox"/>								
<u>MW-11</u>	<u>29/09/14 11:15</u>	<u>GW</u>	<u>10</u>	<input checked="" type="checkbox"/>								
<u>MW-2</u>	<u>29/09/14 11:30</u>	<u>GW</u>	<u>7</u>		<input checked="" type="checkbox"/>							
<u>MW-4</u>	<u>29/09/14 08:10</u>	<u>GW</u>	<u>7</u>		<input checked="" type="checkbox"/>							
<u>WW9</u>	<u>29/09/14 08:00-12:00</u>	<u>WW</u>	<u>1</u>			<input checked="" type="checkbox"/>						
<u>WW10</u>	<u>29/09/14 12:00</u>	<u>SW</u>	<u>1</u>			<input checked="" type="checkbox"/>						

COPY

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

REMARKS

please report MW-2 and MW-4 in a different document and the cyanide results. This means to generate 3 different reports.

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<u>[Signature]</u>	<u>29-09-2014 15:00</u>	<u>[Signature]</u>	<u>29/9/14 15:00</u>
		<u>[Signature]</u>	<u>10-1-14 0957</u>



September 15, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20331

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 05, 2014. This project has been assigned to ACZ's project number, L20331. 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 L20331. 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.

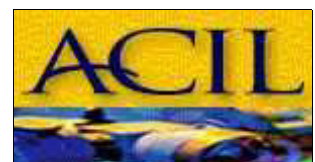
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 15, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

September 15, 2014

Project ID: Escobal

ACZ Project ID: L20331

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 ground water samples from Tahoe Resources, Inc. on September 5, 2014. 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 L20331. 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 except for parameters flagged with "H" flags (H3, HE), received either after the hold time expired or too close to the hold time.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.
2. For TSS values flagged with an "N1", the dessicator humidity was out of range at 32%. It was back in range before samples were removed. The acceptable humidity range is <30%.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-11

ACZ Sample ID: **L20331-01**

Date Sampled: 09/03/14 10:55

Date Received: 09/05/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/14 11:03	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 13:46	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 11:15	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:05	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 16:58	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/08/14 18:37	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:30	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0029			mg/L	0.0002	0.001	09/13/14 0:30	msh
Barium, dissolved	M200.7 ICP	1	0.029			mg/L	0.003	0.02	09/08/14 18:37	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:37	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 18:37	jjc
Boron, dissolved	M200.7 ICP	1	0.18			mg/L	0.01	0.05	09/08/14 18:37	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:30	msh
Calcium, dissolved	M200.7 ICP	1	241			mg/L	0.1	0.5	09/08/14 18:37	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:37	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:37	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:37	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:37	jjc
Iron, dissolved	M200.7 ICP	1	2.21			mg/L	0.02	0.05	09/08/14 18:37	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:30	msh
Lithium, dissolved	M200.7 ICP	1	0.077			mg/L	0.008	0.04	09/08/14 18:37	jjc
Magnesium, dissolved	M200.7 ICP	1	35.6			mg/L	0.2	1	09/08/14 18:37	jjc
Manganese, dissolved	M200.7 ICP	1	0.032			mg/L	0.005	0.03	09/08/14 18:37	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:28	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 18:37	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 18:37	jjc
Potassium, dissolved	M200.7 ICP	1	4.4			mg/L	0.2	1	09/08/14 18:37	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:37	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:30	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:30	msh
Sodium, dissolved	M200.7 ICP	1	71.3			mg/L	0.2	1	09/08/14 18:37	jjc
Strontium, dissolved	M200.7 ICP	1	2.310		*	mg/L	0.005	0.03	09/08/14 18:37	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:30	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 18:37	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:37	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/13/14 0:30	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:37	jjc
Zinc, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/08/14 18:37	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-11

ACZ Sample ID: **L20331-01**
 Date Sampled: 09/03/14 10:55
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	126		*	mg/L	2	20	09/09/14 0:00	jad
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Total Alkalinity		1	126		*	mg/L	2	20	09/09/14 0:00	jad
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.9			%			09/15/14 14:38	calc
Sum of Anions			17			meq/L			09/15/14 14:38	calc
Sum of Cations			18			meq/L			09/15/14 14:38	calc
Chloride	SM4500Cl-E	1	60.3		*	mg/L	0.5	2	09/10/14 10:55	mss2
Conductivity @25C	SM2510B	1	1610		*	umhos/cm	1	10	09/09/14 15:55	jad
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:53	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:33	pjb
Fluoride	SM4500F-C	1	2.68		*	mg/L	0.05	0.3	09/11/14 15:25	abd
Hardness as CaCO3	SM2340B - Calculation		748			mg/L	0.8	4	09/15/14 14:38	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/12/14 23:31	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:29	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:35	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	09/09/14 0:00	jad
pH measured at		1	20.2		*	C	0.1	0.1	09/09/14 0:00	jad
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/15/14 14:38	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/10/14 23:57	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/06/14 15:27	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/12/14 0:19	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1300		*	mg/L	10	20	09/05/14 14:24	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	10	B	*	mg/L	5	20	09/05/14 15:22	eea
Residue, Total (TS) @ 105C	SM2540B	1	1380		*	mg/L	10	20	09/05/14 14:30	id
Sulfate	D516-02/-07 - Turbidimetric	50	608		*	mg/L	50	250	09/09/14 16:11	bsu
Sulfide as S	SM4500S2-D	1	0.07	B	*	mg/L	0.02	0.1	09/09/14 13:06	enb
TDS (calculated)	Calculation		1100			mg/L			09/15/14 14:38	calc
TDS (ratio - measured/calculated)	Calculation		1.18						09/15/14 14:38	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-20

ACZ Sample ID: **L20331-02**
 Date Sampled: 09/03/14 12:00
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/14 11:20	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 13:53	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 11:27	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:12	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:05	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/08/14 18:46	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:33	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	09/13/14 0:33	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	09/08/14 18:46	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:46	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 18:46	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:46	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:33	msh
Calcium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.1	0.5	09/08/14 18:46	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:46	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:46	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:46	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:46	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/08/14 18:46	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:33	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 18:46	jjc
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/08/14 18:46	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:46	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:30	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 18:46	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 18:46	jjc
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/08/14 18:46	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:46	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:33	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:33	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/08/14 18:46	jjc
Strontium, dissolved	M200.7 ICP	1		U	*	mg/L	0.005	0.03	09/08/14 18:46	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:33	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 18:46	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:46	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:33	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:46	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:46	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-20

ACZ Sample ID: **L20331-02**
 Date Sampled: 09/03/14 12:00
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Total Alkalinity		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			09/15/14 14:38	calc
Sum of Anions			N/A			meq/L			09/15/14 14:38	calc
Sum of Cations				U		meq/L			09/15/14 14:38	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	09/10/14 10:55	mss2
Conductivity @25C	SM2510B	1	2.4	B	*	umhos/cm	1	10	09/09/14 16:02	jad
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:55	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:35	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	09/11/14 15:31	abd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	09/15/14 14:38	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/12/14 23:32	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:30	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:36	pjb
pH (lab)	SM4500H+ B									
pH		1	5.7	H	*	units	0.1	0.1	09/09/14 0:00	jad
pH measured at		1	20.7		*	C	0.1	0.1	09/09/14 0:00	jad
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/15/14 14:38	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/11/14 0:00	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	09/06/14 15:31	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/12/14 0:20	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	09/05/14 14:26	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/05/14 15:24	eea
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	09/05/14 14:32	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/09/14 15:46	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:14	enb
TDS (calculated)	Calculation		0.2			mg/L			09/15/14 14:38	calc
TDS (ratio - measured/calculated)	Calculation		n/a						09/15/14 14:38	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-21

ACZ Sample ID: **L20331-03**
Date Sampled: 09/03/14 14:00
Date Received: 09/05/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/14 11:28	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 14:00	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 11:39	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:18	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:12	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/08/14 18:56	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:36	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	09/13/14 0:36	msh
Barium, dissolved	M200.7 ICP	1	0.058			mg/L	0.003	0.02	09/08/14 18:56	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:56	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 18:56	jjc
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/08/14 18:56	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:36	msh
Calcium, dissolved	M200.7 ICP	1	54.7			mg/L	0.1	0.5	09/08/14 18:56	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:56	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:56	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:56	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:56	jjc
Iron, dissolved	M200.7 ICP	1	11.50			mg/L	0.02	0.05	09/08/14 18:56	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:36	msh
Lithium, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.008	0.04	09/08/14 18:56	jjc
Magnesium, dissolved	M200.7 ICP	1	9.3			mg/L	0.2	1	09/08/14 18:56	jjc
Manganese, dissolved	M200.7 ICP	1	0.162			mg/L	0.005	0.03	09/08/14 18:56	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:33	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 18:56	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 18:56	jjc
Potassium, dissolved	M200.7 ICP	1	4.1			mg/L	0.2	1	09/08/14 18:56	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:56	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:36	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:36	msh
Sodium, dissolved	M200.7 ICP	1	26.8			mg/L	0.2	1	09/08/14 18:56	jjc
Strontium, dissolved	M200.7 ICP	1	0.401		*	mg/L	0.005	0.03	09/08/14 18:56	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:36	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 18:56	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:56	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:36	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:56	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:56	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-21

ACZ Sample ID: **L20331-03**
 Date Sampled: 09/03/14 14:00
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	138		*	mg/L	2	20	09/09/14 0:00	jad
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Total Alkalinity		1	138		*	mg/L	2	20	09/09/14 0:00	jad
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.9			%			09/15/14 0:00	calc
Sum of Anions			4.9			meq/L			09/15/14 0:00	calc
Sum of Cations			5.4			meq/L			09/15/14 0:00	calc
Chloride	SM4500Cl-E	1	9.3		*	mg/L	0.5	2	09/10/14 10:56	mss2
Conductivity @25C	SM2510B	1	452		*	umhos/cm	1	10	09/09/14 16:10	jad
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:56	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:36	pjb
Fluoride	SM4500F-C	1	0.63		*	mg/L	0.05	0.3	09/11/14 15:39	abd
Hardness as CaCO3	SM2340B - Calculation		175			mg/L	0.8	4	09/15/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/12/14 23:36	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:31	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:37	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	09/09/14 0:00	jad
pH measured at		1	20.2		*	C	0.1	0.1	09/09/14 0:00	jad
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	09/15/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/11/14 0:01	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/06/14 15:32	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.20		*	mg/L	0.01	0.05	09/12/14 0:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	350		*	mg/L	10	20	09/05/14 14:28	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	27		*	mg/L	5	20	09/05/14 15:25	eea
Residue, Total (TS) @ 105C	SM2540B	1	390		*	mg/L	10	20	09/05/14 14:34	id
Sulfate	D516-02/-07 - Turbidimetric	5	88.3		*	mg/L	5	25	09/09/14 15:46	bsu
Sulfide as S	SM4500S2-D	1	0.11		*	mg/L	0.02	0.1	09/09/14 13:23	enb
TDS (calculated)	Calculation		289			mg/L			09/15/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.21						09/15/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-SR

ACZ Sample ID: **L20331-04**

Date Sampled: 09/03/14 09:50

Date Received: 09/05/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/14 11:37	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 14:07	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 11:52	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:25	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:18	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/08/14 18:59	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:46	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0123			mg/L	0.0002	0.001	09/13/14 0:46	msh
Barium, dissolved	M200.7 ICP	1	0.101			mg/L	0.003	0.02	09/08/14 18:59	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:59	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 18:59	jjc
Boron, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	09/08/14 18:59	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:46	msh
Calcium, dissolved	M200.7 ICP	1	117			mg/L	0.1	0.5	09/08/14 18:59	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:59	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:59	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:59	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:59	jjc
Iron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	09/08/14 18:59	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:46	msh
Lithium, dissolved	M200.7 ICP	1	0.154			mg/L	0.008	0.04	09/08/14 18:59	jjc
Magnesium, dissolved	M200.7 ICP	1	7.7			mg/L	0.2	1	09/08/14 18:59	jjc
Manganese, dissolved	M200.7 ICP	1	0.077			mg/L	0.005	0.03	09/08/14 18:59	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:35	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 18:59	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 18:59	jjc
Potassium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	09/08/14 18:59	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 18:59	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:46	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:46	msh
Sodium, dissolved	M200.7 ICP	1	87.6			mg/L	0.2	1	09/08/14 18:59	jjc
Strontium, dissolved	M200.7 ICP	1	5.030		*	mg/L	0.005	0.03	09/08/14 18:59	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:46	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 18:59	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:59	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/13/14 0:46	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 18:59	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 18:59	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-SR

ACZ Sample ID: **L20331-04**
 Date Sampled: 09/03/14 09:50
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	169		*	mg/L	2	20	09/09/14 0:00	jad
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Total Alkalinity		1	169		*	mg/L	2	20	09/09/14 0:00	jad
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/15/14 14:39	calc
Sum of Anions			11			meq/L			09/15/14 14:39	calc
Sum of Cations			11			meq/L			09/15/14 14:39	calc
Chloride	SM4500Cl-E	1	4.6		*	mg/L	0.5	2	09/10/14 10:56	mss2
Conductivity @25C	SM2510B	1	950		*	umhos/cm	1	10	09/09/14 16:19	jad
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:56	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:37	pjb
Fluoride	SM4500F-C	1	0.80		*	mg/L	0.05	0.3	09/11/14 15:42	abd
Hardness as CaCO3	SM2340B - Calculation		324			mg/L	0.8	4	09/15/14 14:39	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/12/14 23:37	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:32	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:38	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/09/14 0:00	jad
pH measured at		1	19.8		*	C	0.1	0.1	09/09/14 0:00	jad
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/15/14 14:39	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/11/14 0:02	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/06/14 15:33	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/12/14 0:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	700		*	mg/L	10	20	09/05/14 14:30	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/05/14 15:27	eea
Residue, Total (TS) @ 105C	SM2540B	1	740		*	mg/L	10	20	09/05/14 14:36	id
Sulfate	D516-02/-07 - Turbidimetric	20	333		*	mg/L	20	100	09/09/14 16:10	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 13:31	enb
TDS (calculated)	Calculation		661			mg/L			09/15/14 14:39	calc
TDS (ratio - measured/calculated)	Calculation		1.06						09/15/14 14:39	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-1

ACZ Sample ID: **L20331-05**

Date Sampled: 09/03/14 12:45

Date Received: 09/05/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/14 11:45	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 14:14	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 12:16	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:31	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:25	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/08/14 19:02	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:49	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0070			mg/L	0.0002	0.001	09/13/14 0:49	msh
Barium, dissolved	M200.7 ICP	1	0.021			mg/L	0.003	0.02	09/08/14 19:02	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:02	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 19:02	jjc
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/08/14 19:02	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:49	msh
Calcium, dissolved	M200.7 ICP	1	203			mg/L	0.1	0.5	09/08/14 19:02	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:02	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:02	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:02	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 19:02	jjc
Iron, dissolved	M200.7 ICP	1	1.10			mg/L	0.02	0.05	09/08/14 19:02	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:49	msh
Lithium, dissolved	M200.7 ICP	1	0.089			mg/L	0.008	0.04	09/08/14 19:02	jjc
Magnesium, dissolved	M200.7 ICP	1	36			mg/L	0.2	1	09/08/14 19:02	jjc
Manganese, dissolved	M200.7 ICP	1	0.054			mg/L	0.005	0.03	09/08/14 19:02	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:37	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 19:02	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 19:02	jjc
Potassium, dissolved	M200.7 ICP	1	4.7			mg/L	0.2	1	09/08/14 19:02	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 19:02	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:49	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:49	msh
Sodium, dissolved	M200.7 ICP	1	48.2			mg/L	0.2	1	09/08/14 19:02	jjc
Strontium, dissolved	M200.7 ICP	1	1.970		*	mg/L	0.005	0.03	09/08/14 19:02	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:49	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 19:02	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 19:02	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	09/13/14 0:49	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 19:02	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:02	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-1

ACZ Sample ID: **L20331-05**
 Date Sampled: 09/03/14 12:45
 Date Received: 09/05/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	158		*	mg/L	2	20	09/09/14 0:00	jad
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Total Alkalinity		1	158		*	mg/L	2	20	09/09/14 0:00	jad
Cation-Anion Balance	Calculation									
Cation-Anion Balance			6.7			%			09/15/14 14:39	calc
Sum of Anions			14			meq/L			09/15/14 14:39	calc
Sum of Cations			16			meq/L			09/15/14 14:39	calc
Chloride	SM4500Cl-E	1	42.5		*	mg/L	0.5	2	09/10/14 11:07	mss2
Conductivity @25C	SM2510B	1	1290		*	umhos/cm	1	10	09/09/14 16:28	jad
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 17:57	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:38	pjb
Fluoride	SM4500F-C	1	2.57		*	mg/L	0.05	0.3	09/11/14 15:45	abd
Hardness as CaCO3	SM2340B - Calculation		655			mg/L	0.8	4	09/15/14 14:39	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.56		*	mg/L	0.02	0.1	09/12/14 23:38	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.16	B	*	mg/L	0.05	0.2	09/11/14 14:33	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/13/14 14:40	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/09/14 0:00	jad
pH measured at		1	19.6		*	C	0.1	0.1	09/09/14 0:00	jad
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/15/14 14:39	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/11/14 0:04	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/06/14 15:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/12/14 0:26	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1000		*	mg/L	10	20	09/05/14 16:30	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5	B	*	mg/L	5	20	09/08/14 11:47	djc
Residue, Total (TS) @ 105C	SM2540B	1	1050		*	mg/L	10	20	09/05/14 14:39	id
Sulfate	D516-02/-07 - Turbidimetric	50	465		*	mg/L	50	250	09/09/14 16:11	bsu
Sulfide as S	SM4500S2-D	1	0.11		*	mg/L	0.02	0.1	09/09/14 13:57	enb
TDS (calculated)	Calculation		902			mg/L			09/15/14 14:39	calc
TDS (ratio - measured/calculated)	Calculation		1.11						09/15/14 14:39	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L20331-06**

Date Sampled: 09/03/14 13:15

Date Received: 09/05/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/14 11:54	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/11/14 14:28	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/14 12:41	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:38	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/14 17:31	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.07	B		mg/L	0.03	0.2	09/08/14 19:05	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/13/14 0:59	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	09/13/14 0:59	msh
Barium, dissolved	M200.7 ICP	1	0.180			mg/L	0.003	0.02	09/08/14 19:05	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:05	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/08/14 19:05	jjc
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/08/14 19:05	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:59	msh
Calcium, dissolved	M200.7 ICP	1	35.9			mg/L	0.1	0.5	09/08/14 19:05	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:05	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:05	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/08/14 19:05	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 19:05	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/08/14 19:05	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/13/14 0:59	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 19:05	jjc
Magnesium, dissolved	M200.7 ICP	1	6.1			mg/L	0.2	1	09/08/14 19:05	jjc
Manganese, dissolved	M200.7 ICP	1	0.040			mg/L	0.005	0.03	09/08/14 19:05	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/11/14 13:41	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/08/14 19:05	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/08/14 19:05	jjc
Potassium, dissolved	M200.7 ICP	1	9.9			mg/L	0.2	1	09/08/14 19:05	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/08/14 19:05	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/13/14 0:59	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/13/14 0:59	msh
Sodium, dissolved	M200.7 ICP	1	25			mg/L	0.2	1	09/08/14 19:05	jjc
Strontium, dissolved	M200.7 ICP	1	0.264		*	mg/L	0.005	0.03	09/08/14 19:05	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:59	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/08/14 19:05	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 19:05	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/13/14 0:59	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/08/14 19:05	jjc
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/08/14 19:05	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L20331-06**
Date Sampled: 09/03/14 13:15
Date Received: 09/05/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	70.3		*	mg/L	2	20	09/09/14 0:00	jad
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/09/14 0:00	jad
Total Alkalinity		1	70.3		*	mg/L	2	20	09/09/14 0:00	jad
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.8			%			09/15/14 14:40	calc
Sum of Anions			3.5			meq/L			09/15/14 14:40	calc
Sum of Cations			3.7			meq/L			09/15/14 14:40	calc
Chloride	SM4500Cl-E	1	35.5		*	mg/L	0.5	2	09/10/14 11:07	mss2
Conductivity @25C	SM2510B	1	387		*	umhos/cm	1	10	09/09/14 16:36	jad
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/14 18:00	mpb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/12/14 22:40	pjb
Fluoride	SM4500F-C	1	0.10	B	*	mg/L	0.05	0.3	09/11/14 15:48	abd
Hardness as CaCO3	SM2340B - Calculation		115			mg/L	0.8	4	09/15/14 14:40	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.41		*	mg/L	0.02	0.1	09/12/14 23:39	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	09/11/14 14:35	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/13/14 14:43	pjb
pH (lab)	SM4500H+ B									
pH		1	7.2	H	*	units	0.1	0.1	09/09/14 0:00	jad
pH measured at		1	19.5		*	C	0.1	0.1	09/09/14 0:00	jad
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	09/15/14 14:40	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/11/14 0:05	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.09	H	*	mg/L	0.01	0.05	09/06/14 15:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.01	0.05	09/12/14 0:27	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	290		*	mg/L	10	20	09/05/14 16:31	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	6	B	*	mg/L	5	20	09/08/14 11:50	djc
Residue, Total (TS) @ 105C	SM2540B	1	310		*	mg/L	10	20	09/05/14 14:41	id
Sulfate	D516-02/-07 - Turbidimetric	5	51.0		*	mg/L	5	25	09/09/14 16:10	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/09/14 14:05	enb
TDS (calculated)	Calculation		207			mg/L			09/15/14 14:40	calc
TDS (ratio - measured/calculated)	Calculation		1.40						09/15/14 14:40	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20331**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20331-01	WG370724	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.
	WG370807	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG370807	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370921	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370807	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370807	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370790	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).
	WG370807	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20331**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20331-02	WG370724	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.
	WG370807	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG370807	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370921	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370807	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370807	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370790	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).
	WG370807	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20331**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20331-03	WG370724	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.
	WG370807	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370807	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370921	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370807	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370807	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370790	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).
	WG370807	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20331**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20331-04	WG370724	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.
	WG370807	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370807	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370921	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370807	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370807	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370658	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370668	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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370790	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).
	WG370807	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20331**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20331-05	WG370724	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.
	WG370807	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370807	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370921	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370807	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370807	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370674	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370731	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370790	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).
	WG370807	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20331**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20331-06	WG370724	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.
	WG370807	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG370863	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG370807	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG370921	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).
	WG371083	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).
	WG370951	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG370807	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG371085	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG370964	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).
	WG371091	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).
	WG370807	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG370927	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).
	WG370693	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).
	WG371020	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG370674	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG370731	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			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).
	WG370662	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG370830	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG370790	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).
	WG370807	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L20331**

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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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L20331
 Date Received: 09/05/2014 09:57
 Received By: mtb
 Date Printed: 9/5/2014

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?
4136	16.1	9	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.



Laboratories, Inc.

L20331

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@scmritiel.com.gt

Address: Boulevard Los Proceres 19 calle 24-69 zona 10
Empresarial Zona Proceres Torre 10 Oficina 1406
Telephone: (502) 59515248

Copy of Report to:

Name: Charlie Muevhoff
Company: Tahoe Resources inc

E-mail: Cmuevhoff@tahoeresourcesinc
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@scmritiel.com.gt

Address:
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

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

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: LF Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns for # of Containers and analysis results. Includes handwritten '3' in the container column and checkmarks in the analysis columns.

Table with columns for SAMPLE IDENTIFICATION, DATE:TIME, and Matrix. Lists samples MW-11, MW-20, MW-21, PSA-SR, PSA-1, ZW-1, HW-1 with their respective dates and times.

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

REMARKS

Report results of HW-1 in a different report.

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

Table for RELINQUISHED BY and RECEIVED BY with signatures and dates: 03-09-2014 18:53 and 3/9/14 18:55.



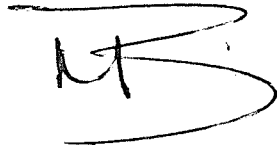
Guatemala September 3rd, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

REG 016 Resultados de Análisis

Muestras: 12 muestras 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 muestreo: 030914
Fecha de ingreso de muestras: 030914
Fecha de análisis: 030914-160914
Fecha de informe: 160914

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)
2289	MW-3	< 1	< 1	N.D.	< 2
2290	MW-5	< 1	< 1	N.D.	23
2291	MW-6	< 1	< 1	N.D.	4.5
2292	MW-7	82	< 1	N.D.	9 x 10 ³
2293	MW-8	< 1	< 1	N.D.	< 2
2294	MW-9	264	22	N.D.	4.5
2295	MW-11	199	< 1	N.D.	< 2
2296	MW-20	< 1	< 1	N.D.	< 2
2297	MW-21	276	13	N.D.	< 2
2299	PSA-SR	< 1	< 1	N.D.	< 2
2300	PSA-1	237	< 1	N.D.	< 2
2301	RW-1	86	<1	N.D.	240

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 total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

* Análisis referidos.



Ing. Fernando Fuentes
Gerente Técnico

REG 016 Resultados de Análisis

Muestras: 2 muestras 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 muestreo: 290914
 Fecha de ingreso de muestras: 290914
 Fecha de análisis: 290914-091014
 Fecha de informe: 091014

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)
2637	MW-2	5925	89	N.D.	540
2638	MW-4	< 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 total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Fernando Fuentes
Gerente Técnico

11.6 Informes Originales de los Resultados Analíticos Obtenidos del muestreo de sedimentos, Septiembre 2014.

October 30, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21031

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 13, 2014. This project has been assigned to ACZ's project number, L21031. 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 L21031. 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.

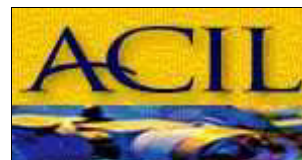
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 29, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-1

ACZ Sample ID: **L21031-01**

Date Sampled: 09/10/14 10:40

Date Received: 10/13/14

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 11:20	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 9:33	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	5860		*	mg/Kg	30	100	10/28/14 14:15	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.8	B	*	mg/Kg	0.2	1	10/27/14 20:32	msh
Arsenic, total (3050)	M6020 ICP-MS	505	9.3			mg/Kg	0.1	0.5	10/27/14 20:32	msh
Barium, total (3050)	M6020 ICP-MS	505	97.3		*	mg/Kg	0.3	1	10/27/14 20:32	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 4:14	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.11	B		mg/Kg	0.05	0.3	10/27/14 20:32	msh
Calcium, total (3050)	M6010B ICP	101	2910			mg/Kg	10	50	10/25/14 4:14	jjc
Chromium, total (3050)	M6020 ICP-MS	505	2.7			mg/Kg	0.3	1	10/27/14 20:32	msh
Copper, total (3050)	M6020 ICP-MS	505	7.3			mg/Kg	0.3	1	10/27/14 20:32	msh
Iron, total (3050)	M6010B ICP	101	10400		*	mg/Kg	2	5	10/25/14 4:14	jjc
Lead, total (3050)	M6020 ICP-MS	505	11.10			mg/Kg	0.05	0.3	10/27/14 20:32	msh
Magnesium, total (3050)	M6010B ICP	101	1170			mg/Kg	20	100	10/25/14 4:14	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	270		*	mg/Kg	10	60	10/28/14 14:15	msh
Mercury, total	M7471A CVAA	232	0.09	BH	*	mg/Kg	0.05	0.2	10/29/14 13:39	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:14	jjc
Nickel, total (3050)	M6020 ICP-MS	505	4.1			mg/Kg	0.3	2	10/27/14 20:32	msh
Potassium, total (3050)	M6010B ICP	101	1770			mg/Kg	20	100	10/25/14 4:14	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.06	B		mg/Kg	0.05	0.1	10/27/14 20:32	msh
Silver, total (3050)	M6020 ICP-MS	505	0.10			mg/Kg	0.03	0.1	10/27/14 20:32	msh
Zinc, total (3050)	M6020 ICP-MS	505	32		*	mg/Kg	1	3	10/27/14 20:32	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	78.4		*	%	0.1	0.5	10/14/14 15:06	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 13:30	mns
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 13:24	spl
Digestion - Hot Plate	M3050B ICP								10/23/14 13:24	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 12:50	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-1

ACZ Sample ID: **L21031-01**

Date Sampled: 09/10/14 10:40

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	31.1		UH	*	mg/Kg	0.2	0.6	10/15/14 13:03	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	250	0.017	H	*	%	0.003	0.01	10/18/14 0:21	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2B

ACZ Sample ID: **L21031-02**
Date Sampled: 09/10/14 09:20
Date Received: 10/13/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 11:41	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 9:45	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	11300		*	mg/Kg	30	100	10/28/14 14:24	msh
Antimony, total (3050)	M6020 ICP-MS	505	2.4		*	mg/Kg	0.2	1	10/27/14 20:42	msh
Arsenic, total (3050)	M6020 ICP-MS	505	37.1			mg/Kg	0.1	0.5	10/27/14 20:42	msh
Barium, total (3050)	M6020 ICP-MS	505	148		*	mg/Kg	0.3	1	10/27/14 20:42	msh
Boron, total (3050)	M6010B ICP	101	2	B		mg/Kg	1	5	10/25/14 4:20	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	3.76			mg/Kg	0.05	0.3	10/27/14 20:42	msh
Calcium, total (3050)	M6010B ICP	101	23900			mg/Kg	10	50	10/25/14 4:20	jjc
Chromium, total (3050)	M6020 ICP-MS	505	6			mg/Kg	0.3	1	10/27/14 20:42	msh
Copper, total (3050)	M6020 ICP-MS	505	16.6			mg/Kg	0.3	1	10/27/14 20:42	msh
Iron, total (3050)	M6010B ICP	101	14800		*	mg/Kg	2	5	10/25/14 4:20	jjc
Lead, total (3050)	M6020 ICP-MS	505	200			mg/Kg	0.05	0.3	10/27/14 20:42	msh
Magnesium, total (3050)	M6010B ICP	101	5260			mg/Kg	20	100	10/25/14 4:20	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	1680		*	mg/Kg	10	60	10/28/14 14:24	msh
Mercury, total	M7471A CVAA	238	0.09	BH	*	mg/Kg	0.05	0.2	10/29/14 13:45	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:20	jjc
Nickel, total (3050)	M6020 ICP-MS	505	6.5			mg/Kg	0.3	2	10/27/14 20:42	msh
Potassium, total (3050)	M6010B ICP	101	2090			mg/Kg	20	100	10/25/14 4:20	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.13			mg/Kg	0.05	0.1	10/27/14 20:42	msh
Silver, total (3050)	M6020 ICP-MS	505	10.70			mg/Kg	0.03	0.1	10/27/14 20:42	msh
Zinc, total (3050)	M6020 ICP-MS	505	307		*	mg/Kg	1	3	10/27/14 20:42	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	72.1		*	%	0.1	0.5	10/14/14 18:06	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 13:42	mns
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 14:13	spl
Digestion - Hot Plate	M3050B ICP								10/23/14 14:13	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 12:55	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2B

ACZ Sample ID: **L21031-02**

Date Sampled: 09/10/14 09:20

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.7		UH	*	mg/Kg	0.2	0.6	10/15/14 13:05	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	180	0.028	H	*	%	0.002	0.009	10/18/14 0:22	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4

ACZ Sample ID: **L21031-03**

Date Sampled: 09/10/14 08:30

Date Received: 10/13/14

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 12:02	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 9:56	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	9440		*	mg/Kg	30	100	10/28/14 14:37	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.9		*	mg/Kg	0.2	1	10/27/14 20:55	msh
Arsenic, total (3050)	M6020 ICP-MS	505	15.2			mg/Kg	0.1	0.5	10/27/14 20:55	msh
Barium, total (3050)	M6020 ICP-MS	505	182		*	mg/Kg	0.3	1	10/27/14 20:55	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 4:30	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.58			mg/Kg	0.05	0.3	10/27/14 20:55	msh
Calcium, total (3050)	M6010B ICP	101	4220			mg/Kg	10	50	10/25/14 4:30	jjc
Chromium, total (3050)	M6020 ICP-MS	505	5			mg/Kg	0.3	1	10/27/14 20:55	msh
Copper, total (3050)	M6020 ICP-MS	505	8.7			mg/Kg	0.3	1	10/27/14 20:55	msh
Iron, total (3050)	M6010B ICP	101	16000		*	mg/Kg	2	5	10/25/14 4:30	jjc
Lead, total (3050)	M6020 ICP-MS	505	28.20		*	mg/Kg	0.05	0.3	10/27/14 20:55	msh
Magnesium, total (3050)	M6010B ICP	101	1270			mg/Kg	20	100	10/25/14 4:30	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	530		*	mg/Kg	10	60	10/28/14 14:37	msh
Mercury, total	M7471A CVAA	244	0.10	BH	*	mg/Kg	0.05	0.2	10/29/14 13:48	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:30	jjc
Nickel, total (3050)	M6020 ICP-MS	505	3.2			mg/Kg	0.3	2	10/27/14 20:55	msh
Potassium, total (3050)	M6010B ICP	101	1800			mg/Kg	20	100	10/25/14 4:30	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.09	B		mg/Kg	0.05	0.1	10/27/14 20:55	msh
Silver, total (3050)	M6020 ICP-MS	505	0.88			mg/Kg	0.03	0.1	10/27/14 20:55	msh
Zinc, total (3050)	M6020 ICP-MS	25300	100		*	mg/Kg	50	100	10/28/14 14:37	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	71		*	%	0.1	0.5	10/14/14 19:37	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 13:55	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 15:02	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 15:02	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:00	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4

ACZ Sample ID: **L21031-03**

Date Sampled: 09/10/14 08:30

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	33.2		UH	*	mg/Kg	0.2	0.7	10/15/14 13:07	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	210	0.021	H	*	%	0.002	0.01	10/18/14 0:25	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2

ACZ Sample ID: **L21031-04**
Date Sampled: 09/10/14 09:55
Date Received: 10/13/14
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 12:13	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 10:08	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	18800		*	mg/Kg	30	100	10/28/14 14:41	msh
Antimony, total (3050)	M6020 ICP-MS	505	6.5		*	mg/Kg	0.2	1	10/27/14 20:58	msh
Arsenic, total (3050)	M6020 ICP-MS	505	44.2			mg/Kg	0.1	0.5	10/27/14 20:58	msh
Barium, total (3050)	M6020 ICP-MS	505	128		*	mg/Kg	0.3	1	10/27/14 20:58	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 4:33	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	3.09			mg/Kg	0.05	0.3	10/27/14 20:58	msh
Calcium, total (3050)	M6010B ICP	101	21900			mg/Kg	10	50	10/25/14 4:33	jjc
Chromium, total (3050)	M6020 ICP-MS	505	4.2			mg/Kg	0.3	1	10/27/14 20:58	msh
Copper, total (3050)	M6020 ICP-MS	505	16.4			mg/Kg	0.3	1	10/27/14 20:58	msh
Iron, total (3050)	M6010B ICP	101	13200		*	mg/Kg	2	5	10/25/14 4:33	jjc
Lead, total (3050)	M6020 ICP-MS	505	115		*	mg/Kg	0.05	0.3	10/27/14 20:58	msh
Magnesium, total (3050)	M6010B ICP	101	3870			mg/Kg	20	100	10/25/14 4:33	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	2250		*	mg/Kg	10	60	10/28/14 14:41	msh
Mercury, total	M7471A CVAA	228	0.09	BH	*	mg/Kg	0.05	0.2	10/29/14 13:50	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:33	jjc
Nickel, total (3050)	M6020 ICP-MS	505	5.1			mg/Kg	0.3	2	10/27/14 20:58	msh
Potassium, total (3050)	M6010B ICP	101	1390			mg/Kg	20	100	10/25/14 4:33	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B		mg/Kg	0.05	0.1	10/27/14 20:58	msh
Silver, total (3050)	M6020 ICP-MS	505	14.70			mg/Kg	0.03	0.1	10/27/14 20:58	msh
Zinc, total (3050)	M6020 ICP-MS	25300	530		*	mg/Kg	50	100	10/28/14 14:41	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	74		*	%	0.1	0.5	10/14/14 21:07	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 14:07	mns
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 15:18	spl
Digestion - Hot Plate	M3050B ICP								10/23/14 15:18	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:06	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2

ACZ Sample ID: **L21031-04**

Date Sampled: 09/10/14 09:55

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	33.3		UH	*	mg/Kg	0.2	0.7	10/15/14 13:07	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	180	0.022	H	*	%	0.002	0.009	10/18/14 0:27	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-5

ACZ Sample ID: **L21031-05**
Date Sampled: 09/10/14 07:45
Date Received: 10/13/14
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 12:23	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 10:20	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	9180		*	mg/Kg	30	100	10/28/14 14:44	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.6	B	*	mg/Kg	0.2	1	10/27/14 21:02	msh
Arsenic, total (3050)	M6020 ICP-MS	505	12.5			mg/Kg	0.1	0.5	10/27/14 21:02	msh
Barium, total (3050)	M6020 ICP-MS	505	164		*	mg/Kg	0.3	1	10/27/14 21:02	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 4:42	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.24	B		mg/Kg	0.05	0.3	10/27/14 21:02	msh
Calcium, total (3050)	M6010B ICP	101	1300			mg/Kg	10	50	10/25/14 4:42	jjc
Chromium, total (3050)	M6020 ICP-MS	505	2.1			mg/Kg	0.3	1	10/27/14 21:02	msh
Copper, total (3050)	M6020 ICP-MS	505	6.2			mg/Kg	0.3	1	10/27/14 21:02	msh
Iron, total (3050)	M6010B ICP	101	12000		*	mg/Kg	2	5	10/25/14 4:42	jjc
Lead, total (3050)	M6020 ICP-MS	25300	7	B	*	mg/Kg	3	10	10/28/14 14:44	msh
Magnesium, total (3050)	M6010B ICP	101	540			mg/Kg	20	100	10/25/14 4:42	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	420		*	mg/Kg	10	60	10/28/14 14:44	msh
Mercury, total	M7471A CVAA	254	0.10	BH	*	mg/Kg	0.05	0.3	10/29/14 13:52	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:42	jjc
Nickel, total (3050)	M6020 ICP-MS	505	1.4	B		mg/Kg	0.3	2	10/27/14 21:02	msh
Potassium, total (3050)	M6010B ICP	101	1800			mg/Kg	20	100	10/25/14 4:42	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.07	B		mg/Kg	0.05	0.1	10/27/14 21:02	msh
Silver, total (3050)	M6020 ICP-MS	505	0.06	B		mg/Kg	0.03	0.1	10/27/14 21:02	msh
Zinc, total (3050)	M6020 ICP-MS	25300	60	B	*	mg/Kg	50	100	10/28/14 14:44	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	75.1		*	%	0.1	0.5	10/14/14 22:37	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 14:20	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 15:34	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 15:34	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:11	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-5

ACZ Sample ID: **L21031-05**

Date Sampled: 09/10/14 07:45

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	32.7		UH	*	mg/Kg	0.2	0.7	10/15/14 13:08	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	170	0.007	BH	*	%	0.002	0.009	10/18/14 0:28	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-7

ACZ Sample ID: **L21031-06**
Date Sampled: 09/10/14 07:55
Date Received: 10/13/14
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 12:33	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 10:31	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	5110		*	mg/Kg	30	100	10/28/14 14:47	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.6	B	*	mg/Kg	0.2	1	10/27/14 21:05	msh
Arsenic, total (3050)	M6020 ICP-MS	505	5.9			mg/Kg	0.1	0.5	10/27/14 21:05	msh
Barium, total (3050)	M6020 ICP-MS	505	99.7		*	mg/Kg	0.3	1	10/27/14 21:05	msh
Boron, total (3050)	M6010B ICP	101	1	B		mg/Kg	1	5	10/25/14 4:46	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.17	B		mg/Kg	0.05	0.3	10/27/14 21:05	msh
Calcium, total (3050)	M6010B ICP	101	1630			mg/Kg	10	50	10/25/14 4:46	jjc
Chromium, total (3050)	M6020 ICP-MS	505	4.6			mg/Kg	0.3	1	10/27/14 21:05	msh
Copper, total (3050)	M6020 ICP-MS	505	4.6			mg/Kg	0.3	1	10/27/14 21:05	msh
Iron, total (3050)	M6010B ICP	101	8740		*	mg/Kg	2	5	10/25/14 4:46	jjc
Lead, total (3050)	M6020 ICP-MS	505	12.30		*	mg/Kg	0.05	0.3	10/27/14 21:05	msh
Magnesium, total (3050)	M6010B ICP	101	930			mg/Kg	20	100	10/25/14 4:46	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	840		*	mg/Kg	10	60	10/28/14 14:47	msh
Mercury, total	M7471A CVAA	208	0.08	BH	*	mg/Kg	0.04	0.2	10/29/14 13:59	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:46	jjc
Nickel, total (3050)	M6020 ICP-MS	505	2.1			mg/Kg	0.3	2	10/27/14 21:05	msh
Potassium, total (3050)	M6010B ICP	101	1930			mg/Kg	20	100	10/25/14 4:46	jjc
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/27/14 21:05	msh
Silver, total (3050)	M6020 ICP-MS	505	0.05	B		mg/Kg	0.03	0.1	10/27/14 21:05	msh
Zinc, total (3050)	M6020 ICP-MS	25300	60	B	*	mg/Kg	50	100	10/28/14 14:47	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	80.6		*	%	0.1	0.5	10/15/14 0:08	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 14:33	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 15:51	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 15:51	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:17	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-7

ACZ Sample ID: **L21031-06**

Date Sampled: 09/10/14 07:55

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.9		UH	*	mg/Kg	0.2	0.6	10/15/14 13:09	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	190	0.006	BH	*	%	0.002	0.01	10/18/14 0:29	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-6

ACZ Sample ID: **L21031-07**
Date Sampled: 09/09/14 08:10
Date Received: 10/13/14
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 12:44	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 10:43	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	6580		*	mg/Kg	30	100	10/28/14 14:51	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.2	B	*	mg/Kg	0.2	1	10/27/14 21:08	msh
Arsenic, total (3050)	M6020 ICP-MS	505	4.5			mg/Kg	0.1	0.5	10/27/14 21:08	msh
Barium, total (3050)	M6020 ICP-MS	505	98.2		*	mg/Kg	0.3	1	10/27/14 21:08	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 4:49	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.17	B		mg/Kg	0.05	0.3	10/27/14 21:08	msh
Calcium, total (3050)	M6010B ICP	101	1250			mg/Kg	10	50	10/25/14 4:49	jjc
Chromium, total (3050)	M6020 ICP-MS	505	3.6			mg/Kg	0.3	1	10/27/14 21:08	msh
Copper, total (3050)	M6020 ICP-MS	505	5.4			mg/Kg	0.3	1	10/27/14 21:08	msh
Iron, total (3050)	M6010B ICP	101	11900		*	mg/Kg	2	5	10/25/14 4:49	jjc
Lead, total (3050)	M6020 ICP-MS	25300	4	B	*	mg/Kg	3	10	10/28/14 14:51	msh
Magnesium, total (3050)	M6010B ICP	101	1000			mg/Kg	20	100	10/25/14 4:49	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	240		*	mg/Kg	10	60	10/28/14 14:51	msh
Mercury, total	M7471A CVAA	274	0.06	BH	*	mg/Kg	0.05	0.3	10/29/14 14:01	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:49	jjc
Nickel, total (3050)	M6020 ICP-MS	505	1.8	B		mg/Kg	0.3	2	10/27/14 21:08	msh
Potassium, total (3050)	M6010B ICP	101	1130			mg/Kg	20	100	10/25/14 4:49	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.06	B		mg/Kg	0.05	0.1	10/27/14 21:08	msh
Silver, total (3050)	M6020 ICP-MS	505	0.04	B		mg/Kg	0.03	0.1	10/27/14 21:08	msh
Zinc, total (3050)	M6020 ICP-MS	25300	70	B	*	mg/Kg	50	100	10/28/14 14:51	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	61.8		*	%	0.1	0.5	10/15/14 1:38	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 14:45	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 16:07	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 16:07	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:22	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-6

ACZ Sample ID: **L21031-07**

Date Sampled: 09/09/14 08:10

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	39.5		UH	*	mg/Kg	0.2	0.8	10/15/14 13:12	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	190	0.013	H	*	%	0.002	0.01	10/18/14 0:30	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-9

ACZ Sample ID: **L21031-08**
Date Sampled: 09/09/14 09:10
Date Received: 10/13/14
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 12:54	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 10:55	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	7900		*	mg/Kg	30	100	10/28/14 14:54	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.6	B	*	mg/Kg	0.2	1	10/27/14 21:12	msh
Arsenic, total (3050)	M6020 ICP-MS	505	5.6			mg/Kg	0.1	0.5	10/27/14 21:12	msh
Barium, total (3050)	M6020 ICP-MS	505	120		*	mg/Kg	0.3	1	10/27/14 21:12	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 4:52	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.28	B		mg/Kg	0.05	0.3	10/27/14 21:12	msh
Calcium, total (3050)	M6010B ICP	101	2090			mg/Kg	10	50	10/25/14 4:52	jjc
Chromium, total (3050)	M6020 ICP-MS	505	5.4			mg/Kg	0.3	1	10/27/14 21:12	msh
Copper, total (3050)	M6020 ICP-MS	505	7.2			mg/Kg	0.3	1	10/27/14 21:12	msh
Iron, total (3050)	M6010B ICP	101	16000		*	mg/Kg	2	5	10/25/14 4:52	jjc
Lead, total (3050)	M6020 ICP-MS	25300	8	B	*	mg/Kg	3	10	10/28/14 14:54	msh
Magnesium, total (3050)	M6010B ICP	101	1120			mg/Kg	20	100	10/25/14 4:52	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	410		*	mg/Kg	10	60	10/28/14 14:54	msh
Mercury, total	M7471A CVAA	240	0.07	BH	*	mg/Kg	0.05	0.2	10/29/14 14:04	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:52	jjc
Nickel, total (3050)	M6020 ICP-MS	505	2.5			mg/Kg	0.3	2	10/27/14 21:12	msh
Potassium, total (3050)	M6010B ICP	101	1320			mg/Kg	20	100	10/25/14 4:52	jjc
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/27/14 21:12	msh
Silver, total (3050)	M6020 ICP-MS	505	0.10			mg/Kg	0.03	0.1	10/27/14 21:12	msh
Zinc, total (3050)	M6020 ICP-MS	25300	80	B	*	mg/Kg	50	100	10/28/14 14:54	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	76.2		*	%	0.1	0.5	10/15/14 3:08	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 14:58	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 16:23	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 16:23	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:28	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-9

ACZ Sample ID: **L21031-08**

Date Sampled: 09/09/14 09:10

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	26.2		UH	*	mg/Kg	0.2	0.5	10/15/14 13:13	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	190	0.013	H	*	%	0.002	0.01	10/18/14 0:31	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-8

ACZ Sample ID: **L21031-09**
Date Sampled: 09/09/14 10:15
Date Received: 10/13/14
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 13:05	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 11:06	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25000	5300		*	mg/Kg	30	100	10/28/14 14:57	msh
Antimony, total (3050)	M6020 ICP-MS	500	0.4	B	*	mg/Kg	0.2	1	10/27/14 21:15	msh
Arsenic, total (3050)	M6020 ICP-MS	500	8.6			mg/Kg	0.1	0.5	10/27/14 21:15	msh
Barium, total (3050)	M6020 ICP-MS	500	114		*	mg/Kg	0.3	1	10/27/14 21:15	msh
Boron, total (3050)	M6010B ICP	100		U		mg/Kg	1	5	10/25/14 4:55	jjc
Cadmium, total (3050)	M6020 ICP-MS	500	0.31			mg/Kg	0.05	0.3	10/27/14 21:15	msh
Calcium, total (3050)	M6010B ICP	100	2220			mg/Kg	10	50	10/25/14 4:55	jjc
Chromium, total (3050)	M6020 ICP-MS	500	2			mg/Kg	0.3	1	10/27/14 21:15	msh
Copper, total (3050)	M6020 ICP-MS	500	9.2			mg/Kg	0.3	1	10/27/14 21:15	msh
Iron, total (3050)	M6010B ICP	100	8710		*	mg/Kg	2	5	10/25/14 4:55	jjc
Lead, total (3050)	M6020 ICP-MS	25000	9	B	*	mg/Kg	3	10	10/28/14 14:57	msh
Magnesium, total (3050)	M6010B ICP	100	610			mg/Kg	20	100	10/25/14 4:55	jjc
Manganese, total (3050)	M6020 ICP-MS	25000	450		*	mg/Kg	10	60	10/28/14 14:57	msh
Mercury, total	M7471A CVAA	270	0.11	BH	*	mg/Kg	0.05	0.3	10/29/14 14:06	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	10/25/14 4:55	jjc
Nickel, total (3050)	M6020 ICP-MS	500	1.5	B		mg/Kg	0.3	2	10/27/14 21:15	msh
Potassium, total (3050)	M6010B ICP	100	1740			mg/Kg	20	100	10/25/14 4:55	jjc
Selenium, total (3050)	M6020 ICP-MS	500		U		mg/Kg	0.05	0.1	10/27/14 21:15	msh
Silver, total (3050)	M6020 ICP-MS	500	0.07	B		mg/Kg	0.03	0.1	10/27/14 21:15	msh
Zinc, total (3050)	M6020 ICP-MS	25000	80	B	*	mg/Kg	50	100	10/28/14 14:57	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	65.1		*	%	0.1	0.5	10/15/14 4:39	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 15:11	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 16:40	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 16:40	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:33	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-8

ACZ Sample ID: **L21031-09**

Date Sampled: 09/09/14 10:15

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	34.5		UH	*	mg/Kg	0.2	0.7	10/15/14 13:13	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	190	0.013	H	*	%	0.002	0.01	10/18/14 0:32	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4A

ACZ Sample ID: **L21031-10**
Date Sampled: 09/09/14 11:15
Date Received: 10/13/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 13:15	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 11:18	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	7700		*	mg/Kg	30	100	10/28/14 15:00	msh
Antimony, total (3050)	M6020 ICP-MS	505	2.7		*	mg/Kg	0.2	1	10/27/14 21:18	msh
Arsenic, total (3050)	M6020 ICP-MS	505	21			mg/Kg	0.1	0.5	10/27/14 21:18	msh
Barium, total (3050)	M6020 ICP-MS	505	187		*	mg/Kg	0.3	1	10/27/14 21:18	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 4:58	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.31			mg/Kg	0.05	0.3	10/27/14 21:18	msh
Calcium, total (3050)	M6010B ICP	101	3330			mg/Kg	10	50	10/25/14 4:58	jjc
Chromium, total (3050)	M6020 ICP-MS	505	5.7			mg/Kg	0.3	1	10/27/14 21:18	msh
Copper, total (3050)	M6020 ICP-MS	505	6.2			mg/Kg	0.3	1	10/27/14 21:18	msh
Iron, total (3050)	M6010B ICP	101	15300		*	mg/Kg	2	5	10/25/14 4:58	jjc
Lead, total (3050)	M6020 ICP-MS	505	18.90		*	mg/Kg	0.05	0.3	10/27/14 21:18	msh
Magnesium, total (3050)	M6010B ICP	101	1650			mg/Kg	20	100	10/25/14 4:58	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	510		*	mg/Kg	10	60	10/28/14 15:00	msh
Mercury, total	M7471A CVAA	294	0.09	BH	*	mg/Kg	0.06	0.3	10/29/14 14:08	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 4:58	jjc
Nickel, total (3050)	M6020 ICP-MS	505	3.5			mg/Kg	0.3	2	10/27/14 21:18	msh
Potassium, total (3050)	M6010B ICP	101	1550			mg/Kg	20	100	10/25/14 4:58	jjc
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/27/14 21:18	msh
Silver, total (3050)	M6020 ICP-MS	505	0.56			mg/Kg	0.03	0.1	10/27/14 21:18	msh
Zinc, total (3050)	M6020 ICP-MS	25300	80	B	*	mg/Kg	50	100	10/28/14 15:00	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	66.6		*	%	0.1	0.5	10/15/14 6:09	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 15:23	mns
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 16:56	spl
Digestion - Hot Plate	M3050B ICP								10/23/14 16:56	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:39	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4A

ACZ Sample ID: **L21031-10**

Date Sampled: 09/09/14 11:15

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	35.4		UH	*	mg/Kg	0.2	0.7	10/15/14 13:14	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	190	0.017	H	*	%	0.002	0.01	10/18/14 0:33	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2A

ACZ Sample ID: **L21031-11**
Date Sampled: 09/09/14 11:45
Date Received: 10/13/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 13:26	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 11:30	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	23800		*	mg/Kg	50	300	10/28/14 15:04	msh
Antimony, total (3050)	M6020 ICP-MS	505	5.5		*	mg/Kg	0.2	1	10/27/14 21:22	msh
Arsenic, total (3050)	M6020 ICP-MS	505	37.6			mg/Kg	0.1	0.5	10/27/14 21:22	msh
Barium, total (3050)	M6020 ICP-MS	50500	270		*	mg/Kg	30	100	10/28/14 15:04	msh
Boron, total (3050)	M6010B ICP	101	3	B		mg/Kg	1	5	10/25/14 5:02	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	8.47			mg/Kg	0.05	0.3	10/27/14 21:22	msh
Calcium, total (3050)	M6010B ICP	101	36000			mg/Kg	10	50	10/25/14 5:02	jjc
Chromium, total (3050)	M6020 ICP-MS	505	10.1			mg/Kg	0.3	1	10/27/14 21:22	msh
Copper, total (3050)	M6020 ICP-MS	505	35.6			mg/Kg	0.3	1	10/27/14 21:22	msh
Iron, total (3050)	M6010B ICP	101	20100		*	mg/Kg	2	5	10/25/14 5:02	jjc
Lead, total (3050)	M6020 ICP-MS	50500	521		*	mg/Kg	5	30	10/28/14 15:04	msh
Magnesium, total (3050)	M6010B ICP	101	6540			mg/Kg	20	100	10/25/14 5:02	jjc
Manganese, total (3050)	M6020 ICP-MS	50500	2140		*	mg/Kg	30	100	10/28/14 15:04	msh
Mercury, total	M7471A CVAA	372	0.18	BH	*	mg/Kg	0.07	0.4	10/29/14 14:12	mfm
Molybdenum, total (3050)	M6010B ICP	101	5	B		mg/Kg	2	10	10/25/14 5:02	jjc
Nickel, total (3050)	M6020 ICP-MS	505	9.7			mg/Kg	0.3	2	10/27/14 21:22	msh
Potassium, total (3050)	M6010B ICP	101	2920			mg/Kg	20	100	10/25/14 5:02	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.25			mg/Kg	0.05	0.1	10/27/14 21:22	msh
Silver, total (3050)	M6020 ICP-MS	50500	29		*	mg/Kg	3	10	10/28/14 15:04	msh
Zinc, total (3050)	M6020 ICP-MS	50500	800		*	mg/Kg	100	300	10/28/14 15:04	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	52.4		*	%	0.1	0.5	10/15/14 7:39	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 15:36	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 17:12	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 17:12	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:44	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2A

ACZ Sample ID: **L21031-11**

Date Sampled: 09/09/14 11:45

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.6		UH	*	mg/Kg	0.2	0.6	10/15/14 13:15	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	130	0.037	H	*	%	0.001	0.007	10/18/14 0:34	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-3

ACZ Sample ID: **L21031-12**
Date Sampled: 09/09/14 12:20
Date Received: 10/13/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/14/14 13:36	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/17/14 11:41	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	25300	6260		*	mg/Kg	30	100	10/28/14 15:07	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.5		*	mg/Kg	0.2	1	10/27/14 21:25	msh
Arsenic, total (3050)	M6020 ICP-MS	505	7.7			mg/Kg	0.1	0.5	10/27/14 21:25	msh
Barium, total (3050)	M6020 ICP-MS	505	142		*	mg/Kg	0.3	1	10/27/14 21:25	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	10/25/14 5:05	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.19	B		mg/Kg	0.05	0.3	10/27/14 21:25	msh
Calcium, total (3050)	M6010B ICP	101	2380			mg/Kg	10	50	10/25/14 5:05	jjc
Chromium, total (3050)	M6020 ICP-MS	505	2.3			mg/Kg	0.3	1	10/27/14 21:25	msh
Copper, total (3050)	M6020 ICP-MS	505	4.4			mg/Kg	0.3	1	10/27/14 21:25	msh
Iron, total (3050)	M6010B ICP	101	9340		*	mg/Kg	2	5	10/25/14 5:05	jjc
Lead, total (3050)	M6020 ICP-MS	505	10.40		*	mg/Kg	0.05	0.3	10/27/14 21:25	msh
Magnesium, total (3050)	M6010B ICP	101	740			mg/Kg	20	100	10/25/14 5:05	jjc
Manganese, total (3050)	M6020 ICP-MS	25300	640		*	mg/Kg	10	60	10/28/14 15:07	msh
Mercury, total	M7471A CVAA	275	0.11	BH	*	mg/Kg	0.06	0.3	10/29/14 14:14	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/25/14 5:05	jjc
Nickel, total (3050)	M6020 ICP-MS	505	2			mg/Kg	0.3	2	10/27/14 21:25	msh
Potassium, total (3050)	M6010B ICP	101	1750			mg/Kg	20	100	10/25/14 5:05	jjc
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/27/14 21:25	msh
Silver, total (3050)	M6020 ICP-MS	505	0.04	B		mg/Kg	0.03	0.1	10/27/14 21:25	msh
Zinc, total (3050)	M6020 ICP-MS	25300	70	B	*	mg/Kg	50	100	10/28/14 15:07	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	67.2		*	%	0.1	0.5	10/15/14 9:09	mns

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/14/14 15:48	mns
Digestion - Hot Plate	M3050B ICP								10/23/14 17:29	spl
Digestion - Hot Plate	M3050B ICP-MS								10/23/14 17:29	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/17/14 13:49	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-3

ACZ Sample ID: **L21031-12**

Date Sampled: 09/09/14 12:20

Date Received: 10/13/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	34		UH	*	mg/Kg	0.2	0.7	10/15/14 13:16	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	210	0.014	H	*	%	0.002	0.01	10/18/14 0:36	pjb



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21031**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-01	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373635	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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373586	Zinc, 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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		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.	

Tahoe Resources, Inc.

ACZ Project ID: **L21031**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-02	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373635	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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373586	Zinc, 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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		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.	

Tahoe Resources, Inc.

ACZ Project ID: **L21031**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-03	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373586	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG373635	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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		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.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-04	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373586	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG373635	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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		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.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-05	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373635	Lead, total (3050)	M6020 ICP-MS	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
		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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		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.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-06	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373586	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG373635	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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		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.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-07	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373635	Lead, total (3050)	M6020 ICP-MS	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
		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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-08	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373635	Lead, total (3050)	M6020 ICP-MS	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
		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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-09	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
	WG373464	Iron, total (3050)	M6020 ICP-MS	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.
			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.
	WG373635	Lead, total (3050)	M6020 ICP-MS	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
		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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-10	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373586	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG373635	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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION	
L21031-11	WG373635	Aluminum, 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.	
	WG373586	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
	WG373635	Barium, total (3050)	M6020 ICP-MS	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.	
	WG373464	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.	
	WG373635	Lead, total (3050)	Manganese, total (3050)	M6020 ICP-MS	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
				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.
	WG373677	Mercury, total	M7471A CVAA M7471A CVAA	H3 Q6	Sample was received and analyzed past holding time. Sample was received above recommended temperature.	
	WG373635	Silver, total (3050)	Zinc, total (3050)	M6020 ICP-MS	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
				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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
	WG372905	Cyanide, total		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.
				M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
				M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
				M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
WG373106	Phosphorus, 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)	H3	Sample was received and analyzed past holding time.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21031-12	WG373635	Aluminum, 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.
	WG373586	Antimony, 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.
			M6020 ICP-MS	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.
	WG373464	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.
	WG373586	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG373635	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.
	WG373677	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG373635	Zinc, 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	MD	The spike recovery (and spike duplicate RPD, if applicable) was not used for data validation because the concentration of the sample and/or the spike was less than the reporting limit.
			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.
	WG372905	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
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).	
WG373106	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	

Tahoe Resources, Inc.

ACZ Project ID: **L21031**

Soil Analysis

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

Solids, Percent	D2216-80
-----------------	----------

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)
-------------------	--------------------------------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21031
 Date Received: 10/13/2014 09:52
 Received By: ddp
 Date Printed: 10/13/2014

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? A change was made in the Date:Time Line 2 on COC 2 section prior to ACZ custody.	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

The 'Relinquished By' field on the COC was not completed. The project manager is contacting the client.

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA20573	14.3	5	N/A

Was ice present in the shipment container(s)?

No - Wet or gel ice was not present in the shipment container(s).

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L21031
Date Received: 10/13/2014 09:52
Received By: ddp
Date Printed: 10/13/2014

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



Laboratories, Inc. 21031

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
 Company: Tahoe Resources Inc
 E-mail: M.Berganza@sanrafael.com.gt

Address: Bulvar los Proceros 18 calle 24-69-2-16
 Empresarial Zona Pradera. Torre IV Oficina 1406
 Telephone: (502) 59 51 52 48

Copy of Report to:

Name: Charlie Mueshoff
 Company: Tahoe Resources Inc

E-mail: CMueshoff@tahoeresources.com
 Telephone:

Invoice to:

Name: Miguel Berganza
 Company: Tahoe Resources Inc
 E-mail: M.Berganza@sanrafael.com.gt

Address:
 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

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

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: LF Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: *[Signature]* I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: WATER quality
 PO#: Escobal
 Reporting state for compliance testing:
 Check box if samples include NRC licensed material?

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers							
SED-2	10/09/14 10:40	SO	1	✓						
SED-2B	10/09/14 09:20	SO	1	✓						
SED-4	10/09/14 08:30	SO	1	✓						
SED-2	10/09/14 09:55	SO	1	✓						
SED-5	10/09/14 07:45	SO	1	✓						
SED-7	10/09/14 07:55	SO	1	✓						
SED-6	09/09/14 08:10	SO	1	✓						
SED-9	09/09/14 09:10	SO	1	✓						
SED-8	09/09/14 10:15	SO	1	✓						
SED-4A	09/09/14 11:15	SO	1	✓						

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

REMARKS

COC # 1/2

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
		<i>[Signature]</i>	10-13-14 09:50

Guatemala October 6th, 2014

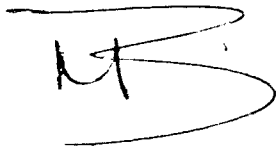
QUARANTINE STATEMENT

To whom it might concern:

Minera San Rafael, S.A is sending a case of sediment samples, which require quarantine and documentation due to organic content. These samples will be analyzed by ACZ Laboratories Inc. in Steamboat Springs, Colorado, USA.

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

Best regards,

A handwritten signature in black ink, appearing to be the initials 'MB' followed by a large, sweeping flourish that extends to the right.

Miguel Berganza
Environment Department
Proyecto Escobal, S. A.

11.7 Informes Originales de los Resultados Analíticos Obtenidos del Efluente en los meses de Agosto a Octubre 2014.



REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)
 Aliquota 1: 03:00 horas
 Aliquota 2: 06:00 horas
 Aliquota 3: 09:00 horas
 Aliquota 4: 12:00 horas
 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 muestreo: 250814
 Fecha de ingreso de muestras: 250814
 Fecha de análisis: 250814-050914
 Fecha de informe: 050914

Identificación de la muestra: WW9
 Correlativo Ecosistemas: 2221

Acuerdo Gubernativo 236-2006 (excepto cianuros)

					Límites 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	7.64	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 ₅	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 ₅ /DQO	---	---	-----	---	---
Relación DQO/DBO ₅	---	---	-----	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	7.1	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	0.006	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

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	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	< 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	23	NMP	< 1 x 10 ⁴

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/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.*

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
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 muestreo: 250814
Fecha de ingreso de muestras: 250814
Fecha de análisis: 250814-050914
Fecha de informe: 050914

Identificación de la muestra: WW10
Correlativo Ecosistemas: 2222

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Límites 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	6.41	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 ₅	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 ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	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
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	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	< 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 ⁴

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/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.**

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

September 12, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20199

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 27, 2014. This project has been assigned to ACZ's project number, L20199. 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 L20199. 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.

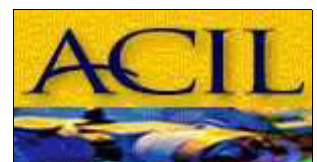
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 12, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW9

ACZ Sample ID: **L20199-11**
 Date Sampled: 08/25/14 12:00
 Date Received: 08/27/14
 Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/03/14 11:16	mss2

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/04/14 13:24	mpb

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW10

ACZ Sample ID: **L20199-12**

Date Sampled: 08/25/14 12:00

Date Received: 08/27/14

Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/03/14 11:24	mss2

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/04/14 13:27	mpb



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20199**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					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).
WG370521		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).
WG370204		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG370212		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).
WG370318		Residue, Total (TS) @ 105C	SM2540B	N1	See Case Narrative.
			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).
WG370538		Sulfate	D516-02/-07 - 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/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG370198		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).
WG370273		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L20199-03	WG370565	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).
L20199-04	WG370417	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).
L20199-05	WG370565	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).
L20199-06	WG370565	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).
L20199-07	WG370565	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).

Tahoe Resources, Inc.

ACZ Project ID: **L20199**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20199-08	WG370565	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).
L20199-09	WG370565	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).
L20199-10	WG370565	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).
L20199-11	WG370565	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).
L20199-12	WG370565	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).

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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20199**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20199-01	WG370359	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
	WG370412	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370189	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20199-02	WG370359	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
	WG370412	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370189	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20199**

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
--------------	------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L20199
 Date Received: 08/27/2014 10:19
 Received By: mtb
 Date Printed: 8/27/2014

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?
3100	15.4	11	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc.

L20199

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@sanrafael.com.gt

Address: Boulevard Los Proceres 18 calle 24-69 zona 10
Empresarial, Zona Proceres, Torre IV oficina 1406
Telephone: (502) 59515247

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc

E-mail: C.Muerhoff@TahoeResourcesInc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@sanrafael.com.gt

Address:
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

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

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: LF Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Wateq Qualitx

PO#: Escobal

Reporting state for compliance testing:

Check box if samples include NRC licensed material?

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, SW, Total CW. Rows include WW9, WW10, WW0, WW6, SW2A, SW4A, SW2B, WW13, WW14, WW14.

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

EMARKS

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

Table with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME. Includes signatures and dates like 25/8/14 6:37 PM and 25/8/14 12:19.

Chain of Custody L20199

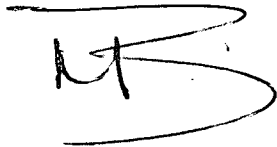
Guatemala August 25th, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, appearing to be the initials 'MB' followed by a large, sweeping flourish that extends to the right and then loops back down.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.



REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 03:00 horas

Alicuota 2: 06:00 horas

Alicuota 3: 09:00 horas

Alicuota 4: 12:00 horas

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 muestreo: 100914

Fecha de ingreso de muestras: 100914

Fecha de análisis: 100914-230914

Fecha de informe: 230914

Identificación de la muestra: WW9

Correlativo Ecosistemas: 2401

Acuerdo Gubernativo 236-2006 (excepto cianuros)

Límites 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	7.66	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 ₅	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 ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	9.5	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	0.007	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

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	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	19	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	400	NMP	< 1 x 10 ⁴

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/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.*

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
 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 muestreo: 100914
 Fecha de ingreso de muestras: 100914
 Fecha de análisis: 100914-230914
 Fecha de informe: 230914

Identificación de la muestra: WW10

Correlativo Ecosistemas: 2402

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Límites 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	7.72	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 ₅	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 ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	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

					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	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	< 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 ⁴

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/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.*

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

September 23, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20497

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 12, 2014. This project has been assigned to ACZ's project number, L20497. 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 L20497. 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.

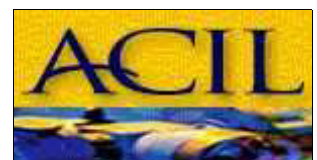
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 23, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L20497-01**

Date Sampled: 09/10/14 12:00

Date Received: 09/12/14

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 15:58	mpb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:17	mpb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW10

ACZ Sample ID: **L20497-02**
 Date Sampled: 09/10/14 12:00
 Date Received: 09/12/14
 Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/14 16:09	mpb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/14 18:18	mpb

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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20497**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20497-01	WG371593	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).
L20497-02	WG371593	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).

Tahoe Resources, Inc.

ACZ Project ID: **L20497**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L20497
 Date Received: 09/12/2014 10:15
 Received By: mtb
 Date Printed: 9/12/2014

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?
4204	7.7	6	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc. (20497)

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources Inc.
E-mail: mberganza@sanrafael.com.gt

Address: Bulevar los Proceres 18 calle 24-69 z. 10
Tercer Empresarial, zona Fractura, Torre IV of 14av
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muelhoff
Company: Tahoe Resources Inc

E-mail: cmuelhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc.
E-mail: MBERGANZA@SANRAFAEL.COM.GT

Address:
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

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

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: LF Sampler's site Information State: Zip code Time Zone

Check box if observe Daylight Savings Time

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box if samples include NRC licensed material?, Matrix, # of Containers, and analysis results. Includes handwritten entries for 'Water Quality', 'Escobal', and 'SW'.

COPY

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

REMARKS

Please report results of SW profile in a different document.

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

Table for Relinquished By, Date/Time, Received By, Date/Time. Includes signatures and dates like 10-09-2014 17:00.





REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 03:00 horas

Alicuota 2: 06:00 horas

Alicuota 3: 09:00 horas

Alicuota 4: 12:00 horas

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 muestreo: 090914

Fecha de ingreso de muestras: 090914

Fecha de análisis: 090914-220914

Fecha de informe: 220914

Identificación de la muestra: WW14

Correlativo Ecosistemas: 2374

Acuerdo Gubernativo 236-2006 (excepto cianuros)

Límites 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	7.27	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 ₅	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 ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	49	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	4.18	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	0.006	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

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	0.05	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	31	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	6	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

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

Se trabajaron diluciones.

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal

de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.*

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

September 26, 2014

Report to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L20465

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 11, 2014. This project has been assigned to ACZ's project number, L20465. 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 L20465. 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.

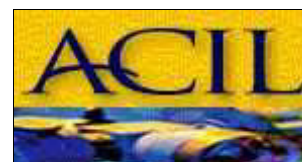
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 26, 2014. 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.



Sue Webber has reviewed and
approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW14

ACZ Sample ID: **L20465-10**
 Date Sampled: 09/09/14 12:00
 Date Received: 09/11/14
 Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/15/14 16:55	mpb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/17/14 0:31	pjb



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20465**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG371119	Sulfide as S	SM4500S2-D	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).
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG371131	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
L20465-03	WG371257	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).
L20465-04	WG371257	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).
L20465-05	WG371257	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).
L20465-06	WG371257	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).
L20465-07	WG371257	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).
L20465-08	WG371086	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
L20465-09	WG371086	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
L20465-10	WG371257	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).

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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L20465**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L20465-01	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L20465-02	WG371244	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG371268	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG370988	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L20465**

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
--------------	------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L20465
 Date Received: 09/11/2014 09:51
 Received By: mtb
 Date Printed: 9/11/2014

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?
4233	12.4	8	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc. *L20465*

CHAIN of CUSTODY

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

Report to:

Name: *Miguel Berganza*
Company: *Tahoe Resources inc.*
E-mail: *M.Berganza@sanrafael.com.gt*

Address: *Riverway 105 pradera 18 calle 24-19 zona 10*
Empresarial, Zona Pradera Torre IV oficina 1406
Telephone: *(502) 59515248*

Copy of Report to:

Name: *Charlie Muerhoff*
Company: *Tahoe Resources inc.*

E-mail: *cmuerhoff@tahoresourcesinc.com*
Telephone:

Invoice to:

Name: *Miguel Berganza*
Company: *Tahoe Resources inc*
E-mail: *M.Berganza@sanrafael.com.gt*

Address:
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

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

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: *LF* Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: *[Signature]* I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers							
TWD	09/09/14 07:40	SW	10	✓						
1386-LA	06/09/14 10:32	SW	10	✓						
Pileta 1	07/09/14 08:20	SW	1		✓					
Pileta 2	07/09/14 08:10	SW	1		✓					
Pileta 3	07/09/14 07:51	SW	1		✓					
Pileta de Proceso	07/09/14 08:55	WW	1		✓					
Pozo PP	07/09/14 08:40	SW	1		✓					
WW13	09/09/14 11:35	WW	1		✓					
WW14	09/09/14 03:00-12:00	WW	1		✓					
WW14	09/09/14 03:00-12:00	WW	1		✓					

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

REMARKS

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

RELINQUISHED BY: DATE:TIME RECEIVED BY: DATE:TIME

[Signature] 09/09/2014 17:25:07 *[Signature]* 09/11/14 17:25
[Signature] 09/11/14 09:51

20465 Chain of Custody

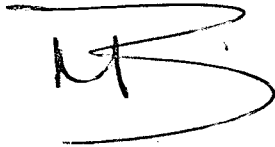
Guatemala September 9th, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.



Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 09:00 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 Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 281014
Fecha de ingreso de muestras: 291014
Fecha de análisis: 291014-101114
Fecha de informe: 101114

Identificación de la muestra: WW9
Correlativo Ecosistemas: 2904

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	8.58	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 ₅	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 ₅ /DQO	---	---	---	---	---
Relación DQO/DBO ₅	---	---	---	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	5.9	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	0.006	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	Límites Máximos Permisibles Entes
					Generadores Nuevos Acuerdo 236-2006
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	descarga a cuerpo receptor
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	0.4
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	10
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

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/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.**

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

November 20, 2014

Report to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza
Tahoe Resources, Inc.
Boulevard Los Proceres 18 c. 24-69 zona 10
Centro
Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21356

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 31, 2014. This project has been assigned to ACZ's project number, L21356. 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 L21356. 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.

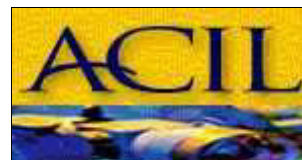
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 20, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

November 20, 2014

Project ID: Escobal

ACZ Project ID: L21356

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on October 31, 2014. 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 L21356. 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 except for parameters flagged with an "H3", received after the hold time had expired.

Sample Analysis

These samples were analyzed for inorganic, organic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For TSS and TS values flagged with an "N1", The 105 degree oven was out of specifications at 107 degrees. The oven was back in range when the workgroup was removed.
2. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW9

ACZ Sample ID: **L21356-03**
 Date Sampled: 10/28/14 18:00
 Date Received: 10/31/14
 Sample Matrix: Waste Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	14.8	B	*	mg/L	2	20	11/01/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	11/01/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	11/01/14 0:00	id
Total Alkalinity		1	14.8	B	*	mg/L	2	20	11/01/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-6.4			%			11/20/14 8:33	calc
Sum of Anions			25			meq/L			11/20/14 8:33	calc
Sum of Cations			22			meq/L			11/20/14 8:33	calc
Chemical Oxygen Demand	M410.4	1	11	B	*	mg/L	10	20	11/06/14 14:03	id
Chloride	SM4500Cl-E	1	88.9		*	mg/L	0.5	2	11/06/14 16:03	jlf
Conductivity @25C	SM2510B	1	2020		*	umhos/cm	1	10	11/01/14 4:06	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	11/07/14 12:04	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	11/11/14 17:12	mpb
Fluoride	SM4500F-C	1	1.44		*	mg/L	0.05	0.3	11/05/14 15:45	enb
Hardness as CaCO3	SM2340B - Calculation		895			mg/L	0.8	4	11/20/14 8:33	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.42		*	mg/L	0.02	0.1	11/08/14 15:44	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	1.84		*	mg/L	0.05	0.2	11/06/14 16:44	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2.2		*	mg/L	0.1	0.5	11/11/14 12:24	bsu
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	11/01/14 0:00	id
pH measured at		1	20.2		*	C	0.1	0.1	11/01/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	11/20/14 8:33	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	11/07/14 23:16	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	10/31/14 20:56	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	11/07/14 0:03	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1700		*	mg/L	10	20	11/03/14 11:32	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	11/03/14 14:20	eea
Residue, Total (TS) @ 105C	SM2540B	1	1750		*	mg/L	10	20	11/03/14 10:00	id
Sulfate	D516-02/-07 - Turbidimetric	50	1040		*	mg/L	50	250	11/07/14 14:32	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	11/04/14 13:24	enb
TDS (calculated)	Calculation		1580			mg/L			11/20/14 8:33	calc
TDS (ratio - measured/calculated)	Calculation		1.08						11/20/14 8:33	calc



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>ICSAB</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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21356**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21356-03	WG374071	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG374005	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.
	WG373891	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG374208	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).
	WG374237	Chloride	SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG373891	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG374282	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).
	WG374473	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).
	WG374101	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).
	WG373891	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG374334	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG374246	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).
	WG374427	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.
	WG373891	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG374327	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG373902	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).
	WG374261	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

Tahoe Resources, Inc.

ACZ Project ID: **L21356**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG373937		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG373955		Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			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).
WG373930		Residue, Total (TS) @ 105C	SM2540B	N1	See Case Narrative.
			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).
WG374306		Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG374047		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).
WG373891		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21356**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21356-01	WG374182	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG374417	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L21356-02	WG374181	*All Compounds*	M8015D GC/FID	MC	Recovery for matrix spike and matrix spike duplicate are outside of acceptance limits; recovery for the method control sample was acceptable.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
	WG374417	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L21356-03	WG374181	*All Compounds*	M8015D GC/FID	MC	Recovery for matrix spike and matrix spike duplicate are outside of acceptance limits; recovery for the method control sample was acceptable.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
	WG374417	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21356**

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
--------------	------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21356
 Date Received: 10/31/2014 10:11
 Received By: ear
 Date Printed: 10/31/2014

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? L21356-02 Container B1527865 (YELLOW GLASS): Added 2 mls sulfuric acid to the sub-sample to adjust the pH to the appropriate range.		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?
4160	14.4	4	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L21356
Date Received: 10/31/2014 10:11
Received By: ear
Date Printed: 10/31/2014



Laboratories, Inc. L21356

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@sanrafael.com.gt

Address: Rincon Las Paredes 12 calle 24-69 zona 10
Empresarial zona proteccion Taxe w oficina 1406
Telephone: (502) 59515248

Copy of Report to:

Name: Charice Murchhoff
Company: Tahoe Resources inc

E-mail: cmurchhoff@tahoresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc
E-mail: M.Berganza@sanrafael.com.gt

Address:
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

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

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: LF Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results for samples WW0, WW6, WW9.

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

REMARKS

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

Table for RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME with handwritten signatures and dates.

L21356 Chain of Custody

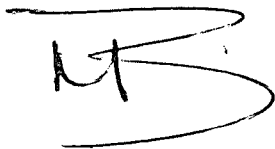
Guatemala October 29th, 2014

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 Sue Webber at ACZ Laboratories (970-879-6590).

Best regards,

A handwritten signature in black ink, appearing to be the initials 'MB' with a large, sweeping flourish underneath.

Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
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 muestreo: 281014
Fecha de ingreso de muestras: 291014
Fecha de análisis: 291014-101114
Fecha de informe: 101114

Identificación de la muestra: WW10
Correlativo Ecosistemas: 2905

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	8.83	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 ₅	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 ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	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
* Níquel 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
					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	< 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 ⁴

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/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.**

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

November 13, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21359

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 31, 2014. This project has been assigned to ACZ's project number, L21359. 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 L21359. 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.

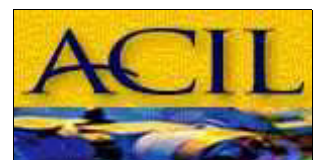
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 13, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

November 13, 2014

Project ID: Escobal

ACZ Project ID: L21359

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 1 miscellaneous sample from Tahoe Resources, Inc. on October 31, 2014. The sample was received in good condition. Upon receipt, the sample custodian removed the sample from the cooler, inspected the contents, and logged the sample into ACZ's computerized Laboratory Information Management System (LIMS). The sample was assigned ACZ LIMS project number L21359. 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 except for parameters flagged with an "H3", received after the hold time expired.

Sample Analysis

This sample was analyzed for inorganic, organic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

1. For TSS flagged with an "N1", the 105 degree oven was out of specifications at 107 degrees. The oven was back in range when the workgroup was removed.

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW10

ACZ Sample ID: **L21359-01**
 Date Sampled: 10/28/14 12:00
 Date Received: 10/31/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	11/01/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	11/01/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	11/01/14 0:00	id
Total Alkalinity		1		U	*	mg/L	2	20	11/01/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			11/13/14 11:40	calc
Sum of Anions			N/A			meq/L			11/13/14 11:40	calc
Sum of Cations				U		meq/L			11/13/14 11:40	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	11/06/14 14:52	id
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	11/10/14 13:59	mpb
Conductivity @25C	SM2510B	1	2.3	B	*	umhos/cm	1	10	11/01/14 4:48	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	11/07/14 12:09	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	11/11/14 17:15	mpb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	11/05/14 16:05	enb
Hardness as CaCO3	SM2340B - Calculation		0.824	B		mg/L	0.8	4	11/13/14 11:40	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	11/08/14 15:52	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	11/11/14 15:17	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	11/11/14 12:29	bsu
pH (lab)	SM4500H+ B									
pH		1	6.3	H	*	units	0.1	0.1	11/01/14 0:00	id
pH measured at		1	20.1		*	C	0.1	0.1	11/01/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	11/13/14 11:40	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	11/07/14 23:22	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	10/31/14 21:07	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	11/07/14 22:29	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	11/03/14 11:38	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	11/03/14 14:26	eea
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	11/03/14 10:11	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	11/07/14 14:13	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	11/04/14 13:47	enb
TDS (calculated)	Calculation		0.2			mg/L			11/13/14 11:40	calc
TDS (ratio - measured/calculated)	Calculation		n/a						11/13/14 11:40	calc



Report Header Explanations

Table with 2 columns: Term and Definition. Includes terms like Batch, Found, Limit, Lower, MDL, PCN/SCN, PQL, QC, Rec, RPD, Upper, and Sample.

QC Sample Types

Table with 4 columns: Code, Description, Code, Description. Lists various QC sample types such as AS, ASD, CCB, CCV, DUP, ICB, ICV, ICSAB, LCSS, LCSSD, and LCSW.

QC Sample Type Explanations

Table with 2 columns: Term and Definition. Explains Blanks, Control Samples, Duplicates, Spikes/Fortified Matrix, and Standard.

ACZ Qualifiers (Qual)

Table with 2 columns: Qualifier and Definition. Lists qualifiers B, H, L, and U with their respective meanings.

Method References

- List of 5 method references including EPA 600/4-83-020, EPA 600/R-93-100, EPA 600/R-94-111, EPA SW-846, and Standard Methods for the Examination of Water and Wastewater.

Comments

- List of 5 comments regarding QC results, reporting basis (dry weight vs as received), asterisks in XQ column, and MDL/PQL reporting.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21359**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21359-01	WG374099	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.
	WG373891	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG374208	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).
	WG374370	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).
	WG373891	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG374282	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).
	WG374473	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).
	WG374101	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).
	WG373891	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG374334	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG374446	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).
	WG374427	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.
	WG373891	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG374327	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).
	WG373902	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).
	WG374325	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).
	WG373937	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data

Tahoe Resources, Inc.

ACZ Project ID: **L21359**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG373955		Residue, Non-Filterable (TSS) @105C	SM2540D	N1	validation because the sample concentration is too low for accurate evaluation (< 10x MDL). See Case Narrative.
			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).
WG373930		Residue, Total (TS) @ 105C	SM2540B	N1	See Case Narrative.
			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).
WG374306		Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG374047		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).
WG373891		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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

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/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21359**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21359-01	WG374182	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG374417	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21359**

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
--------------	------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21359
 Date Received: 10/31/2014 10:13
 Received By: ear
 Date Printed: 10/31/2014

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?
4237	13.3	4	Yes

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc.

L21359

CHAIN of CUSTODY

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

Report to:

Name: Miguel Hernandez
Company: Tabea Resources Inc
E-mail: M.hernandez@taberesources.com

Address: P.O. Box 105 Proterea, CO 80487
Telephone: (522) 5951 5248

Copy of Report to:

Name: Miguel Hernandez
Company: Tabea Resources Inc

E-mail: mhernandez@taberesources.com
Telephone:

Invoice to:

Name: Miguel Hernandez
Company: Tabea Resources Inc
E-mail: M.hernandez@taberesources.com

Address:
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

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

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: LF Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis columns.

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

REMARKS

Please send ww10 analysis report in a separate document.

COPY

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

Table with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME

Chain of Custody



REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 03:00 horas

Alicuota 2: 06:00 horas

Alicuota 3: 09:00 horas

Alicuota 4: 12:00 horas

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 muestreo: 161014

Fecha de ingreso de muestras: 161014

Fecha de análisis: 161014-291014

Fecha de informe: 291014

Identificación de la muestra: WW14

Correlativo Ecosistemas: 2832

Acuerdo Gubernativo 236-2006 (excepto cianuros)

Límites 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	7.27	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 ₅	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	27	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	mg/L	10	24	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	47	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	3.36	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	0.004	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
					descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	0.02	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	103	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	12	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	4.5	NMP	$< 1 \times 10^4$

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/DBO₅ y DBO₅/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 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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.*

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

November 03, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21219

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 23, 2014. This project has been assigned to ACZ's project number, L21219. 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 L21219. 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.

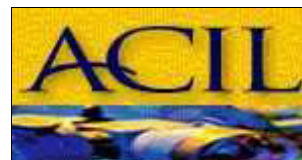
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 03, 2014. 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.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW14

ACZ Sample ID: **L21219-02**

Date Sampled: 10/16/14 12:00

Date Received: 10/23/14

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								10/31/14 10:05	tcd

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		UH	*	mg/L	0.003	0.01	10/31/14 13:57	tcd



Report Header Explanations

Table with 2 columns: Term and Definition. Includes terms like Batch, Found, Limit, Lower, MDL, PCN/SCN, PQL, QC, Rec, RPD, Upper, and Sample.

QC Sample Types

Table with 4 columns: Code, Description, Code, Description. Lists various QC sample types such as AS, ASD, CCB, CCV, DUP, ICB, ICV, ICSAB, LCSS, LCSSD, LCSW, LCSWD, LFB, LFM, LFMD, LRB, MS, MSD, PBS, PBW, PQV, and SDL.

QC Sample Type Explanations

Table with 2 columns: Sample Type and Explanation. Explains Blanks, Control Samples, Duplicates, Spikes/Fortified Matrix, and Standard.

ACZ Qualifiers (Qual)

Table with 2 columns: Qualifier and Description. Lists qualifiers B, H, L, and U with their respective meanings.

Method References

- List of 5 method references including EPA 600/4-83-020, EPA 600/R-93-100, EPA 600/R-94-111, EPA SW-846, and Standard Methods for the Examination of Water and Wastewater.

Comments

- List of 5 comments regarding QC results, reporting basis (dry weight vs as received), asterisks in XQ column, and MDL/PQL reporting.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21219**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21219-01	WG373877	Cyanide, total	M335.4 - Colorimetric w/ distillation	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			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).
L21219-02	WG373877	Cyanide, total	M335.4 - Colorimetric w/ distillation	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			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).

Tahoe Resources, Inc.

ACZ Project ID: **L21219**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21219
 Date Received: 10/23/2014 09:52
 Received By: ear
 Date Printed: 10/23/2014

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?
3895	12.9	4	N/A

Was ice present in the shipment container(s)?

Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.

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



Laboratories, Inc.

L21219

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: M.Berganza@sanrafael.com.gt

Address: Buenas Las Praderas 18 Calle 24-69 zona 10
Empresarial zona Pradera Torre IV oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muechhoff
Company: Tahoe Resources inc.

E-mail: cmuechhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: M.Berganza@sanrafael.com.gt

Address:
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

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

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: LF Sampler's Site Information State Zip code Time Zone

*Sampler's Signature: I attest to the authenticity and validity of this sample. I understand that mislabeling the time/date/location, or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns for Quote #, PO#, Reporting state, Check box, # of Containers, Total, and multiple empty columns for analyses.

SAMPLE IDENTIFICATION DATE:TIME Matrix

Table with columns for Sample ID, Date/Time, Matrix, # of Containers, Total, and multiple empty columns for analyses.

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

REMARKS

Please include in a different report samples with the following ID's:
- WW 14
- Pozo PP

COPY

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

Table with columns for RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME.



REG 016 Resultados de Análisis

Muestra: 1 muestra de lodo
 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 muestreo: 291014
 Fecha de ingreso de muestras: 031114
 Fecha de análisis: 031114-131114
 Fecha de informe: 131114

Identificación de la muestra: Lodos PTAR (Sed-WW7)
 Correlativo Ecosistemas: 2950

Acuerdo Gubernativo 236-2006					Parámetros y límites máximos permisibles para lodos (Acuerdo 236-2006) según disposición final		
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	aplicación al suelo mg/kg	relleno sanitario mg/Kg	confinamiento o aislamiento mg/Kg
* Arsénico As	mg/kg	2	44.2	EPA 3051A. UNICAM AN40177_E10/03C	50	100	> 100
* Cadmio Cd	mg/kg	4	12	EPA 3051A. SMWW 3111B	50	100	> 100
* Mercurio Hg	mg/kg	2	N.D.	EPA 3051A. UNICAM AN40181_E10/03C	25	50	> 50
* Plomo Pb	mg/kg	10	628	EPA 3051A. SMWW 3111B	500	1000	> 1000
* Cromo Cr	mg/kg	6	N.D.	EPA 3051A. SMWW 3111 D	1500	3000	> 3000

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Temperatura ambiente.

Metodología base: Espectrofotometría de Absorción Atómica. Standard Methods for the examination of water and wastewater APHA, AWWA, WEF 22 Ed. / EPA 3051A

Se trabajaron diluciones.

N.D. No detectable. Debajo del límite de detección.

Los resultados se determinaron en base seca.

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o 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

Comparación de disposición final a solicitud del cliente.

Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

teléfonos: (502) 2254 6156 - 2254 8268

20 calle B 13-08 zona 2 El Roble, Guatemala, Guatemala.

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www.ecosistemas.com.gt

laboratorio ambiental e industrial
acreditado ISO 17025 según OGA-LE 006-04

REG 016 Resultados de Análisis

Muestra: 1 muestra de lodo
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 muestreo: 100914
Fecha de ingreso de muestra: 160914
Fecha de análisis: 160914-260914
Fecha de informe: 260914

Identificación de la muestra: SED-VVW14
Correlativo Ecosistemas: 2461

Acuerdo Gubernativo 236-2006					Parámetros y límites máximos permisibles para lodos (Acuerdo 236-2006) según disposición final		
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	aplicación al suelo mg/kg	relleno sanitario mg/Kg	confinamiento o aislamiento mg/Kg
* Arsénico As	mg/kg	2	11.1	EPA 3051A. UNICAM AN40177_E10/03C	50	100	> 100
* Cadmio Cd	mg/kg	4	16.5	EPA 3051A. SMWW 3111B	50	100	> 100
* Mercurio Hg	mg/kg	2	N.D.	EPA 3051A. UNICAM AN40181_E10/03C	25	50	> 50
* Plomo Pb	mg/kg	10	1124	EPA 3051A. SMWW 3111B	500	1000	> 1000
* Cromo Cr	mg/kg	6	N.D.	EPA 3051A. SMWW 3111 D	1500	3000	> 3000

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Temperatura ambiente.

Metodología base: Espectrofotometría de Absorción Atómica. Standard Methods for the examination of water and wastewater APHA, AWWA, WEF 22 Ed. / EPA 3051A

Se trabajaron diluciones.

N.D. No detectable. Debajo del límite de detección.

Los resultados se determinaron en base seca.

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

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Comparación de disposición final a solicitud del cliente.

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