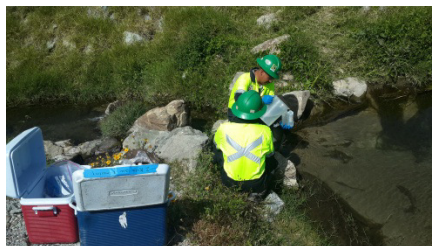


Proyecto Minero Escobal
San Rafael Las Flores, Santa Rosa

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

NOVIEMBRE 2014 – ENERO 2015

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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 Noviembre 2014 a Enero 2015.

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 11 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 942 voladuras durante los meses de Noviembre 2014 a Enero 2015.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 50 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 Noviembre 2014 a Enero 2015.
- Copia de registro documentado del análisis In Situ y kit de Cianuro de efluentes. En el anexo 11.2 se presenta copia de las lecturas diarias de parámetros *In Situ* (pH, temperatura, conductividad 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 Noviembre 2014 a Enero 2015.

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 (%)			Precipitación (mm)
Max	Min	Media	Max	Min	Media	Max	Max	Min	Media	Total
Noviembre 2014										
28.72	9.17	18.58	113.26	0.16	23.78	160.92	100	40.47	74.49	5.82
Diciembre 2014										
28.33	9.75	18.34	10.99	0.31	25.83	113.57	100	31.87	70.03	7.84
Enero 2015										
28.4	10.8	18.7	89.8	0.3	23.4	121.12	100	31.3	66.2	0

°C = grados centígrados. Km/h = kilómetros por hora. % = porcentaje. mm = milímetros. Max = valor máximo. Min = valor mínimo. Fuente: MSR, 2015.

Durante el trimestre se registró una temperatura promedio de entre los 18.3° a los 18.7°C y en el mes de Enero no se registró precipitación. El mes que en promedio presentó la mayor humedad relativa fue Noviembre con 74.5% y el mes que en promedio presentó la mayor velocidad de vientos fue Diciembre con 25.8 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.

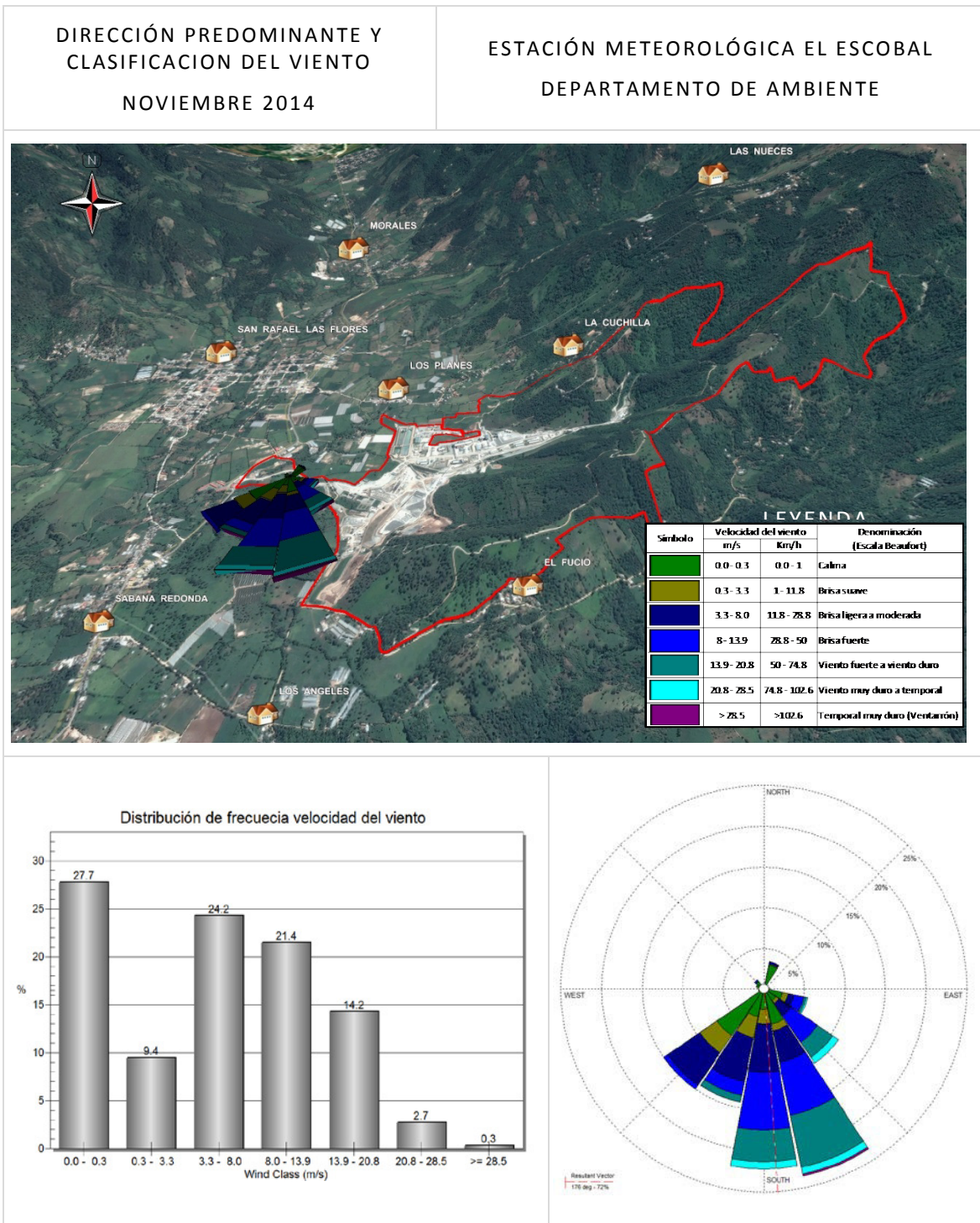


Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa.

Fuente: MSR, 2015.

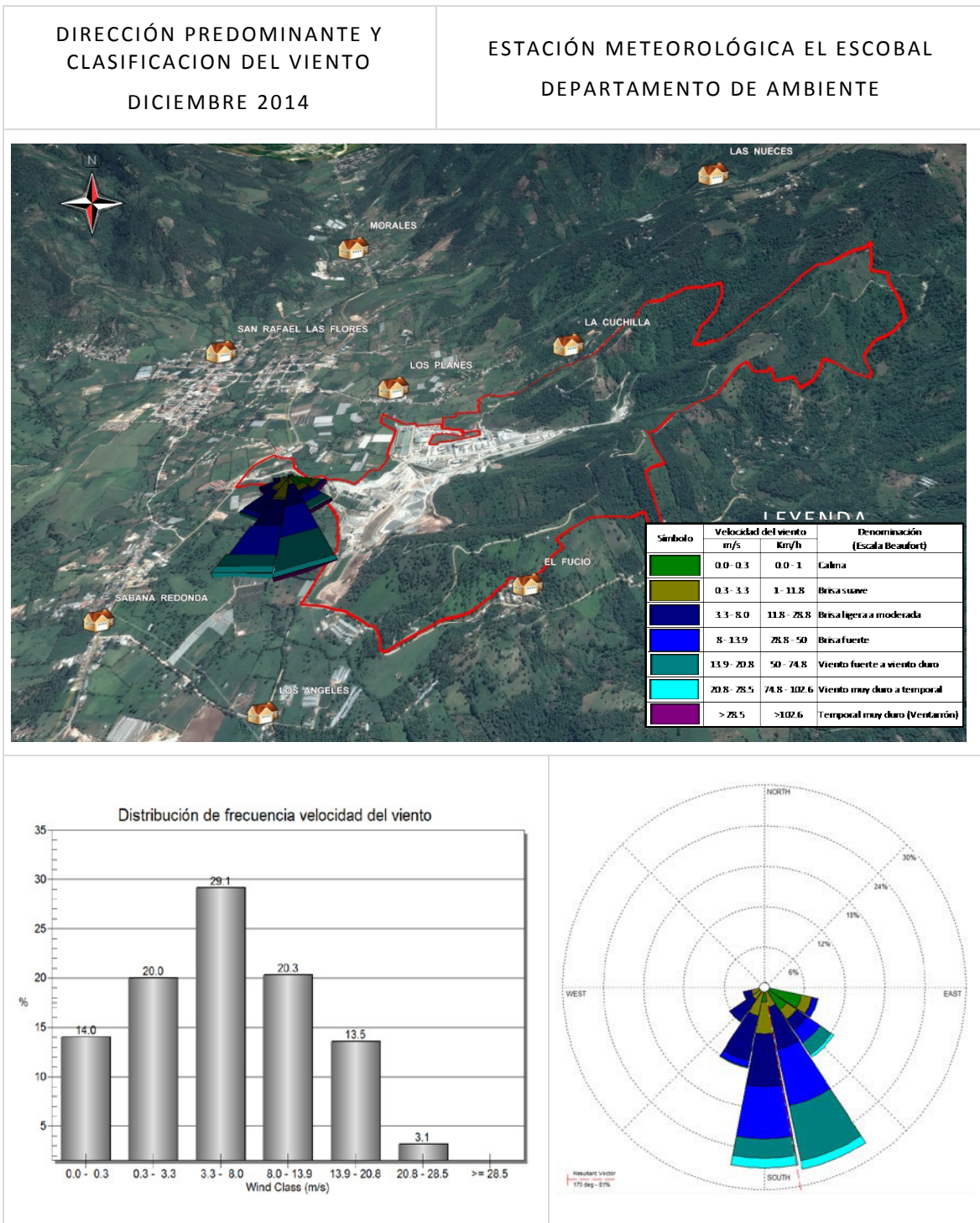
Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 la predominancia de los vientos de Noviembre 2014 a Enero 2015 fue de norte a sureste.

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



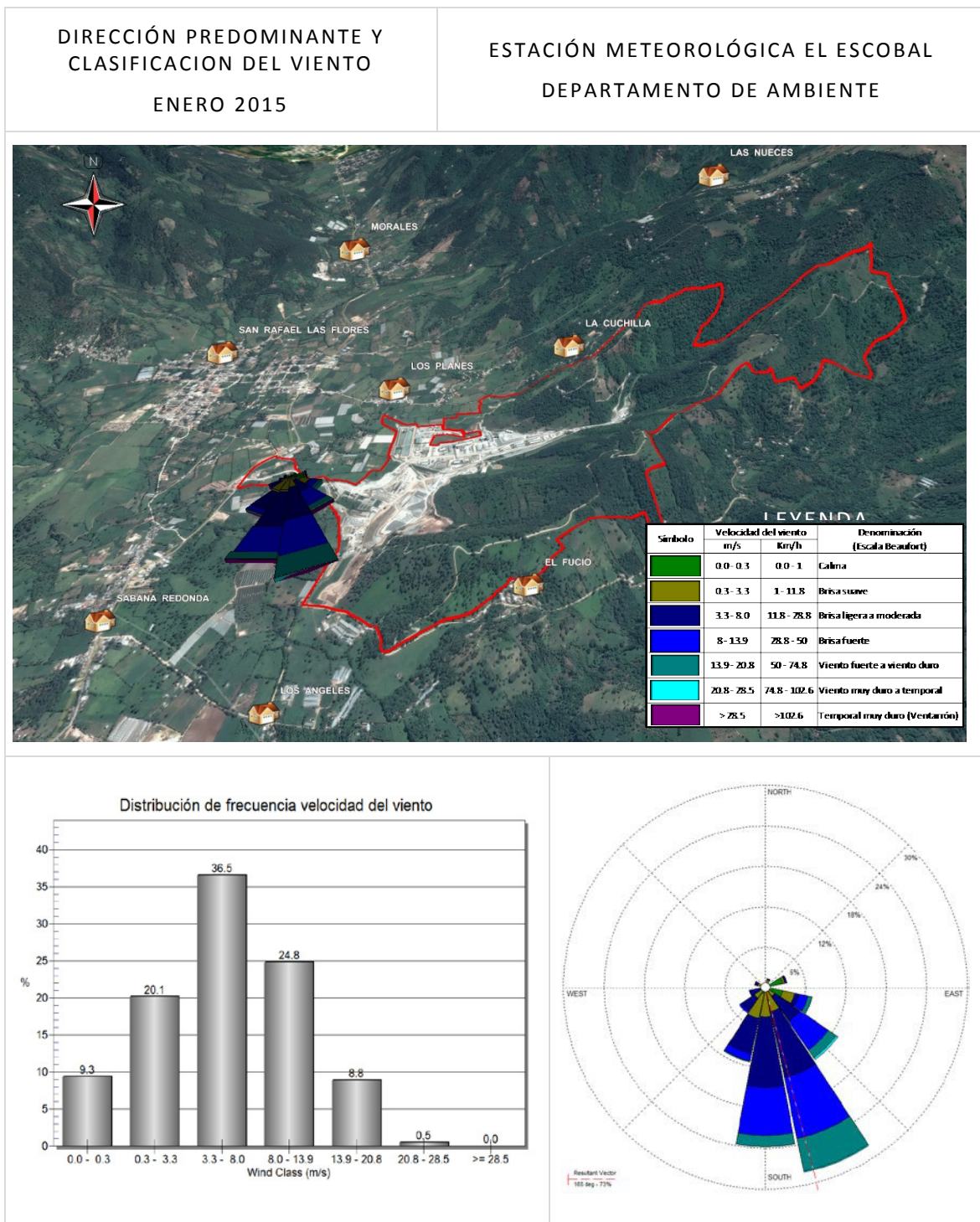
Fuente: MSR, 2015.

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



Fuente: MSR, 2015.

Figura 2-3: Dirección del viento Enero 2015, Proyecto Minero Escobal



Fuente: MSR, 2015.

3 Calidad de Aire

3.1 Material Particulado

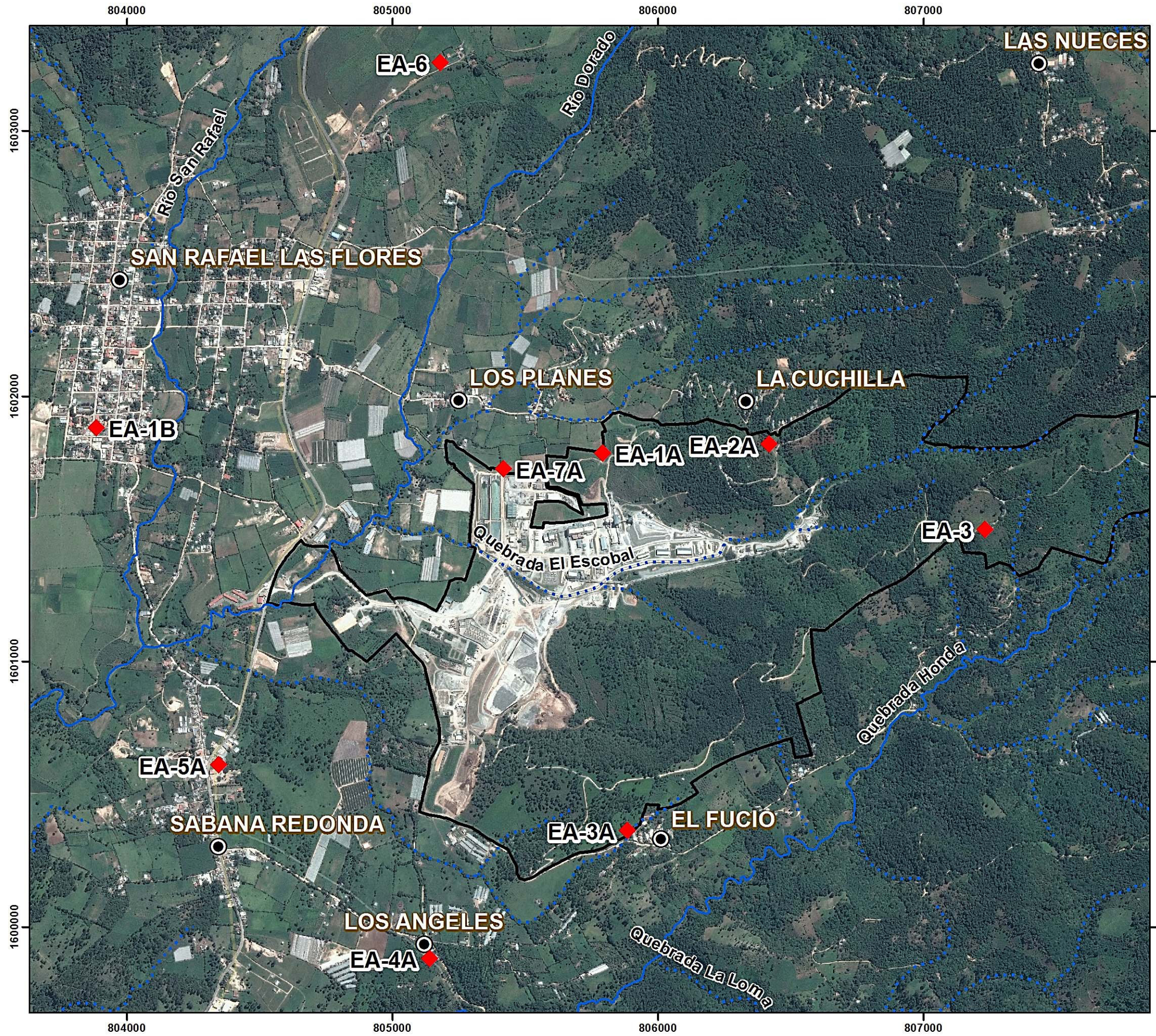
3.1.1 Sitios de Monitoreo

En el Cuadro 3-1 se enlistan las estaciones de monitoreo de material particulado (**PM₁₀**) 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 **PM₁₀** 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, 2015.



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)

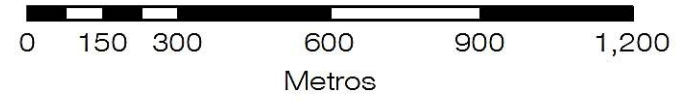
Símbolo	Estación	X	Y
	EA-1A	805791	1601785
	EA-1B	803885	1601881
	EA-2A	806419	1601819
	EA-3	807232	1601498
	EA-3A	805886	1600364
	EA-4A	805140	1599883
	EA-5A	804346	1600611
	EA-6	805181	1603257
	EA-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas catográficas año 2010 Mataquesuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN, Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014. datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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, 2015.

3.1.3 Resultados

En el Cuadro 3-3 se presentan los resultados de PM₁₀ durante los meses de Noviembre 2014 a Enero 2015 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 ($150 \mu\text{g}/\text{m}^3$).

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	Nov-14	Dic-14	Ene-15
				(µg/m ³)					
EA-1A	150	150**	50	24.36	89.95	3.67	11.42	23.65	13.73
EA-1B				NR	NR	NR	54.62	NA	NA
EA-2A				21.40	76.20	2.74	10.32	20.72	25.37
EA-3				25.68	78.85	1.25	18.28	14.11	7.82
EA-3A				NR	NR	NR	48.54	NA	NA
EA-4A				103.55	120.40	86.70	79.02	NA	NA
EA-5A				50.73 [¥]	104.80 [¥]	11.80 [¥]	43.87	NA	NA
EA-6				23.05	57.90	1.70	34.17	NA	NA
EA-7A				46.48 [¥]	115.90 [¥]	13.40 [¥]	2.86	20.3	13.31

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, 2015.

Los resultados obtenidos durante los meses de Noviembre 2014 a Enero 2015 se encontraron entre los 2.86 a 79.02 µg/m³. En Noviembre se registró el menor valor de PM₁₀ en la estación EA-7A (2.86 µg/m³), mientras que en Diciembre y Enero se registró en la estación EA-3 (14.11 y 7.82 µg/m³ respectivamente). Los valores más altos de PM₁₀ se registraron en la estaciones EA-4A durante Noviembre (79.02 µg/m³), mientras que los valores más altos en Diciembre y Enero se registraron en las estaciones EA-1A y EA-2A (23.65 y 25.37 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. Todos los valores de PM₁₀ se encuentran por debajo de los valores establecidos por las guías de la OMS (50 µg/m³) a excepción de las estaciones EA-1B y EA-4A durante Noviembre. Sin embargo son valores menores que los registrados durante el establecimiento de la línea base.

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, 2015.

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, 2015.

3.2.3 Resultados

En el Cuadro 3-6 se presentan los resultados de concentración de mercurio en PM₁₀ durante el mes de Noviembre 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 mercurio registradas durante Noviembre 2014 estuvieron por debajo de los valores registrados durante Noviembre 2013 en todas las estaciones de monitoreo, a excepción de las estaciones EA-3A, EA-4A y EA-6.

Cuadro 3-6: Resultados de concentración de metales en PM₁₀, Proyecto Minero Escobal

Parámetro	LD	EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A
		2233-1119	2271-0223	2273-0440	2230-0808	2229-0717	2234-1212	2272-0303
Noviembre 2013 (µg/m³)								
Mercurio	0,0001	0,0006	<0.0001	0,0001	0,0007	<0.0001	<0.0001	0,0001
Noviembre 2014 (µg/m³)								
Mercurio	0,0001	N.D.	N.D.	0.0080	0.0080	N.D.	0.0010	N.D.

ND: no detectado. LD: límite de detección. µg/m³ = microgramos por metro cúbico. Fuente: MSR, 2015.

3.3 Partículas Sedimentables Totales (PST)

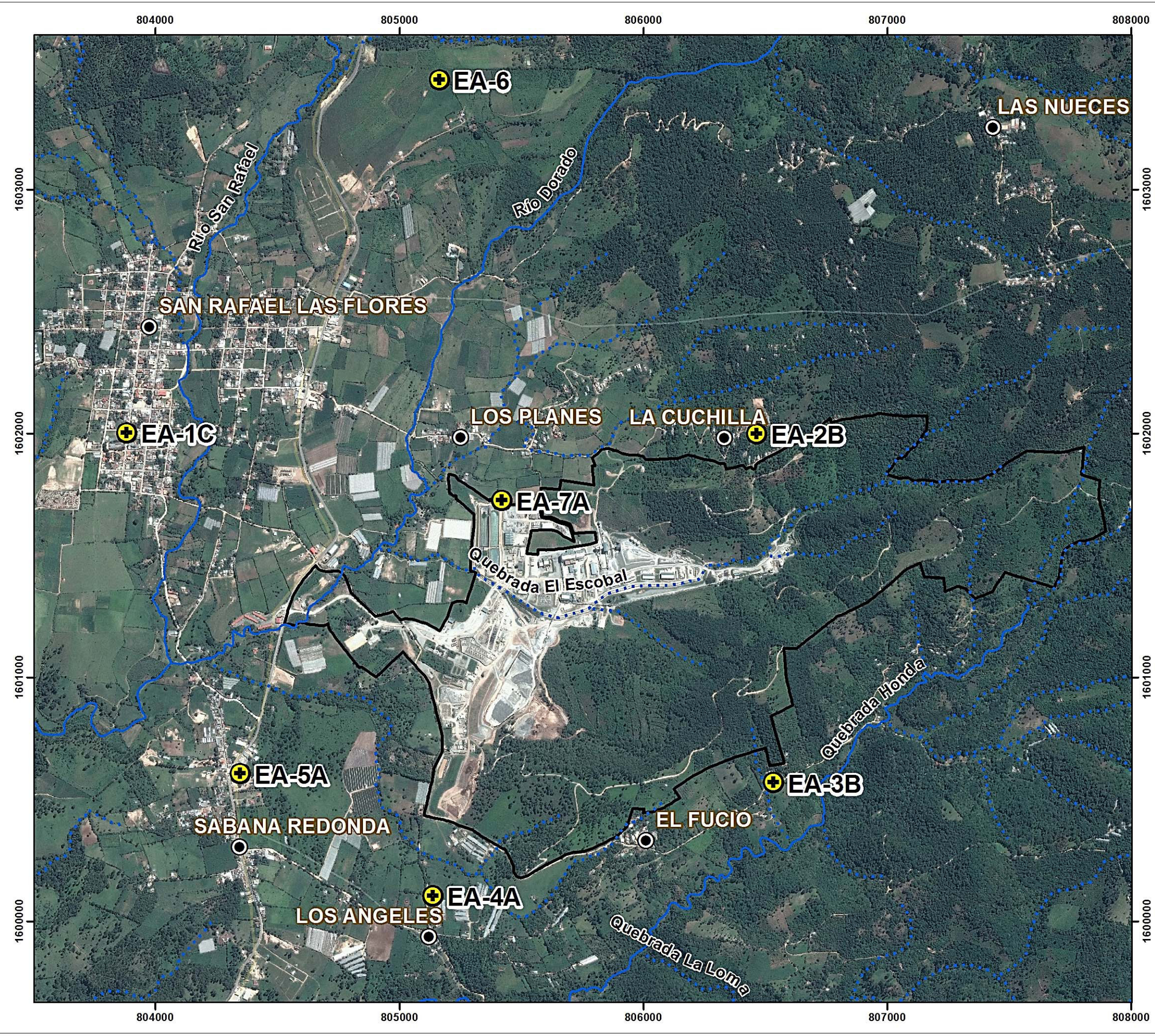
3.3.1 Sitios de Monitoreo

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, 2015.



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 Intermitente

ESTACIONES DE MONITOREO

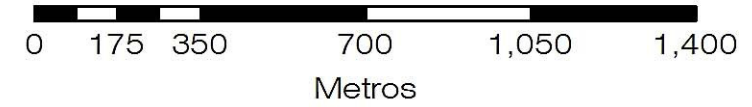
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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, 2015.

3.3.3 Resultados

En el Cuadro 3-9 se presentan los resultados de Partículas Sedimentables Totales (PST) realizado durante Diciembre 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-5A				EA-6	EA-7A	
	USEPA ¹	Banco Mundial ² OMS ³	Dic-14	Dic-14	Dic-14	Línea Base			Muestreo	Línea Base			Muestreo	Dic-14	Dic-14
						Promedio	Mínimo	Máximo	Dic-14	Promedio	Mínimo	Máximo	Dic-14		
g/(m² x 30 días)															
Sólidos insolubles			21.75	12.05	17.15	6.27	2.60	10.80	35.99	6.50	0.80	16.00	12.91	1.70	2.69
Sólidos solubles	ND	ND	1.77	0.98	1.07	2.12	0.90	2.90	0.43	11.26	2.00	37.00	0.70	9.53	1.60
Sólidos totales			23.52	13.03	18.22	8.37	4.60	13.00	36.02	17.58	3.20	50.00	13.61	11.23	4.30

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, 2015.

Los valores de PST se encuentran entre 4.30 a 36.02 g/(m² x 30 días), los cuales corresponden a las estaciones EA-7A y EA-4A respectivamente. Únicamente el valor para la estación EA-4A se encuentra por arriba 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)

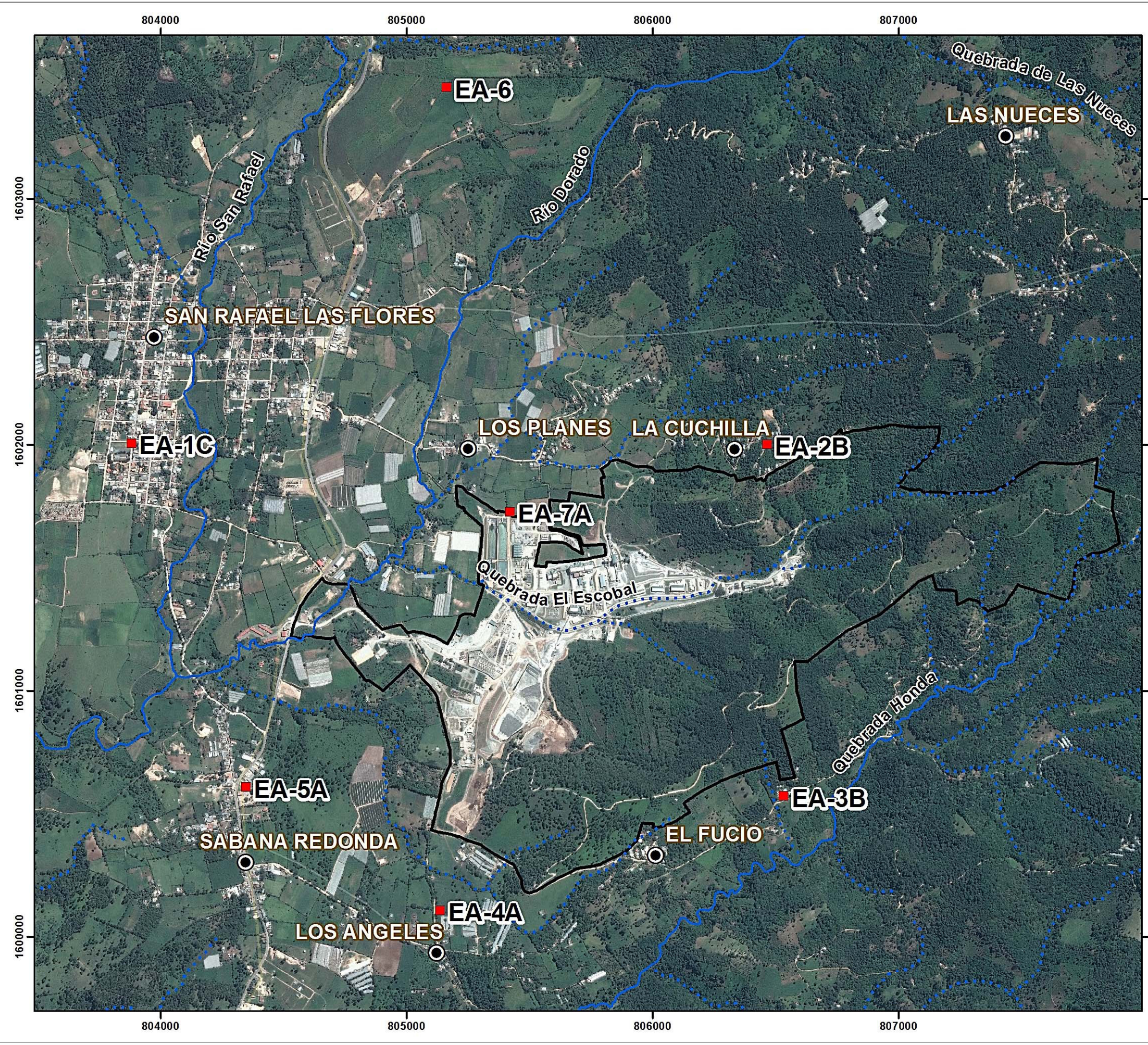
3.4.1 Sitios de Monitoreo

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, 2015.



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 Intermitente

ESTACIONES DE MONITOREO

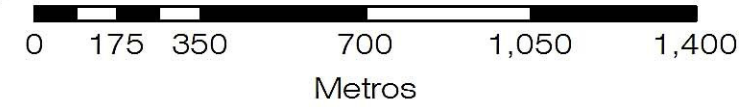
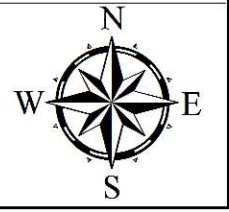
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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, 2015.

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-6) y 12 µg/m³ en EA-1C. 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*	Guías*				EA-1C	EA-2B	EA-3B	EA-4A	EA-5A			EA-6	EA-7A			
										Línea base**				Muestreo	Línea base**		
	USEPA ¹	Banco Mundial ²	OMS ³	British Columbia ⁴	Dic-14	Dic-14	Dic-14	Dic-14	Promedio	Mínimo	Máximo	Dic-14	Dic-14	Promedio	Mínimo	Máximo	Dic-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	12	<9	11	11	<9	<9	<9	<9	10	<9	<9	<9	15

Nota: µg/m³ = microgramos por metro cúbico; SO₂= dióxido de azufre, NO₂= dióxido de nitrógeno. ¹Guía USEPA, 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, 2015.

3.5 Niveles de Presión Sonora

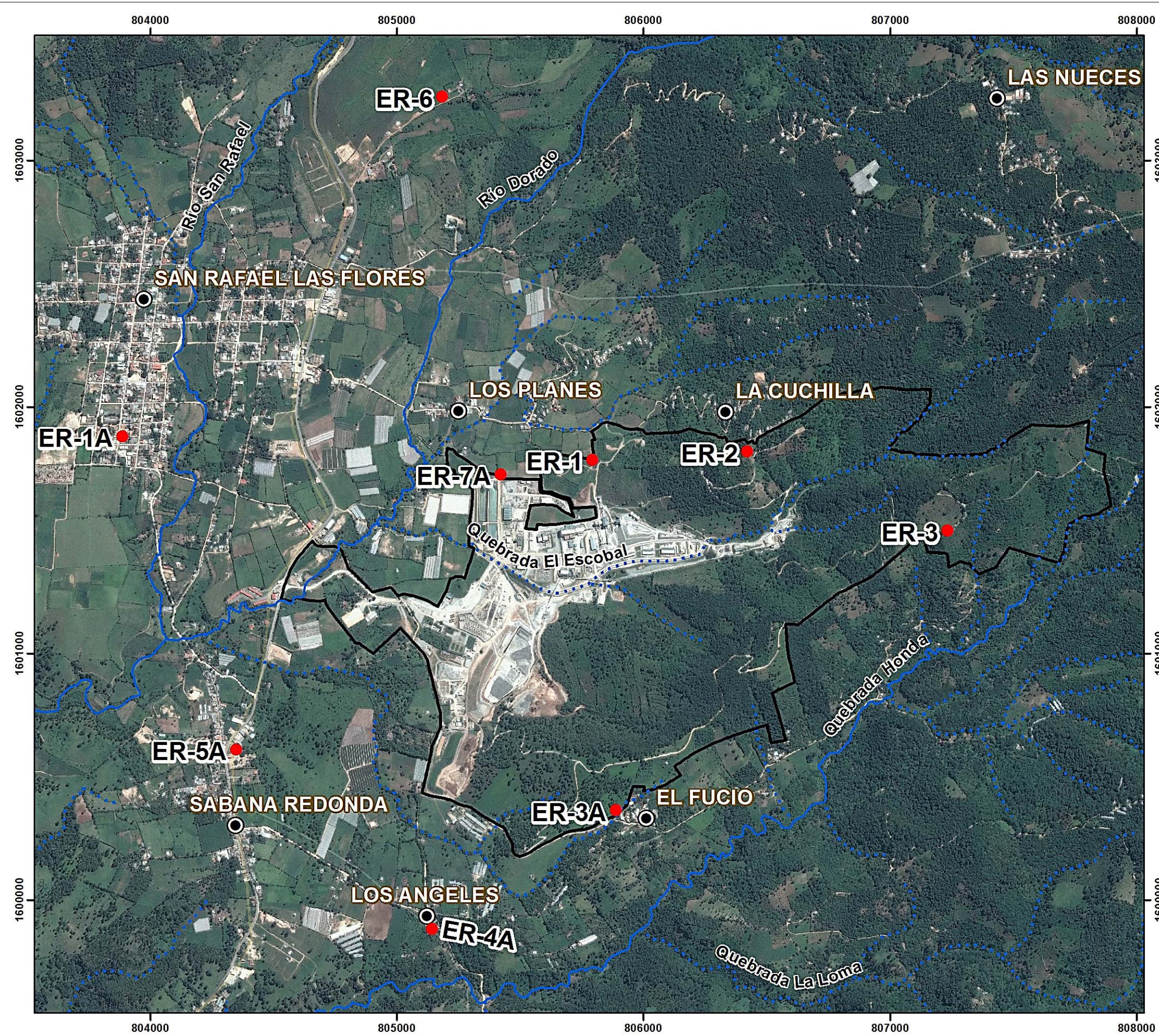
3.5.1 Sitios de Monitoreo

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 Mataquesuintla

Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2015.



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

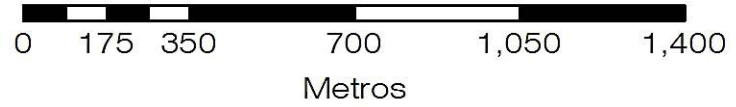
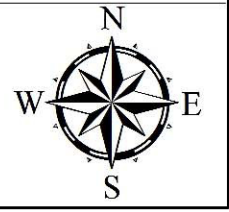
Símbolo	Estación	X	Y
	ER-1	805791	1601785
	ER-1A	803885	1601881
	ER-2	806419	1601819
	ER-3	807232	1601498
	ER-3A	805886	1600364
	ER-4A	805140	1599883
	ER-5A	804346	1600611
	ER-6	805181	1603257
	ER-7A	805419	1601726

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 2008 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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, 2015.

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 Noviembre 2014 a Enero 2015. 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 L_{eq} , están dentro del rango de 45.1 dBa y 67.1 dBa, los cuales corresponden a las estaciones ER-3 y ER-6 respectivamente.

La estación ER-3 presentó el menor promedio diurno (45.83 dBa) y el menor promedio nocturno (43.76 dBa) de todas las mediciones efectuadas durante el monitoreo; mientras que la estación ER-6 presentó el mayor promedio diurno

(66.8 dBa) y el mayor promedio nocturno (67.5 dBa) se registró en la estación ER-2.

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

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Los promedios diurnos y nocturnos registrados durante los meses de Noviembre 2014 a Enero 2015 estuvieron por debajo de la norma establecida por la USEPA, a excepción de ER-2, ER-7A, ER-1A, ER-5A y ER-6.

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			Nov-14	Dic-14	Ene-15	Línea Base			Nov-14	Dic-14	Ene-15
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
Lmax					89.3	99.5	64.6	73.7	84.9	75.8	86.7	97.8	64.9	78.3	77.7	75.7
Lmin	NL	NL	NL	NL	32.5	37.7	27.0	38.1	34.7	35.2	35.2	42.8	26.5	47.2	50.2	49.2
Leq					49.9	57.1	41.2	52.2	48.2	50.1	49.4	58.7	39.7	55.3	57.4	57.8
PD	55	55	55	70	50.5	59.1	39.7	51.9	48.1	51.6	48.8	57.1	39.8	55.3	57.2	57.4
PN	55	50	45	70	47.6	55.7	39.3	52.8	48.5	45.3	46.6	54.5	37.9	55.5	58	58.5

Parámetro	Norma*		Guías*		ER-3						ER-7A					
	USEPA ¹	OMS ²	Banco Mundial		Línea Base			Nov-14	Dic-14	Ene-15	Línea Base**			Nov-14	Dic-14	Ene-15
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
Lmax					87.4	100.7	67.2	71.6	77.1	75.5	87.5	89.0	82.1	72.4	77	94.8
Lmin	NL	NL	NL	NL	49.4	56.2	26.9	38.2	33.4	37	NR	NR	NR	43.5	39	24.8
Leq					56.8	63.2	39.7	51.1	45.1	48.4	52.8	54.5	50.9	55	49.8	51.7
PD	55	55	55	70	56.5	63.1	41.0	51.7	45.83	49.3	52.1	53.5	50.4	54.6	49.5	52.8
PN	55	50	45	70	57.2	64.0	34.1	49.84	43.76	46.9	49.7	50.9	48.8	55.7	50.5	49.3

*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. ¹Guía USEPA, 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, 2015.

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			Nov-14	Línea Base			Nov-14	Línea Base			Nov-14
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Lmax	NL	NL	NL	NL	NR	NR	NR	95	NR	NR	NR	72	80.6	78.2	82.1	83.4
Lmin								47.7				29.5	NR	NR	NR	43.3
Leq								61.2				49.9	50.2	49.3	50.9	52
PD								60.9				50.71	49.5	48.4	50.4	53.2
PN								61.6				48.42	48.6	48.2	48.9	48.6

Parámetro	Norma*		Guías*		ER-5A				ER-6			
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Nov-14	Línea Base			Nov-14
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Lmax	NL	NL	NL	NL	91.6	85.1	92.2	87.8	NR	NR	NR	90.1
Lmin					NR	NR	NR	41				47.1
Leq					65.8	51.6	67.6	58.9				67.1
PD					61.2	50.2	63.8	60.8				66.8
PN					62.8	45.9	65.0	49.9				67.5

*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. ¹Guía USEPA, 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, 2015.

4 Calidad del Agua

4.1 Sitios de Monitoreo

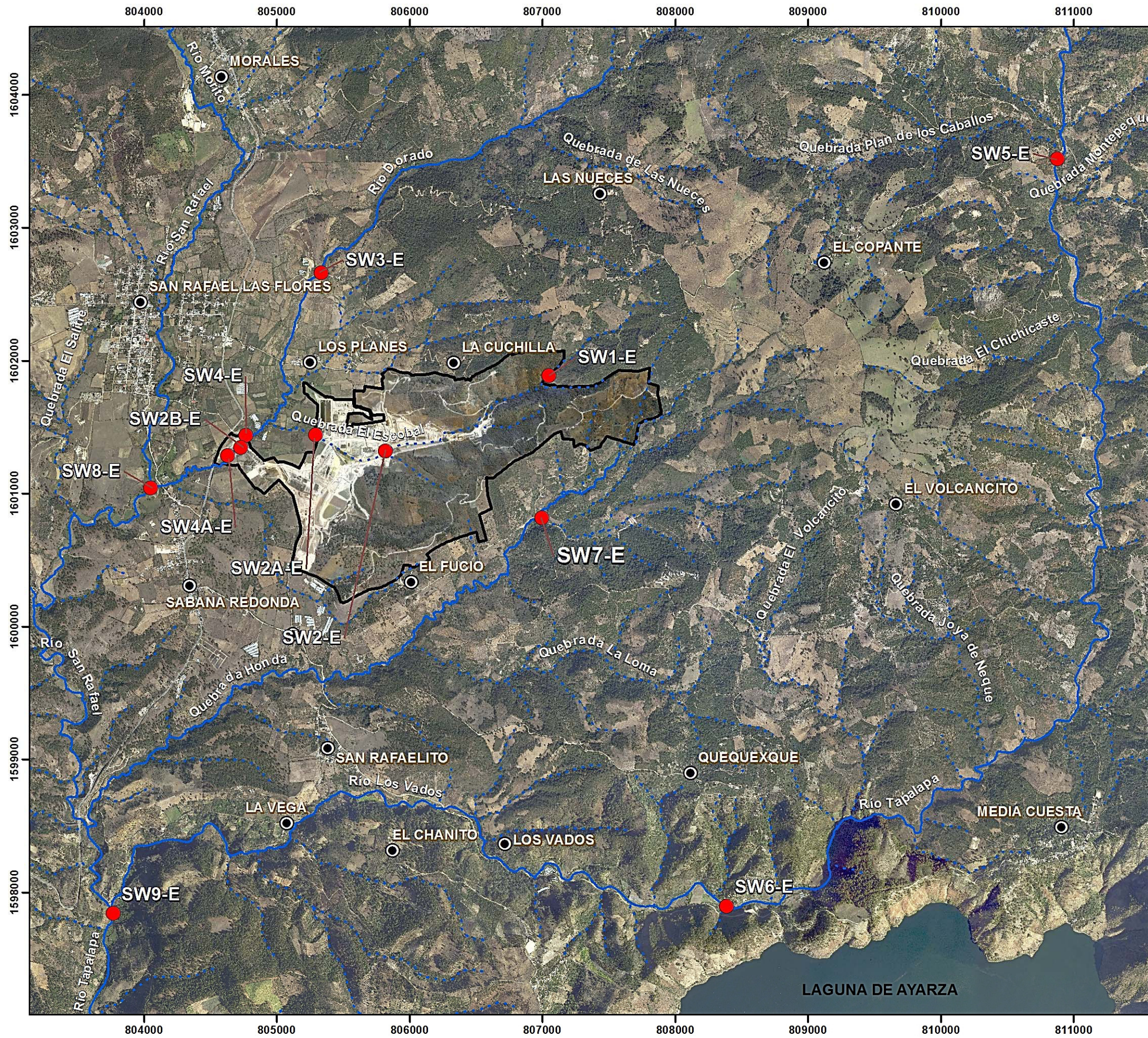
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua 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	
SW-9	803,772	1,597,635	Río Tapalapa, aguas abajo (cercano a la Ceibita)	Noviembre 2011 a Diciembre 2012
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, 2015.



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 Intermittente

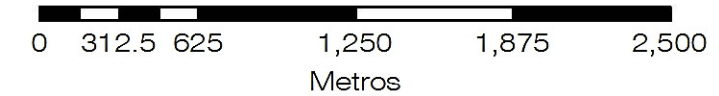
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW6-E	808385	1597892
	SW7-E	806995	1600815
	SW8-E	804048	1601037
	SW9-E	803766	1597838

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-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.

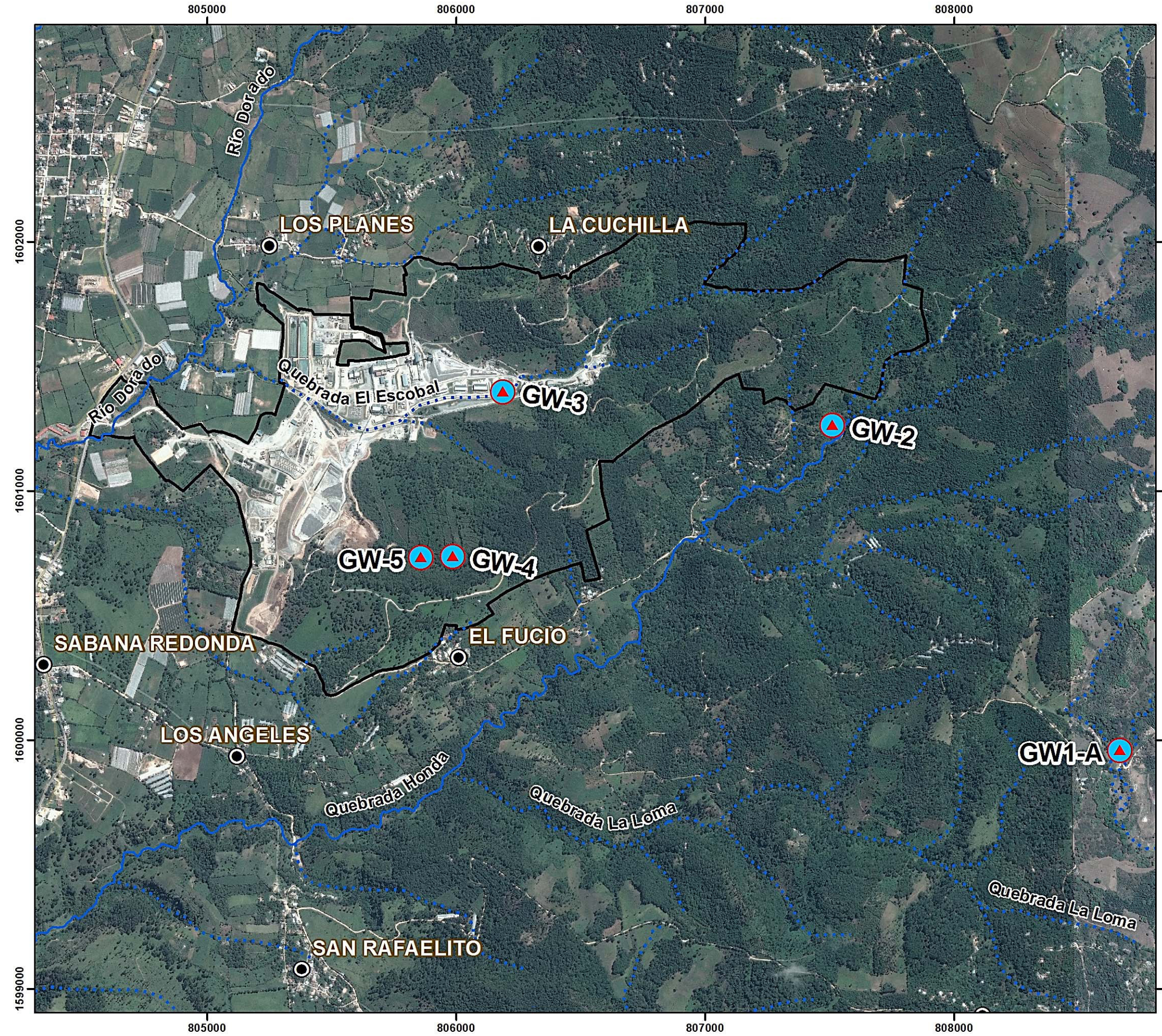
Fecha de Elaboración: Enero de 2015

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)

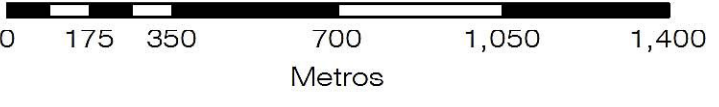
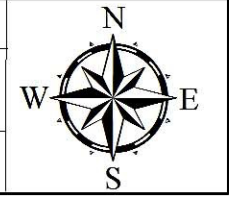
Símbolo	Estación	X	Y
	GW-1A	808664	1599957
	GW-2	807509	1601262
	GW-3	806187	1601397
	GW-4	805986	1600736
	GW-5	805858	1600731

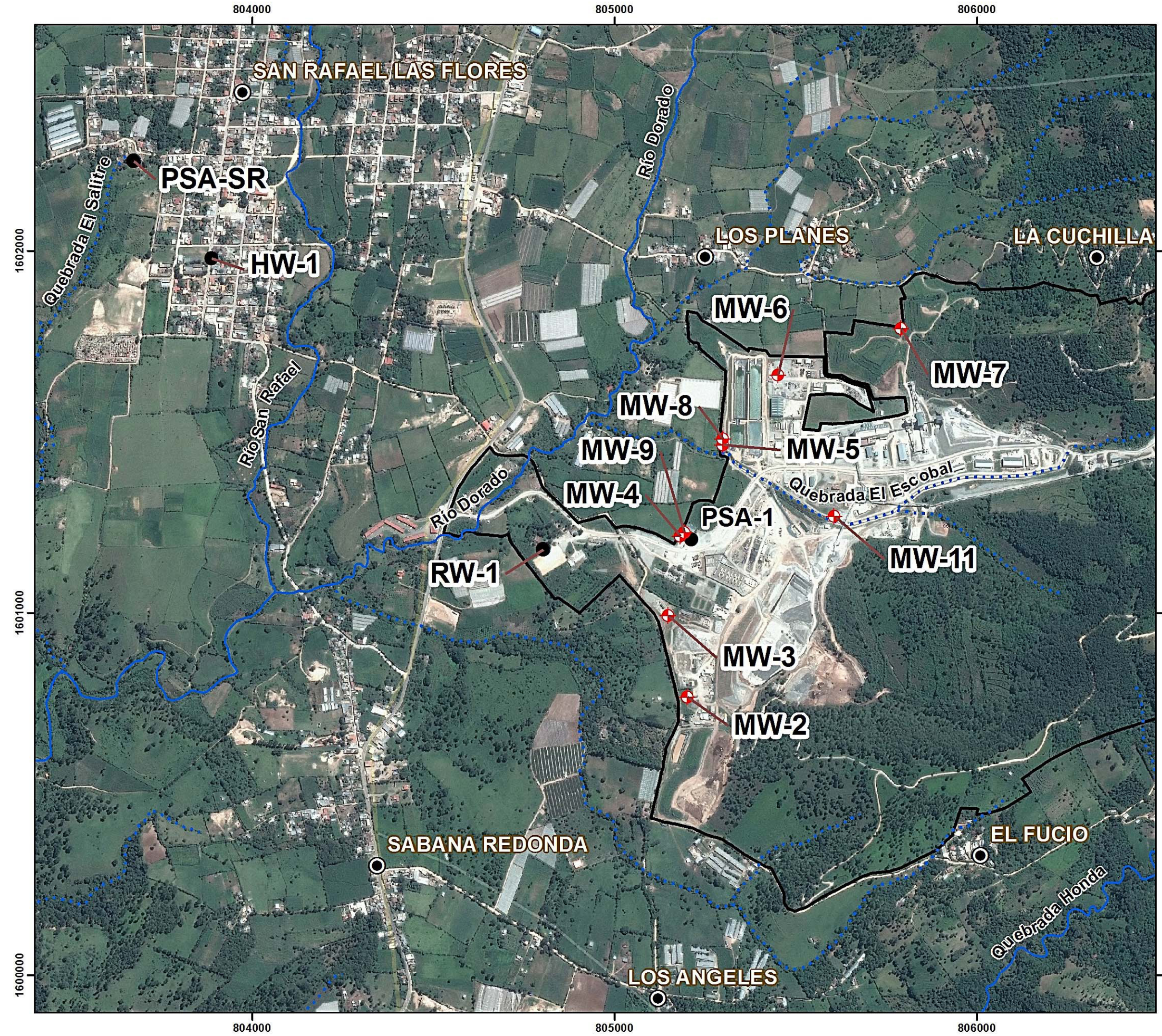
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2008 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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 Intermitente

ESTACIONES DE MONITOREO (POZOS)

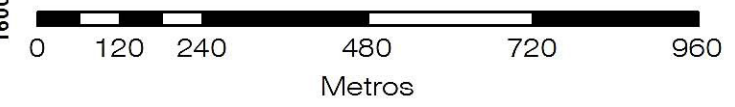
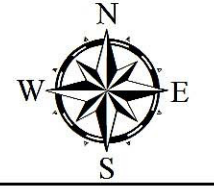
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	MW-2	805201	1600768	
	MW-3	805148	1600993	
	MW-4	805181	1601212	
	MW-5	805299	1601463	
	MW-6	805452	1601657	
	MW-7	805791	1601785	
	MW-8	805298	1601480	
	MW-9	805192	1601222	
	MW-11	805607	1601267	
		RW-1	804803	1601175
		PSA-SR	803672	1602247
HW-1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

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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 Intermittente

ESTACIONES DE MONITOREO

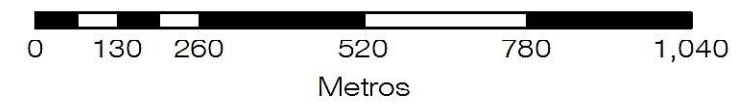
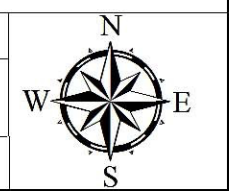
Símbolo	Estación	X	Y
	PSA-1	805212	1601203
	PSA-SR	803672	1602247

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas cartográficas 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 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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, 2015.

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 Diciembre 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, potasio disuelto y sodio disuelto (MW20). 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	mg/L	<10	N/A	N/A	<10	<10	N/A	N/A	N/A	N/A
Coliformes Fecales	NMP/100 ml	<2	<2	<2	23	240	<2	<2	<2	<2
Color Aparente	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	78	493
Color Real	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	42	117
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	0.04	0.06	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0095	0.0095	0.0006	0.0005	<0.0004	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0088	0.01	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.0072	0.0072	0.0023	0.0025	0.0017	0.0016
Arsénico Total		<0.0002	NA	NA	0.0067	0.0078	NA			
Bario Disuelto		<0.003	<0.003	<0.003	0.058	0.057	0.085	0.085	0.056	0.056
Bario Total		<0.003	NA	NA	0.061	0.059	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	0.09	0.08	<0.01	<0.01	0.02	0.02
Boro Total		<0.01	NA	NA	0.1	0.09	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		<0.1	<0.1	0.2	371	370	50.7	50.3	49.8	50.3
Calcio Total		<0.1	NA	NA	369	380	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	0.05	0.04	7.65	7.50
Hierro Total		<0.02	NA	NA	<0.02	0.02	NA			
Plomo Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Plomo Total		<0.0001	NA	NA	0.0005	0.0006	NA			
Litio Disuelto	<0.008	<0.008	<0.008	0.093	0.091	<0.008	<0.008	0.01	0.010	
Litio Total	<0.008	NA	NA	0.091	0.085	NA				

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
Magnesio Disuelto		<0.2	<0.2	<0.2	19.9	19.7	10	10	8.6	8.6
Magnesio Total		<0.2	NA	NA	20	19.3	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.02	0.02	0.051	0.05	0.111	0.109
Manganeso Total		<0.005	NA	NA	0.027	0.028	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	0.3	10.3	10.3	7.1	7.1	4.3	4.3
Potasio Total		<0.2	NA	NA	11.1	10.4	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	0.0004	0.0004	0.0003	0.0002	<0.0001	<0.001
Selenio Total		<0.0001	NA	NA	0.0004	0.0004	NA			
Plata Disuelta		<0.00005	<7x10 ⁻⁵	<5x10 ⁻⁵	<0.00005	<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵
Plata Total		<0.00005	NA	NA	<0.00005	<0.00005	NA			
Sodio Disuelto		<0.2	<0.2	0.4	67	66.9	17.7	17.6	26.2	26.4
Sodio Total		<0.2	NA	NA	74	68	NA			
Estroncio Disuelto		<0.005	<0.005	<0.005	3.98	4.04	0.273	0.270	0.377	0.379
Estroncio Total		<0.005	NA	NA	4.51	4.12	NA			
Talio Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Talio Total		<0.0001	NA	NA	0.0002	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	0.016	0.016	<0.005	<0.005	<0.005	<0.005
Titanio Total		<0.005	NA	NA	0.005	<0.005	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Uranio Total		<0.0001	NA	NA	0.0001	0.0001	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	0.008	0.009	<0.005	<0.005	<0.005	<0.005
Vanadio Total		<0.005	NA	NA	0.011	0.011	NA			
Zinc Disuelto		<0.01	<0.01	<0.01	<0.01	<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	64.5	65.2	6.3	6.2	9.5	8.6
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	1.18	1.18	<0.003	0.17	0.66	0.61
Nitratos/Nitritos como N		<0.02	<0.02	<0.02	3.54	3.49	2.8	2.83	0.6	<0.02
Amonio		<0.05	<0.05	<0.05	0.19	0.19	<0.05	<0.05	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)		<0.1	<0.1	<0.1	0.4	0.5	0.2	0.2	<0.1	0.1
Fosfatos		<0.03	<0.03	<0.03	0.03	0.03	0.12	0.06	0.43	0.40
Fósforo Disuelto (Orto)		<0.01	<0.01	<0.01	0.01	0.01	0.03	0.03	0.01	0.02
Fósforo Total		<0.01	<0.01	<0.01	0.02	0.01	0.02	0.02	0.15	0.15
STD (TDS)		<10	<10	<10	1620	1610	354	366	336	346
SST (TSS)		<5	<5	<5	<5	<5	<5	<5	18.0	22.0
ST (TS)		<10	<10	<10	1700	1680	368	366	362	366
Sulfatos		<1	<1	<1	1050	1010	125	126	86.8	88.8
Alcalinidad Total	mg/L	<2	<2	<2	39.8	50.3	74.8	74.9	129	145

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
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, 2015.

4.3.2 Agua Superficial

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

Las estaciones muestreadas presentaron un pH levemente alcalino (7.17 a 8.81 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 10-29 mg/L, y no sobrepasaron el valor guía establecido por el Banco Mundial (125 mg/L). 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 dos 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.

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, a excepción de las estaciones SW2-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. El Antimonio fue detectado en siete estaciones, y se detectó en un rango de concentración de 0.0005 – 0.01 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 ligeramente 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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	8.15	7.42	6.56	7.87	8.81				7.85
Temperatura (campo)	°C				17.4	13	19.8	17.3	22.4	20.3	25.6	26.6				26.4
Conductividad (campo)	µS/cm				277.9	66.3	566.6	184.6	807.3	177.3	1965	1898				1902
Oxígeno disuelto (campo)					3.6	0.1	6.4	7.64	4.76	3.5	5.8	7.02				7.28
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							49				23				240
Color Aparente	U Pt/Co				NR	NR	NR	17	NR	NR	NR	<1				<1
Color Real								<1				<1				<1
Turbidez	NTU							9.50				1.43				13.07
Aluminio Disuelto					0.035	<0.03	0.09	<0.03	0.043	<0.03	0.12	0.04				<0.03
Aluminio Total		0.2			5.02	<0.03	35.1	0.3	2.35	0.06	8.77	<0.03				0.06
Antimonio Disuelto					<0.0004	<0.0004	0.0006	<0.0004	<0.0004	<0.0004	<0.0004	0.0092				0.0095
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	<0.0004	<0.0004	<0.0004	0.0005	0.0095				0.01
Arsénico Disuelto					0.00216	0.0005	0.0034	0.0018	0.00184	0.0013	0.0024	0.0084				0.0072
Arsénico Total		0.01		0.1	0.00339	0.0015	0.0094	0.0022	0.00266	0.0012	0.0054	0.009				0.0078
Bario Disuelto					0.1361	0.086	0.207	0.086	0.109	0.088	0.133	0.052				0.057
Bario Total		1			0.186	0.1	0.434	0.091	0.131	0.096	0.186	0.051				0.059
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	<0.04				<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	0.1				0.08
Boro Total					<0.01	<0.01	0.02	0.01	0.11	<0.01	0.28	0.11				0.09
Cadmio Disuelto					<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	0.0007	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	NR	NR	NR	<0.0001
Calcio Disuelto					45.2	18.9	74.5	23.1	144.9	20.7	333	376				370
Calcio Total					45.5	20.9	70.5	22.6	144.6	20.5	331	378				380
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	0.14	1.3	0.06	5.19	<0.02				0.02
Plomo Disuelto					<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001	0.0002				0.0002
Plomo Total		0.015		0.4	0.0025	<0.0001	0.0191	0.0004	0.00088	<0.0001	0.0038	0.0014				0.0006
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.086				0.091
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.089				0.085
Magnesio Disuelto					3.9	2.6	5.3	3	15.9	3.2	37.3	20.6				19.7
Magnesio Total					4.2	2.8	5.2	3.1	15.1	3.6	32.2	21.5				19.3
Manganeso Disuelto					0.0051	<0.005	0.02	<0.005	0.0195	<0.005	0.07	<0.005				0.02
Manganeso Total		0.4			0.1041	<0.005	0.721	<0.005	0.0602	0.007	0.174	0.006				0.028
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	0.03				<0.02
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	0.04				<0.02

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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Níquel Disuelto	mg/L				<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	4.1	6.1	4.9	7.6	14.5					10.3	
Potasio Total				5.3	3.5	13	4.3	6.3	5.2	7.4	15.5					10.4	
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	0.00045	<0.0001	0.0002	0.0011					0.0004	
Selenio Total		0.17		0.0001	<0.0001	0.0003	0.0001	0.00011	<0.0001	0.0002	0.0012					0.0004	
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	0.0001	<0.00005	<0.00005	0.00006	<0.00005					<0.00005	
Sodio Disuelto				9.81	8.3	11.6	8	40.1	9.4	87.8	70.3					66.9	
Sodio Total				9.46	7.8	11.8	8.7	39.8	9.4	85.2	76.8					68	
Estroncio Disuelto				0.17	0.09	0.26	0.116	1.23	0.1	2.99	3.91					4.04	
Estroncio Total				0.18	0.1	0.25	0.129	1.23	0.11	2.91	4.32					4.12	
Talio Disuelto				<0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	0.0001	0.0002					0.0002	
Talio Total		0.002		<0.0001	<0.0001	0.0004	<0.0001	0.0001	<0.0001	0.0002	0.0002					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	0.005					0.016	
Titanio Total				0.092	<0.005	0.591	0.012	0.2715	<0.005	0.171	<0.005					<0.005	
Uranio Disuelto				0.00013	<0.0001	0.0003	<0.0001	0.00028	<0.0001	0.0006	0.0002					0.0001	
Uranio Total				0.00038	<0.0001	0.0011	<0.0001	0.00024	<0.0001	0.0005	0.0002					0.0001	
Vanadio Disuelto				<0.005	<0.005	0.007	<0.005	0.0065	<0.005	0.015	0.012			NR	NR	NR	0.009
Vanadio Total				0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	0.008					0.011	
Zinc Disuelto				0.053	<0.01	0.1	<0.01	0.046	<0.02	0.1	<0.01					<0.01	
Zinc Total		7.4		0.064	<0.01	0.12	<0.01	0.041	<0.01	0.06	<0.01					<0.01	
Grasas y Aceites					10	10	<2.062	<2.062	<2.248	<2	<2.04	<2.04	<2.04	<2		<2	
DQO					125		15.7	<10	40	13	<2.04	<2.04	<2.04	15		<10	
Cloruros		250		5	4	7	5.7	<2.04	<2.04	<2.04	70.5					65.2	
Cianuro Total		0.14		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	11	0.6	0.1	1.2	1.35					1.18	
Nitratos/Nitritos como N				1.61	0.08	4.87	1.16	2.46	0.03	4.9	5.66					3.49	
Amonio				<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	0.35					0.19	
Nitrógeno Kjeldahl (TKN)			3.53	<0.1	25.9	0.2	0.32	<0.1	0.8	0.6					0.5		
Fosfatos			0.185	0.1	0.3	0.16	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	0.37	0.04	2.51	0.05	0.08	0.03	0.19	0.02					0.01		
STD (TDS)	500		225	170	280	144	754	170	1620	1670					1610		
SST (TSS)		50	163.6	<5	780	<5	67	<5	320	<5					<5		
ST (TS)			346.3	200	1080	172	850	230	1660	1740					1680		
Sulfatos	250		26.3	10	42	18.7	472.6	14	1600	964					1010		
Alcalinidad Total			104	38	161	62.8	80	44	119	30.2					50.3		
Hidrocarburos totales (TPH)			<0.1	<0.09	<0.1	1.3	<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, 2015.

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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	7.80	7.4	6.56	7.94	7.45				7.67
Temperatura (campo)	°C				19.8	17	24	19.5	21	17.2	24	20.8				22.5
Conductividad (campo)	µS/cm				219.7	80	374.5	170.3	308.9	120	612	772.3				1150
Oxígeno disuelto (campo)					3.8	0.1	6.8	7.69	4.2	0.1	7.5	7.18				7.31
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							70				1.6 x 10 ⁴				2.4 x 10 ³
Color Aparente	U Pt/Co				NR	NR	NR	41	NR	NR	NR	17				31
Color Real								<1				<1				<1
Turbidez	NTU							7.39				10.5				15.1
Aluminio Disuelto					0.061	<0.03	0.15	0.06	0.03	<0.03	0.1	<0.03				<0.03
Aluminio Total		0.2			3.25	<0.03	17.4	0.91	5.72	0.1	36	0.21				0.2
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0019				0.0036
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.0012	0.0005	0.0037	0.0019				0.0037
Arsénico Disuelto					0.00797	0.0041	0.0139	0.0112	0.00541	0.0039	0.0072	0.0049				0.006
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0112	0.00873	0.0043	0.0326	0.0055				0.006
Bario Disuelto					0.0915	0.051	0.118	0.069	0.1645	0.08	0.234	0.138				0.12
Bario Total		1			0.12445455	0.098	0.253	0.079	0.2356	0.144	0.567	0.14				0.127
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	0.02				0.04
Boro Total					<0.01	<0.01	0.02	<0.01	0.012	<0.01	0.02	0.04				0.05
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	21.9	37.4	18.5	61.7	124				193
Calcio Total					27.9272727	12.3	38.7	22.9	38.3	17.2	58.9	123				202
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	0.05	0.032	<0.02	0.15	0.03				<0.02
Hierro Total		0.3			1.9	0.06	10.2	0.4	3.8	0.09	26.5	0.29				0.17
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	0.0004	0.003	<0.0001	0.0198	0.0006				0.0006
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.018				0.038
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.018				0.036
Magnesio Disuelto					2.6	1.3	3.5	1.8	4.2	2.4	7.3	9.4				12.4
Magnesio Total					2.7	1.6	3.5	1.9	4.6	2.5	7.3	9.7				12.6
Manganeso Disuelto					0.07418182	0.01	0.381	0.024	0.116	0.011	0.26	0.221				0.16
Manganeso Total		0.4			0.14745455	0.025	0.403	0.038	0.2844	0.101	1.23	0.226				0.171
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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14			
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo				
Molibdeno Total	mg/L	0.61		2	0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.02			
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.02	<0.008				<0.008			
Níquel Total					<0.01	<0.01	0.05	<0.008	0.01	<0.01	0.06	<0.008				<0.008			
Potasio Disuelto					4.2	3.5	5.5	3.1	5.8	4.2	8.7	6.9				7.9			
Potasio Total					4.5	3.6	7	3.3	6.5	4.4	11.7	7.2				8.1			
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	0.00014	<0.0001	0.0005	0.0002				0.0002			
Selenio Total					<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0002				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				<0.00005			
Sodio Disuelto					12.65	7.7	16.6	8.8	12.44	9	15.6	26.3				37.3			
Sodio Total					12.17	7.5	15.4	9.1	12.13	8.6	15.2	28.2				39.1			
Estroncio Disuelto					0.19	0.06	0.3	0.146	0.22	0.09	0.36	1.08				1.87			
Estroncio Total					0.18818182	0.08	0.3	0.155	0.228	0.11	0.33	1.18				1.97			
Talio Disuelto					<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	<0.0001				<0.0001			
Talio Total					<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007	<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	<0.005	<0.005				0.014			
Titanio Total					0.071	<0.005	0.307	0.021	0.127	0.005	0.534	0.012				0.008			
Uranio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0004	0.0001				0.0002			
Uranio Total					0.00019	<0.0001	0.0005	<0.0001	0.00027	<0.0001	0.0009	0.0001				0.0002			
Vanadio Disuelto					<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	<0.005				<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	<0.01	1.01	<0.01	0.065	0.01	0.17	<0.01				<0.01			
Grasas y Aceites						10	10	<2.062	<2.04	<2.326	<2	<2.062				<2.02	<2.084	<2	<2
DQO						125		10.9	<10	40	29	16.8				<10	60	<10	18
Cloruros					250			2.7	2	3	2.4	8.5				4	16	23	35.9
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	0.17	0.15				0.1	0.2	0.37	0.62
Nitratos/Nitritos como N								0.59	<0.02	1.51	0.32	4.49				1.96	10.1	3.77	3.69
Amonio								0.05	<0.05	0.21	<0.05	0.059				<0.05	0.15	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)								0.35	<0.1	0.6	0.2	0.58				0.1	1.3	0.4	0.1
Fosfatos								0.12	0.1	0.4	0.06	0.36				0.1	1.2	0.22	0.19
Fósforo Disuelto (Orto)								0.04	0.02	0.12	0.03	0.12				0.03	0.39	0.07	0.07
Fósforo Total						2	10	0.05	0.02	0.14	0.03	0.17				0.04	0.39	0.09	0.07
STD (TDS)					500			183.636364	140	220	154	233.6				150	350	608	926
SST (TSS)						50	100	48	5	340	<5	115				<5	880	<5	<5
ST (TS)				231.8	140	500	168	378.2	260	1180	632	930							
Sulfatos	250			16.9	4	25	17.1	27.5	10	57	292	490							
Alcalinidad Total				83	38	118	69.6	80	45	102	81.4	74.3							
Hidrocarburos totales (TPH)				<0.1	<0.09	<0.2	<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, 2015.

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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	7.38	7.4	7.1	7.8	7.37	7.5	6.9	8	7.17
Temperatura (campo)	°C				17.4	14.5	21.5	15.5	19.4	12.2	27.3	16.7	18.7	15	21.3	16.8
Conductividad (campo)	µS/cm				72.1	0.1	160.2	156.1	259	60	948	112.7	216	120	416.2	117.4
Oxígeno disuelto (campo)	mg/L				4	0	8	8.04	4	0	8.3	8.3	3.9	0.1	7.5	7.72
Cr VI								<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml				NR	NR	NR	5.4 x 10 ³	NR	NR	NR	2.4 x 10 ³	NR	NR	NR	2.4 x 10 ³
Color Aparente	U Pt/Co							31				29				84
Color Real								<1				<1				13
Turbidez	NTU							6.62				8.54				20.0
Aluminio Disuelto	mg/L				0.055	<0.03	0.14	<0.03	0.031	<0.03	0.08	0.05	0.033	<0.03	0.13	<0.03
Aluminio Total		0.2			1.09	<0.03	3.7	0.59	1.89	<0.03	8.1	0.57	3.05	0.1	16.4	2.49
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	0.0005
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0005	<0.0004	0.0007	0.0007
Arsénico Disuelto					0.00139	0.0005	0.0024	0.0014	0.0032	0.0007	0.0076	0.0018	0.00382	0.0022	0.0054	0.0034
Arsénico Total		0.01	0.1		0.00177	0.0013	0.0028	0.0017	0.00387	0.0025	0.0074	0.0021	0.00446	0.003	0.0061	0.0043
Bario Disuelto					0.0447	0.023	0.072	0.034	0.0618	0.027	0.136	0.04	0.0946	0.052	0.143	0.055
Bario Total		1			0.0556	0.039	0.069	0.044	0.0806	0.055	0.136	0.049	0.2142	0.088	0.99	0.078
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	0.05	<0.01	<0.01	0.01	0.01
Boro Total					0.01	<0.01	0.02	<0.01	0.379	<0.01	1.93	0.06	0.013	<0.01	0.02	0.01
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	<0.0001	<0.0001	<0.0001	0.0003	<0.0001
Calcio Disuelto					7.9	3.4	13.7	6.2	15.1	5.4	38.9	8.7	23.1	11.2	38.1	11.7
Calcio Total					7.73	3.4	13.1	5.9	14.81	5.9	37.5	8.7	23.04	11.5	36.7	12
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	<0.01	<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
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	0.04	0.097	<0.02	0.28	0.05	0.022	<0.02	0.07	<0.02
Hierro Total		0.3			0.7	0.16	1.8	0.46	1.3	0.33	4.8	0.43	1.8	0.08	9.5	1.08
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	0.0002	0.0007	<0.0001	0.0028	0.0002	0.0015	<0.0001	0.0083	0.001
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	0.13	<0.02	0.67	0.016	<0.02	<0.02	<0.02	<0.008
Litio Total					<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.02	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					1.5	0.8	2.5	1.2	3	1.4	7.4	1.8	4.1	2.2	6.4	2.2
Magnesio Total					1.5	0.9	2.5	1.4	3.1	1.8	7.5	2	4.3	2.6	6.5	2.4
Manganeso Disuelto					0.025	0.006	0.047	0.009	0.114	<0.005	0.551	0.009	0.032	0.014	0.074	0.01
Manganeso Total		0.4			0.0406	0.014	0.062	0.021	0.1482	0.04	0.543	0.021	0.0981	0.019	0.342	0.052
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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	2.9	4.1	3.6	5.4	3
Potasio Total					3	2.2	4.1	2.7	4.2	3.1	7.5	3.2	4.5	3.6	7	3.4
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	<0.0001	<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	<0.00005	<0.00005	<0.00005	0.00006	0.00006
Sodio Disuelto					6.34	3.7	10.8	4.4	32.16	6	135	9	11.69	8.7	15.4	7.2
Sodio Total					5.99	3.4	9.4	4.8	31.11	5.3	124	9.9	11.45	8.3	15.5	7.9
Estroncio Disuelto					0.06	0.02	0.09	0.049	0.12	0.03	0.33	0.065	0.17	0.07	0.29	0.083
Estroncio Total					0.057	0.02	0.08	0.06	0.122	0.04	0.35	0.078	0.174	0.09	0.28	0.098
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	<0.0001	<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	0.018	0.05	<0.005	0.22	0.02	0.069	<0.005	0.325	0.074
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	<0.0001	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	<0.005
Vanadio Total					<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.005	<0.005	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	<0.01	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	<10	10	<10	40	20
Cloruros		250			1.8	1	3	1.6	43.9	3	230	6.7	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	0.08	0.11	<0.1	0.3	0.10	<0.1	0.2	0.1	0.12
Nitratos/Nitritos como N					0.13	0.03	0.42	0.11	0.3	<0.02	1.22	0.16	<0.1	3.53	0.19	0.36
Amonio					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)					0.21	<0.1	0.4	0.2	0.2	0.1	0.5	0.2	<0.1	0.7	0.4	0.3
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	0.02	0.03	<0.01	0.09	0.01	0.03	0.08	0.03	0.04
Fósforo Total			2	10	0.02	<0.01	0.05	0.02	0.04	0.02	0.08	0.02	0.03	0.19	0.19	0.06
STD (TDS)		500			84	60	110	74	187	90	540	102	140	240	100	120
SST (TSS)			50	100	9	<5	32	<5	21	<5	105	<5	<5	330	6	13.0
ST (TS)					97	70	130	88	221	120	550	120	150	610	140	158
Sulfatos		250			16.5	<10	47	8.8	14	<10	23	11.5	9	38	19.4	9.3
Alcalinidad Total					25	13	43	22.7	48	22	108	33.6	30	101	54	45.1
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, 2015.

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			Dic-14	Línea Base			Dic-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	7.3	7.86	7.5	10.7	8.12
Temperatura (campo)	°C				22.1	18.9	25.1	20.4	21.8	19.1	24.2	19.4
Conductividad (campo)	µS/cm				363.7	186.8	807.6	578.9	267.4	121.8	518	347.1
Oxígeno disuelto (campo)					5.14	0.28	7.48	6.65	6.2	0.8	8.5	7.96
Cr VI	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO					15	15	25	<10	<10	<10	<10	<10
Coliformes Fecales	NMP/100ml				2x10 ⁶	2x10 ⁴	5x10 ⁶	1.6 x 10 ⁴	9x10 ⁴	1x10 ²	2x10 ⁵	3.5 x 10 ³
Color Aparente	U Pt/Co				172	19	351	60	342	29	824	27
Color Real					20	22	36	<1	43	10	60	<1
Turbidez	NTU				14.15	6.09	22.2	6.84	25.72	4.93	46.5	5.50
Aluminio Disuelto	mg/L				0.033	<0.03	0.06	<0.03	0.087	<0.03	0.22	<0.03
Aluminio Total		0.2			2.39	0.04	7.35	0.18	2.96	0.4	8.6	0.39
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0011	0.0006	<0.0004	0.0013	0.0004
Antimonio Total		0.006			0.001	<0.0004	0.0027	0.0011	0.0007	<0.0004	0.0012	0.0005
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0041	0.004	0.0023	0.0057	0.0034
Arsénico Total		0.01		0.1	0.006	0.0041	0.0096	0.0043	0.0042	0.002	0.006	0.0034
Bario Disuelto					0.107	0.074	0.143	0.107	0.094	0.056	0.135	0.072
Bario Total		1			0.136	0.102	0.185	0.12	0.121	0.09	0.154	0.081
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	0.02	0.043	<0.01	0.09	0.06
Boro Total					0.023	<0.01	0.06	0.03	0.041	<0.01	0.1	0.07
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	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Calcio Disuelto					50.4	17.5	156	70.3	35.7	18.2	78.3	38.2
Calcio Total					52.1	18.6	156	72.9	36.2	18.5	79.7	38.3
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	<0.01
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	0.18	0.09	<0.02	0.17	0.06
Hierro Total		0.3			1.53	0.05	4.36	0.58	1	0.25	2.2	0.37
Plomo Disuelto					0.0001	<0.0001	0.0003	0.0001	0.0002	<0.0001	0.0005	<0.0001
Plomo Total		0.015		0.4	0.003	<0.0001	0.0089	0.0005	0.0022	0.0002	0.008	0.0003
Litio Disuelto				<0.02	<0.02	0.04	0.014	<0.02	<0.02	0.04	0.021	
Litio Total				<0.02	<0.02	0.04	0.016	<0.02	<0.02	0.04	0.024	
Magnesio Disuelto				6.3	3.2	14.7	6.3	6	3.3	9.7	5.2	
Magnesio Total				6.6	3.3	14.8	6.6	6.2	3.4	10.1	5.4	
Manganeso Disuelto				0.095	0.009	0.118	0.149	0.057	0.023	0.148	0.012	
Manganeso Total	0.4			0.1808	0.047	0.349	0.178	0.115	0.043	0.187	0.025	
Mercurio Disuelto				<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	

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			Dic-14	Línea Base			Dic-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Disuelto					<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	7.4	6	4.5	8.1	5.3
Potasio Total					6.8	6.4	7.8	8	6.1	4.8	8.5	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	0.0001	<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
Plata Total					<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					18.8	12.3	33.7	23.1	17.6	10.7	26.9	18.2
Sodio Total					18.4	12.9	34.3	25.8	17.4	11	28.5	20
Estroncio Disuelto					0.44	0.16	1.5	0.698	0.29	0.14	0.71	0.335
Estroncio Total					0.44	0.16	1.48	0.812	0.295	0.14	0.73	0.388
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	<0.0001	<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
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	0.007	<0.005	<0.005	0.009	<0.005
Titanio Total					0.069	<0.005	0.195	0.013	0.084	0.015	0.237	0.017
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	<0.0001	0.00022	0.0002	0.0003	<0.0001
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	<0.005	0.0054	<0.005	0.012	<0.005
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	<0.01	<0.01	<0.01	0.03	<0.01
Grasas y Aceites			10	10	<2.04	<2.02	<2.062	<2	<2.02	<2.02	<5	<2
DQO			125		20	<10	40	19	17.8	<10	35	14
Cloruros		250			10	7	19	17.6	12	6	20	15.4
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	0.30	0.006	<0.003	0.013	0.23
Nitratos/Nitritos como N					3.07	2.01	5.23	2.27	1.97	1.14	3.85	1.24
Amonio					0.24	<0.05	0.58	0.92	0.129	<0.05	0.22	<0.05
Nitrógeno Kjeldahl (TKN)					0.74	<0.1	1.6	2	0.57	0.3	0.9	0.7
Fosfatos					0.55	0.3	1	0.68	0.49	0.22	1.3	0.31
Fósforo Disuelto (Orto)					0.18	0.08	0.33	0.17	0.18	0.09	0.49	0.10
Fósforo Total			2	10	0.27	0.12	0.51	0.31	0.25	0.09	0.58	0.11
STD (TDS)		500			312	160	750	414	255	160	440	268
SST (TSS)			50	100	34	<5	102	5.0	73	<5	340	<5
ST (TS)					362	180	750	440	310	200	450	302
Sulfatos		250			91	22	360	163	60	25	169	79.3
Alcalinidad Total					79	50	110	78.4	70	45	90	64.8
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, 2015.

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 materia flotante, color real y aparente en las estaciones GW1, GW4 y GW5 están sobre los límites establecidos.

La temperatura de las estaciones muestreadas se encontró entre 17.9 y 21.2 °C. La lectura menor de pH se obtuvo en la estación GW-4 (5.73 u.e.) y la mayor en la estación GW-1A (7.17 u.e.). Los Sólidos Suspendidos Totales (**SST**) se registraron en las estaciones GW-1A y GW-2 (6.0 y 5.0 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. 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 GW4; 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, Boro, Cobalto, Cobre, Cromo, Galio, Litio, Cromo hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Talio, Estaño, Plata, Uranio y Vanadio no fueron detectados en ninguna de las estaciones. El Selenio fue detectado en las estaciones GW3 (0.0002 mg/L) y GW-5 (0.0001 mg/L) por debajo de la guía de la USEPA (0.17mg/L). El Antimonio fue detectado en las estaciones GW2 y GW3 en concentraciones por debajo de la guía dada por la USEPA (0.01 mg/L). El Plomo se registró en GW4 y GW5 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 Fucio				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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	7.17	6.54	6.01	7.16	6.66	6.54	6.21	7.13	6.28	6.13	6.13	6.13	5.73	6.05			
Temperatura de campo	°C				15.2	14.8	15.6	20.3	21.4	19	23.7	17.9	19.4	18.5	21	21.2	18.1	18.1	18.1	18.1	19.8			
Conductividad de campo	µS/cm				229.8	223	236.5	263.8	323.4	111.3	500.5	130.7	315.3	236.7	501.1	433.8	147.3	147.3	147.3	118.9	107.7			
Oxígeno Disuelto de campo	mg/L				0.1	0.03	0.17	6.15	1.18	0.13	2.35	7.08	0.68	0.03	1.26	5.07	0.14	0.14	0.14	3.55	6.03			
Turbidez	NTU							21.4				27.7				1.10				139	117			
Materia Flotante				Ausente				Ausente				Presente				Ausente				Presente	Ausente			
Color aparente	u Pt/Co			500	NR	NR	NR	166	NR	NR	NR	153	NR	NR	NR	<1	NR	NR	NR	1263	882			
Color Real	u Pt/Co							62				10				<1				782	561			
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05	<0.05			
Coliformes Fecales	NMP/100mL			<1x10 ⁴				4.5				240				<2				<2	<2			
Aluminio Disuelto	mg/L	0.2			<0.03	<0.03	<0.03	0.1	0.075	<0.03	0.24	0.16	<0.03	<0.03	0.04	<0.03	1.42	1.42	1.42	0.84	0.25			
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	0.00078	<0.0004	0.0011	0.0006	0.0004	<0.0004	0.001	0.0005	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Arsénico Disuelto		0.01	0.1		0.001	0.0008	0.0011	0.0009	0.0156	0.0043	0.0299	0.0063	0.0059	0.0037	0.0115	0.0025	0.0008	0.0008	0.0008	0.0005	0.0007	0.0007		
Bario Disuelto		1			0.025	0.022	0.028	0.013	0.24	0.125	0.451	0.091	0.186	0.102	0.328	0.085	0.127	0.127	0.127	0.127	0.242	0.066		
Berilio Disuelto		0.004			<0.01	<0.002	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.002	<0.01	<0.002	<0.002	<0.002	<0.01	<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	<0.04	<0.04		
Boro 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	<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	<0.0001		
Calcio Disuelto					5.7	5.1	6.2	2.9	33.5	9.6	65.3	13.7	31.6	25.7	43.4	50.3	4.4	4.4	4.4	4.9	4.4	4.4		
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	<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	<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	<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	<0.1		
Hierro Disuelto		0.3			0.02	<0.02	0.03	0.05	0.103	0.03	0.17	0.06	0.103	<0.02	0.33	0.04	0.74	0.74	0.74	0.57	0.09	0.09		
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	<0.0001	0.0009	0.0009	0.0009	0.0024	0.0003		
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	<0.008		
Magnesio Disuelto					3.1	2.9	3.3	1.4	5.9	1.8	12	2.5	4.9	3.3	8.3	10	2.6	2.6	2.6	3.1	2.6	2.6		
Manganeso Disuelto		0.05			<0.005	<0.005	<0.005	<0.005	0.123	0.02	0.356	0.015	0.057	<0.005	0.133	0.05	0.069	0.069	0.069	0.058	<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	<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	<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	<0.008	<0.008		
Potasio Disuelto					7.3	5.9	8.6	4.9	2.9	1.3	4.3	2.4	3.8	2.5	5	7.1	4.6	4.6	4.6	4.9	5.5	5.5		
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	<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	0.0002	<0.0001	<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	<0.00005		
Sodio Disuelto					17.6	16.9	18.2	13.1	13.5	7.2	22	8.3	11.5	9.3	16.4	17.6	10.3	10.3	10.3	10.1	10.1	10.1		
Estroncio Disuelto					0.03	0.03	0.03	0.022	0.26	0.08	0.56	0.105	0.2	0.12	0.37	0.27	0.03	0.03	0.03	0.052	0.039	0.039		
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	<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	<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	<0.005	0.042	0.042	0.042	0.029	0.007	0.007		
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	0.0007	0.0001	0.0001		
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.006	0.006	0.01	0.005	0.005		
Zinc Disuelto		7.4	10		<0.01	<0.01	<0.01	<0.01	<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	<0.01		
Cloruros		250			15	14	16	10.5	4	2	7	2.9	5	3	6	6.2	4	4	4	2	3.7	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	<0.003		
Fluoruros					<0.1	<0.1	<0.1	0.09	<0.1	<0.1	<0.1	0.12	0.15	0.1	0.2	0.17	<0.1	<0.1	<0.1	0.07	0.12	0.12		
Nitratos/Nitritos como N					2.19	1.9	2.48	0.55	0.74	0.14	1.1	0.05	1.19	0.05	3.16	2.83	0.07	0.07	0.07	0.02	0.41	0.41		
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	<0.05	<0.05		
Nitrógeno Kjeldahl (TKN)					0.7	0.3	1.1	0.7	0.63	0.2	0.9	0.5	0.46	<0.05	1.2	0.2	0.3	0.3	0.3	0.7	0.6	0.6		
Fosfatos					0.2	0.1	0.2	0.12	0.4	0.1	0.7	0.12	0.3	0.1	0.5	0.06	0.09	0.09	0.09	0.03	0.19	0.19		
Fósforo Total		2	10	0.1	0.02	0.17	0.06	0.18	0.09	0.27	0.08	0.1	0.05	0.15	0.02									

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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
STD (TDS)	mg/L	500			190	190	190	210	223	130	350	162	213	190	260	366	170	170	170	596	NR	NR	NR	476
SST (TSS)		50	100	6.5	6	7	6.0	7.7	6	9	5.0	39	5	105	<5	206	206	206	<5	<5				
ST (TS)				200	180	220	206	237.5	140	380	166	217.5	170	270	366	360	360	360	592	478				
Sulfatos		250		12.5	11	14	7.1	43	7	90	11.6	30	16	71	126	7	7	7	11.3	14.9				
Alcalinidad Total				31	31	31	24.4	0.18	0.09	0.27	51.2	83	71	97	74.9	35	35	35	39.0	36				

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, 2015.

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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	6.76	6.44	6.34	6.49	6.52	6.32	6.23	6.41	6.44	6.19	6.04	6.34	6.2
Temperatura de campo	°C				24.4	23.4	25.1	28.9	24.1	23.7	24.5	24.4	23.3	22.2	24.4	24.1	23.4	23	24.6	23.7
Conductividad de campo	µS/cm				427.5	211.9	1001.3	130.8	803.9	741.6	829.1	568.4	916.9	872.1	944.8	585.3	469.7	401.4	494.1	899.3
Oxígeno Disuelto de campo	mg/L				0.75	0.3	1.21	5.91	0.65	0.11	1.44	6.06	0.97	0.48	1.93	5.54	0.82	0.19	1.77	4.37
Turbidez	NTU							>1000								0.45				3.04
Materia flotante	Visual			Ausente				Presente								Ausente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	6665	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1
Color Real								98				<1				<1				<1
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2				4.5				<2
Aluminio Disuelto		0.2			0.038	<0.03	0.07	0.74	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Antimonio Disuelto		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
Arsénico Disuelto		0.01		0.1	0.0011	0.0008	0.0014	0.001	0.0023	0.0021	0.0027	0.0024	0.0023	0.0021	0.0028	0.0026	0.0013	0.001	0.0016	0.001
Bario Disuelto		1			0.03	0.024	0.039	0.12	0.036	0.032	0.041	0.035	0.042	0.038	0.047	0.031	0.162	0.157	0.166	0.043
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	0.06	0.078	0.06	0.09	0.06	0.015	<0.01	0.03	0.04
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	8.1	80.3	76.4	83.3	77.9	100	93	107	81.7	40.8	39.2	42.2	137
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	1.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Plomo Disuelto		0.015		0.4	<0.0001	<0.0001	0.0001	0.003	<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	0.013	<0.02	<0.02	0.02	0.012	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					3.5	2.4	6.1	2.5	10.3	10.1	10.7	9.5	11.3	10.9	11.6	8.9	7.3	6.8	7.6	18.4
Manganeso Disuelto		0.05			0.108	0.03	0.308	0.82	<0.005	<0.005	0.008	<0.005	0.009	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	<0.005
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto		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	3.1	4.2	3.9	4.6	4.1	4.7	4.5	5.2	4.3	6	5.5	6.5	8
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	0.0003	0.0003	0.0002	0.0003	0.0003	0.0004	0.0003	0.0004	0.0007
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
Sodio Disuelto					22	17.4	33.6	14.8	29.5	28.2	30.9	27.8	32.3	30.4	35.8	27.4	16.9	15.6	19.1	30.4
Estroncio Disuelto					0.18	0.07	0.46	0.058	0.74	0.71	0.77	0.727	0.89	0.84	0.98	0.744	0.27	0.26	0.29	0.484
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	0.027	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranio Disuelto					0.00016	<0.0001	0.0005	0.0005	0.0002	0.0002	0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0002	0.00033	0.0001	0.001	0.0004
Vanadio Disuelto					0.0059	<0.005	0.008	0.021	0.0055	<0.005	0.009	<0.005	0.006	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc Disuelto		7.4		10	0.031	<0.01	0.11	0.04	0.053	<0.01	0.1	0.02	<0.01	<0.01	0.1	<0.01	<0.01	<0.01	0.1	0.02
Cloruros		250			12	3	28	6.1	16	16	17	16.2	20	19	21	16	9	8	9	24
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	0.40	0.8	0.8	0.8	0.70	0.8	0.8	0.8	0.82	0.18	0.1	0.2	0.22
Nitratos/Nitritos como N					2.48	2.04	2.93	2.67	2.2	2.08	2.26	2.43	2.13	1.98	2.32	2.59	3.32	3	3.57	7.4
Amonio					<0.05	<0.05	<0.05	0.06	<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	1.9	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.3	<0.1

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Fosfatos	mg/L				0.233	0.21	0.27	0.16	0.315	0.27	0.37	0.28	0.248	0.24	0.27	0.25	0.203	0.15	0.24	0.12
Fósforo Total			2	10	0.24	0.06	0.44	0.33	0.09	0.08	0.1	0.08	0.07	0.06	0.08	0.06	0.06	0.05	0.07	0.03
STD (TDS)		500			253	190	360	268	470	460	480	476	553	540	560	494	305	290	320	746
SST (TSS)			50	100	345.8	137	584	476	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	7.0
ST (TS)					597.5	350	810	896	487.5	450	510	490	555	520	580	500	325	280	350	754
Sulfatos		250			28.5	4	97	10.3	166	162	169	175	212.5	210	220	182	72.3	64	76	341
Alcalinidad Total					64	56	80	46.3	84	82	86	82.2	85	83	88	88.8	66	61	68	102

u.e.: unidades exponenciales. mg/L: miligramos por litro. μ S/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, 2015.

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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	6.06	6.38	6.14	6.98	5.98	6.16	6.07	6.29	6.13	7.15	6.9	7.4	6.75
Temperatura de campo	°C				22.3	21.6	22.8	23.4	22.4	22	23.1	21.1	23.3	23.2	23.4	23.2	27.5	25.9	29	27.6
Conductividad de campo	µS/cm				538.2	342.9	752.6	1060	299.6	285.9	323.8	341.7	426.8	424.6	428.1	829	1595	1569	1621	458.9
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	4.09	0.61	0.25	1.19	3.55	0.72	0.16	1.45	3.86	0.38	0.35	0.41	2.02
Turbidez	NTU							0.86								0.28				6.82
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	493
Color Real								<1				<1				<1				117
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				49				<2				<2
Aluminio Disuelto		0.2			<0.03	<0.03	0.05	<0.03	0.053	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Antimonio Disuelto		0.01			0.00045	<0.0004	0.0012	<0.0004	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	0.0022	0.0034	0.0029	0.0041	0.0018	0.0021	0.0019	0.0024	0.0014	0.003	0.0007	0.0052	0.0016
Bario Disuelto		1			0.198	0.134	0.281	0.115	0.156	0.129	0.176	0.427	0.125	0.122	0.129	0.08	0.031	0.028	0.034	0.056
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	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.03	0.09	0.08	0.1	0.02
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	174	16.7	13.9	19.6	29.1	34.6	32.5	36.3	120	185.5	170	201	50.3
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	0.03	<0.02	<0.02	<0.02	<0.02	5.52	1.53	9.51	7.5
Plomo Disuelto		0.015	0.4		<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.0002	0.0002	<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	<0.008	0.07	0.07	0.07	0.01
Magnesio Disuelto					7.5	4.9	10.5	19.8	4.8	4.6	5	9.2	6.4	6.3	6.7	18.8	35.8	34.4	37.2	8.6
Manganeso Disuelto		0.05			<0.005	<0.005	0.006	0.007	0.0065	<0.005	0.012	0.02	0.019	0.012	0.029	<0.005	0.203	0.149	0.257	0.109
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	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto		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	8.8	6.2	5.4	6.8	8.5	4.8	4.6	5.1	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	0.0012	0.0002	0.0001	0.0002	<0.0001	0.0004	0.0003	0.0006	0.0005	<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	0.00007	<0.00005
Sodio Disuelto					14	12.3	17	26.5	19.1	15.4	27.5	18.6	15.2	15	15.6	27.9	45.1	44.7	45.4	26.4
Estroncio Disuelto					0.26	0.18	0.35	0.71	0.1	0.09	0.11	0.202	0.22	0.21	0.23	0.437	1.64	1.58	1.69	0.379
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	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranio Disuelto					0.00013	0.0001	0.0002	0.0006	<0.0001	<0.0001	0.0001	<0.0001	0.00017	0.0001	0.0002	0.0003	<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	0.07	0.034	<0.01	0.1	0.24	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Cloruros		250			11	6	17	19.9	11	9	12	13.1	6	6	6	22.7	37	36	37	8.6
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	0.13	0.13	0.1	0.2	0.12	0.17	0.1	0.2	0.14	2.55	2.5	2.6	0.61
Nitratos/Nitritos como N					5.08	4.42	6.15	18.2	4.75	4.08	5.24	2.38	2.76	2.63	2.83	5.75	<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	<0.1	0.21	<0.1	0.4	0.3	0.09	<0.1	0.2	<0.1	0.23	<0.1	0.4	0.1

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Fosfatos	mg/L				0.173	0.15	0.21	0.19	0.113	0.09	0.18	0.09	0.23	0.21	0.24	0.16	<0.03	<0.03	<0.03	0.40
Fósforo Total			2	10	0.05	0.04	0.06	0.06	0.04	0.01	0.07	0.03	0.07	0.06	0.08	0.05	<0.01	<0.01	0.02	0.15
STD (TDS)		500			340	260	440	886	233	220	250	306	277	270	290	704	905	890	920	346
SST (TSS)		50	100		<5	<5	<5	<5	19.75	7	45	<5	9	6	14	<5	27	25	29	22.0
ST (TS)					345	240	450	930	260	230	280	304	300	290	310	704	940	910	970	366
Sulfatos		250			85.3	33	153	404	19.3	17	23	62.5	54.7	54	55	313	440	440	440	88.8
Alcalinidad Total					65	62	68	92.9	48	41	60	76.5	68	66	70	81.1	147	136	157	145

u.e.: unidades exponenciales. mg/L: miligramos por litro. μ S/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, 2015.

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			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-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	7.74	7.45	7.45	7.45	7.22				7.22				6.56				7.27	
Temperatura de campo	°C				30.4	30.4	30.4	32	27.8	27.8	27.8	29.7				25.9				21.6				32	
Conductividad de campo	µS/cm				2.243	2.243	2.243	1558	663.9	663.9	663.9	921.4				976.7				1033				1277	
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	2.14	0.05	0.05	0.05	1.41				6.18				4.78				4.98	
Turbidez	NTU							6.85				3.03				3.2				6.73				2.88	
Materia flotante	Visual			Ausente				Ausente				NA				NA			Presente					Ausente	
Color Aparente	u Pt/Co			500	NR	NR	NR	178	NR	NR	NR	<1				<1			<1				<1	250	
Color Real	mg/L			0.1				<0.05				<0.05				<0.05			<0.05				<0.05	<0.05	
Cr (VI)	NMP/100mL			<1x10 ⁴				<2				<2				<2			<2				<2	49	
Aluminio Disuelto		0.2			<0.03	<0.03	<0.03	<0.03	0.06	0.06	0.06	<0.03				<0.03			0.03				<0.03	<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	0.0032	0.0136	0.0136	0.0136	0.0133				0.0076			0.0007				0.0065	0.0065	
Bario Disuelto		1			0.033	0.033	0.033	0.032	0.125	0.125	0.125	0.094				0.105			0.166				0.019	0.019	
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	0.2	0.07	0.07	0.07	0.11				0.07			0.02				0.1	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			0.0002				<0.0001	<0.0001	
Calcio Disuelto					271	271	271	266	47.5	47.5	47.5	109				72.5			144				201	201	
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	2.31	0.05	0.05	0.05	0.1				<0.02			<0.02				1.33	1.33	
Plomo Disuelto		0.015		0.4	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001	NR	NR	NR	0.0001	NR	NR	NR	<0.0001	<0.0001
Litio Disuelto					0.06	0.06	0.06	0.081	0.08	0.08	0.08	0.149				0.094			<0.008				0.084	0.084	
Magnesio Disuelto					41.3	41.3	41.3	41.9	4.1	4.1	4.1	6.9				5.8			26.7				36.1	36.1	
Manganeso Disuelto		0.05			0.044	0.044	0.044	0.035	0.03	0.03	0.03	0.036				0.006			0.737				0.052	0.052	
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	mg/L				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	4.8	2.5	2.5	2.5	2.4				3.5			13.2				4.7	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	0.0002	<0.0001	<0.0001	<0.0001	<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	
Sodio Disuelto					77.4	77.4	77.4	78.4	55.2	55.2	55.2	82.9				54.5			40.8				47	47	
Estroncio Disuelto					2.23	2.23	2.23	2.59	1.33	1.33	1.33	4.68				2.78			0.792				1.93	1.93	
Talio Disuelto					0.0002	0.0002	0.0002	<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				<0.04			<0.04				<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	<0.005	
Uranio Disuelto					0.0007	0.0007	0.0007	0.0004	0.0002	0.0002	0.0002	0.0002				0.0002			0.0002				0.0006	0.0006	
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	
Zinc Disuelto		7.4		10	0.04	0.04	0.04	<0.01	0.12	0.12	0.12	<0.01				<0.01			0.02				<0.01	<0.01	
Cloruros		250			68	68	68	68.7	32	32	32	4.2				4.9			45.7				41.9	41.9	
Cianuro Total		0.14		1	<0.003	<0.003	<0.003	<0.003	0.003	0.003	0.003	<0.003				<0.003			<0.003				<0.003	<0.003	
Fluoruros					2.7	2.7	2.7	2.51	0.7	0.7	0.7	0.76				0.46			0.06				2.48	2.48	
Nitratos/Nitritos como N					0.19	0.19	0.19	<0.02	<0.02	<0.02	<0.02	<0.02				1.39			0.27				<0.02	<0.02	
Amonio					<0.05	<0.05	<0.05	<0.05	0.06	0.06	0.06	<0.05				<0.05			<0.05				<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1				<0.1			0.2				0.1	0.1	

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1						
					Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14	Línea Base			Dic-14			
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo				
Fosfatos	mg/L				0.03	0.03	0.03	<0.03	0.06	0.06	0.06	0.06				0.12				0.19				0.03			
Fósforo Total			2	10	0.06	0.06	0.06	<0.01	0.02	0.02	0.02	<0.01				0.02				0.05				0.01			
STD (TDS)		500			1370	1370	1370	1360	320	320	320	638				470				820				1000			
SST (TSS)			50	100	145	145	145	9.0	<5	<5	<5	<5		NR	NR	NR	<5		NR	NR	NR	<5		NR	NR	NR	<5
ST (TS)					1000	1000	1000	1400	300	300	300	672				480				848				1030			
Sulfatos			250		700	700	700	733	45	45	45	302				205				413				527			
Alcalinidad Total					133	133	133	127	186	186	186	175				120				95.7				163			

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. NR = Cálculo No Realizado por falta de datos de línea base. ND = no determinado. NA= no analizado. Fuente: MSR, 2015.

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 Junio. 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 5.98 a 7.27 u.e. y la temperatura en el rango de 21.1 a 32 °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, MW-11, PSA-SR, RW-1 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, MW8, MW9 y MW11 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.

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 los pozos MW7 y 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 MW2, MW7, MW-11, PSA-SR y PSA-1. En los pozos MW-11, MW-9 y PSA-SR las concentraciones se encuentran por arriba de lo establecido por USEPA (0.3 mg/L).

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

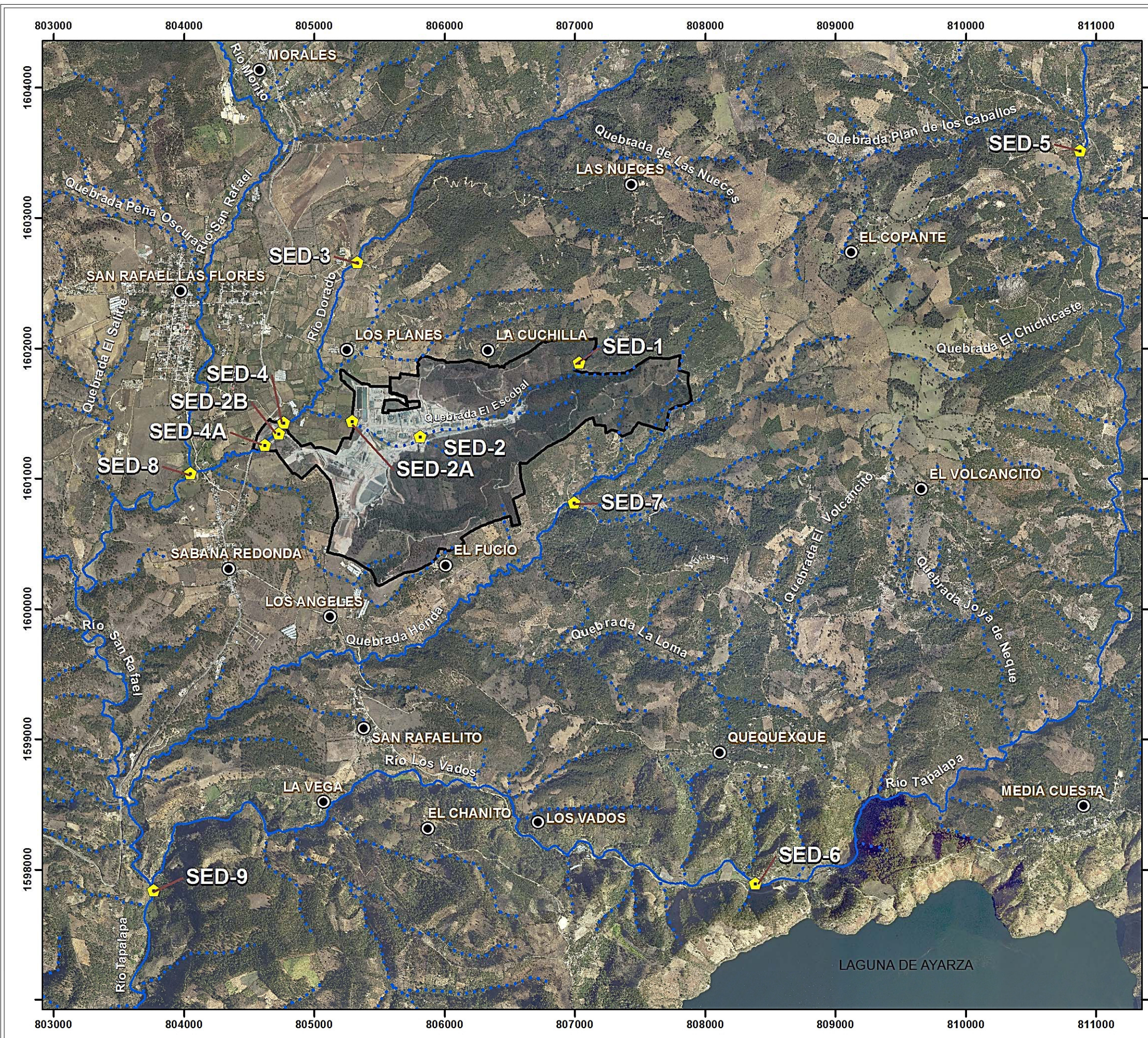
5.1 Sitios de Monitoreo

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, 2015.



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

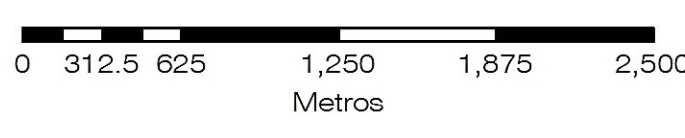
Símbolo	Estación	X	Y
	SED-1	807047	1601885
	SED-2	805805	1601367
	SED-2A	805289	1601433
	SED-2B	804728	1601341
	SED-3	805331	1602656
	SED-4	804775	1601431
	SED-4A	804623	1601255
	SED-5	810876	1603516
	SED-6	808385	1597892
	SED-7	806995	1600815
	SED-8	804048	1601037
	SED-9	803766	1597838

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 2014, datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

Distancia Horizontal y Vertical de Grilla: 1,000 metros

Escala 1:30,000



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, 2015.

5.3 Resultados

En el Cuadro 5-3 se presenta los resultados de metales registrados para el mes de Diciembre 2014. Los resultados del laboratorio se presentan en el Anexo 11.6

El porcentaje de fósforo total se encuentra en el rango de 0.019% (SED-4) a 0.0165% (SED-5). No se detectó cianuro en ninguna de las estaciones muestreadas.

El mercurio solo se detectó en las estaciones SED5 y SED8, 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	Dic-14	Dic-14	Dic-14	Dic-14	Dic-14	Dic-14
Arsénico Total	mg/Kg**	50	10.8	39.8	34.2	11.4	16.4	18.8
Cadmio Total	mg/Kg**	50	0.2	4.49	4.11	0.1	0.21	0.48
Cromo Total	mg/Kg**	1500	3.7	5.7	6.6	3	5.3	6.7
Plomo Total	mg/Kg**	500	11.1	125	182	8.6	13.1	27.8
Mercurio Total	mg/Kg**	25	<0.05	<0.07	<0.07	<0.06	<0.05	<0.06
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.03	<0.3	<0.2	<0.2
Fósforo Total	%		0.027	0.025	0.041	0.023	0.019	0.031

Parámetro	Unidades	Acuerdo236-2006	SED-5	SED-6	SED-7	SED-8	SED-9
		Aplicación al suelo	Dic-14	Dic-14	Dic-14	Dic-14	Dic-14
Arsénico Total	mg/Kg**	50	46.8	6.3	10.7	12.5	9.5
Cadmio Total	mg/Kg**	50	0.12	0.09	0.32	0.54	0.24
Cromo Total	mg/Kg**	1500	5.6	3.5	4.3	5.4	3.8
Plomo Total	mg/Kg**	500	12.9	4.43	12.2	22.9	13.5
Mercurio Total	mg/Kg**	25	0.07	<0.06	<0.1	0.07	<0.07
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.3	<0.2	<0.2
Fósforo Total	%		0.0165	0.014	0.041	0.072	0.033

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, 2015.

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, 2015.

805000 806000

1602000

1602000



805000 806000

1601000

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 Intermitente

ESTACIÓN DE MONITOREO

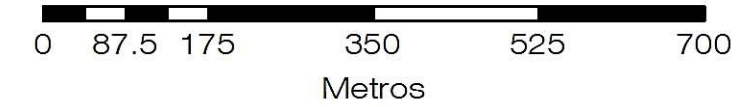
Símbolo	Estación	X	Y
	WW9	805461	1601314

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 2014, datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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, 2015.

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	Noviembre	Diciembre	Enero		
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11	WW9
No. Reporte Lab.			2105-14	2252-14	204-15	205-15	206-15
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	<10	<10	<10
Fósforo Total		10	<0.05	<0.05	<0.05	0.10	<0.05
Arsénico		0.1	<0.002	<0.002	<0.002	0.010	0.010
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	17
Color Real	< 1			< 1	< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	< 2	< 2	< 2	49	23

*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, 2015.

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 11.7.

Los valores de pH se encontraron en el rango de 6.92 a 7.65 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)	Noviembre	Diciembre	Enero
Fecha Muestreo					10/11/2014	01/12/2014	26/01/2015
ID Muestra					WW9	WW9	WW9
No. Reporte Lab.					2114-14	2251-14	206-15
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.65	6.92	7.36
Temperatura de campo	°C		+/- 3		25.6	26.0	25.1
Temperatura. Quebrada El Escobal					24.88	25.90	26.48
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		1.5	8.1	<10
Fósforo Total		10	2		<0.05	<0.05	<0.05
Arsénico		0.1	0.1		0.009	0.006	0.010
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			7	5
Color Real					< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	400		540	49	23

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, 2015.

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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, 2015.



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

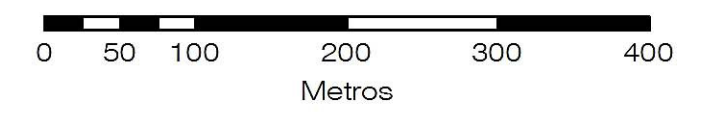
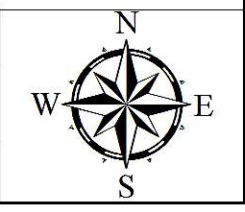
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

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 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2015

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 noviembre 2014 a enero 2015. 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, 2015.

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)
Noviembre	1190-PORTON	1	05:30AM	<1.3
	1290-6720	1	05:35AM	<1.3
	1190-6920	1	05:40AM	<1.3
	1190-6900	1	05:45AM	<1.3
	1365-C/F W R/E	1	05:50AM	<1.3
	1365-C/F R/E	1	05:55AM	<1.3
	1290-6340	1	05:30PM	<1.3
	1265-6610	1	05:35PM	<1.3
	1290-6780	1	05:40PM	<1.3
	1340-6540	1	05:45PM	<1.3
	1340-6500	1	05:50PM	<1.3
	1340-6420	1	05:55PM	<1.3
	1190-C/E	1	06:00PM	<1.3
	1215-6440	1	06:05PM	<1.3
	1340-6540	3	05:30AM	<1.3
	1215-6540	3	05:35AM	<1.3
	1340-6900	3	05:40AM	<1.3
	1215-CF/ESTE	3	05:45AM	<1.3
	1290-6580	3	05:30PM	<1.3
	1340-6900	3	05:35PM	<1.3
	1315-6980	3	05:40PM	<1.3
	1386-este	3	05:45PM	<1.3
	1315-6600	3	05:50PM	<1.3
	1215-CF/ESTE	4	05:30AM	<1.3
	1190-6900	4	05:35AM	<1.3
	1290-6690	4	05:40AM	<1.3
	1315-6600	4	05:45AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1340-6940	4	05:30PM	<1.3
	1215-6460	4	05:35PM	<1.3
	1190-6360	4	05:40PM	<1.3
	1190-6380	4	05:45PM	<1.3
	1315-6600	4	05:50PM	<1.3
	1215-C/F R/ESTE	5	05:30AM	<1.3
	1215-6440	5	05:35AM	<1.3
	1340-6420	5	05:40AM	<1.3
	1340-7000	5	05:45AM	<1.3
	1340-6540	5	05:50AM	<1.3
	1315-6540	5	05:55AM	<1.3
	1315-6980	5	05:30PM	<1.3
	1215-C/F R/ESTE	5	05:35PM	<1.3
	1290-6580	5	05:40PM	<1.3
	1386-ESTE	5	05:45PM	<1.3
	1290-6380 OESTE	5	05:50PM	<1.3
	1290-6380-ESTE	5	05:55PM	<1.3
	1315-6740	6	05:30AM	<1.3
	1190-C/E OESTE	6	05:35AM	<1.3
	1386-ESTE	6	05:40AM	<1.3
	1290-6580	6	05:45AM	<1.3
	1265-6610	6	05:50AM	<1.3
	1190-6380	6	05:55AM	<1.3
	1215-6680	6	05:30PM	<1.3
	1215-CF/OESTE	6	05:35PM	<1.3
	1290-6380	6	05:40PM	<1.3
	1340-6910	6	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1340-6900	6	05:50PM	<1.3
	1215-6540	7	05:30AM	<1.3
	1290-6500	7	05:35AM	<1.3
	1386-ESTE	7	05:40AM	<1.3
	1265-6780	7	05:45AM	<1.3
	1215-C/E OESTE	7	05:50AM	<1.3
	1315-6980	7	05:55AM	<1.3
	1265-6500	7	05:30PM	<1.3
	1340-6500	7	05:35PM	<1.3
	1215-CF/ESTE	7	05:40PM	<1.3
	1190-CF-R/E	7	05:45PM	<1.3
	1340-6820	7	05:50PM	<1.3
	1190-C/E	8	05:30AM	<1.3
	1190-6380	8	05:35AM	<1.3
	1190-6540	8	05:40AM	<1.3
	1386-ESTE	8	05:45AM	<1.3
	1315-6540	8	05:50AM	<1.3
	1290-6640	8	05:55AM	<1.3
	1290-6580	8	05:30PM	<1.3
	1315-6980	8	05:35PM	<1.3
	1215-C/E OESTE	8	05:40PM	<1.3
	1215-CF/R/E	8	05:45PM	<1.3
	1315-CF	8	05:50PM	<1.3
	1340-6780	9	05:30AM	<1.3
	1386-ESTE	9	05:35AM	<1.3
	1215-6680	9	05:40AM	<1.3
	1190-C/E OESTE	9	05:45AM	<1.3
	1340-6420	9	05:50AM	<1.3
	1340-6500	9	05:55AM	<1.3
	1340-6540	9	06:00:AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1386-ESTE	9	06:05AM	<1.3
	1365-SUB ESTE	9	05:30PM	<1.3
	1365-C/F	9	05:35PM	<1.3
	1190-CF-W	9	05:40PM	<1.3
	1190-CF/R-E	9	05:45PM	<1.3
	1190-6900	9	05:50PM	<1.3
	1265-CF/E	9	05:55PM	<1.3
	1386-ESTE	9	06:00PM	<1.3
	1340-6560	10	05:30AM	<1.3
	1265-6610	10	05:35AM	<1.3
	1386-ESTE	10	05:40AM	<1.3
	1215-C/E ESTE	10	05:45AM	<1.3
	1340-6780	10	05:50AM	<1.3
	1215-CF-R-E	10	05:30PM	<1.3
	1340-6900	10	05:35PM	<1.3
	1340-6940	10	05:40PM	<1.3
	1340-7000	10	05:45PM	<1.3
	1215-6660	10	05:50PM	<1.3
	1190-6900	11	05:30AM	<1.3
	1190-C/O ESTE	11	05:35AM	<1.3
	1190-6360	11	05:40AM	<1.3
	1265-6730	11	05:30PM	<1.3
	1190-CF-OESTE	11	05:35PM	<1.3
	1340-6940	11	05:40PM	<1.3
	1190-C/E OESTE	12	05:30AM	<1.3
	1215-C/F OESTE	12	05:35AM	<1.3
	1190-6340	12	05:40AM	<1.3
	1265-6730	12	05:45AM	<1.3
	1340-6540	12	05:50AM	<1.3
	1315-6540	12	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1386-RAM ESTE	12	05:35PM	<1.3
	1215-CF/RAM ESTE	12	05:40PM	<1.3
	1215-CF/RAM OESTE	12	05:45PM	<1.3
	1340-6780	13	05:30AM	<1.3
	1386-RAM ESTE	13	05:35AM	<1.3
	1190-CF R/ESTE	13	05:40AM	<1.3
	1340-6560	13	05:45AM	<1.3
	1340-6900	13	05:50AM	<1.3
	1215-6540	13	05:30PM	<1.3
	1340-6500	13	05:35PM	<1.3
	1215-6500	13	05:40PM	<1.3
	1340-6940	14	05:30AM	<1.3
	1365-CF-R/E	14	05:35AM	<1.3
	1365-CF/R/E	14	05:40AM	<1.3
	1190-6360	14	05:45AM	<1.3
	1190-CF/R/E	14	05:50AM	<1.3
	1215-6760	14	05:30PM	<1.3
	1340-6420	14	05:35PM	<1.3
	1265-6610	14	05:40PM	<1.3
	1315-6540	14	05:45PM	<1.3
	1190-C/F R/E	14	05:50PM	<1.3
	1215-CF/R/W	15	05:30AM	<1.3
	1290-6690	15	05:35AM	<1.3
	1340-6900	15	05:40AM	<1.3
	1215-6560	15	05:45AM	<1.3
	1386-1430	15	05:30PM	<1.3
	1265-6730	15	05:35PM	<1.3
	1340-6540	15	05:40PM	<1.3
1215-C/F	15	05:45PM	<1.3	
1215-6660	15	05:50PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1265-6340	15	05:55PM	<1.3
	1365-CF/R/W	16	05:30AM	<1.3
	1365-CF/R/E	16	05:35AM	<1.3
	1386-6430	16	05:40AM	<1.3
	1190-CF-R/E	16	05:45AM	<1.3
	1215-6540	16	05:50AM	<1.3
	1190-C/F R/E	16	05:30PM	<1.3
	1215-C/F R/E	16	05:35PM	<1.3
	1265-6610	16	05:40PM	<1.3
	1340-6940	16	05:45PM	<1.3
	1190-CF/R/W	17	05:30AM	<1.3
	1315-CF-E	17	05:35AM	<1.3
	1265-6730	17	05:40AM	<1.3
	1340-6900	17	05:45AM	<1.3
	1265-6770	17	05:30PM	<1.3
	1290-6690	17	05:35PM	<1.3
	1190-6380	17	05:40PM	<1.3
	1190-6400	17	05:45PM	<1.3
	1190-6360	17	05:50PM	<1.3
	1215-CF/W	18	05:30AM	<1.3
	1240-6610	18	05:35AM	<1.3
	1190-CF/W	18	05:40AM	<1.3
	1215-6660	18	05:45AM	<1.3
	1315-CF-R/E	18	05:50AM	<1.3
	1290-6860	18	05:55AM	<1.3
	1265-6770	18	06:00:AM	<1.3
	1340-6940	18	05:30PM	<1.3
	1265-6610	18	05:35PM	<1.3
	1215-CF-R/E	18	05:40PM	<1.3
	1215-6610	18	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1315-6580	18	05:50PM	<1.3
	1315-6980	18	05:55PM	<1.3
	1215-CF/W R/W	19	05:30AM	<1.3
	1240-6610	19	05:35AM	<1.3
	1190-CF-W	19	05:40AM	<1.3
	1215-6660	19	05:45AM	<1.3
	1315-CF/R/E	19	05:50AM	<1.3
	1290-6860	19	05:55AM	<1.3
	1265-6770	19	06:00:AM	<1.3
	1265-6730	19	05:30PM	<1.3
	1190-VENTILACION	19	05:35PM	<1.3
	1386-RAMPA ESTE	19	05:40PM	<1.3
	1386-1430	19	05:45PM	<1.3
	1340-6540	19	05:50PM	<1.3
	1265-6610	19	05:55PM	<1.3
	1215-CF/W R/W	19	06:00PM	<1.3
	1190-6380	20	05:30AM	<1.3
	1190-6360	20	05:35AM	<1.3
	1240-6610	20	05:40AM	<1.3
	1265-6610	20	05:45AM	<1.3
	1315-6580	20	05:50AM	<1.3
	1386-1430	20	05:55AM	<1.3
	1315-6980	20	06:00:AM	<1.3
	1365-DESG	20	05:30PM	<1.3
	1215-CF/R/O	20	05:35PM	<1.3
	1365-CF-OESTE	20	05:40PM	<1.3
	1365-CF/ESTE	20	05:45PM	<1.3
	1215-6560	20	05:50PM	<1.3
	1215-ESTE	21	05:30AM	<1.3
	1315-CF-ESTE	21	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1290-6580	21	05:40AM	<1.3
	1290-6980	21	05:45AM	<1.3
	1290-6690	21	05:50AM	<1.3
	1315-7020	21	05:55AM	<1.3
	1265-6730	21	05:30PM	<1.3
	1340-6340	21	05:35PM	<1.3
	1315-6540	21	05:40PM	<1.3
	1215-6520	21	05:45PM	<1.3
	1215-CF-E	21	05:50PM	<1.3
	1315-680	22	05:30AM	<1.3
	1240-6610	22	05:35AM	<1.3
	1265-6610	22	05:40AM	<1.3
	1190-R/E	22	05:45AM	<1.3
	1215-6660	22	05:50AM	<1.3
	1340-6660	22	05:55AM	<1.3
	1386-1430	22	05:30PM	<1.3
	1340-6900	22	05:35PM	<1.3
	1190-R/W	22	05:40PM	<1.3
	1315-6980	22	05:45PM	<1.3
	1290-6580	22	05:50PM	<1.3
	1290-6580	23	05:30AM	<1.3
	1315-C/F E	23	05:35AM	<1.3
	1215-CF-E R/W	23	05:40AM	<1.3
	1215-6380	23	05:45AM	<1.3
	1215-6360	23	05:50AM	<1.3
	1365-6820	23	05:55AM	<1.3
	1365-6800	23	06:00:AM	<1.3
	1315-6580	23	05:30PM	<1.3
	1290-6860	23	05:35PM	<1.3
	1190-CF-O R-E	23	05:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1290-6380	23	05:45PM	<1.3
	1190-6880 R-E	23	05:50PM	<1.3
	1265-6770	24	05:30AM	<1.3
	1265-CF-R/E	24	05:35AM	<1.3
	1265-CF-R/W	24	05:40AM	<1.3
	1315-6980	24	05:30PM	<1.3
	1386-C/E	24	05:35PM	<1.3
	1190-CF-R/O	24	05:40PM	<1.3
	1240-6610	24	05:45PM	<1.3
	1190-6380	24	05:50PM	<1.3
	1386-1430	24	05:55PM	<1.3
	1290-6690	24	06:00PM	<1.3
	1190-CF-E	25	05:30AM	<1.3
	1265-6610	25	05:35AM	<1.3
	1290-6690	25	05:40AM	<1.3
	1315-6980	25	05:45AM	<1.3
	1290-6580	25	05:30PM	<1.3
	1215-6520	25	05:35PM	<1.3
	1215-6760	25	05:40PM	<1.3
	1386-1430	25	05:45PM	<1.3
	1315-CF-E	25	05:50PM	<1.3
	1315-6580	25	05:55PM	<1.3
	1240-6610	26	05:30AM	<1.3
	1215-6560	26	05:35AM	<1.3
	1215-6520	26	05:40AM	<1.3
	1265-6730	26	05:45AM	<1.3
	1386-R/E	26	05:50AM	<1.3
	1386-1430	26	05:55AM	<1.3
	1290-6380	26	06:00:AM	<1.3
	1290-6580	26	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1190-ESTE	26	05:35PM	<1.3
	1215-CF-ESTE	26	05:40PM	<1.3
	1315-6540	26	05:45PM	<1.3
	1340-6900	26	05:50PM	<1.3
	1340-6540	26	05:55PM	<1.3
	1190-C/E	27	05:30AM	<1.3
	1240-6610	27	05:35AM	<1.3
	1190-6400	27	05:40AM	<1.3
	1290-6690	27	05:45AM	<1.3
	1365-6800	27	05:50AM	<1.3
	1265-6610	27	05:55AM	<1.3
	1290-6380	27	06:00:AM	<1.3
	1315-6660	27	05:30PM	<1.3
	1215-6660	27	05:35PM	<1.3
	1365-6820	27	05:40PM	<1.3
	1265-6770	27	05:45PM	<1.3
	1215-6640	27	05:50PM	<1.3
	1315-6620	27	05:55PM	<1.3
	1215-C-E	28	05:30AM	<1.3
	1386-ESTE	28	05:35AM	<1.3
	1315-7020	28	05:40AM	<1.3
	1386-C/E	28	05:45AM	<1.3
	1315-6620	28	05:30PM	<1.3
	1315-6760	28	05:35PM	<1.3
	1315-CF-E	28	05:40PM	<1.3
	1315-6340	28	05:45PM	<1.3
	1215-CF-W	28	05:50PM	<1.3
	1215-6920	28	05:55PM	<1.3
	1340-6780	29	05:30AM	<1.3
	1340-6540	29	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1265-6770	29	05:40AM	<1.3
	1240-6610	29	05:45AM	<1.3
	1340-6900	29	05:30PM	<1.3
	1215-6760	29	05:35PM	<1.3
	1215-CF-E	29	05:40PM	<1.3
	1215-6520	30	05:30AM	<1.3
	1215-6610	30	05:35AM	<1.3
	1290-6690	30	05:40AM	<1.3
	1315-C/E	30	05:45AM	<1.3
	1386-1430	30	05:50AM	<1.3
	1315-VENTILACION	30	05:55AM	<1.3
	1215-C/E	30	06:00:AM	<1.3
	1315-6620	30	05:30PM	<1.3
	1190-CF/E	30	05:35PM	<1.3
	1190-V	30	05:40PM	<1.3
	1386-R/E	30	05:45PM	<1.3
Diciembre	1386-1430	1	05:30AM	<1.3
	1365-6700	1	05:35AM	<1.3
	1365-6820	1	05:40AM	<1.3
	1215-C/E	1	05:45AM	<1.3
	1215-6700	1	05:50AM	<1.3
	1190-6880	1	05:55AM	<1.3
	1190-CF/E	1	05:30PM	<1.3
	1386-ESTE	1	05:35PM	<1.3
	1265-6730	1	05:40PM	<1.3
	1265-6770	1	05:45PM	<1.3
	1190-6860	1	05:50PM	<1.3
	1265-6610	2	05:30AM	<1.3
	1215-C/E	2	05:35AM	<1.3
	1215-6520	2	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1386-C/E	2	05:45AM	<1.3
	1240-6610	2	05:50AM	<1.3
	1240-6610	2	05:30PM	<1.3
	1340-6540	2	05:35PM	<1.3
	1190-VENTILACION	2	05:40PM	<1.3
	1190-6400	2	05:45PM	<1.3
	1190-6800	3	05:30AM	<1.3
	1215-6640	3	05:35AM	<1.3
	1340-6900	3	05:40AM	<1.3
	1315-6620	3	05:30PM	<1.3
	1365-6800	3	05:35PM	<1.3
	1365-6820	3	05:40PM	<1.3
	1215-CF-E	3	05:45PM	<1.3
	1240-6610	3	05:50PM	<1.3
	1240-6610	4	05:30AM	<1.3
	1190-VENTILACION	4	05:35AM	<1.3
	1265-6770	4	05:40AM	<1.3
	1386-ESTE	4	05:45AM	<1.3
	1190-C/F	4	05:30PM	<1.3
	1190-SERVICIOS	4	05:35PM	<1.3
	1430-VENTILACION	4	05:40PM	<1.3
	1340-6570	4	05:45PM	<1.3
	1340-6660	4	05:50PM	<1.3
	1340-6540	5	05:30AM	<1.3
	1386-este	5	05:35AM	<1.3
	1430 VENTILACION	5	05:40AM	<1.3
	1190-CF/OESTE	5	05:45AM	<1.3
	1215-CF/E	5	05:50AM	<1.3
	1190-6360	5	05:55AM	<1.3
	1365-6820	5	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1365-6800	5	05:35PM	<1.3
	1215-6520	5	05:40PM	<1.3
	1290-6400	5	05:45PM	<1.3
	1290-6670	5	05:50PM	<1.3
	1315-VENTILACION	6	05:30AM	<1.3
	1365-6820	6	05:35AM	<1.3
	1215-6520	6	05:40AM	<1.3
	1190-6420	6	05:45AM	<1.3
	1190-C/E	6	05:30PM	<1.3
	1190-SERCICIOS	6	05:35PM	<1.3
	1240-6610	6	05:40PM	<1.3
	1290-6620	6	05:45PM	<1.3
	1386-RAMESTE	7	05:30AM	<1.3
	1430-1386	7	05:35AM	<1.3
	1215-CF	7	05:40AM	<1.3
	1190-VENTILACION	7	05:45AM	<1.3
	1340-6660	7	05:30PM	<1.3
	1190-6880	7	05:35PM	<1.3
	1215-CF/E	7	05:40PM	<1.3
	1265-6770	8	05:30AM	<1.3
	1215-6520	8	05:35AM	<1.3
	1386-RAMPA ESTE	8	05:40AM	<1.3
	1215-6800	8	05:30PM	<1.3
	1265-6730	8	05:35PM	<1.3
	1365-6820	8	05:40PM	<1.3
	1365-6800	8	05:45PM	<1.3
	1190-6420	8	05:50PM	<1.3
	1315-6620	8	05:55PM	<1.3
	1215-6520	9	05:30AM	<1.3
	1365-RAMPA ESTE	9	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1215-CF/E	9	05:40AM	<1.3
	1365-6800	9	05:30PM	<1.3
	1190-CF-R/W	9	05:35PM	<1.3
	1340-6660	9	05:40PM	<1.3
	1386-RAMPA ESTE	10	05:30AM	<1.3
	1365-6800	10	05:35AM	<1.3
	1340-6540	10	05:40AM	<1.3
	1365-6820	10	05:45AM	<1.3
	1190-CF/O	10	05:50AM	<1.3
	1190-6900	10	05:55AM	<1.3
	1290-6620	10	06:00:AM	<1.3
	1340-6660	10	05:30PM	<1.3
	1190-CF-R/E	10	05:35PM	<1.3
	1215-CF-R/E	10	05:40PM	<1.3
	1430-VENTILACION	10	05:45PM	<1.3
	1290-6690	10	05:50PM	<1.3
	1340-6660	11	05:30AM	<1.3
	1430-	11	05:35AM	<1.3
	1386-R/E	11	05:40AM	<1.3
	1290-6690	11	05:45AM	<1.3
	1215-6420	11	05:50AM	<1.3
	1215-CF/R/W	11	05:55AM	<1.3
	1315-6580	11	05:30PM	<1.3
	1386-1430	11	05:35PM	<1.3
	1315-C/E	11	05:40PM	<1.3
	1265-6770	11	05:45PM	<1.3
	1340-6900	11	05:50PM	<1.3
	1215-6640	11	05:55PM	<1.3
	1215-6520	11	06:00PM	<1.3
	1240-C/E R/W	11	06:05PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1315-VENTILACION	12	05:30AM	<1.3
	1386-R/E	12	05:35AM	<1.3
	1265-6770	12	05:40AM	<1.3
	1190-VENTILACION	12	05:45AM	<1.3
	1215-6520	12	05:50AM	<1.3
	1365-6820	12	05:30PM	<1.3
	1365-6800	12	05:35PM	<1.3
	1215-C/O	12	05:40PM	<1.3
	1190-R/E	12	05:45PM	<1.3
	1340-6540	12	05:50PM	<1.3
	1265-6730	12	05:55PM	<1.3
	1315-6580	12	06:00PM	<1.3
	1265-6770	13	05:30AM	<1.3
	1386-R/E	13	05:35AM	<1.3
	1430-VENTILACION	13	05:40AM	<1.3
	1190-C/F	13	05:45AM	<1.3
	1190-6860	13	05:50AM	<1.3
	1315-6580	13	05:30PM	<1.3
	1190-6420	13	05:35PM	<1.3
	1290-6690	13	05:40PM	<1.3
	1215-C/E	13	05:45PM	<1.3
	1190-C/F	14	05:30AM	<1.3
	1215-6640	14	05:35AM	<1.3
	1290-6690	14	05:40AM	<1.3
	1340-6900	14	05:45AM	<1.3
	1386-R/E	14	05:50AM	<1.3
	1240-C/E	14	05:30PM	<1.3
	1240-C/O	14	05:35PM	<1.3
	1215-C/E	14	05:40PM	<1.3
	1365-6800	14	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1365-6820	14	05:50PM	<1.3
	1265-6730	14	05:55PM	<1.3
	1215-6520	14	06:00PM	<1.3
	1386-R/E	15	05:30AM	<1.3
	1190-C/E	15	05:35AM	<1.3
	1190-6420	15	05:40AM	<1.3
	1215-C/E RW	15	05:45AM	<1.3
	1265-6730	15	05:50AM	<1.3
	1340-6520	15	05:30PM	<1.3
	1315-VENTILACION	15	05:35PM	<1.3
	1365-6800	15	05:40PM	<1.3
	1365-6820	15	05:45PM	<1.3
	1215-6520	15	05:50PM	<1.3
	1215-C/E R/E	15	05:55PM	<1.3
	1340-6900	16	05:30AM	<1.3
	1215-C/F R/W	16	05:35AM	<1.3
	1265-6730	16	05:40AM	<1.3
	1265-6730	16	05:30PM	<1.3
	1215-6780	16	05:35PM	<1.3
	1215-C/F R/E	16	05:40PM	<1.3
	1430-1386	16	05:45PM	<1.3
	1290-6580	16	05:50PM	<1.3
	1240-C/F	17	05:30AM	<1.3
	1240-CF/W	17	05:35AM	<1.3
	1386-R/E	17	05:40AM	<1.3
	1365-CF/E	17	05:45AM	<1.3
	1215-6700	17	05:50AM	<1.3
	1340-6540	17	05:55AM	<1.3
	1190-C/F R/E	17	06:00:AM	<1.3
	1190-6860	17	06:05AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1340-6520	17	05:30PM	<1.3
	1365-6820	17	05:35PM	<1.3
	1315-V	17	05:40PM	<1.3
	1386-1430	17	05:45PM	<1.3
	1215-6520	17	05:50PM	<1.3
	1365-6800	17	05:55PM	<1.3
	1215-6580	17	06:00PM	<1.3
	1215-6600	17	06:05PM	<1.3
	1215-6520	18	05:30AM	<1.3
	1190-VENTILACION	18	05:35AM	<1.3
	1215-C/F O	18	05:40AM	<1.3
	1315-V	18	05:45AM	<1.3
	1365-6820	18	05:50AM	<1.3
	1386-ESTE	18	05:55AM	<1.3
	1340-6900	18	05:30PM	<1.3
	1190-CF/R/E	18	05:35PM	<1.3
	1190-6420	18	05:40PM	<1.3
	1215-6440	18	05:45PM	<1.3
	1386-1430	18	05:50PM	<1.3
	1215-6620	19	05:30AM	<1.3
	1290-6650	19	05:35AM	<1.3
	1190-SERVICIOS	19	05:40AM	<1.3
	1215-6700	19	05:45AM	<1.3
	1190-C/O	19	05:50AM	<1.3
	1265-6730	19	05:55AM	<1.3
	1265-6730	19	05:30PM	<1.3
	1365-6800	19	05:35PM	<1.3
	1215-6780	19	05:40PM	<1.3
	1215-CF/O	19	05:45PM	<1.3
	1190-CFE-O	19	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1315-6660	19	05:55PM	<1.3
	1340-6520	20	05:30AM	<1.3
	1365-C/O	20	05:35AM	<1.3
	1365-6820	20	05:40AM	<1.3
	1265-6770	20	05:45AM	<1.3
	1215-C/O	20	05:50AM	<1.3
	1215-6570	20	05:55AM	<1.3
	1215-600	20	06:00:AM	<1.3
	1240-CF	20	05:30PM	<1.3
	1240-CF/E	20	05:35PM	<1.3
	1215-6520	20	05:40PM	<1.3
	1386-RAM	20	05:45PM	<1.3
	1340-6540	20	05:50PM	<1.3
	1315-VENTILACION	20	05:55PM	<1.3
	1190-N	21	05:30AM	<1.3
	1190-SERVICIOS	21	05:35AM	<1.3
	1215-6520	21	05:40AM	<1.3
	1265-6730	21	05:45AM	<1.3
	1365-6820	21	05:50AM	<1.3
	1315-6640	21	05:30PM	<1.3
	1386-R/E	21	05:35PM	<1.3
	1365-6800	21	05:40PM	<1.3
	1215-CF/E	21	05:45PM	<1.3
	1215-6780	21	05:50PM	<1.3
	1215-6640	21	05:55PM	<1.3
	1240-C/O	22	05:30AM	<1.3
	1215-C/E	22	05:35AM	<1.3
	1386-ESTE	22	05:40AM	<1.3
	1215-6620	22	05:45AM	<1.3
	1290-6420	22	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1190-c/e	22	05:35PM	<1.3
	1240-C/E	22	05:40PM	<1.3
	1290-6650	22	05:45PM	<1.3
	1340-6540	22	05:50PM	<1.3
	1215-6620	23	05:30AM	<1.3
	1386-ESTE	23	05:35AM	<1.3
	1290-6420	23	05:40AM	<1.3
	1290-6650	23	05:30PM	<1.3
	1215-C/E	23	05:35PM	<1.3
	1315-VENTILACION	24	05:30AM	<1.3
	1215-6580	24	05:35AM	<1.3
	1215-6600	24	05:40AM	<1.3
	1240-C/E	24	05:45AM	<1.3
	1240-C/O	24	05:50AM	<1.3
	1215-6520	24	05:55AM	<1.3
	1190-6840	24	05:30PM	<1.3
	1190-CF/E	24	05:35PM	<1.3
	1190-CF/O	24	05:40PM	<1.3
	1190-VENTILACION	24	05:45PM	<1.3
	1430-SUB.ESTE	24	05:50PM	<1.3
	1365-6820	24	05:55PM	<1.3
	1365-CF/E	24	06:00PM	<1.3
	1365-CF/O	24	06:05PM	<1.3
	1425-1386	25	05:30AM	<1.3
	1215-6420	25	05:35AM	<1.3
	1190-VENTILACION	25	05:40AM	<1.3
	1215-6580	25	05:45AM	<1.3
	1215-6620	25	05:50AM	<1.3
	1215-C/F W	25	05:55am	<1.3
	1290-6420	25	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1215-6800	25	05:35PM	<1.3
	1190-6440	25	05:40PM	<1.3
	1440-ACESSO	25	05:45PM	<1.3
	1215-CF/E	25	05:50PM	<1.3
	1290-6650	25	05:55PM	<1.3
	1215-6780	26	05:30AM	<1.3
	1440-1386	26	05:35AM	<1.3
	1425-1386	26	05:40AM	<1.3
	1190-CF/EST	26	05:45AM	<1.3
	1190-6440	26	05:50AM	<1.3
	1215-6520	26	05:30PM	<1.3
	1365-C/FW	26	05:35PM	<1.3
	1240-CF/E	26	05:40PM	<1.3
	1240-CF/W	26	05:45PM	<1.3
	1290-6650	26	05:50PM	<1.3
	1215-6520	27	05:30AM	<1.3
	1240-CF/E	27	05:35AM	<1.3
	1240-CF/W	27	05:40AM	<1.3
	1215-CF/ESTE	27	05:45AM	<1.3
	1215-6580	27	05:50AM	<1.3
	1215-6800	27	05:55AM	<1.3
	1215-6600	27	05:30PM	<1.3
	1215-6580	27	05:35PM	<1.3
	1290-6650	27	05:40PM	<1.3
	1215-VENTILACION	27	05:45PM	<1.3
	1215-6420	27	05:50PM	<1.3
	1190-6440	27	05:55PM	<1.3
	1290-6650	28	05:30AM	<1.3
	1315-VENTILACION	28	05:35AM	<1.3
	1215-6620	28	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1215-6520	28	05:45AM	<1.3
	1190-CF/E	28	05:50AM	<1.3
	1440-1386	28	05:30PM	<1.3
	1440-ACCESO	28	05:35PM	<1.3
	1290-6650	28	05:40PM	<1.3
	1190-6400	28	05:45PM	<1.3
	1190-CF/R/W	28	05:50PM	<1.3
	1215-6600	29	05:30AM	<1.3
	1190-CF-O	29	05:35AM	<1.3
	1240-CF/E	29	05:30PM	<1.3
	1290-6420	29	05:35PM	<1.3
	1386-CF/E	30	05:30AM	<1.3
	1240-CF/E	30	05:35AM	<1.3
	1215-C/F.W	30	05:30PM	<1.3
	1340-SUB	30	05:35PM	<1.3
	1215-C/F.E	30	05:40PM	<1.3
	1190-CF/E	31	05:30AM	<1.3
	1190-6400	31	05:35AM	<1.3
	1215-6700	31	05:40AM	<1.3
	1215-6420	31	05:45AM	<1.3
	1440-SUB EST	31	05:50AM	<1.3
	1440-RAMPA	31	05:30PM	<1.3
	1440-ACCESO	31	05:35PM	<1.3
	1365-C/F ESTE	31	05:40PM	<1.3
1215-6520	31	05:45PM	<1.3	
1190-VENTILACION	31	05:50PM	<1.3	
1240-C/F W	31	05:55PM	<1.3	
Enero	1190-C/F	1	05:30AM	<1.3
	1190-6840	1	05:35AM	<1.3
	1190-SERVICIOS	1	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1440-ACCESO	1	05:45AM	<1.3
	1290-6650	1	05:50AM	<1.3
	1215-6520	1	05:55AM	<1.3
	1240-C/E	1	05:30PM	<1.3
	1215-6800	1	05:35PM	<1.3
	1190-6440	1	05:40PM	<1.3
	1190-C/F R/W	2	05:30AM	<1.3
	1190-6440	2	05:35AM	<1.3
	1190-SERVICIOS	2	05:40AM	<1.3
	1251-C/F	2	05:45AM	<1.3
	1365-C/F	2	05:50AM	<1.3
	1215-6520	2	05:55AM	<1.3
	1190-6400	2	06:00:AM	<1.3
	1240-C/E	2	05:30PM	<1.3
	1190-VENTILACION	2	05:35PM	<1.3
	1215-C/E	2	05:40PM	<1.3
	1215-6800	2	05:45PM	<1.3
	1215-6820	2	05:50PM	<1.3
	1315-6380	3	05:30AM	<1.3
	1240-6640	3	05:35AM	<1.3
	1190-6460	3	05:40AM	<1.3
	1190-C/E	3	05:45AM	<1.3
	1190-6880	3	05:50AM	<1.3
	1215-6420	3	05:55AM	<1.3
	1215-6520	3	06:00:AM	<1.3
	1290-6650	3	06:05AM	<1.3
	1315-PORTON	3	05:30PM	<1.3
	1240-6580	3	05:35PM	<1.3
	1440-ACCESO	3	05:40PM	<1.3
	1200 ACCESO	3	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1365-C/O	3	05:50PM	<1.3
	1340-6560	4	05:30AM	<1.3
	1440-SUMIDERO	4	05:35AM	<1.3
	1440-ACESSO	4	05:40AM	<1.3
	1440-R/E	4	05:45AM	<1.3
	1240-6640	4	05:50AM	<1.3
	1190-VENTILACION	4	05:55AM	<1.3
	1215-SUMIDERO	4	06:00:AM	<1.3
	1240-CF/EST	4	05:30PM	<1.3
	1240-6580	4	05:35PM	<1.3
	1190-6880	4	05:40PM	<1.3
	1365-CF	4	05:45PM	<1.3
	1215-CF/ESTE	4	05:50PM	<1.3
	1215-6820	4	05:55PM	<1.3
	1290-6650	5	05:30AM	<1.3
	1190-6650	5	05:35AM	<1.3
	1215-6820	5	05:40AM	<1.3
	1315-6380	5	05:30PM	<1.3
	1190-6460	5	05:35PM	<1.3
	1190-servicios	5	05:40PM	<1.3
	1440-1386	5	05:45PM	<1.3
	1215-C/E	6	05:30PM	<1.3
	1190-SERVICIOS	6	05:35PM	<1.3
	1315-6380	6	05:40PM	<1.3
	1215-6400	7	05:30AM	<1.3
	1190-6400	7	05:35AM	<1.3
	1215-6700	7	05:40AM	<1.3
	1215-C/W	7	05:45AM	<1.3
	1290-6650	7	05:50AM	<1.3
	1190-C/F R/W	7	05:55am	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1190-6460	7	06:00:AM	<1.3
	1340-6560	7	06:05AM	<1.3
	1240-C/E	7	05:30PM	<1.3
	1240-6640	7	05:35PM	<1.3
	1190-VENTILACION	7	05:40PM	<1.3
	1440-R/E	7	05:45PM	<1.3
	1440-ACESSO	7	05:50PM	<1.3
	1365-C/O	7	05:55PM	<1.3
	1215-6520	7	06:00PM	<1.3
	1190-6880	7	06:05PM	<1.3
	1340-6560	8	05:30AM	<1.3
	1440-SUMIDERO	8	05:35AM	<1.3
	1440-ACESSO	8	05:40AM	<1.3
	1440-R/E	8	05:45AM	<1.3
	1240-6640	8	05:50AM	<1.3
	1190-VENTILACION	8	05:55AM	<1.3
	1215-SUMIDERO	8	06:00:AM	<1.3
	1240-CF/EST	8	05:30PM	<1.3
	1240-6580	8	05:35PM	<1.3
	1190-6880	8	05:40PM	<1.3
	1365-CF	8	05:45PM	<1.3
	1215-CF/ESTE	8	05:50PM	<1.3
	1215-6820	8	05:55PM	<1.3
	1340-6560	9	05:30AM	<1.3
	1240-C/E	9	05:35AM	<1.3
	1190-6400	9	05:40AM	<1.3
	1215-6520	9	05:45AM	<1.3
	1215-6700	9	05:50AM	<1.3
	1290-6650	9	05:30PM	<1.3
	1365-CF/OESTE	9	05:35PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1190-CF/ESTE	9	05:40PM	<1.3
	1190-CF/OESTE	9	05:45PM	<1.3
	1190-6460	9	05:50PM	<1.3
	1190-VENTILACION	10	05:30AM	<1.3
	1190-6460	10	05:35AM	<1.3
	1190-C/E	10	05:40AM	<1.3
	1440	10	05:45AM	<1.3
	1440-ACESSO	10	05:50AM	<1.3
	1440-SUMIDERO	10	05:55AM	<1.3
	1365-ESTE	10	06:00:AM	<1.3
	1215-6820	10	05:30PM	<1.3
	1215-CF/ESTE	10	05:35PM	<1.3
	1365-CF/ESTE	10	05:40PM	<1.3
	1190-6840	10	05:45PM	<1.3
	1190-VENTILACION	10	05:50PM	<1.3
	1315-C/O	11	05:30AM	<1.3
	1365-6780	11	05:35AM	<1.3
	1215-SUMIDERO	11	05:40AM	<1.3
	1240-C/E	11	05:45AM	<1.3
	1190-6840	11	05:50AM	<1.3
	1240-6580	11	05:30PM	<1.3
	1190-CF/OESTE	11	05:35PM	<1.3
	1240-CF	11	05:40PM	<1.3
	1290-6650	11	05:45PM	<1.3
	1215-6520	11	05:50PM	<1.3
	1315-REQUEMA	12	05:30AM	<1.3
	1240-C/E R/E	12	05:35AM	<1.3
	1440-R/E	12	05:40AM	<1.3
1365-C/E	12	05:45AM	<1.3	
1190-C/O	12	05:50AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1340-6640	12	05:30PM	<1.3
	1190-ACCESO	12	05:35PM	<1.3
	1215-CF/OESTE	12	05:40PM	<1.3
	1215-6400	12	05:45PM	<1.3
	1440-ACESSO	12	05:50PM	<1.3
	1215-CF/OESTE R/W	13	05:30AM	<1.3
	125-6820	13	05:35AM	<1.3
	1215-CF/ESTE	13	05:30PM	<1.3
	1340-6640	13	05:35PM	<1.3
	1290-6390	13	05:40PM	<1.3
	1215-6330	14	05:30AM	<1.3
	1190-6840	14	05:35AM	<1.3
	1190 C/E	14	05:40AM	<1.3
	1290-6650	14	05:45AM	<1.3
	1215-6700	14	05:50AM	<1.3
	1240-6640	14	05:30PM	<1.3
	1190-VENTILACION	14	05:35PM	<1.3
	1240-CF/ESTE	14	05:40PM	<1.3
	1440-RAMPA/PRINCIPAL	14	05:45PM	<1.3
	1365-CF/E	14	05:50PM	<1.3
	1340-VENTILACION	14	05:55PM	<1.3
	1340-6640	14	06:00PM	<1.3
	1440-R/PRINCIPAL	15	05:30AM	<1.3
	1365-6780	15	05:35AM	<1.3
	1215-6700	15	05:40AM	<1.3
	1190-SERVICIOS	15	05:45AM	<1.3
	1190-VENTILACION	15	05:50AM	<1.3
	1265-6370	15	05:55AM	<1.3
	1315-6620	15	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1240-CF/E	15	05:35PM	<1.3
	1190-C/F R/E	15	05:40PM	<1.3
	1365-C/F R/E	15	05:45PM	<1.3
	1215-C/F R/E	15	05:50PM	<1.3
	1240-6580	15	05:55PM	<1.3
	1440-RAMPA	16	05:30AM	<1.3
	1215-CF/O	16	05:35AM	<1.3
	1215-6400	16	05:40AM	<1.3
	1190-CF/E	16	05:45AM	<1.3
	1240-CF/E	16	05:50AM	<1.3
	1240-6640	16	05:55AM	<1.3
	1190-C/F E	16	05:30PM	<1.3
	1190-6880	16	05:35PM	<1.3
	1190-6400	16	05:40PM	<1.3
	1340-VENTILACION	16	05:45PM	<1.3
	1365-C/E	16	05:50PM	<1.3
	1290-6690	16	05:55PM	<1.3
	1315-6620	16	06:00PM	<1.3
	1365-CF/	17	05:30AM	<1.3
	1365-6780	17	05:35AM	<1.3
	1440-RAMPA	17	05:40AM	<1.3
	1265-6330	17	05:45AM	<1.3
	1240-CF/E	17	05:50AM	<1.3
	1190-VENTILACION	17	05:30PM	<1.3
	1190-6880	17	05:35PM	<1.3
	1190-6400	17	05:40PM	<1.3
	1215-C/F	17	05:45PM	<1.3
	1215-6700	17	05:50PM	<1.3
	1290-6650	17	05:55PM	<1.3
	1190-6880	18	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1190-CF/E	18	05:35AM	<1.3
	1190-CF/O	18	05:40AM	<1.3
	1215-CF-ESTE	18	05:45AM	<1.3
	1440-RAMPA	18	05:50AM	<1.3
	1265-6370	18	05:30PM	<1.3
	1240-6580	18	05:35PM	<1.3
	1240-C/F	18	05:40PM	<1.3
	1365-C/E	18	05:45PM	<1.3
	1215-C/F	18	05:50PM	<1.3
	1215-6400	18	05:55PM	<1.3
	1365-cf/e	19	05:30AM	<1.3
	1365-6780	19	05:35AM	<1.3
	1240-CF/O	19	05:40AM	<1.3
	1265-6370	19	05:30PM	<1.3
	1290-6650	19	05:35PM	<1.3
	1190-CF/E	20	05:30AM	<1.3
	1290-6650	20	05:35AM	<1.3
	1340-6700	20	05:30PM	<1.3
	1190-cf/w	20	05:35PM	<1.3
	1190-SERVICIOS	20	05:40PM	<1.3
	1215-6400	20	05:45PM	<1.3
	1265-6330	20	05:50PM	<1.3
	1290-6690	20	05:55PM	<1.3
	1265-6500	21	05:30AM	<1.3
	1340-CF/E	21	05:35AM	<1.3
	1340-VENTILACION	21	05:40AM	<1.3
	1215-CF/O	21	05:45AM	<1.3
	1240-CF/O	21	05:50AM	<1.3
	1190-6400	21	05:55AM	<1.3
	1215-6840	21	06:00:AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1265-6500	21	06:05AM	<1.3
	1240-CF/E	21	05:30PM	<1.3
	1265-6330	21	05:35PM	<1.3
	1265-6370	21	05:40PM	<1.3
	1440-RAMPA	21	05:45PM	<1.3
	1215-6700	21	05:50PM	<1.3
	1290-6500	21	05:55PM	<1.3
	1340-6700	21	06:00PM	<1.3
	1365-6840	22	05:30AM	<1.3
	1240-6660	22	05:35AM	<1.3
	1290-6690	22	05:40AM	<1.3
	1215-C/F E	22	05:45AM	<1.3
	1290-6500	22	05:50AM	<1.3
	1365-C/F E	22	05:55AM	<1.3
	1240-C/F E	22	06:00:AM	<1.3
	1190-VENTILACION	22	06:05AM	<1.3
	1190-C/E R/O	22	05:30PM	<1.3
	1190-C/O R/E	22	05:35PM	<1.3
	1365-C/O	22	05:40PM	<1.3
	1440 PRINCIPAL	22	05:45PM	<1.3
	1365-6760	22	05:50PM	<1.3
	1190-6480	22	05:55PM	<1.3
	1265-6330	23	05:30AM	<1.3
	1190-6400	23	05:35AM	<1.3
	1215-6840	23	05:40AM	<1.3
	1215-6380	23	05:45AM	<1.3
	CTO-1240	23	05:30PM	<1.3
	1265-6370	23	05:35PM	<1.3
	1215-6700	23	05:40PM	<1.3
	1215-6500	23	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1440-RP	23	05:50PM	<1.3
	1340-6700	23	05:55PM	<1.3
	1240-6560	23	06:00PM	<1.3
	1290-6460	24	05:30AM	<1.3
	1440-RAMPA	24	05:35AM	<1.3
	1340-C/F	24	05:40AM	<1.3
	1265-6370	24	05:45AM	<1.3
	1240-C/F	24	05:50AM	<1.3
	1215-6700	24	05:30PM	<1.3
	1190-6480	24	05:35PM	<1.3
	1365-C/O	24	05:40PM	<1.3
	1190-C/E	24	05:45PM	<1.3
	1215-6580	24	05:50PM	<1.3
	1240-C/E	25	05:30AM	<1.3
	1240-6640	25	05:35AM	<1.3
	1215-C/E	25	05:40AM	<1.3
	1315-C/E	25	05:45AM	<1.3
	1215-6840	25	05:50AM	<1.3
	1365-C/E	25	05:30PM	<1.3
	1440-RAMPA	25	05:35PM	<1.3
	1240-C/F	25	05:40PM	<1.3
	1240-6560	26	05:30AM	<1.3
	1265-6330	26	05:35AM	<1.3
	1215-C/F-E	26	05:40AM	<1.3
	1215-6400	26	05:45AM	<1.3
	1190-C/F W R/E	26	05:50AM	<1.3
	1215-6700	26	05:30PM	<1.3
	1340-VENTILACION	26	05:35PM	<1.3
	1290-6460	26	05:40PM	<1.3
	1190-C/E	26	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1190-6400	26	05:50PM	<1.3
	1290-6460	28	05:30AM	<1.3
	1215-C/F W	28	05:35AM	<1.3
	1215-6580	28	05:40AM	<1.3
	1190-6400	28	05:45AM	<1.3
	1265-6370	28	05:50AM	<1.3
	1265-6330	28	05:55AM	<1.3
	1365-6760	28	06:00:AM	<1.3
	1190-6800	28	05:30PM	<1.3
	1190-C/O	28	05:35PM	<1.3
	1215-6400	28	05:40PM	<1.3
	1440-PRINCIPAL	28	05:45PM	<1.3
	1440-RAMPA	28	05:50PM	<1.3
	1365-C/O R/E	28	05:55PM	<1.3
	1290-6370	29	05:30AM	<1.3
	1215-6840	29	05:35AM	<1.3
	1190-6480	29	05:40AM	<1.3
	1365-C/O	29	05:45AM	<1.3
	1240-C/E	29	05:50AM	<1.3
	1240-CFE/E	29	05:30PM	<1.3
	1340-VENTILACION	29	05:35PM	<1.3
	1440-RAMPA	29	05:40PM	<1.3
	1240-CFE/E	29	05:45PM	<1.3
1190-CF/ESTE	29	05:50PM	<1.3	
1440-ACESSO	30	05:30AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1265-6330	30	05:35AM	<1.3
	1265-6370	30	05:40AM	<1.3
	1240-C/O R/E	30	05:45AM	<1.3
	1240-6560	30	05:50AM	<1.3
	1215-C/E R/O	30	05:55AM	<1.3
	1290-6380	30	06:00:AM	<1.3
	1290-6650	30	06:05AM	<1.3
	1290-6460	30	05:30PM	<1.3
	1190-CF/E	30	05:35PM	<1.3
	1190-6800	30	05:40PM	<1.3
	1440-RAMPA	30	05:45PM	<1.3
	1365-CF/E	30	05:50PM	<1.3
	1365-6840	30	05:55PM	<1.3
	1215-C/E R/E	31	05:30AM	<1.3
	1190-C/E R/O	31	05:35AM	<1.3
	1190-6480	31	05:40AM	<1.3
	1440-R/O	31	05:45AM	<1.3
	1340-VENTILACION	31	05:50AM	<1.3
	1290-6650	31	05:55AM	<1.3
	1240-CF/ESTE	31	05:30PM	<1.3
	1215-6480	31	05:35PM	<1.3
	1365-CF/ESTE	31	05:40PM	<1.3
	1365-6700	31	05:45PM	<1.3
1290-6650	31	05:50PM	<1.3	

Donde mm/s: milímetros por segundo; NR: no registrado
 Fuente: MSR, 2015.

8 Geoquímica de Roca Estéril

8.1 Sitios de Monitoreo

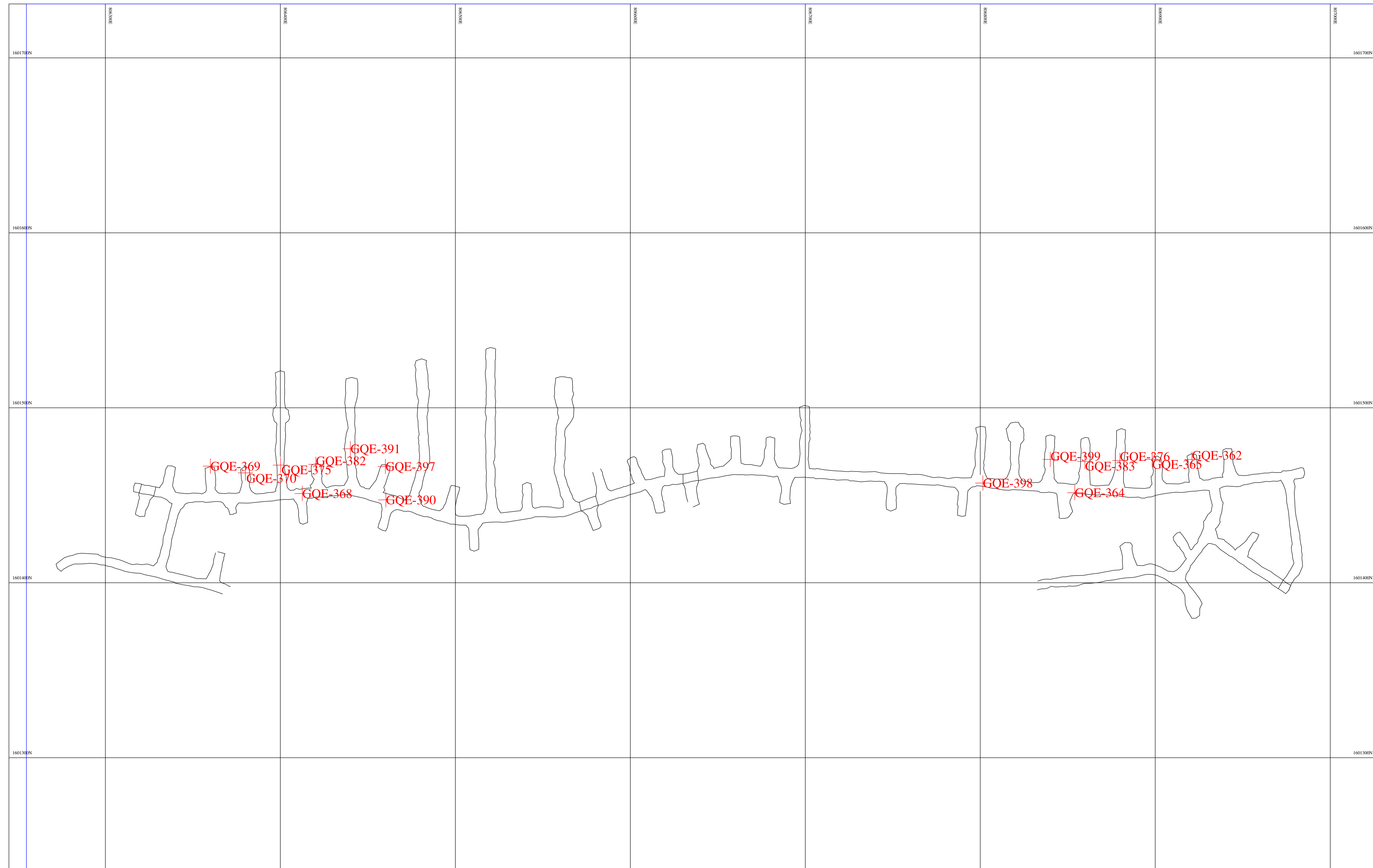
En el Cuadro 8-1 se enlistan las muestras analizadas de material extraído de los túneles del proyecto, rampa oeste y rampa este, durante los meses de Noviembre 2014 a Enero 2015. La ubicación de la extracción de las muestras se presenta en la Figura 8-1, Figura 8-2, Figura 8-3, Figura 8-4, Figura 8-5 y Figura 8-6.

Cuadro 8-1: Sitios de Material Extraído de los Túneles, Proyecto Minero Escobal

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-359	1215-CFTO-EC	806644.5	1601428.5	1217
GQE-360	1386-RAMP-ZE	807283	1601451.43	1423
GQE-361	1386-RAMP-ZE	807344.8	1601476.5	1432
GQE-362	1190-6920-EC	806921	1601470.5	1192
GQE-363	1215-6680-EC	806677.5	1601447	1217
GQE-364	1190-CFTO-EC	806854	1601451.5	1192
GQE-365	1190-6900-EC	806898.25	1601470.5	1192
GQE-366	12215-6540-OC	806538	1601445	1217
GQE-367	1240-ACC-EC	806611.7	1601405	1241
GQE-368	1190-CFTE-OC	806412.5	1601451	1192
GQE-369	1190-6360-OC	806360	1601466.65	1192
GQE-370	1190-6380-OC	806380	1601462.78	1192
GQE-371	1240-6610-EC	806607.5	1601432	1238
GQE-372	1215-6660-EC	806657.5	1601447	1218
GQE-373	1215-6560-OC	806557.75	1601446	1218
GQE-374	1215-CFTE-EC	806786	1601436.25	1218
GQE-375	1190-6400-OC	806400.1	1601467.25	1192
GQE-376	1190-6880-EC	806879.8	1601469.9	1192
GQE-377	1365-6800-EC	806800	1601381.5	1366
GQE-378	1365-6820-EC	806820	1601383	1366
GQE-379	1240-CFTE-EC	806628.5	1601413	1239
GQE-380	1240-CFTO-EC	806591.5	1601412.5	1239
GQE-381	1386-REZ	807391	1601493	1436
GQE-382	1190-6420-OC	806420.3	1601467.7	1192
GQE-383	1190-6860-EC	806859.8	1601469.3	1192
GQE-384	1215-6640-EC	806640.3	1601447	1217

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-385	1215-6700-EC	806700	1601446.75	1217
GQE-386	1215-CFTE-OC	806589.5	1601427.25	1219
GQE-387	1215-6600-EC	806600	1601447	1219
GQE-388	1215-6620-EC	806620	1601446.5	1219
GQE-389	1215-6780-EC	806780	1601450	1219
GQE-390	1190-CFTE-OC	806460.3	1601447.4	1192
GQE-391	1190-6440-OC	806440	1601476.6	1192
GQE-392	1215-CFTO-OC	806390.9	1601444.75	1217
GQE-393	1215-6420-OC	806419.5	1601445.8	1217
GQE-394	1215-6800-EC	806800	1601452.85	1217
GQE-395	1215-CFTE-EC	806839	1601428	1220
GQE-396	1215-6820-EC	806820	1601447	1219
GQE-397	1190-6460-OC	806460	1601466.5	1193
GQE-398	1190-CFTO-EC	806801.5	1601457	1192
GQE-399	1190-6840-EC	806840	1601470.5	1192
GQE-400	1440-RAMPA-ZE	806436	1601510.5	1442
GQE-401	1365-CFTO-EC	806749	1601359	1367
GQE-402	1215-6400-OC	806400	1601457.75	1218
GQE-403	1440-ACC-ZE	807414	1601527	1440
GQE-404	1365-6780-EC	806780	1601380.5	1367
GQE-405	1240-6640-EC	806640	1601429.5	1239
GQE-406	1240-CFTO-OC	806538.5	1601413	1241
GQE-407	1240-CFTE-EC	806686	1601413.5	1241
GQE-408	1340-CFTE-EC	807068	1601416	1342

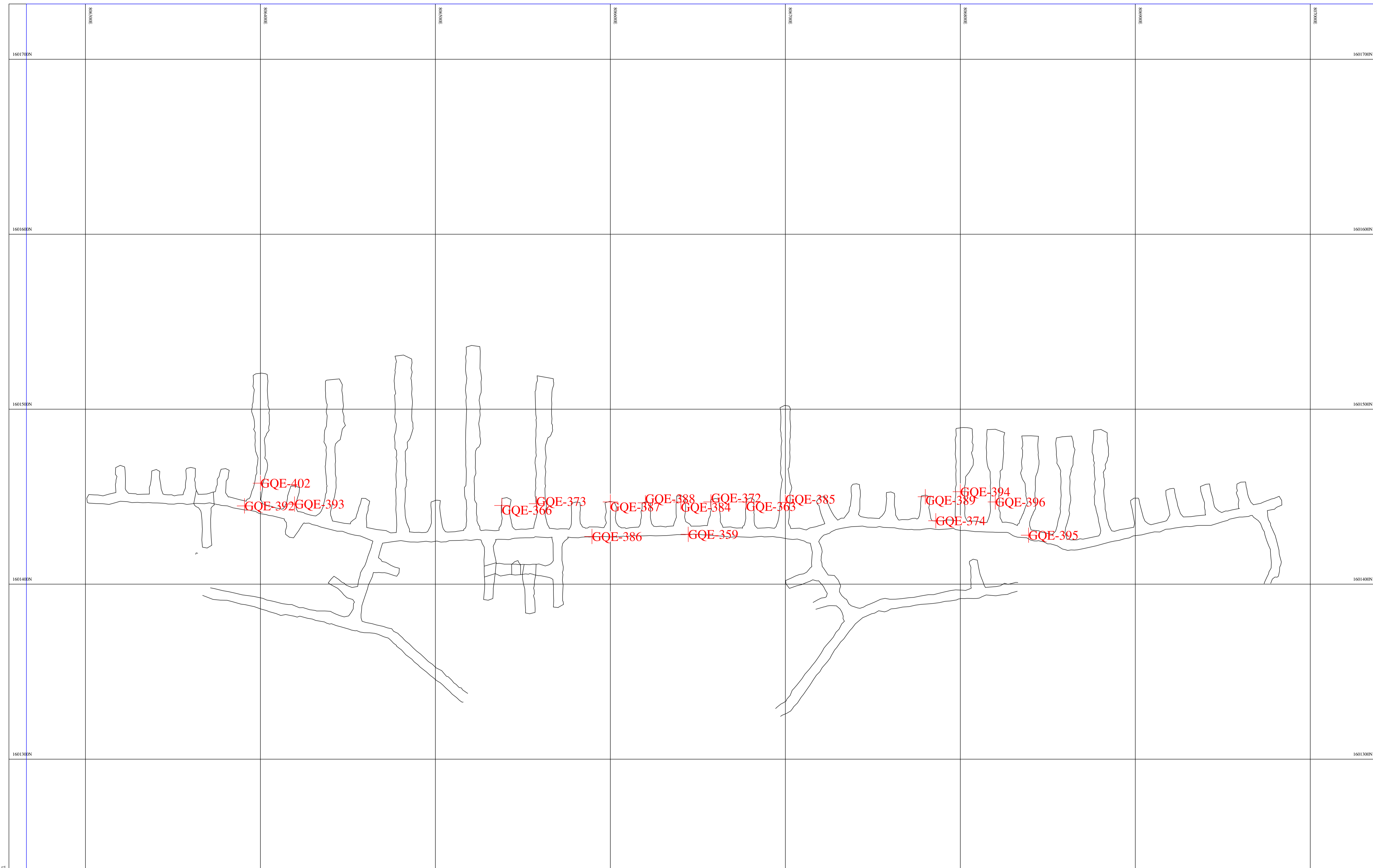
Fuente: MSR, 2015.



Plano ARD Nivel 1190

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2014-En 2015	1:1000

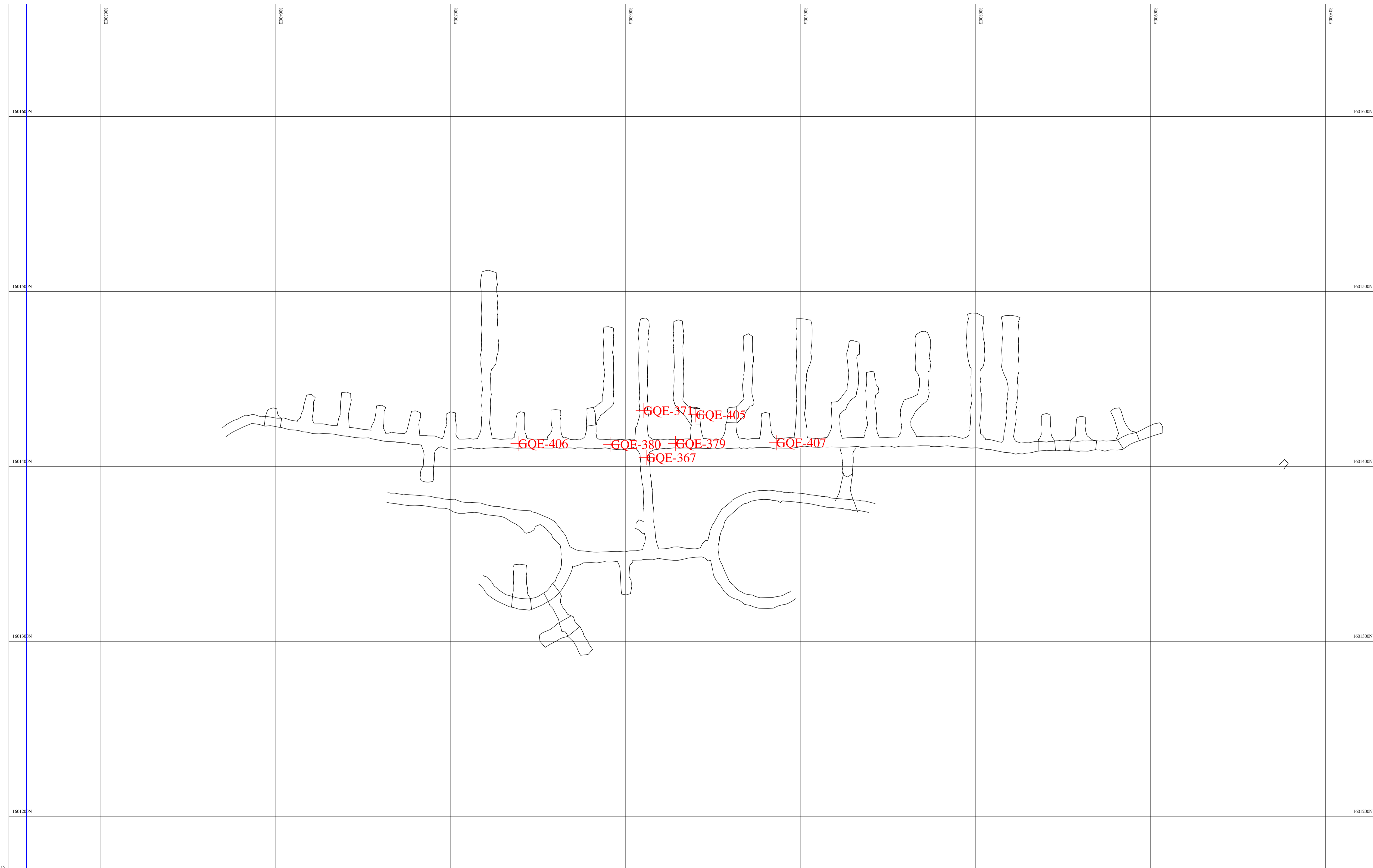
noviembre2014-enero2016



Plano ARD Nivel 1215

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2014-En 2015	1:1000

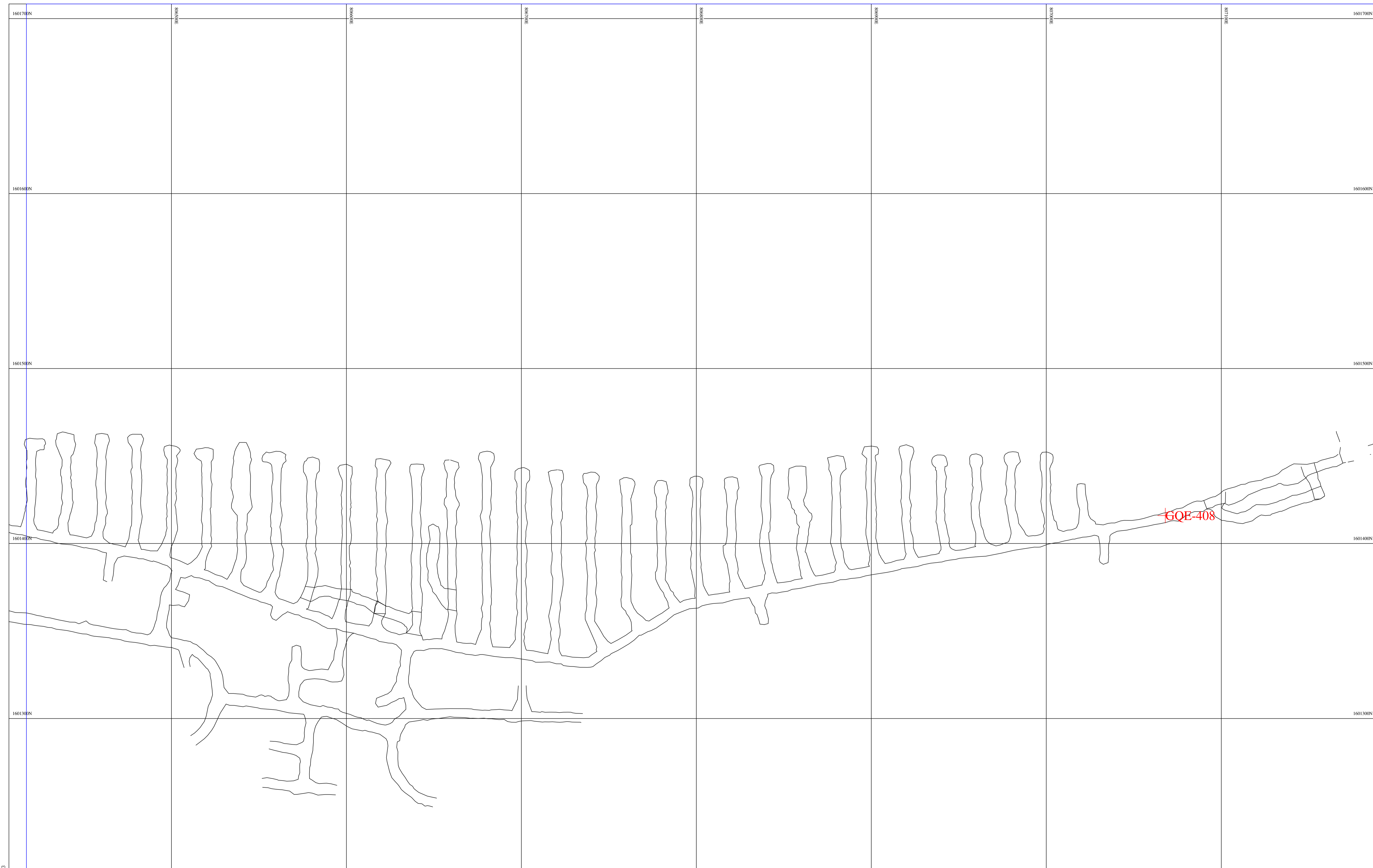
noviembre2014-enero2016_01



Plano ARD Nivel 1240

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2014-En 2015	1:1000

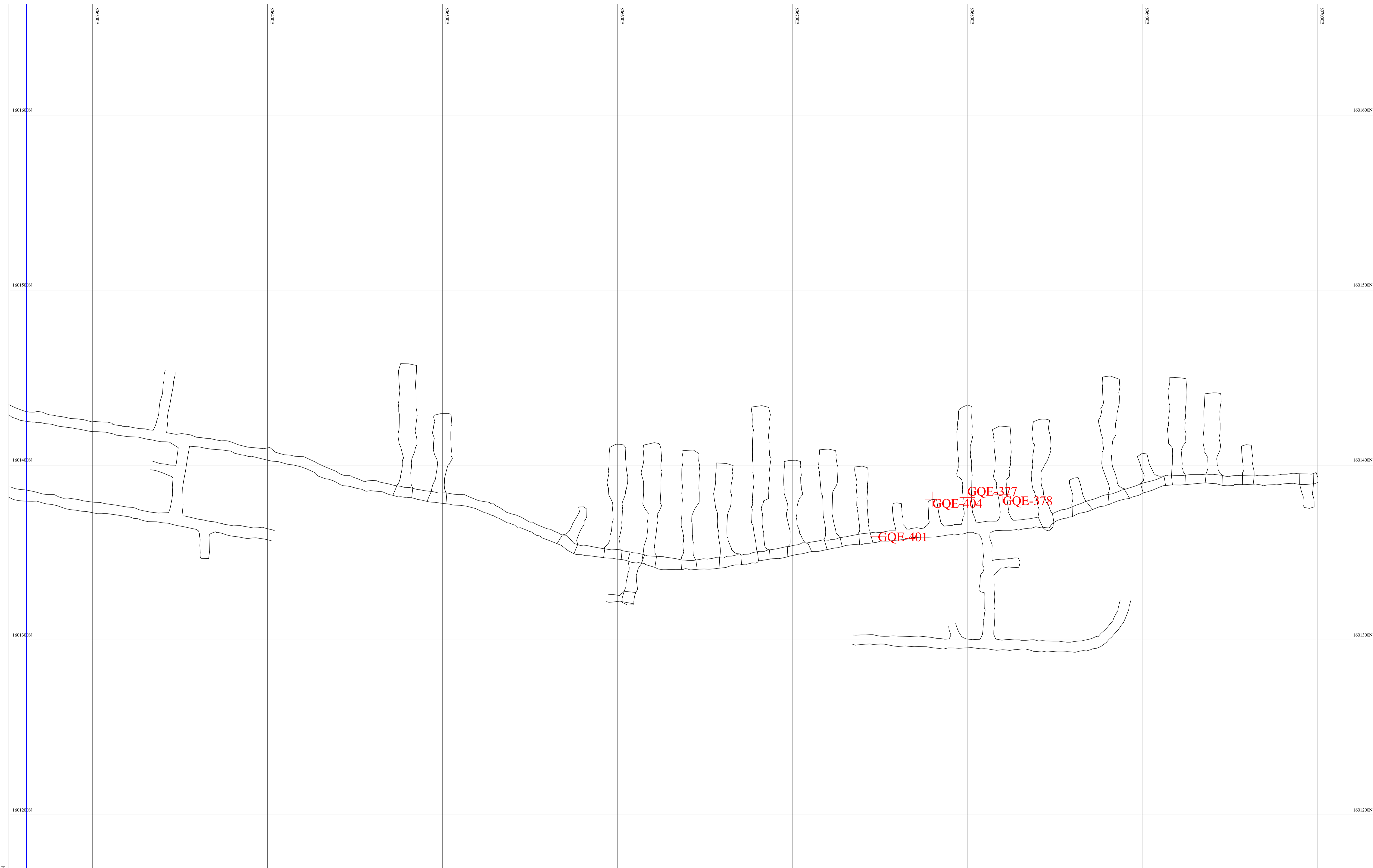
noviembre2.014-enero2016_02



Plano ARD Nivel 1340

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2014-En 2015	1:1000

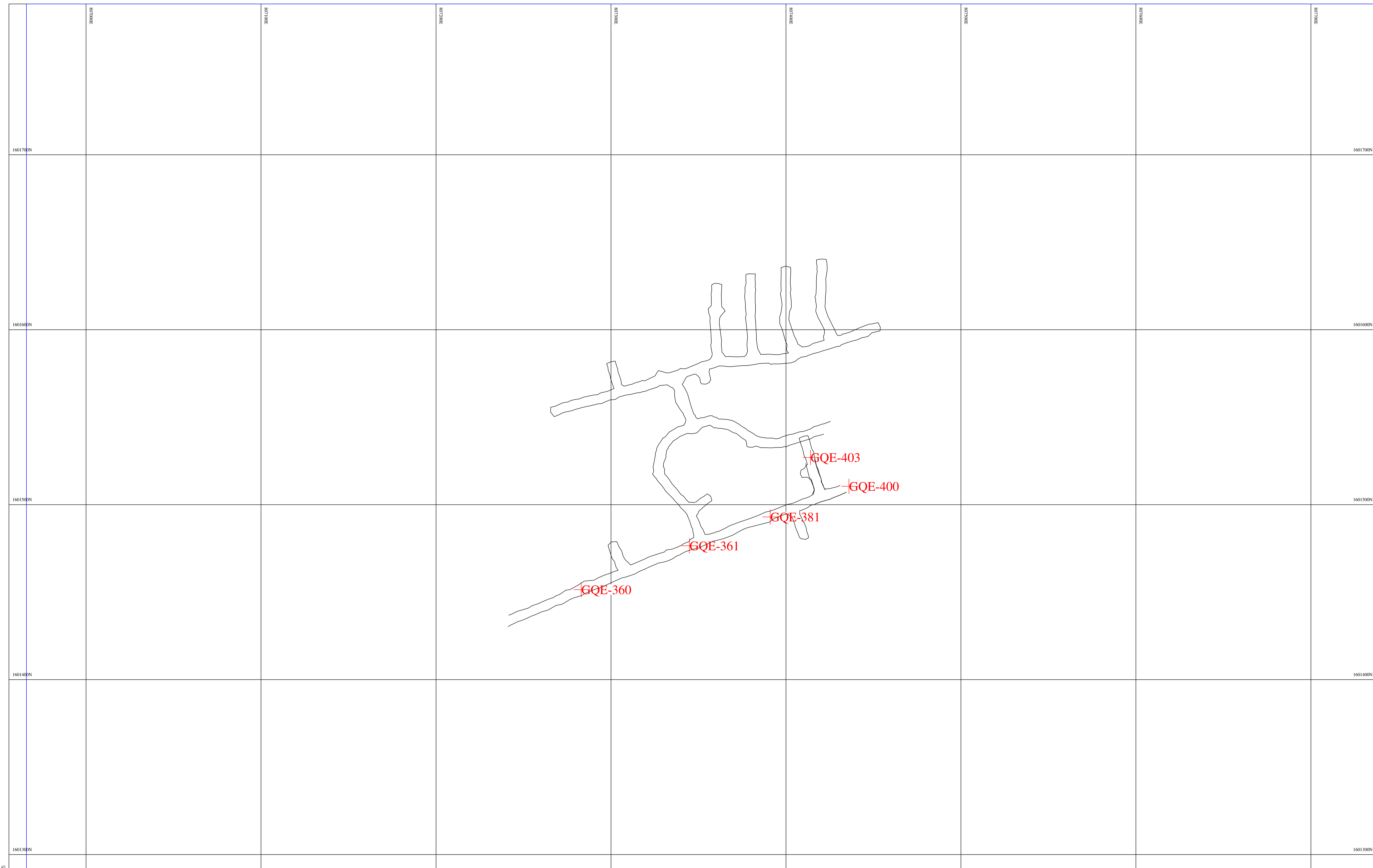
noviembre2014-enero2016_03



Plano ARD Nivel 1365

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HG/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2014-En 2015	1:1000

noviembre2014-enero2016_04



Plano ARD Rampa ZE Nivel 1430

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2014-Eri 2015	1:1000

noviembre2014-enero2016_05

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, 2015.

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 8.04 a 10.62 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-359	02/11/2014	11/11/2014	8.67	20.4
GQE-360	03/11/2014	11/11/2014	8.76	20.2
GQE-361	04/11/2014	11/11/2014	9.05	18.7
GQE-362	10/11/2014	11/11/2014	8.84	18.1
GQE-363	11/11/2014	19/11/2014	8.67	22.5
GQE-364	11/11/2014	19/11/2014	8.5	21.8
GQE-365	17/11/2014	19/11/2014	8.6	21.1
GQE-366	18/11/2014	19/11/2014	8.83	20.8

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-367	22/11/2014	28/11/2014	8.35	18.1
GQE-368	22/11/2014	28/11/2014	8.17	18.3
GQE-369	23/11/2014	28/11/2014	8.04	19.2
GQE-370	27/11/2014	28/11/2014	8.68	20.1
GQE-371	01/12/2014	03/12/2014	8.83	22.9
GQE-372	01/12/2014	03/12/2014	9.03	22.6
GQE-373	01/12/2014	03/12/2014	8.5	22.7
GQE-374	01/12/2014	03/12/2014	8.74	23.4
GQE-375	09/12/2014	17/12/2014	8.86	20.4
GQE-376	10/12/2014	17/12/2014	8.85	20.5
GQE-377	14/12/2014	17/12/2014	8.98	20.8
GQE-378	14/12/2014	17/12/2014	8.74	22.2
GQE-379	15/12/2014	17/12/2014	8.94	22.4
GQE-380	16/12/2014	17/12/2014	9.07	22.4
GQE-381	19/12/2014	23/12/2014	8.66	19.5
GQE-382	22/12/2014	23/12/2014	8.74	19.8
GQE-383	22/12/2014	23/12/2014	8.99	20.1
GQE-384	22/12/2014	23/12/2014	8.82	20.7
GQE-385	22/12/2014	23/12/2014	8.96	21.9
GQE-386	01/01/2015	04/01/2015	8.86	20.3
GQE-387	01/01/2015	04/01/2015	8.72	19.9
GQE-388	01/01/2015	04/01/2015	8.96	20.2
GQE-389	01/01/2015	04/01/2015	8.8	20.5
GQE-390	05/01/2015	09/01/2015	8.51	18.9
GQE-391	06/01/2015	09/01/2015	8.54	19.3
GQE-392	06/01/2015	09/01/2015	8.44	19.2
GQE-393	06/01/2015	09/01/2015	8.58	19.6
GQE-394	07/01/2015	09/01/2015	8.6	19.4
GQE-395	10/01/2015	17/01/2015	10.26	20.2
GQE-396	12/01/2015	17/01/2015	8.68	19.9
GQE-397	13/01/2015	17/01/2015	8.79	20.4
GQE-398	14/01/2015	17/01/2015	8.99	20.2
GQE-399	14/01/2015	17/01/2015	8.75	20.5
GQE-400	21/01/2015	27/01/2015	8.89	20.3
GQE-401	21/01/2015	27/01/2015	9	21.5
GQE-402	21/01/2015	27/01/2015	9.02	20.8
GQE-403	22/01/2015	27/01/2015	9.03	19.1
GQE-404	22/01/2015	27/01/2015	9.01	18.1

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-405	24/01/2015	27/01/2015	9.05	17.6
GQE-406	26/01/2015	27/01/2015	9.17	16.4
GQE-407	26/01/2015	27/01/2015	10.62	16.5
GQE-408	27/01/2015	11/02/2015	8.62	18.3

Fuente: MSR, 2015.

9 Mediciones de Seguridad Industrial y Salud Ocupacional

9.1 Presión Sonora

La medición de Presión Sonora en el trimestre de Noviembre 2014 a Enero 2015 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			2015		
Trimestre	VIII								
Mes	Nov	Dic	Ene						
Fecha	25/11/14	04/12/14	07/01/15						
Hora Inicio	7:00	7:00	7:00						
Duración	11h	11h	11h						
Lmax dBA	101,4	92,9	86,6						
Lmin dBA	96,3	92,4	83,9						
Prom. Diurno dBA	98,85	92,65	85,25						
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86						
Duración de Referencia OSHA	12h	12h	12h						
Leq (Normal sin uso de EPP)	98,85	92,65	85,25						
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	84,35	78,15	70,75						
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable						

Superficie Planta de Proceso - MOLINO				2014			2015		
Trimestre	VIII								
Mes	Nov	Dic	Ene						
Fecha	18/11/14	04/12/14	04/01/15						
Hora Inicio	7:00	7:00	7:00						
Duración	11h	11h	11h						
Lmax dBA	98,5	93,1	93,8						
Lmin dBA	97,2	92,9	93,4						
Prom. Diurno dBA	97,85	93	93,6						
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86						
Duración de Referencia OSHA	12h	12h	12h						
Leq (Normal sin uso de EPP)	97,85	93	93,6						
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	83,35	78,5	79,1						
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable						

Superficie Planta de Proceso - FILTROS				2014			2015		
Trimestre	VIII								
Mes	Nov	Dic	Ene						
Fecha	21/11/14	04/12/14	07/01/15						
Hora Inicio	7:00	7:00	7:00						
Duración	11h	11h	11h						
Lmax dBA	88,5	82,6	83,3						
Lmin dBA	88,2	81,4	81,5						
Prom. Diurno dBA	88,35	82	82,4						
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86						
Duración de Referencia OSHA	12h	12h	12h						
Leq (Normal sin uso de EPP)	88,35	82	82,4						
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	73,85	67,5	67,9						
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable						

Puesto de Operador de Scoop				2014			2015		
Trimestre	VIII								
Mes	Nov	Dic	Ene						
Fecha	06/11/14	18/12/14	04/01/15						
Hora Inicio	7:00	7:00	7:00						
Duración	10h 30min	10h 30min	10h 30min						
Lmax dBA	92	92	87						
Lmin dBA	90	91	86						
Prom. Diurno dBA	91	91,5	86,5						
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86						
Duración de Referencia OSHA	12h	12h	12h						
Leq (Normal sin uso de EPP)	91	91,5	86,5						
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	76,5	77	72						
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable						

Puesto de Operador de Jumbo				2014			2015		
Trimestre	VIII								
Mes	Nov	Dic	Ene						
Fecha	26/11/14	14/12/14	19/01/15						
Hora Inicio	7:00	7:00	7:00						
Duración	10h 30min	10h 30min	10h 30min						
Lmax dBA	101	90	100,7						
Lmin dBA	98	89	98,9						
Prom. Diurno dBA	99,5	89,5	99,8						
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86						
Duración de Referencia OSHA	12h	12h	12h						
Leq (Normal sin uso de EPP)	99,5	89,5	99,8						
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	85	75	85,3						
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable						

Puesto de Operador de Boltec				2014			2015		
Trimestre	VIII								
Mes	Nov	Dic	Ene						
Fecha	05/11/14	12/12/14	04/01/15						
Hora Inicio	7:00	7:00	7:00						
Duración	10h 30min	10h 30min	10h 30min						
Lmax dBA	97	95	91						
Lmin dBA	95	93	90						
Prom. Diurno dBA	96	94	90,5						
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86						
Duración de Referencia OSHA	12h	12h	12h						
Leq (Normal sin uso de EPP)	96	94	90,5						
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	81,5	79,5	76						
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable						

Fuente: MSR, 2015.

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 8210 N95 Homologación NIOSH.

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

Superficie Planta de Proceso - TRITURACION				2014	2015			
Trimestre				VIII				
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Noviembre	Diciembre	Enero		
Fecha				17/11/2014	09/12/2014	20/01/2015		
Hora Inicio				7:00	7:00	7:00		
Duración				OSHA	99.97%	11 h	11h 12min	11h 3min
OSHA Fraccion Respirable PM ₄				mg/m ³	5	16667	0,035	0,015
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,045	0,077	0,058		

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.

Superficie Planta de Proceso - MOLINO				2014	2015			
Trimestre				VIII				
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Noviembre	Diciembre	Enero		
Fecha				19/11/2014	09/12/2014	20/01/2020		
Hora Inicio				7:00	7:00	7:00		
Duración				OSHA	99.97%	11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄				mg/m ³	5	16667	0,042	0,003
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	1,034	0,03	0,026		

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.

Superficie Planta de Proceso - FILTROS				2014	2015			
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	Noviembre	Diciembre	Enero		
Fecha				11/11/2014	09/12/2014	20/01/2015		
Hora Inicio				7:00	7:00	7:00		
Duración				OSHA	99.97%	11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄				mg/m ³	5	16667	0,45	0,007
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,036	0,004	0,226		

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.

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Interior Mina General - REZAGA				2014		2015		
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	Noviembre	Diciembre	Enero		
Fecha				10/11/2014	12/12/2014	15/01/2015		
Hora Inicio				7:00	7:00	7:00		
Duración				OSHA	99.97%	10h 30min	10h 30min	10h 30min
OSHA Fraccion Respirable PM ₄				mg/m ³	5	16667	1,53	0,885
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,562	2,08	1,28		
<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		2015		
Trimestre				VIII				
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	Noviembre	Diciembre	Enero		
Fecha				13/11/2014	12/12/2014	15/01/2015		
Hora Inicio				7:00	7:00	7:00		
Duración				OSHA	99.97%	10h 30min	10h 30min	10h 30min
OSHA Fraccion Respirable PM ₄				mg/m ³	5	16667	0,054	0,441
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	0,32	0,522	0,458		
<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, 2015.

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 trimestre, 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 50 ppm, Exposición Breve 100 ppm	Límite 10ppm, Valores mayores a 1ppm alertar.			
04-nov-14	1190-CFTO.EC	Ninguna	Medición posterior a voladura	27	0	7:17	Diurno	Jose Carrillo
	1190-6920.EC	Ninguna	Medición posterior a voladura	25	0	7:14		
	1265-6500.OC	Ninguna	Medición posterior a voladura	9	0	7:01		
	1265-6610.EC	Ninguna	Medición posterior a voladura	10	0	7:06		
	1265-6340.OC	Ninguna	Medición posterior a voladura	20	0	6:45		
	1290-6340.OC	Ninguna	Medición posterior a voladura	36	0	6:40		
	1315-6600.EC	LH-02	Perforacion	5	0	9:05		
	1290-6580.OC	TL-02	instalación de mangas	19	0	10:35		
1290-6690.EC	RB-06	Fortificacion	20	0	12:14			
09-dic-14	1365 6800 E.C	Ninguna	Medición posterior a voladura	0	0	18:55	Nocturno	Marvin Lopez
	1340 6660 E.C	Ninguna	Medición posterior a voladura	0	0	18:55		
	1190 CFTO E.C.	Ninguna	Medición posterior a voladura	0	0	19:15		
	1315 6660 E.C	Ninguna	Medición posterior a voladura	115	0	19:05		
	1315 6660 E.C	Ninguna	Medición posterior a voladura	25	0	21:00		
	1315 6660 E.C	LL-05	Rezaga	40	0	20:30		
	1215 ACCS E.C	TL-02	Cableado electrico	14	0	21:45		
	1340 6900 E.C	ST-01	Lanzado	23	0	3:45		
02-ene-15	1440- ACC-ZE	Ninguna	Medición posterior a voladura	10	0	7:05	Diurno	Amarildo Mijangos
	1440- ACC-ZE	Ninguna	Medición posterior a voladura	8	0	7:10		
	1290-6650	Ninguna	Medición posterior a voladura	19	0	7:19		
	1215-6520	Ninguna	Medición posterior a voladura	35	0	7:45		
	1190-CFTO	Ninguna	Medición posterior a voladura	37	0	7:31		
	1190-Serv	Ninguna	Medición posterior a voladura	35	0	7:33		
	1190-6840	Ninguna	Medición posterior a voladura	35	0	7:36		
	1315-CFE	LM-75	Anclando Maquina	8	0	10:10		
	1290-6380	TL-05	Instalando Acople	7	0	11:18		
	1215-6800	JD-05	Perforando	9	0	12:20		
	1215-CFE	AT-02	Carguillo	13	0	12:35		

Fuente: MSR, 2015.

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 y el mercurio en **PM₁₀** se detectó únicamente en EA-6, encontrándose ligeramente arriba del límite de detección del método.

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, sedimentos 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.

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Noviembre 2014																														
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")	469513	470143	471019	472076	472883	473988	474716	475141	475642	476100	477357	478914	480523	481460	482423	483244	483987	484661	485401	486302	487360	488941	490160	491125	492111	493105	493978	495118	496278	497879
Total Este (tubería 8")	NL	149197	149197	149197	149199	150188	150512	NL	NL	150585	150585	150585	151126	151401	151800	151930	151930	151930	151930	151930	151930	151931	151931	151931	151931	151932	151934	151934	NL	151934
Portal Oeste (tubería 6")	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219730	219747	219813	219813	220473	220504	220512	220512	220512	220512	220512	220512	220512	220563
Portal Oeste (tubería 8")	1334062	1336888	1338794	1341063	1342980	1345643	1348517	1351249	1353746	1356150	1358141	1359813	1361713	1364017	1366553	1368982	1371563	1374245	1376932	1379711	1381220	1383138	1385600	1388101	1390528	1392917	1394491	1395052	1396812	1399192
Clarificador	2597268	2600465	2602539	2605438	2607785	2611698	2615311	2618318	2621434	2624642	2628260	2630309	2633411	2636048	2639576	2641817	2644580	2647860	2651295	2654456	2656252	2659427	2661784	2664841	2667684	2670577	2673192	2676487	2679096	2682037
VOLUMEN BOMBEADO (m³)																														
Portal Este (tubería 6")	603	630	876	1057	807	1105	728	425	501	458	1257	1557	1609	937	963	821	743	674	740	901	1058	1581	1219	965	986	994	873	1140	1160	1601
Total Este (tubería 8")	NL	NL	0	0	2	989	324	NL	NL	NL	0	0	541	275	399	130	0	0	0	0	0	1	0	0	0	1	2	0	NL	NL
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	66	0	660	31	8	0	0	0	0	0	51	
Portal Oeste (tubería 8")	2692	2826	1906	2269	1917	2663	2874	2732	2497	2404	1991	1672	1900	2304	2536	2429	2581	2682	2687	2779	1509	1918	2462	2501	2427	2389	1574	561	1760	2380
Clarificador	3252	3197	2074	2899	2347	3913	3613	3007	3116	3208	3618	2049	3102	2637	3528	2241	2763	3280	3435	3161	1796	3175	2357	3057	2843	2893	2615	3295	2609	2941
CAUDAL PROYECTADO (gpm)																														
Portal Este (tubería 6")	111	116	161	194	148	203	133	78	92	84	230	285	295	172	177	151	136	124	136	165	194	290	223	177	181	182	160	209	213	294
Total Este (tubería 8")	NL	NL	0	0	0	181	59	NL	NL	NL	0	0	99	50	73	24	0	0	0	0	0	0	0	0	0	0	0	0	NL	NL
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	12	0	121	6	1	0	0	0	0	0	9	
Portal Oeste (tubería 8")	494	518	349	416	351	488	527	501	458	441	365	307	348	422	465	445	473	492	493	509	277	352	451	459	445	438	289	103	323	436
Clarificador	596	586	380	531	430	717	662	551	571	588	663	376	569	483	647	411	507	601	630	580	329	582	432	560	521	530	479	604	478	539

m³: metro cúbico. Gpm: galones por minuto. Gris: fallo de flujómetro. NL: no hay lectura. Fuente: MSR, 2015.

Diciembre 2014																															
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")	498812	499696	501060	502194	503347	504545	505808	506942	508014	508950	509954	511003	512037	512994	514464	515853	516499	517236	518461	519598	520498	521794	522861	523698	525064	526514	527765	528742	529976	531075	532095
Total Este (tubería 8")	151947	151949	NL	152052	152082	NL	NL	152096	152093	152096	152096	152096	152096	152096	152101	152103	152103	152103	152103	152108	152108	152108	152112	152117	152127	152137	152137	152137	152137	152137	
Portal Oeste (tubería 6")	220563	220585	220585	220609	220643	220671	220675	220699	220719	220826	220836	NL	NL	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	
Portal Oeste (tubería 8")	1401630	1403762	1406020	1408494	1410922	1413320	1415675	1418392	1421743	1423972	1426591	1429162	1432110	1434211	1436398	1437897	1439835	1442499	1445161	1447698	1449872	1452228	1454643	1456977	1459270	1461697	1462787	1465033	1467145	1469415	1471619
Clarificador	2685041	2688128	2691307	2694534	2698064	2701291	2704475	2707961	2711339	2713957	2716808	2719571	2722532	2725313	2728439	2731713	2734187	2737102	2739631	2743559	2746254	2749888	2753320	2756266	2758950	2763035	2765891	2768110	2769822	2771599	2774001
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	933	884	1364	1134	1153	1198	1263	1134	1072	936	1004	1049	1034	957	1470	1389	646	737	1225	1137	900	1296	1067	837	1366	1450	1251	977	1234	1099	1020
Total Este (tubería 8")	13	2	NL	NL	30	NL	NL	NL	-3	3	0	0	0	0	5	2	0	0	0	5	0	0	4	5	10	10	0	0	0	0	
Portal Oeste (tubería 6")	0	22	0	24	34	28	4	24	20	220804	10	NL	NL	NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Portal Oeste (tubería 8")	2438	2132	2258	2474	2428	2398	2355	2717	3351	2229	2619	2571	2948	2101	2187	1499	1938	2664	2662	2537	2174	2356	2415	2334	2293	2427	1090	2246	2112	2270	2204
Clarificador	3004	3087	3179	3227	3530	3227	3184	3486	3378	2618	2851	2763	2961	2781	3126	3274	2474	2915	2529	3928	2695	3634	3432	2946	2684	4085	2856	2219	1712	1777	2402
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	171	162	250	208	211	220	232	208	197	172	184	192	190	175	270	255	118	135	225	208	165	238	196	153	250	266	229	179	226	201	187
Total Este (tubería 8")	2	0	9	9	6	5	0	NL	-1	1	0	0	0	0	1	0	0	0	0	1	0	0	1	1	2	2	0	0	0	0	
Portal Oeste (tubería 6")	0	4	0	4	6	5	1	4	4	40481	2	NL	NL	NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Portal Oeste (tubería 8")	447	391	414	454	445	440	432	498	614	409	480	471	540	385	401	275	355	488	488	465	399	432	443	428	420	445	200	412	387	416	404
Clarificador	551	566	583	592	647	592	584	639	619	480	523	507	543	510	573	600	454	534	464	720	494	666	629	540	492	749	524	407	314	326	440

m³: metro cúbico. Gpm: galones por minuto. Gris: fallo de flujómetro. NL: no hay lectura. Fuente: MSR, 2015.

Enero 2015																															
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")	533077	534093	535223	536398	537526	538278	539909	541005	541763	542599	543679	545054	546691	548268	549524	550739	551869	552935	554201	555200	556332	558045	559258	560748	562041	563304	564570	566054	567749	569724	571161
Total Este (tubería 8")	152137	152137	152137	152157	152157	152157	152157	152157	152157	152157	152157	152157	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	152159	
Portal Oeste (tubería 6")	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	
Portal Oeste (tubería 8")	1473982	1476170	1478402	1480562	1482202	1485181	1486748	1488702	1491239	1493667	1496110	1498495	1499963	1501441	1503732	1506273	1508797	1510749	1512839	1514812	1517002	1518740	1520721	1522668	1524525	1526779	1529056	1530985	1532940	1534986	1537154
Clarificador	2776758	2779013	2781742	2784487	2787378	2790291	2793380	2796081	2798559	2801372	2804487	2807659	2810437	2813010	2815868	2818801	2821827	2824368	2827290	2829889	2832857	2835580	2838271	2841358	2845929	2846680	2849534	2852709	2855710	2859293	2862268
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	982	1016	1130	1175	1128	752	1631	1096	758	836	1080	1375	1637	1577	1256	1215	1130	1066	1266	999	1132	1713	1213	1490	1293	1263	1266	1484	1695	1975	1437
Total Este (tubería 8")	0	0	0	20	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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")	2363	2188	2232	2160	1640	2979	1567	1954	2537	2428	2443	2385	1468	1478	2291	2541	2524	1952	2090	1973	2190	1738	1981	1947	1857	2254	2277	1929	1955	2046	2168
Clarificador	2757	2255	2729	2745	2891	2913	3089	2701	2478	2813	3115	3172	2778	2573	2858	2933	3026	2541	2922	2599	2968	2723	2691	3087	4571	751	2854	3175	3001	3583	2975
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	180	186	207	215	207	138	299	201	139	153	198	252	300	289	230	223	207	195	232	183	208	314	222	273	237	232	232	272	311	362	263
Total Este (tubería 8")	0	0	5	4	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 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")	433	401	409	396	301	546	287	358	465	445	448	437	269	271	420	466	463	358	383	362	402	319	363	357	340	413	417	354	358	375	397
Clarificador	505	413	500	503	530	534	566	495	454	516	571	582	509	472	524	538	555	466	536	476	544	499	493	566	838	138	523	582	550	657	545

m³: metro cúbico. Gpm: galones por minuto. Gris: fallo de flujómetro. NL: no hay lectura. Fuente: MSR, 2015.

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

		Noviembre 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.	7.08	6.76	6.39	7.16	6.88	7.32	7.4	6.81	7.06	7.05	7.24	7.85	7.48	6.67	7.04	7.36	7.08	7.2	7.2	7.41	7.09	7.58	7.1	7.44	7.26	7.21	7.44	7.57	7.44	7.33						
Temperatura	°C	25.4	24.5	23.6	25.2	27.4	26.7	25.4	24.7	26.6	26.6	24.3	26.6	26.2	25.6	25	26.2	27.6	26	24	24.9	26.2	23.6	25.6	26.5	26.5	25.8	24.4	23.3	25.1	25.6						
Conductividad	µS/cm	2034	1992	1907	2174	2065	2327	2047	2063	2061	1940	1830	2136	2240	1968	2019	2054	1954	2065	2078	2313	1987	2072	1918	2109	2195	2244	1700	1987	2019	1905						
Turbidez	NTU	2.27	8.94	4.3	10.2	9.1	6.64	2.32	1.97	6.27	5	12.3	4.73	6.98	18.5	5.55	14	4.33	9.52	4.46	9.2	6.5	9.21	10.9	7.03	11.1	8.67	10.6	20.2	5.27	8.08						
kit CN	mg/L	0.003	0.005	0.001	0.002	0.004	0.005	0.001	0.001	0.004	0.003	0.002	0.002	0.001	0.003	0.003	0.002	0.004	0.003	0.002	0.004	0.002	0.002	0.002	0.004	0.004	0.005	0.002	0.001	0.003							
CN Total		NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	0.005	<0.003	NA	NA	NA	NA	0.004						
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																					
pH	u.e.	9.2	9.26	9.16	9.05	9.1	8.81	9.1	9.07	Pileta sin agua						7.34	7.57	7.49	Pileta sin agua						7.61	7.85	7.75	7.9	8.01	7.64	7.79	7.87	7.75	7.79	7.97	8	7.76
Temperatura	°C	19.9	19.2	17.2	18	20.4	21.7	19.3	20.8							19.1	147.7	15.8							25	17.7	17.8	17.8	19.3	19.5	18.3	19.9	19	15	13.3	13.7	15.7
Conductividad	µS/cm	1021	1056	2224	1710	1268	1145	1273	1020							1114	1114	12.3							2987	1595	1622	1462	1493	1615	2049	2821	2877	2877	3816	3413	3483
Turbidez	NTU	4.78	7.05	7.76	4.1	6.63	4.92	8.61	8.27							47.4	24.7	25.1							84.5	35	26.9	30	24	24.5	31.7	15.2	15.8	9.3	8.9	7.95	8.51
Kit CN	mg/L	0.000	0.001	0.002	0.001	0.001	NA	0.003	0.000							0.000	0.004	0.001							0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.002
CN Total		NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	0.012	NA	NA	0.011							

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, 2015.

		Diciembre 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.	6.92	7.24	7.33	7.14	7.43	7.22	7.48	7.34	7.31	7.34	7.53	7.28	7.23	7.59	7.48	7.41	7.25	7.269	7.19	7.09	6.7	7.34	7	7.2	7.42	7.5	7.09	7.2	7.09	7.2	6.53
Temperatura	°C	26	27	24	23.4	24.9	25.8	22.7	27	23.7	23.9	22.7	25.2	25.2	24.5	23	23.3	24.9	24.5	26.6	26.4	25.8	25.5	24.1	25.4	25.2	24.1	22.3	25.9	27.1	25.1	20
Conductividad	µS/cm	1937	2043	2054	2006	2002	1949	1973	2032	4176	1951	1979	2023	1958	1938	1961	1818	1916	1916	1900	1926	1954	1830	2098	1873	1949	1904	1934	1017	1980	2039	2085
Turbidez	NTU	4.52	7.01	17.5	10.3	22.4	7.41	6.48	10.9	11.7	11.6	7.01	9.7	NA	8.06	5.2	11.9	33.8	14.1	6.93	7.2	9.59	12	3.96	9.58	3.7	8.31	3.15	7.62	11.2	8.77	6.91
kit CN	mg/L	0.002	0.001	0.006	0.007	0.001	0.002	0.002	0.003	0.001	0.001	0.002	0.003	0.009	0.003	0.002	0.004	0.005	0.004	0.006	0.006	0.000	0.000	0.003	0.005	0.004	0.005	0.004	0.005	0.008	0.004	0.000
CN Total		NA	NA	NA	NA	0.005	NA	<0.003	NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA
		Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																														
pH	u.e.	7.88																														
Temperatura	°C	17.66																														
Conductividad	µS/cm	3796																														
Turbidez	NTU	15.8																														
Kit CN	mg/L	0.003																														
CN Total		NA																														

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NTU: unidades naftalométricas de turbidez. NA: no analizado. Fuente: MSR, 2015.

		Enero 2015																														
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.	6.59	7.82	7.98	8.84	8.24	7.25	6.97	7.55	6.78	6.96	6.67	7.75	7.59	7.53	7.5	7.38	7.65	7.44	7.32	7.23	7.35	7.3	7.2	7.57	7.34	7.36	6.99	7.04	7.38	7.27	7.12
Temperatura	°C	24.6	26.2	24.4	25.2	24.8	25.9	21.7	24.4	25.9	24.9	25.7	24	24.9	23.4	24.1	25	21.5	22.4	29.9	25.1	24.4	26.2	25.4	22.2	24.6	25.1	23.4	21.8	24.5	22.5	25
Conductividad	µS/cm	2044	2299	2237	2359	2166	2198	2061	2140	2042	2170	1943	1871	2002	2034	2270	2210	2337	2259	2156	2148	5477	2176	2158	2153	2040	2109	2078	2024	2068	2112	1636
Turbidez	NTU	5.13	9.4	7.47	6.34	13.7	10.8	10.2	11.2	11.3	5.96	7.73	10	4.76	20	11.9	13.9	7.1	18.3	2.23	7.31	7.17	9	9.62	7.87	10.1	7.2	7.79	6.12	13.6	12.4	7.15
kit CN	mg/L	0.004	0.004	0.006	0.007	0.001	0.001	0.007	0.000	0.000	0.004	NA	0.004	0.005	0.003	0.004	0.000	0.002	0.001	0.002	0.002	0.000	0.000	0.004	0.000	0.005	0.002	0.005	0.005	0.002	0.002	0.003
CN Total		0.005	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	<0.003	NA
		Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																														
pH	u.e.	7.15	7.5	8.29	8.13	7.97	7.86	8.12	7.88	8.1	7.97	7.74	7.63	Pileta sin agua														7.68	7.63			
Temperatura	°C	18.6	15.4	15.7	18.1	17.2	15.7	14.2	14.5	13.5	13.9	14.9	16.5															13	12.7			
Conductividad	µS/cm	704.9	889.3	2171	1044	907.3	1048	1225	1347	1521	1440	1505	1641															4430	4718			
Turbidez	NTU	8.22	5.72	5.39	8.18	13.5	14.9	19.1	30.3	22.4	26	24	29															22	12.4			
kit CN	mg/L	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.001															0.006	0.108			
CN Total		<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	<0.003	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. Fuente: MSR, 2015.

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 November 2014

Job Details:				Job Code: EA-1A																											
Job Name: EA-1A				Site Name: Los Planes (Top Soil Deposit)																											
Version: PQ200				Station Code:																											
Serial No: 1.00				Operators: LF																											
Pump Time:				User1: NA																											
Flags: NA				User2: NA																											
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>652</td><td>647</td><td>650</td><td>mmHg</td></tr><tr><td>TA</td><td>23.4</td><td>16.3</td><td>18.9</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.71</td><td>Lpm</td></tr></tbody></table>					Max	Min	Avg	Units	BP	652	647	650	mmHg	TA	23.4	16.3	18.9	°C	Q	---	---	16.71	Lpm	Timer Information:				Mass Concentration Data:			
	Max	Min	Avg	Units																											
BP	652	647	650	mmHg																											
TA	23.4	16.3	18.9	°C																											
Q	---	---	16.71	Lpm																											
QCV				Date				Filter ID: 2534-0313																							
Max overheat				Time				Final Wt: 146.850 mg																							
occured NA				dd-mmm				Initial Wt: 146.610 mg																							
				hh:mm:ss				Delta Wt: 0.240 mg																							
				Start: 19-Nov-14				Total Vol: 21.01 m ³																							
				Stop: 20-Nov-14				Mass Conc: 11.42 µg/m ³																							
				ET: 23:59:00																											
Notes 1: Depósito de Suelos, Proyecto El Escobal																															
Notes 2: Minera San Rafael, S.A.																															

BGI PQ200 Air Sampling System

Downloaded November 2014

Job Details:				Job Code: EA-2A																											
Job Name: EA-2A				Site Name: La Cuchilla.																											
Version: PQ200				Station Code:																											
Serial No: 3.00				Operators: LF																											
Pump Time:				User1: NA																											
Flags: NA				User2: NA																											
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>631</td><td>626</td><td>629</td><td>mmHg</td></tr><tr><td>TA</td><td>25.3</td><td>15.1</td><td>18.4</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.70</td><td>Lpm</td></tr></tbody></table>					Max	Min	Avg	Units	BP	631	626	629	mmHg	TA	25.3	15.1	18.4	°C	Q	---	---	16.70	Lpm	Timer Information:				Mass Concentration Data:			
	Max	Min	Avg	Units																											
BP	631	626	629	mmHg																											
TA	25.3	15.1	18.4	°C																											
Q	---	---	16.70	Lpm																											
QCV				Date				Filter ID: 2513-1020																							
Max overheat				Time				Final Wt: 146.960 mg																							
occured NA				dd-mmm				Initial Wt: 146.750 mg																							
				hh:mm:ss				Delta Wt: 0.210 mg																							
				Start: 4-Nov-14				Total Vol: 20.35 m ³																							
				Stop: 5-Nov-14				Mass Conc: 10.32 µg/m ³																							
				ET: 23:59:00																											
Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa.																															
Notes 2: Minera San Rafael, S.A.																															

BGI PQ200 Air Sampling System

Downloaded November 2014

Job Details:				Job Code: EA-3																											
Job Name: EA-3				Site Name: El Fucío, zona este.																											
Version: PQ200				Station Code:																											
Serial No: 1.00				Operators: LF																											
Pump Time:				User1: NA																											
Flags: NA				User2: NA																											
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>624</td><td>620</td><td>622</td><td>mmHg</td></tr><tr><td>TA</td><td>24.1</td><td>12.9</td><td>16.7</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.70</td><td>Lpm</td></tr></tbody></table>					Max	Min	Avg	Units	BP	624	620	622	mmHg	TA	24.1	12.9	16.7	°C	Q	---	---	16.70	Lpm	Timer Information:				Mass Concentration Data:			
	Max	Min	Avg	Units																											
BP	624	620	622	mmHg																											
TA	24.1	12.9	16.7	°C																											
Q	---	---	16.70	Lpm																											
QCV				Date				Filter ID: 2514-1121																							
Max overheat				Time				Final Wt: 149.220 mg																							
occured NA				dd-mmm				Initial Wt: 148.850 mg																							
				hh:mm:ss				Delta Wt: 0.370 mg																							
				Start: 6-Nov-14				Total Vol: 20.25 m ³																							
				Stop: 6-Nov-14				Mass Conc: 18.28 µg/m ³																							
				ET: 23:59:00																											
Notes 1: Aldea El Fucío, San Rafael Las Flores, Santa Rosa.																															
Notes 2: Minera San Rafael, S.A.																															

BGI PQ200 Air Sampling System

Downloaded November 2014

Job Details:			Job Code: EA-7A																									
Job Name: EA-7A			Site Name: Los Planes																									
Version: PQ200			Station Code:																									
Serial No: 3.00			Operators: LF																									
Pump Time:			User1: NA																									
Flags: NA			User2: NA																									
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>650</td><td>645</td><td>648</td><td>mmHg</td></tr><tr><td>TA</td><td>22.7</td><td>16.5</td><td>18.8</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.71</td><td>Lpm</td></tr></tbody></table>				Max	Min	Avg	Units	BP	650	645	648	mmHg	TA	22.7	16.5	18.8	°C	Q	---	---	16.71	Lpm	Timer Information:			Mass Concentration Data:		
	Max	Min	Avg	Units																								
BP	650	645	648	mmHg																								
TA	22.7	16.5	18.8	°C																								
Q	---	---	16.71	Lpm																								
QCV			Date			Filter ID: 2535-0414																						
Max overheat			Time			Final Wt: 146.660 mg																						
occured NA			dd-mmm			Initial Wt: 146.600 mg																						
			hh:mm:ss			Delta Wt: 0.060 mg																						
			Start: 19-Nov-14			Total Vol: 20.95 m ³																						
			Stop: 20-Nov-14			Mass Conc: 2.86 µg/m ³																						
			ET: 23:59:00																									
Notes 1: Aldea Los Planes, San Rafael Las Flores, Santa Rosa.																												
Notes 2: Minera San Rafael, S.A.																												

BGI PQ200 Air Sampling System

Downloaded November 2014

Job Details:			Job Code: EA-4A																									
Job Name: EA-4A			Site Name: Aldea Los Ángeles																									
Version: PQ200			Station Code:																									
Serial No: 2.00			Operators: LF																									
Pump Time:			User1: NA																									
Flags: NA			User2: NA																									
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>653</td><td>647</td><td>651</td><td>mmHg</td></tr><tr><td>TA</td><td>25.3</td><td>16.1</td><td>19.4</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.71</td><td>Lpm</td></tr></tbody></table>				Max	Min	Avg	Units	BP	653	647	651	mmHg	TA	25.3	16.1	19.4	°C	Q	---	---	16.71	Lpm	Timer Information:			Mass Concentration Data:		
	Max	Min	Avg	Units																								
BP	653	647	651	mmHg																								
TA	25.3	16.1	19.4	°C																								
Q	---	---	16.71	Lpm																								
QCV			Date			Filter ID: 2536-0515																						
Max overheat			Time			Final Wt: 148.680 mg																						
occured NA			dd-mmm			Initial Wt: 147.020 mg																						
			hh:mm:ss			Delta Wt: 1.660 mg																						
			Start: 25-Nov-14			Total Vol: 21.01 m ³																						
			Stop: 26-Nov-14			Mass Conc: 79.02 µg/m ³																						
			ET: 23:59:00																									
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 November 2014

Job Details:			Job Code: EA-6																									
Job Name: EA-6			Site Name: Carretera a Mataquesquintla																									
Version: PQ200			Station Code:																									
Serial No: 3.00			Operators: LF																									
Pump Time:			User1: NA																									
Flags: NA			User2: NA																									
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>645</td><td>640</td><td>643</td><td>mmHg</td></tr><tr><td>TA</td><td>20.5</td><td>12.6</td><td>14.9</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.71</td><td>Lpm</td></tr></tbody></table>				Max	Min	Avg	Units	BP	645	640	643	mmHg	TA	20.5	12.6	14.9	°C	Q	---	---	16.71	Lpm	Timer Information:			Mass Concentration Data:		
	Max	Min	Avg	Units																								
BP	645	640	643	mmHg																								
TA	20.5	12.6	14.9	°C																								
Q	---	---	16.71	Lpm																								
QCV			Date			Filter ID: 2539-0818																						
Max overheat			Time			Final Wt: 147.140 mg																						
occured NA			dd-mmm			Initial Wt: 146.420 mg																						
			hh:mm:ss			Delta Wt: 0.720 mg																						
			Start: 27-Nov-14			Total Vol: 21.07 m ³																						
			Stop: 28-Nov-14			Mass Conc: 34.17 µg/m ³																						
			ET: 23:59:00																									
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 November 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	643	638	642	mmHg
TA	27.5	12.9	21.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-Nov-14	14:25:00
Stop:	12-Nov-14	14:25:00

Mass Concentration Data:

Filter ID:	2532-0101
Final Wt:	150.370 mg
Initial Wt:	149.370 mg
Delta Wt:	1.000 mg
Total Vol:	20.60 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 48.54 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 November 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	651	645	649	mmHg
TA	21.9	15.2	19.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	25-Nov-14	15:47:00
Stop:	26-Nov-14	15:47:00

Mass Concentration Data:

Filter ID:	2537-0616
Final Wt:	147.920 mg
Initial Wt:	147.000 mg
Delta Wt:	0.920 mg
Total Vol:	20.97 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 43.87 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 November 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	651	646	649	mmHg
TA	19.6	13.3	15.3	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	27-Nov-14	16:00:00
Stop:	28-Nov-14	16:00:00

Mass Concentration Data:

Filter ID:	2538-0727
Final Wt:	147.240 mg
Initial Wt:	146.080 mg
Delta Wt:	1.160 mg
Total Vol:	21.24 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 54.62 µg/m³

Notes 1: San Rafael Las Flores, Santa Rosa.

Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-14-11280

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-055 (El Escobal)
Análisis de muestras: Diciembre, 12 de 2014
Emisión del reporte: Diciembre, 15 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	2534-0313	0.14661	0.14685
2	EA-1B	2538-0727	0.14608	0.14724
3	EA-2A	2513-1020	0.14675	0.14696
4	EA-3	2514-1121	0.14885	0.14922
5	EA-3A	2532-0101	0.14937	0.15037
6	EA-4A	2536-0515	0.14702	0.14868
7	EA-5A	2537-0616	0.14700	0.14792
8	EA-6	2539-0818	0.14642	0.14714
9	EA-7A	2535-0414	0.14660	0.14666

¹: Código asignado por Laboratorio Ambiental, S.A. *: corresponde a los pesos iniciales indicados en los reportes analíticos RA-14-11246 y RA-14-11267

Anexos:

Anexo 1. Cadena de Custodia R-02-000471

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.	Fecha: Diciembre, 15/14	Revisión y aprobación: A.G.J.	Fecha: Diciembre, 15/14	Versión Cliente: 01
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BGI PQ200 Air Sampling System

Downloaded December 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: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	654	650	651	mmHg
TA	24.7	11.2	17.5	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Dec-14	14:49:00
Stop:	17-Dec-14	14:49:00

Mass Concentration Data:

Filter ID:	2548-0939
Final Wt:	146.800 mg
Initial Wt:	146.300 mg
Delta Wt:	0.500 mg
Total Vol:	21.14 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:58:00

Mass Conc: 23.65 µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded December 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: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	636	632	634	mmHg
TA	23.3	11.9	15.3	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-Dec-14	14:25:00
Stop:	12-Dec-14	14:25:00

Mass Concentration Data:

Filter ID:	2547-0808
Final Wt:	148.150 mg
Initial Wt:	147.720 mg
Delta Wt:	0.430 mg
Total Vol:	20.75 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 24:00:00

Mass Conc: 20.72 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 December 2014

Job Details:

Job Name: EA-3
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	628	624	626	mmHg
TA	21.2	10.3	14.1	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Dec-14	16:47:00
Stop:	11-Dec-14	16:47:00

Mass Concentration Data:

Filter ID:	2549-1030
Final Wt:	148.210 mg
Initial Wt:	147.920 mg
Delta Wt:	0.290 mg
Total Vol:	20.56 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 14.11 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 December 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	655	649	653	mmHg
TA	24.2	13.5	17.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Dec-14	15:06:00
Stop:	17-Dec-14	15:06:00

Mass Concentration Data:

Filter ID:	2551-1212
Final Wt:	147.770 mg
Initial Wt:	147.340 mg
Delta Wt:	0.430 mg
Total Vol:	21.19 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 20.30 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-14-11291

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-055 (El Escobal)
Análisis de muestras: Diciembre, 22-24 de 2014
Emisión del reporte: Diciembre, 24 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-3	2549-1030	0.14792	0.14821
2	EA-2A	2547-0808	0.14772	0.14815
3	EA-1A	2548-0939	0.14630	0.14680
4	EA-7A	2551-1212	0.14734	0.14777

¹: Código asignado por Laboratorio Ambiental, S.A. *: corresponde a los pesos iniciales indicados en el reporte analítico RA-14-11275

Reporte Analítico RA-14-11291

Anexos:

Anexo 1. Cadena de Custodia R-02-000479

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: L.D.	Fecha: Diciembre, 24/14	Revisión y aprobación: A.G.J.	Fecha: Diciembre, 24/14	Versión Cliente: 01
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BGI PQ200 Air Sampling System

Downloaded January 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	652	647	650	mmHg
TA	27.9	15.2	19.7	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	1-Jan-15	13:42:00
Stop:	2-Jan-15	13:42:00

Mass Concentration Data:

Filter ID:	2556-1717
Final Wt:	147.010 mg
Initial Wt:	146.680 mg
Delta Wt:	0.330 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 13.73 µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded January 2015

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: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	634	631	632	mmHg
TA	24.7	12.4	16.3	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	6-Jan-15	14:43:00
Stop:	7-Jan-15	14:43:00

Mass Concentration Data:

Filter ID:	2559-0333
Final Wt:	146.890 mg
Initial Wt:	146.280 mg
Delta Wt:	0.610 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 25.37 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 January 2015

Job Details:

Job Name: EA-3
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	628	624	626	mmHg
TA	26.0	11.2	15.6	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	6-Jan-15	15:20:00
Stop:	7-Jan-15	15:20:00

Mass Concentration Data:

Filter ID:	2560-0404
Final Wt:	147.530 mg
Initial Wt:	147.370 mg
Delta Wt:	0.160 mg
Total Vol:	20.45 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 7.82 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 January 2015

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: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	653	648	651	mmHg
TA	26.9	14.7	17.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	1-Jan-15	14:04:00
Stop:	2-Jan-15	14:04:00

Mass Concentration Data:

Filter ID:	2557-0111
Final Wt:	147.380 mg
Initial Wt:	147.060 mg
Delta Wt:	0.320 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 13.31 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-055 (El Escobal)
Análisis de muestras: Enero, 22-26 de 2015
Emisión del reporte: Enero, 27 de 2015

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	2556-1717	0.14668	0.14701
2	EA-2A	2559-0333	0.14628	0.14689
3	EA-3B	2560-0404	0.14737	0.14753
4	EA-7A	2557-0111	0.14706	0.14738

¹: Código asignado por Laboratorio Ambiental, S.A. *: corresponde a los pesos iniciales indicados en el reporte analítico RA-14-11275 y RA-14-11290.

Anexos:

Anexo 1. Cadena de Custodia R-02-000480

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:	Fecha:	Revisión y aprobación:	Fecha:	Versión Cliente:
L.D.	Enero, 27/15	A.G.J.	Enero, 27/15	02

11.3.2 Informe de Metales en PM₁₀

Reporte Analítico RA-14-11281

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-058
Análisis de muestras: Diciembre ,23 de 2014
Emisión del reporte: Diciembre, 23 de 2014

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

Métodos analíticos: EPA 7470. Mercury (Hg): manual cold-vapor technique.

Parámetro	LD	Análisis de mercurio (μg) en filtros						
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A
		2538-0727	2513-1020	2532-0101	2536-0515	2537-0616	2539-0818	2535-0414
*Mercurio	0.002	0.010	0.013	0.207	0.214	0.011	0.045	0.007

*Análisis realizado por laboratorio subcontratado. μg : microgramos. LD: límite de detección del método.

Anexos:

Anexo 1. Cadena de Custodia R-02-000471

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:	Fecha:	Revisión y aprobación:	Fecha:	Versión Cliente:
L.D.	Diciembre, 23/14	A.G.J.	Diciembre, 23/14	01

11.3.3 Informe sobre PST y Gases de Combustión.

**MONITOREO DE GASES DE COMBUSTIÓN Y
PARTÍCULAS SEDIMENTABLES TOTALES EN AIRE,
PROYECTO MINERO EL ESCOBAL**

Estaciones de muestreo Actuales

Estación	Coordenadas 2013 – junio 2014	Coordenadas Actuales
EA-1C	E (m): 803,887 N (m): 1,601,801	E (m): 803,887 N (m): 1,601,801
EA-2B	E (m): 806,470 N (m): 1,601,796	E (m): 806,470 N (m): 1,601,796
EA-3B	E (m): 806,538 N (m): 1,600,367	E (m): 806,538 N (m): 1,600,367
EA-4A	E (m): 805,142 N (m): 1,599,903	E (m): 805,142 N (m): 1,599,903
EA-5A	E (m): 804,342 N (m): 1,600,404	E (m): 804,342 N (m): 1,600,404
EA-6	E (m): 805,168 N (m): 1,603,247	E (m): 805,168 N (m): 1,603,247
EA-7	E (m): 805,425 N (m): 1,601,523	E (m): 805,191 N (m): 1,601,760
EA-7A*	E (m): 803,887 N (m): 1,601,801	E (m): 854,059 N (m): 1,601,712

*: El equipo para PST de la estación EA-7 fue reubicado a petición de la Ing. Luisa Fernanda Barrios.

Resultados comparativos de las concentraciones de los gases de combustión en las estaciones de muestreo

Estaciones de muestreo	EA-1C				EA-2B				EA-3B				EA-4A				EA-5A				EA-6				EA-7A				Guías del IFC
	Marzo	Junio	Septiembre	Diciembre	Marzo	Junio	Septiembre	Diciembre	Marzo	Junio	Septiembre	Diciembre	Marzo	Junio	Septiembre	Diciembre	Marzo	Junio	Septiembre	Diciembre	Marzo	Junio	Septiembre	Diciembre	Marzo	Junio	Septiembre	Diciembre	
2014																													
Concentración SO ₂ (µg/m ³)	< 13	< 13			< 13	< 13			< 13	< 13			< 13	< 13			< 13	< 13			< 13	< 13			< 13	< 13			20 µg/m ³
Concentración NO ₂ (µg/m ³)	12	11			12	10			10	<9			20	11			12	<9			< 9	<9			10	<9			40 µg/m ³
Partículas sedimentables totales (PST)	4.24	9.56			23.85	9.45			13.71	7.02			13.59	13.83			23.93	8.34			3.71	1.99			7.11	4.46			2.90 mg/(dm ² •día)
2013																													
Concentración SO ₂ (µg/m ³)	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	< 13	20 µg/m ³
Concentración NO ₂ (µg/m ³)	< 9	< 9	9	14	< 9	< 9	< 9	17	< 9	< 9	10	10	< 9	9	9	22	< 9	< 9	14	16	< 9	< 9	< 9	13	< 9	< 9	10	14	40 µg/m ³
Partículas sedimentables totales (PST)	2.7	3.05	1.78	3.41	4.65	1.65	0.92	2.91	4.02	1.59	1.18	3.6	14.20	1.96	1.45	13.45	4.01	1.76	14.95	6.98	0.73	1.09	0.27	0.97	2.45	1.31	1.27	1.62	2.90 mg/(dm ² •día)
2012																													
Concentración SO ₂ (µg/m ³)		< 13	< 13	< 13		< 13	< 13	< 13		< 13	< 13	< 13		< 13	< 13	< 13		< 13	< 13	< 13		< 13	< 13	< 13		< 13	< 13	< 13	20 µg/m ³
Concentración NO ₂ (µg/m ³)		< 9	< 9	< 9		< 9	< 9	< 9		< 9	< 9	< 9		< 9	< 9	< 9		< 9	< 9	< 9		< 9	< 9	< 9		< 9	< 9	< 9	40 µg/m ³
Partículas sedimentables totales (PST)		13.71	4.59	10.83		15.81	21.65	15.79		15.81	21.65	15.79	16.82	19.52	5.96	25.87	21.79	7.89	4.18	11.00		7.18	3.95	4.16		20.76	3.41	6.82	2.90 mg/(dm ² •día)
2011																													
Concentración SO ₂ (µg/m ³)																												< 13	20 µg/m ³
Concentración NO ₂ (µg/m ³)																												< 9	40 µg/m ³
Partículas sedimentables totales (PST)															2.4													0.7	2.90 mg/(dm ² •día)

11.3.4 Presión Sonora

ER-1

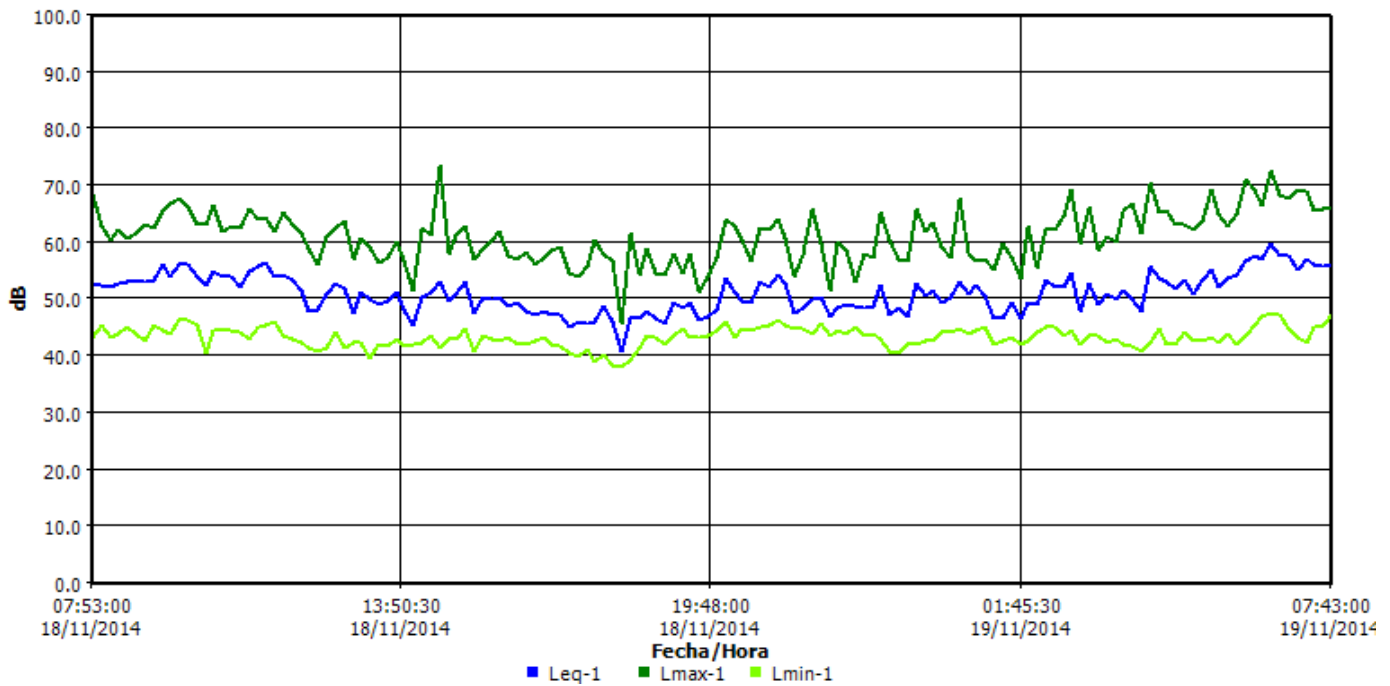
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes
Nombre ER-1
Sesión padre S055
Hora de inicio Martes, 18 de Noviembre de 2014 07:43:00
Hora de paro Miércoles, 19 de Noviembre de 2014 07:43:00
Nombre del usuario EvQ

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	38.1 dB	Lmax	1	73.7 dB
Lpk	1	98.4 dB	Leq	1	52.2 dB

Gráfica de datos de registro



ER-1A

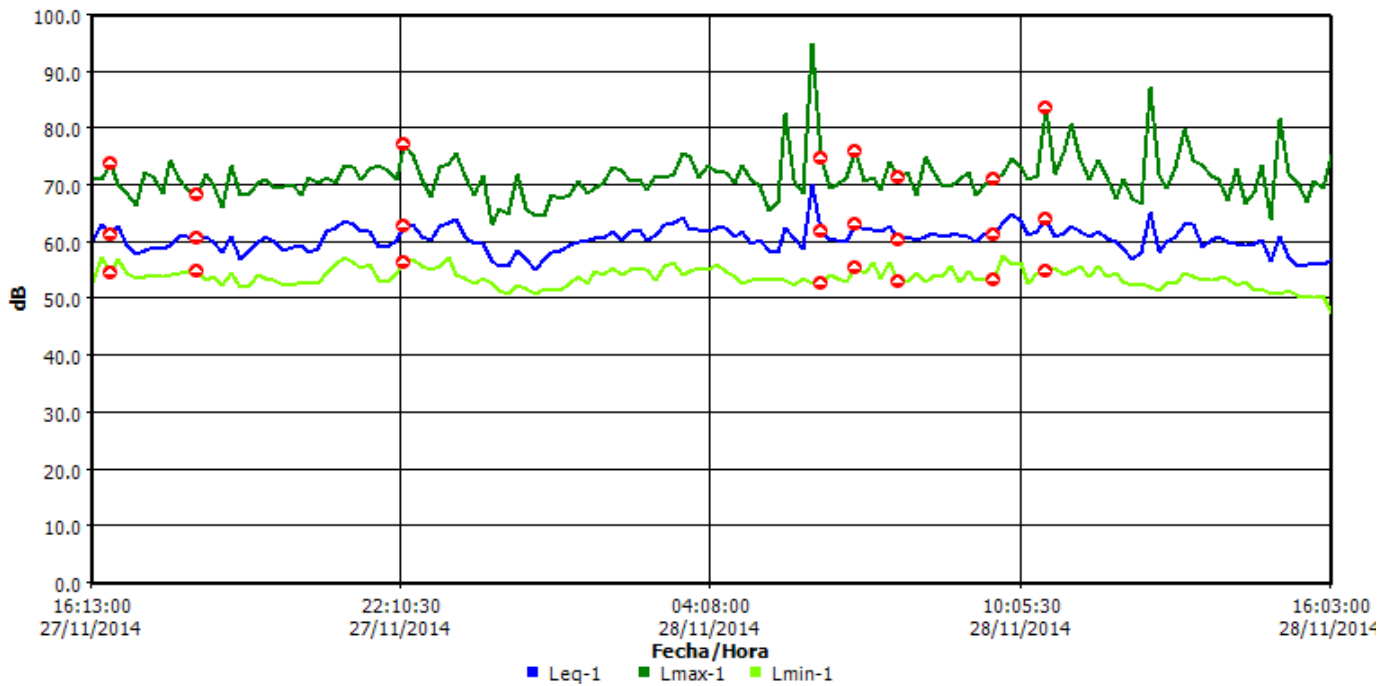
Panel de información

Ubicación San Rafael Las Flores
Nombre ER-1A
Sesión padre S165
Hora de inicio Jueves, 27 de Noviembre de 2014 16:03:00
Hora de paro Viernes, 28 de Noviembre de 2014 16:03:00
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	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	47.7 dB	Lmax	1	95 dB
Lpk	1	106.7 dB	Leq	1	61.2 dB

Gráfica de datos de registro



ER-2

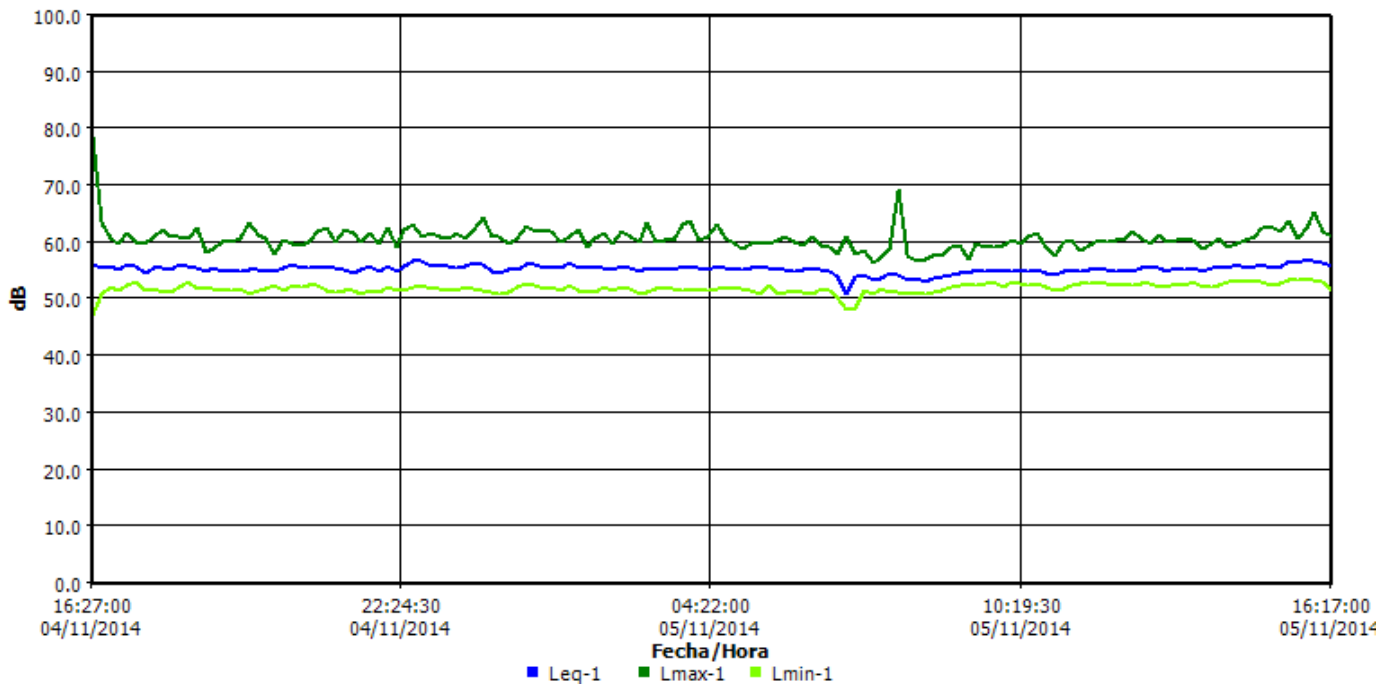
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S053
Hora de inicio Martes, 04 de Noviembre de 2014 16:17:00
Hora de paro Miércoles, 05 de Noviembre de 2014 16:17:00
Nombre del usuario EvQ

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	47.2 dB	Lmax	1	78.3 dB
Lpk	1	104.4 dB	Leq	1	55.3 dB

Gráfica de datos de registro



ER-3

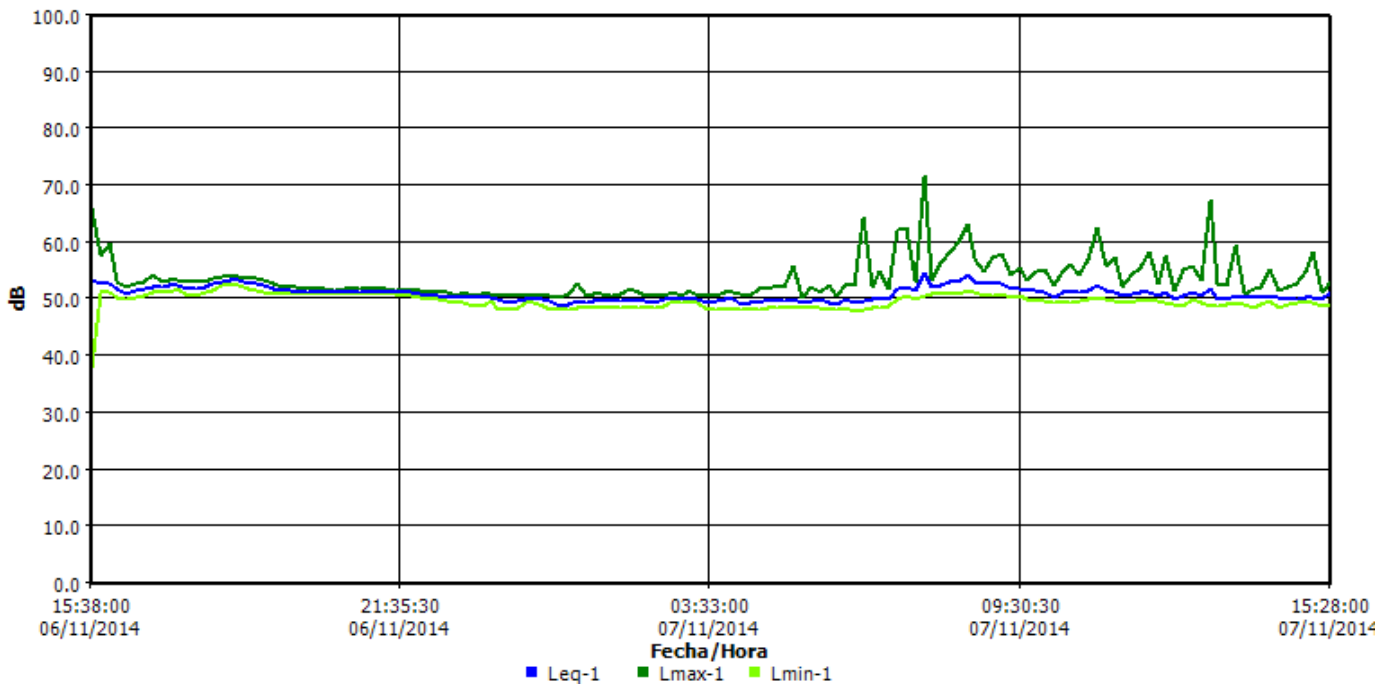
Panel de información

Ubicación Aledaño a aldea El Fucío
Nombre ER-3
Sesión padre S152
Hora de inicio Jueves, 06 de Noviembre de 2014 15:28:00
Hora de paro Viernes, 07 de Noviembre de 2014 15:28:00
Nombre del usuario EvQ

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	38.2 dB	Lmax	1	71.6 dB
Lpk	1	91.5 dB	Leq	1	51 dB

Gráfica de datos de registro



ER-3A

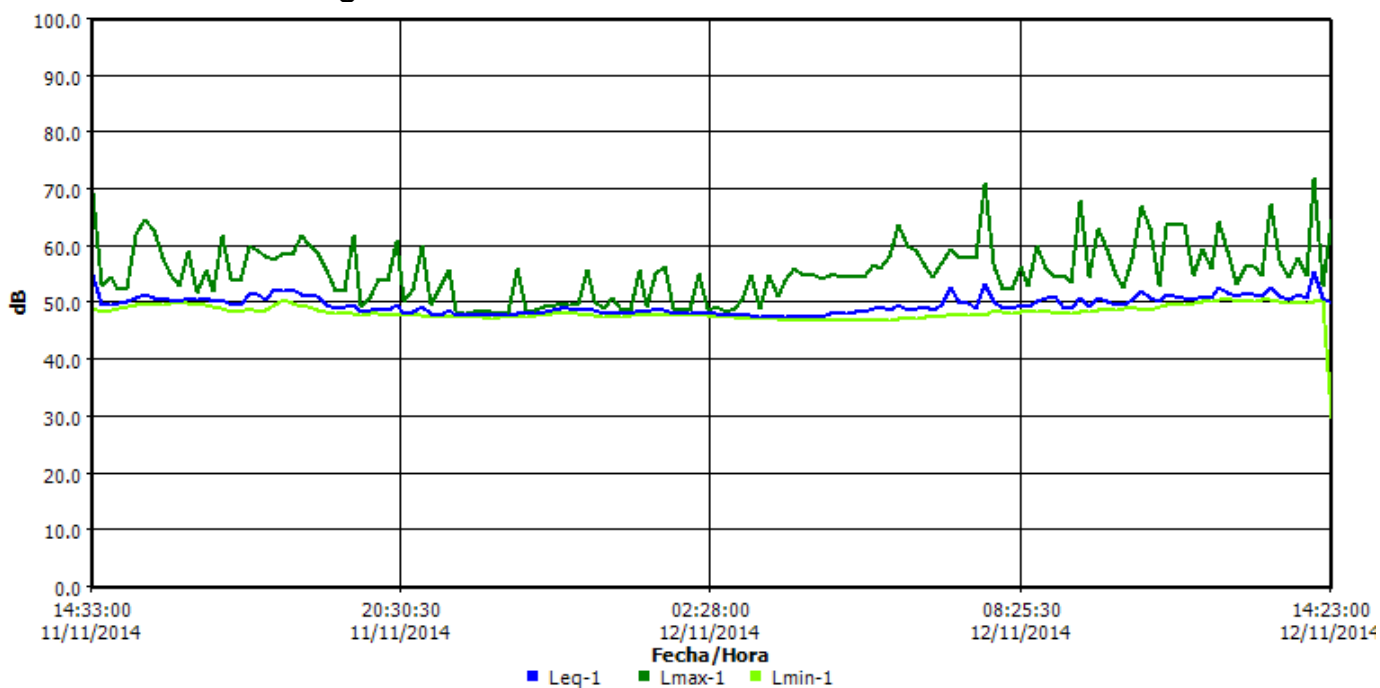
Panel de información

Ubicación Aledaño a aldea El Fucío
Nombre ER-3A
Sesión padre S054
Hora de inicio Martes, 11 de Noviembre de 2014 14:23:00
Hora de paro Miércoles, 12 de Noviembre de 2014 14:23:00
Nombre del usuario EvQ

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	29.5 dB	Lmax	1	72 dB
Lpk	1	106.4 dB	Leq	1	49.9 dB

Gráfica de datos de registro



ER-4A

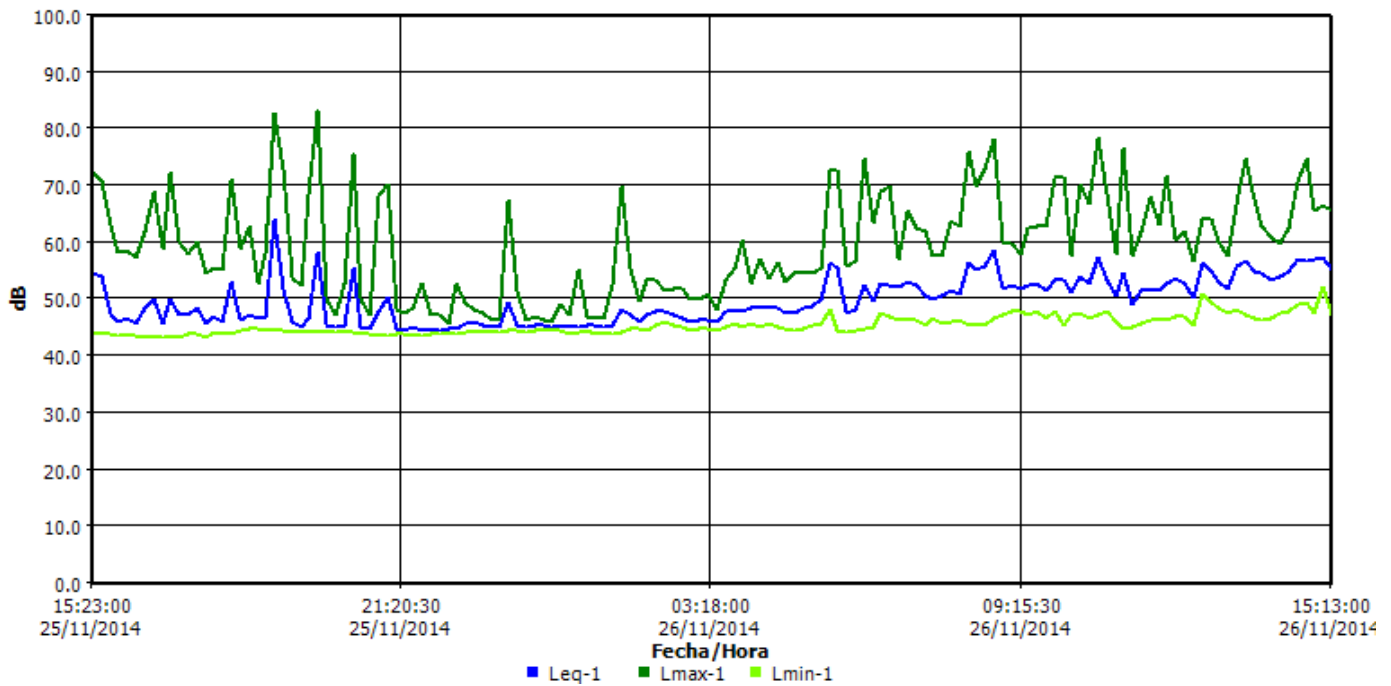
Panel de información

Ubicación Caserío El Portón de los Ángeles
Nombre ER-4A
Sesión padre S164
Hora de inicio Martes, 25 de Noviembre de 2014 15:13:00
Hora de paro Miércoles, 26 de Noviembre de 2014 15:13:00
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	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	43.3 dB	Lmax	1	83.4 dB
Lpk	1	108.2 dB	Leq	1	52 dB

Gráfica de datos de registro



ER-5A

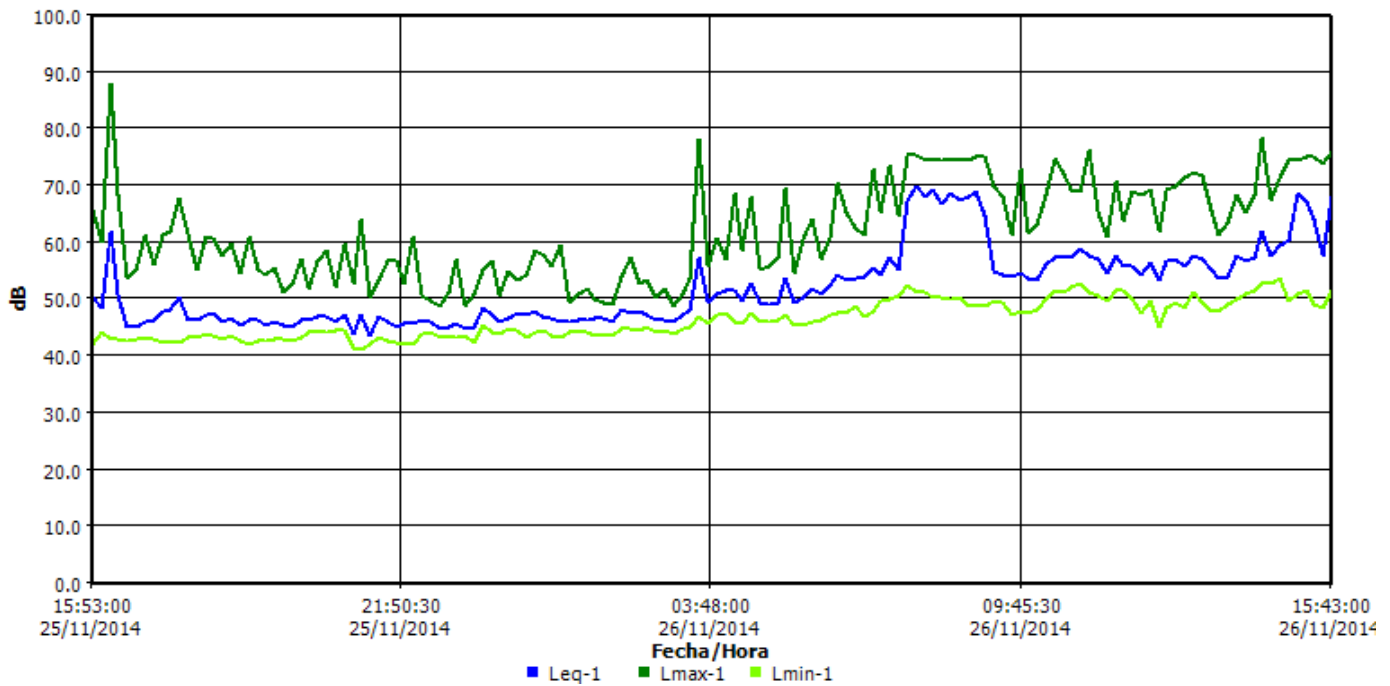
Panel de información

Ubicación Aldea Sabana Redonda
Nombre ER-5A
Sesión padre S056
Hora de inicio Martes, 25 de Noviembre de 2014 15:43:00
Hora de paro Miércoles, 26 de Noviembre de 2014 15:43:00
Nombre del usuario EvQ

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	41 dB	Lmax	1	87.8 dB
Lpk	1	121.4 dB	Leq	1	58.9 dB

Gráfica de datos de registro



ER-6

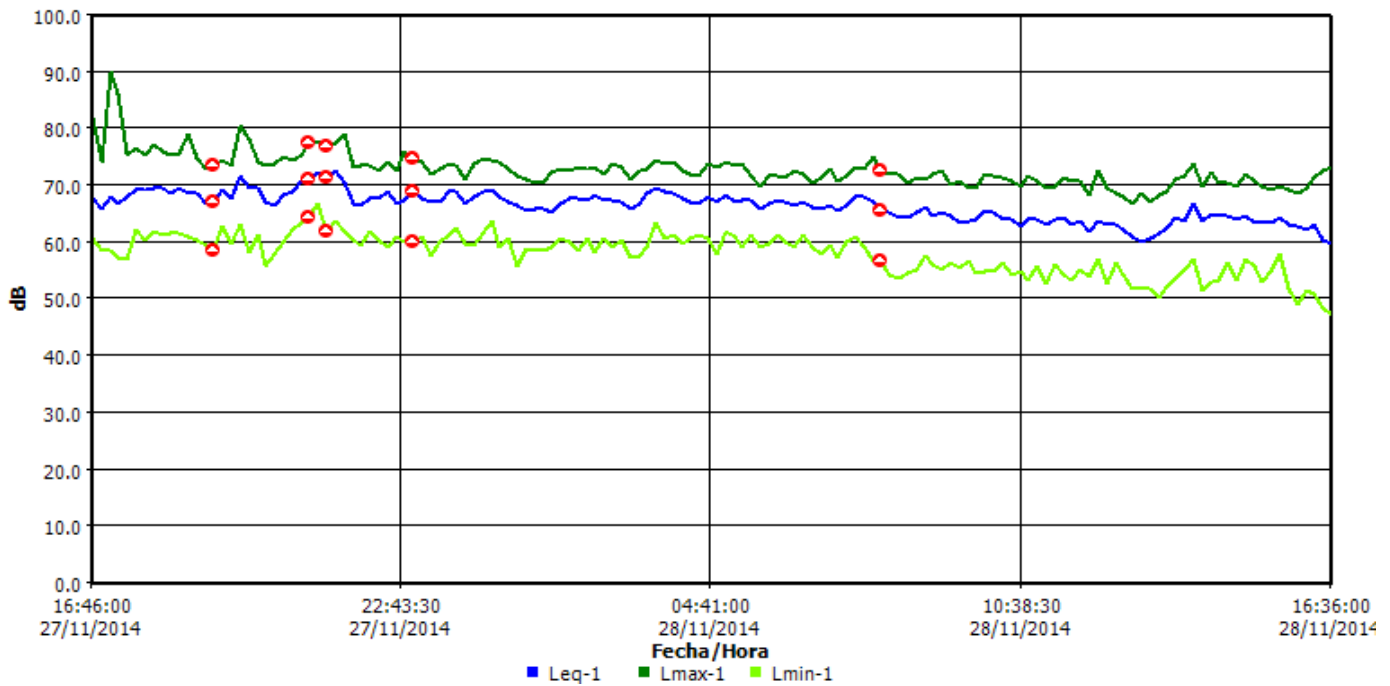
Panel de información

Ubicación Al norte del Proyecto, ruta a Mataquescuintla
Nombre ER-6
Sesión padre S057
Hora de inicio Jueves, 27 de Noviembre de 2014 16:36:00
Hora de paro Viernes, 28 de Noviembre de 2014 16:36:00
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	47.1 dB	Lmax	1	90.1 dB
Lpk	1	113.8 dB	Leq	1	67 dB

Gráfica de datos de registro



ER-7A

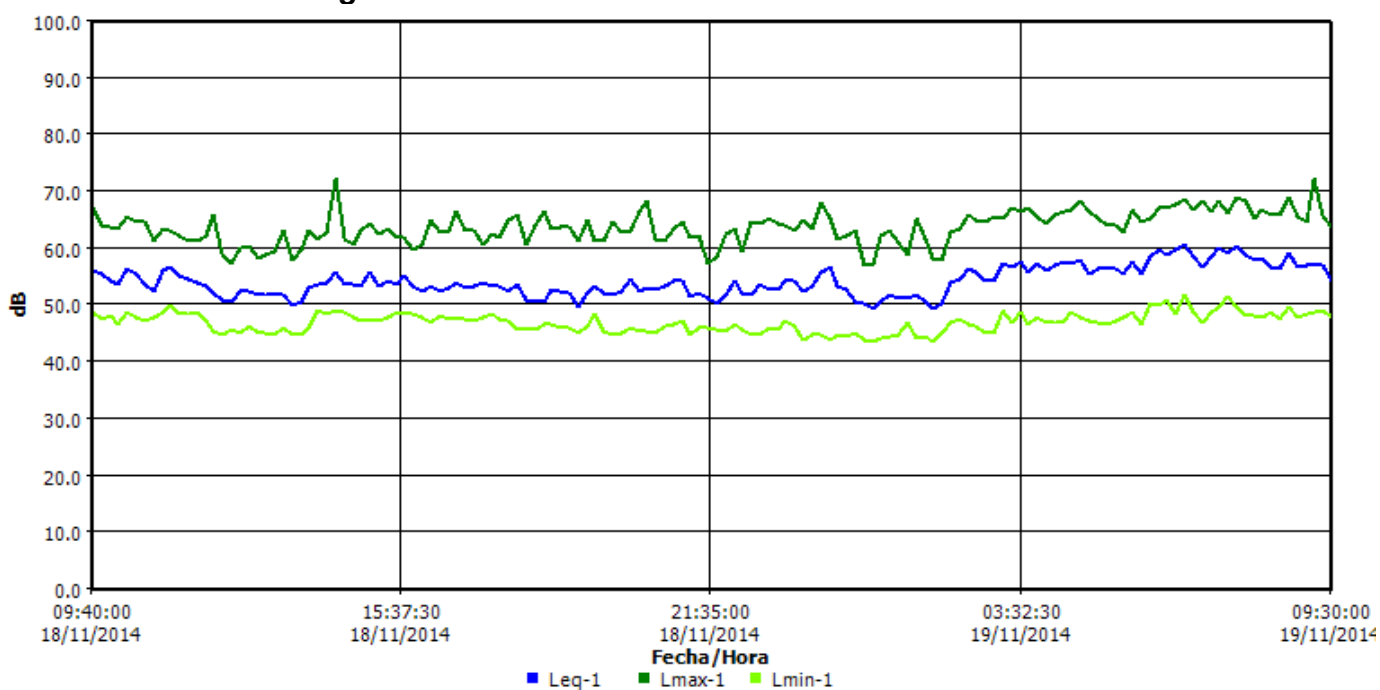
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S163
Hora de inicio Martes, 18 de Noviembre de 2014 09:30:00
Hora de paro Miércoles, 19 de Noviembre de 2014 09:30:00
Nombre del usuario EvQ

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	43.5 dB	Lmax	1	72.4 dB
Lpk	1	95.8 dB	Leq	1	55 dB

Gráfica de datos de registro



ER-7A

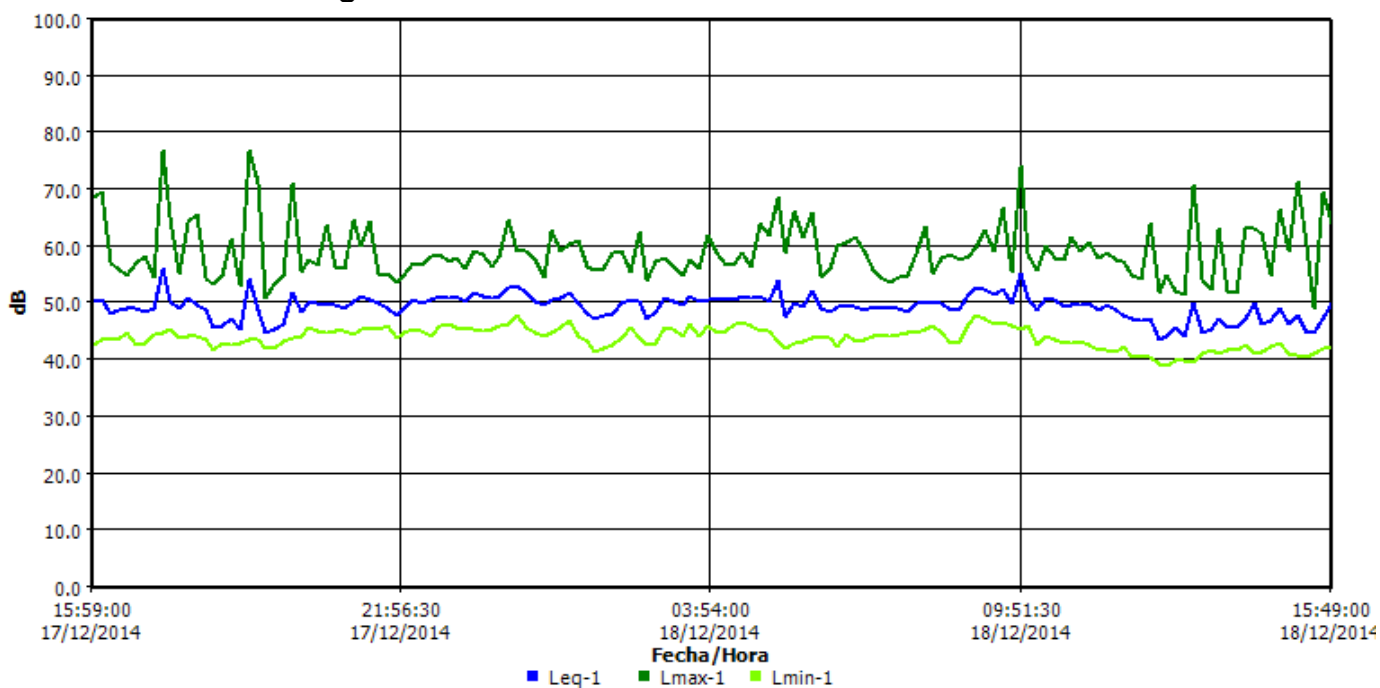
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S157
Hora de inicio Miércoles, 17 de Diciembre de 2014 15:49:00
Hora de paro Jueves, 18 de Diciembre de 2014 15:49:00
Nombre del usuario EvQ

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	39 dB	Lmax	1	77 dB
Lpk	1	108.6 dB	Leq	1	49.8 dB

Gráfica de datos de registro



ER-3

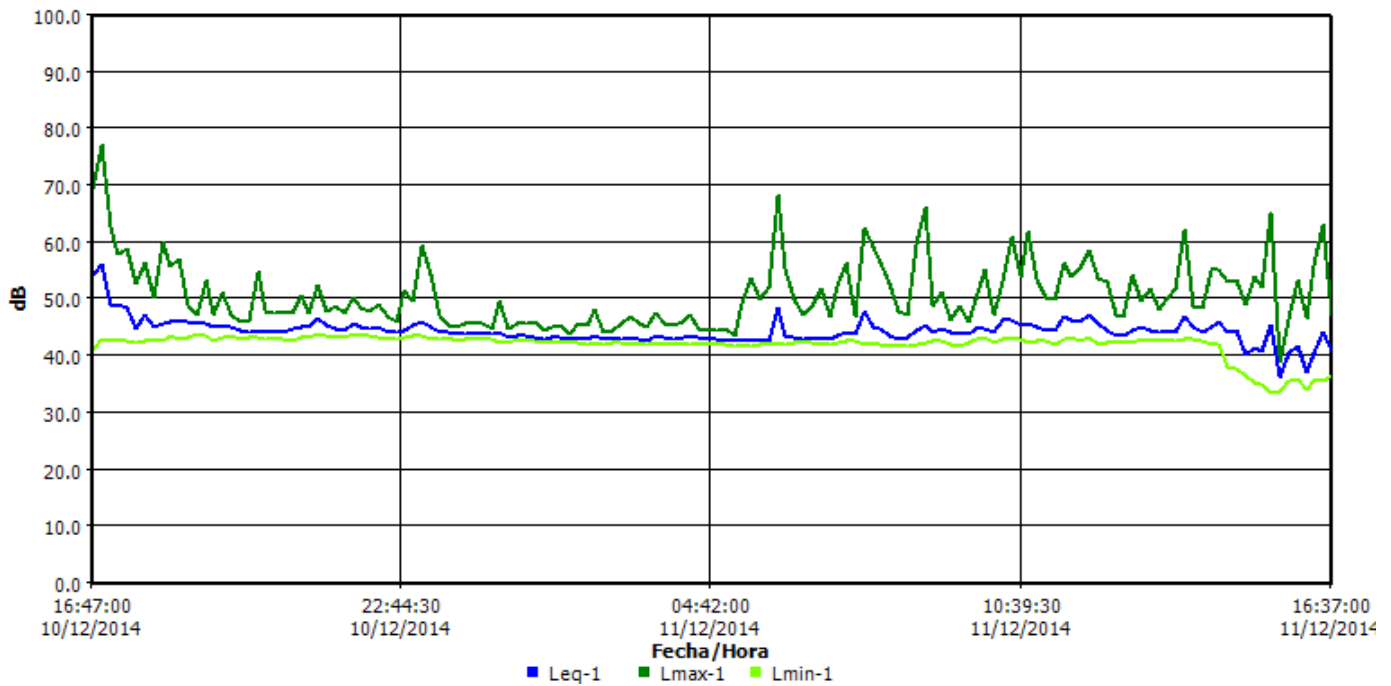
Panel de información

Ubicación Aledaño a aldea El Fucío
Nombre ER-3
Sesión padre S156
Hora de inicio Miércoles, 10 de Diciembre de 2014 16:37:00
Hora de paro Jueves, 11 de Diciembre de 2014 16:37:00
Nombre del usuario EvQ

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	33.4 dB	Lmax	1	77.1 dB
Lpk	1	103.3 dB	Leq	1	45.1 dB

Gráfica de datos de registro



ER-2

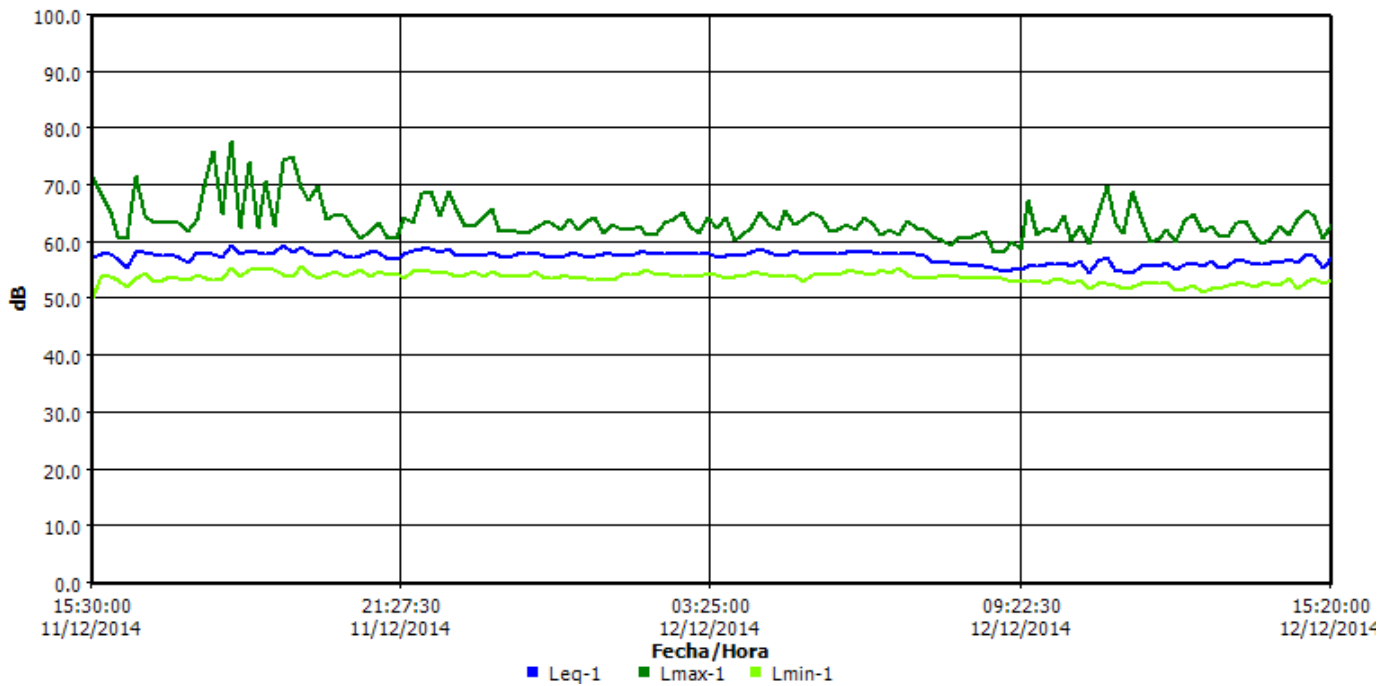
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S058
Hora de inicio Jueves, 11 de Diciembre de 2014 15:20:00
Hora de paro Viernes, 12 de Diciembre de 2014 15:20:00
Nombre del usuario EvQ

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	50.2 dB	Lmax	1	77.7 dB
Lpk	1	106.1 dB	Leq	1	57.4 dB

Gráfica de datos de registro



ER-1

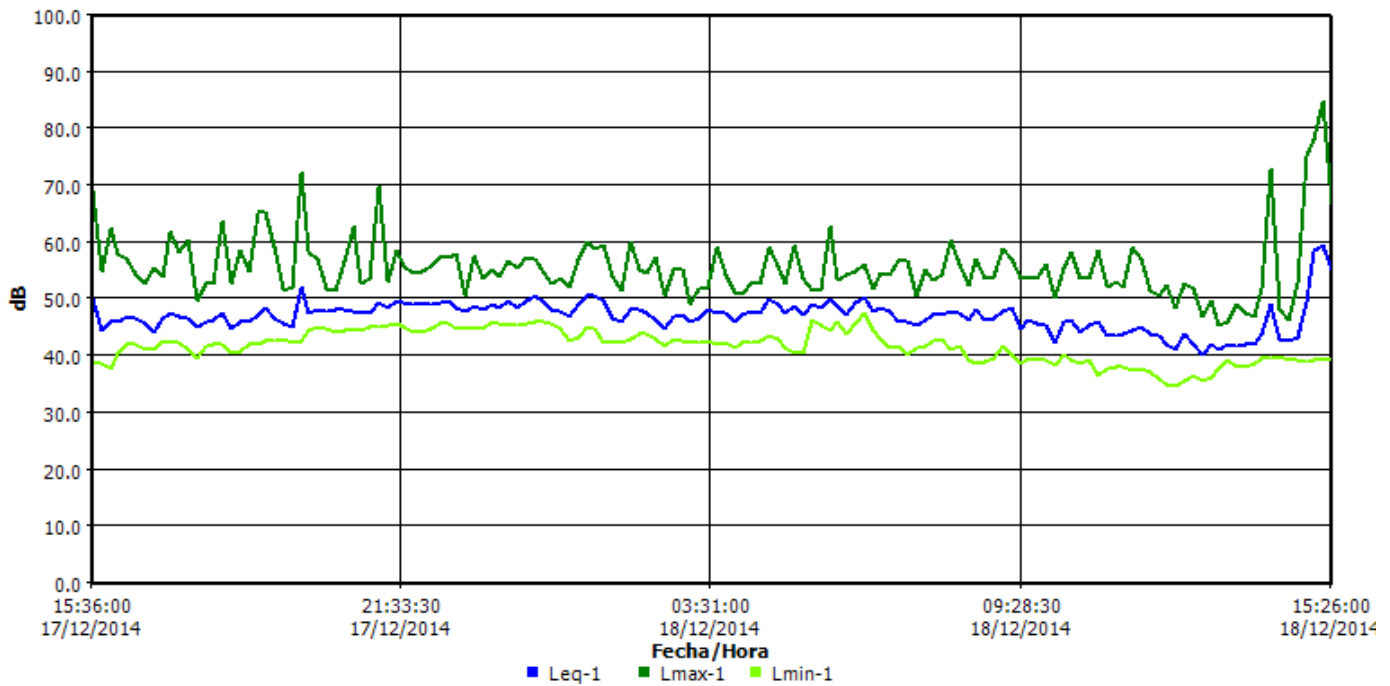
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes
Nombre ER-1
Sesión padre S060
Hora de inicio Miércoles, 17 de Diciembre de 2014 15:26:00
Hora de paro Jueves, 18 de Diciembre de 2014 15:26:00
Nombre del usuario EvQ

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	34.7 dB	Lmax	1	84.9 dB
Lpk	1	111.9 dB	Leq	1	48.2 dB

Gráfica de datos de registro



ER-7A

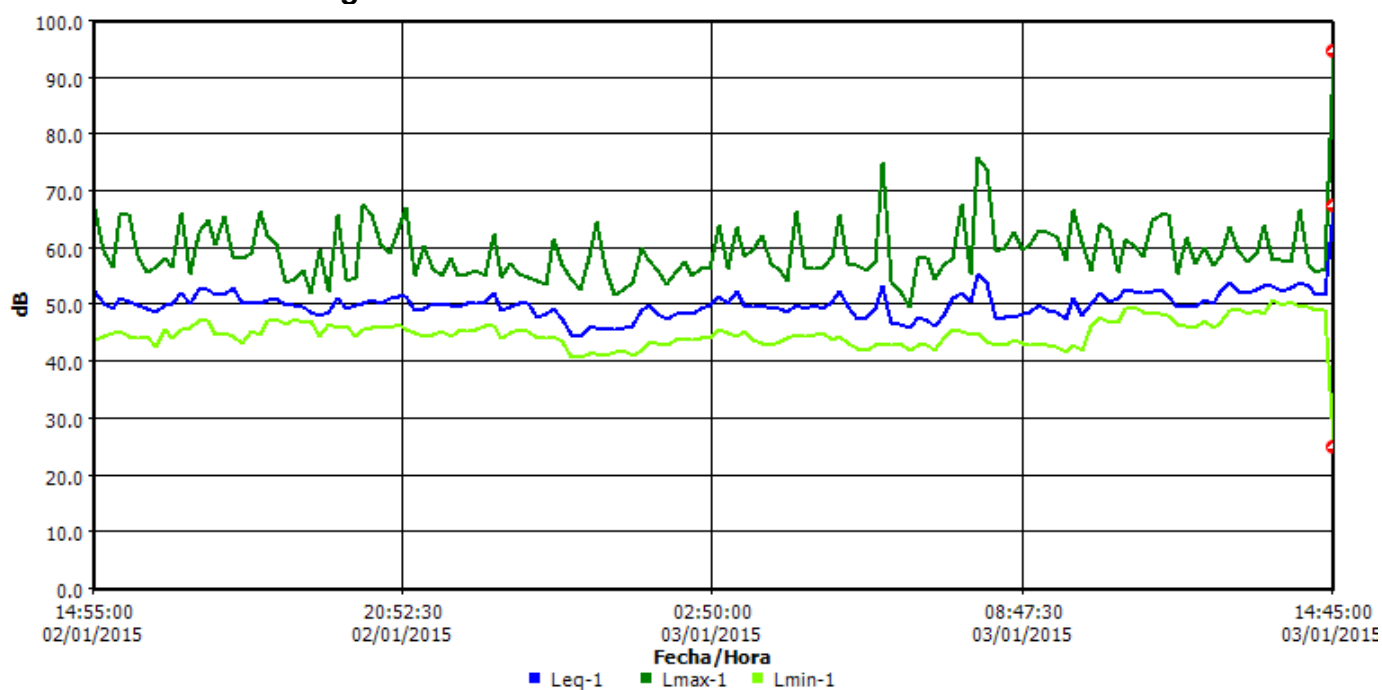
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S172
Hora de inicio Viernes, 02 de Enero de 2015 14:45:00
Hora de paro Sábado, 03 de Enero de 2015 14:45:00
Nombre del usuario EvQ

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	24.8 dB	Lmax	1	94.8 dB
Lpk	1	129.5 dB	Leq	1	51.7 dB

Gráfica de datos de registro



ER-3

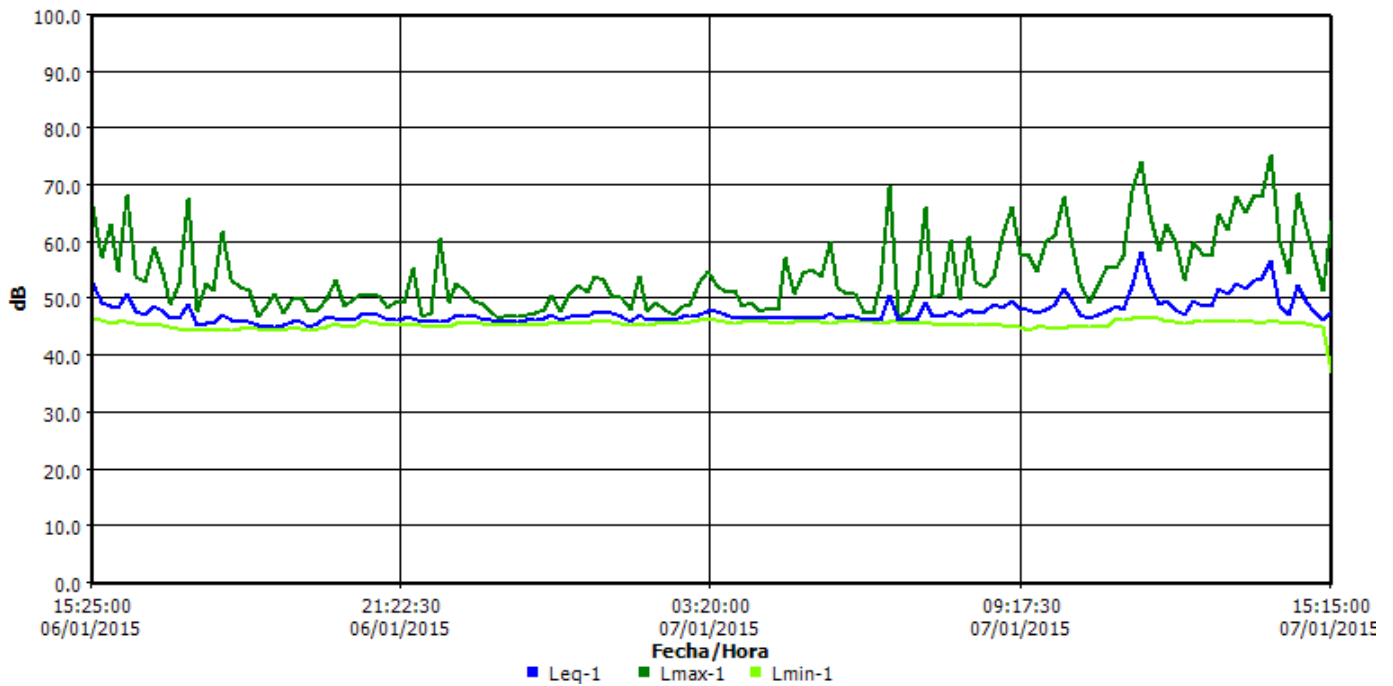
Panel de información

Ubicación Aledaño a aldea El Fucío
Nombre ER-3
Sesión padre S173
Hora de inicio Martes, 06 de Enero de 2015 15:15:00
Hora de paro Miércoles, 07 de Enero de 2015 15:15:00
Nombre del usuario EvQ

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	37 dB	Lmax	1	75.5 dB
Lpk	1	96.4 dB	Leq	1	48.4 dB

Gráfica de datos de registro



ER-2

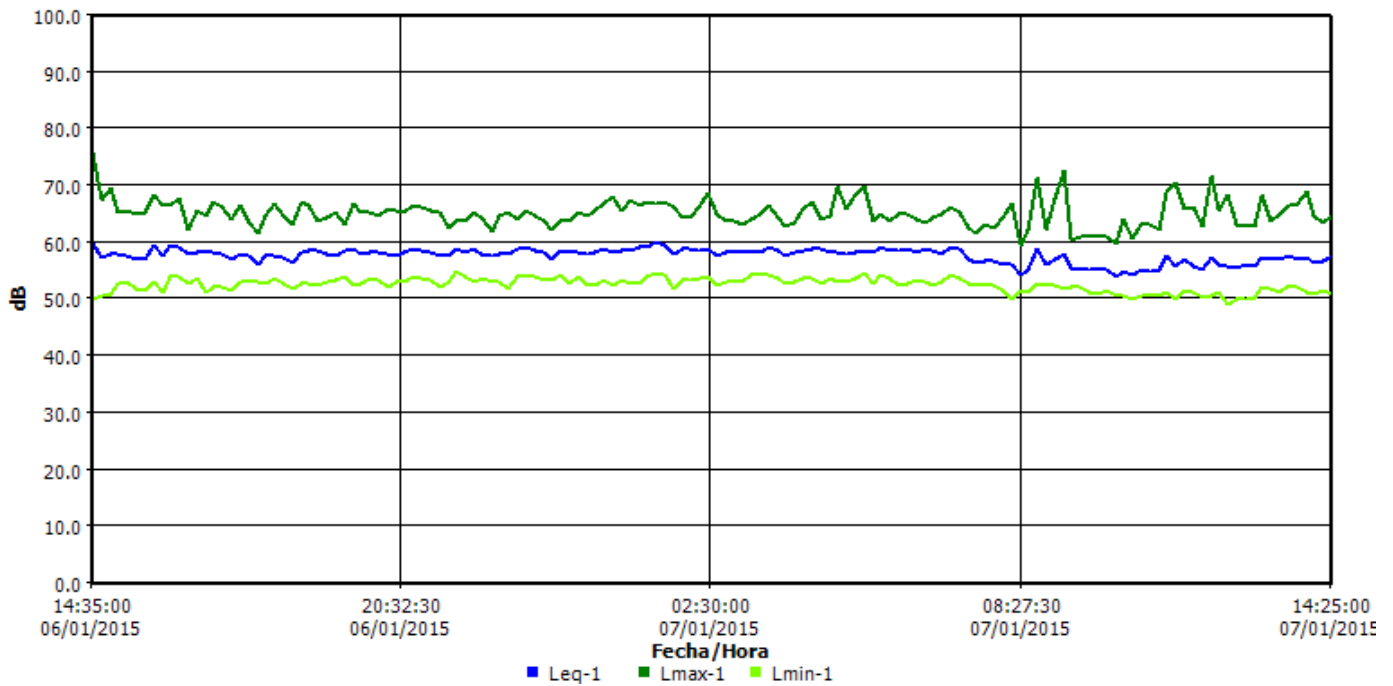
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S159
Hora de inicio Martes, 06 de Enero de 2015 14:25:00
Hora de paro Miércoles, 07 de Enero de 2015 14:25:00
Nombre del usuario EvQ

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	49.2 dB	Lmax	1	75.7 dB
Lpk	1	101.2 dB	Leq	1	57.8 dB

Gráfica de datos de registro



ER-1

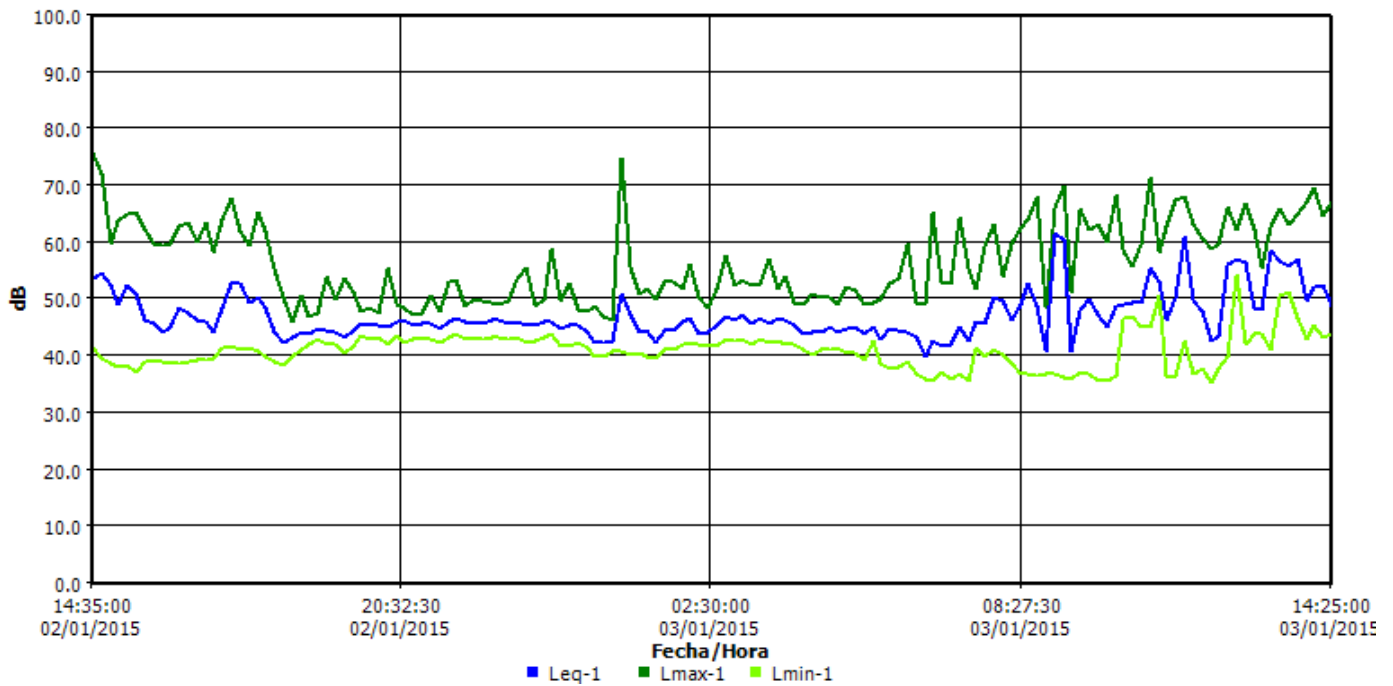
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes
Nombre ER-1
Sesión padre S158
Hora de inicio Viernes, 02 de Enero de 2015 14:25:00
Hora de paro Sábado, 03 de Enero de 2015 14:25:00
Nombre del usuario EvQ

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	35.2 dB	Lmax	1	75.8 dB
Lpk	1	114.2 dB	Leq	1	50.1 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.

**CERTIFICADO DE VERIFICACIÓN DE CALIBRACIÓN DE EQUIPOS
PARA MEDICIÓN DE TSP, PM_{2.5} Y PM₁₀**

dic-14

Certificado Numero: 1462

Características del Equipo

Nombre de equipo: Ambient Particulate Sampler
Modelo: PQ200 BGI Instruments
Fabricante: BGI Incorporated
Unidades de medición: Litros Por Minuto (LPM)
Rango de flujo: De 1.00 a 25.00 LPM



Descripción: Se utiliza el Calibrador BGI "Trical - Nist", el proceso de calibración consiste en hacer pasar por el equipo PQ200 un flujo de aire, el cual es ajustado a un valor específico bajo condiciones estándar de presión y temperatura (1 Atm y 25 °C) para obtener el valor de flujo real.

Nota: El fabricante establece que el equipo no requiere Re-calibración de fabrica, por lo tanto se utiliza el calendario establecido por CTA para el mantenimiento y calibración.

Información de la Calibración

Equipo No.:	1	Fecha de Verificación de Calibración:	18/12/2014
Número de Serie :	938	Vigencia:	30 Días

Valores Ambientales	
Temperatura (°C)	22.10
Presión (Pulg.Hg)	24.37
Humedad Relativa (%)	70.00

Parámetro	Lectura Calibración PQ200	Lectura Patrón(*)
Flujo (LPM)	16.73	16.7
Temperatura Ambiente (°C)	22.30	22.1
Temperatura Filtro (°C)	22.50	22.1
Barómetro (Pulg.Hg)	24.37	24.37

Test de vacio		
SP (cm H ₂ O) _z	33.00	SP < 33
Pi - Vacio inicial (cm H O)	105.00	ΔP < 5
Pf - Vacio final (cm H O)	102.00	

Estado del Equipo: CALIBRADO

(*)Multimetro ambiental 1227U10 traceable. NIST (National Institute of Standards and Technology).

Patrón Utilizado

Nombre el Equipo: TriCal Nist
No. Serie 000103-3
Rango de Flujo: 0.1-30 LPM
Rango de Temperatura: -40 a 50 °C
Rango de Presión Barométrica: 400-800 mm Hg
No. Método: RFPS-1298-124
Fecha de Calibración del Patrón Utilizado: 27/01/2014

Responsables:

Luis Rey
Responsable

Ing. Hasan Zolata
Supervisor

Falla reportada

Ciente solicita revision y mantenimiento general.

Observaciones

Filtro de aire será cambiado en próximo mantenimiento.

Diagnostico

Después de cargar al 100% los equipos, se procedió a correr una prueba de 24 hrs. configurado a 16.7 LPM, encontrando que el equipo funciona correctamente.

Trabajos realizados

Mantenimiento de los siguientes componentes:

- Bomba de vacío (diaragmas, valvulas, ejes)
- Motor eléctrico
- Sensor de flujo másico
- Conexiones del circuito de vacío
- Sistema mecánico de Porta filtro
- Tarjetas electrónicas
- Ventilador
- Sensor de temperatura externa y interna
- Barómetro atmosférico
- Pantalla Anti-Radiación

Al finalizar el mantenimiento se efectuaron las siguientes verificaciones:

- Prueba de fuga de cada sección del circuito
- Calibración de flujo con patrón trazable ante el NIST
- Calibración de presión barométrica y temperatura con patrón trazable ante el NIST.
- Test final: 1 corridas de más de 24 horas exitosa.

Repuestos utilizados

Responsables:



Luis Rey
Responsable



Ing. Hasan Zolata
Supervisor

BGI PQ200 Air Sampling System Downloaded 2014 15 dec 07:24:37

Job Details:
 Job Name:
 Version: 5.62
 Serial No: 938
 Pump Time: 2764:01
 Flags:

Job Code: 1
 Site Name: CTA
 Station Code: LABEL
 Operators: LREY
 User1:
 User2:

	Max	Min	Avg	Units
BP	622	619	620	mmHg
TA	19.3	10.7	13.9	°C
Q	---	---	16.71	Lpm

Timer Information:

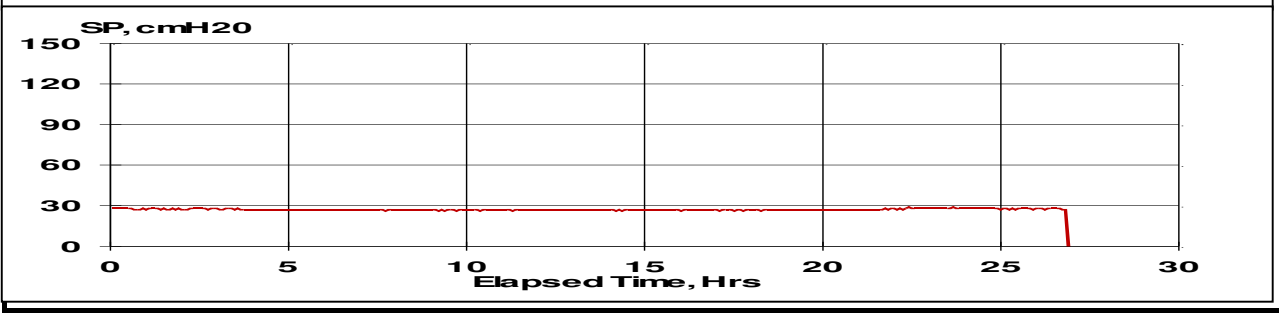
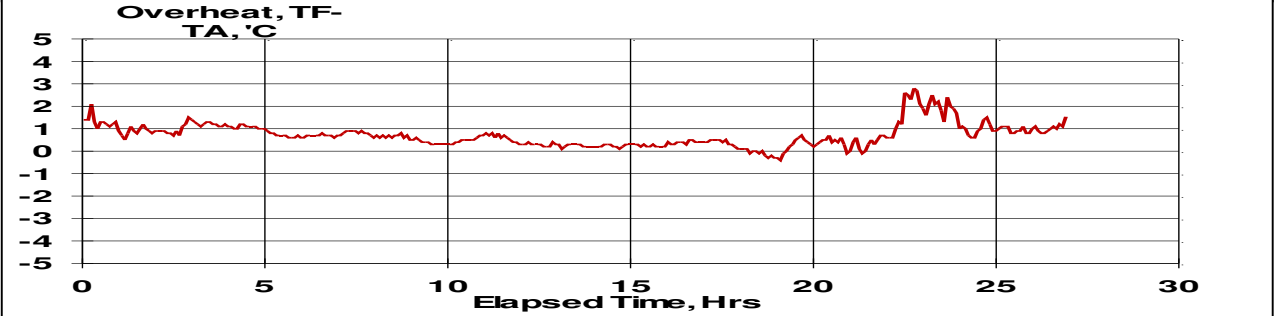
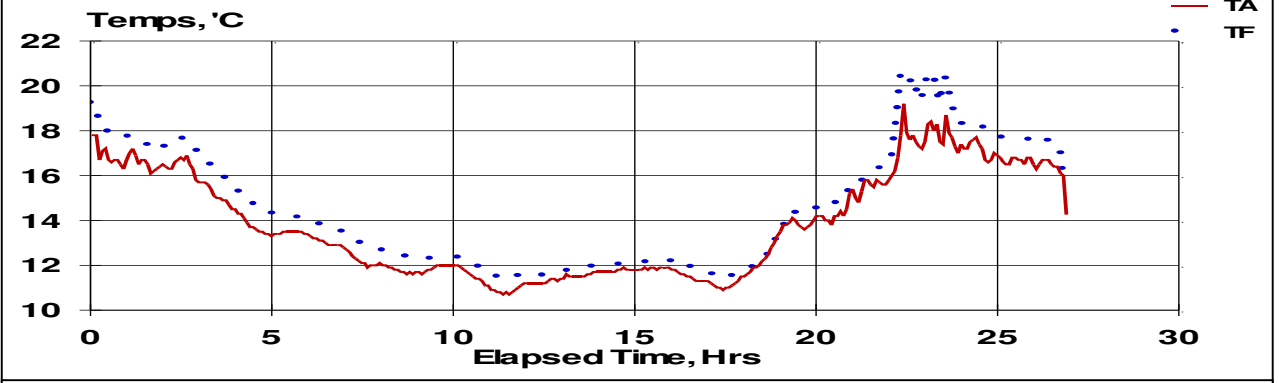
Date	Time
dd-mmm	hh:mm:ss
Start: 14-12-dec	13:00:08
Stop: 14-13-dec	16:00:05
ET: 26:59:00	

Mass Concentration Data:

Filter ID:	
Final Wt:	mg
Initial Wt:	mg
Delta Wt:	0.000 mg
Total Vol:	27.05 m ³
Mass Conc:	0 µg/m ³

QCV 0.68 %
 Max overheat 2.9 °C
 occurred 13-dec 11:49:49

Notes 1:
 Notes 2:



Hourly Averaged Data

Date yy-dd-mmm	Start Hour hh:mm:ss	BP mmHg	AmbT °C	Filt T °C	Delta T °C	SP cmH2O	Flow aLpm
14-12-dec	13:05:08	621	16.9	18.2	1.3	28	16.72
14-12-dec	14:05:08	620	16.6	17.5	0.9	28	16.72
14-12-dec	15:05:08	620	16.4	17.4	1.0	28	16.72
14-12-dec	16:05:08	620	15.1	16.3	1.2	27	16.72
14-12-dec	17:05:08	621	13.7	14.8	1.1	27	16.72
14-12-dec	18:05:08	621	13.5	14.2	0.7	27	16.72
14-12-dec	19:05:08	621	13.0	13.7	0.7	27	16.72
14-12-dec	20:05:08	622	12.2	13.0	0.8	27	16.71
14-12-dec	21:05:08	622	11.8	12.4	0.7	27	16.72
14-12-dec	22:05:08	622	11.9	12.3	0.4	27	16.72
14-12-dec	23:05:08	622	11.6	12.1	0.5	27	16.71
14-13-dec	00:05:08	621	10.9	11.5	0.6	27	16.72
14-13-dec	01:05:08	621	11.3	11.6	0.3	27	16.71
14-13-dec	02:05:08	620	11.6	11.8	0.2	27	16.71
14-13-dec	03:05:08	620	11.8	12.0	0.2	27	16.72
14-13-dec	04:05:08	620	11.9	12.1	0.2	27	16.72
14-13-dec	05:05:08	620	11.5	11.9	0.4	27	16.71
14-13-dec	06:05:08	620	11.1	11.5	0.4	27	16.71
14-13-dec	07:05:08	621	12.2	12.2	-0.1	27	16.72
14-13-dec	08:05:08	622	13.8	14.0	0.2	27	16.72
14-13-dec	09:05:08	622	14.3	14.7	0.4	27	16.72
14-13-dec	10:05:08	621	15.5	15.8	0.3	27	16.71
14-13-dec	11:05:08	621	17.3	19.0	1.7	28	16.72
14-13-dec	12:05:08	620	17.8	19.8	2.0	28	16.71
14-13-dec	13:05:08	620	17.2	18.2	1.0	28	16.71
14-13-dec	14:05:08	619	16.7	17.6	0.9	28	16.71
14-13-dec	15:05:08	619	16.4	17.4	1.0	28	16.71
14-13-dec	17:36:56	620	14.3	15.8	1.5		0.00

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

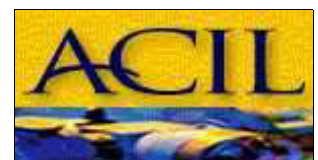
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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	eea
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	eea
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	

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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-E

ACZ 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.



Laboratories, Inc.

C20492

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@smrtafel.com.gt

Address: Bulvar las Praderas 19 Calle 24-69 Zona 10
Empresarial Zona Pradera, Torre 11 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@smrtafel.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

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?

Table with columns for # of Containers, Matrix, and analysis results. Includes handwritten 'MS' and checkmarks.

Table with columns for SAMPLE IDENTIFICATION, DATE:TIME, and Matrix. Includes handwritten entries like SW1-E, SW2-E, SW2B-E.

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.

20492 Chain of Custody

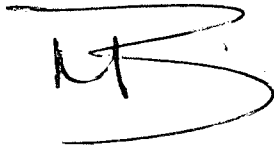
Guatemala September 10th, 2014

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 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.

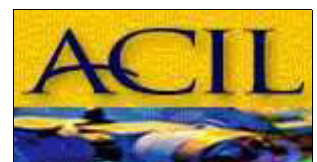
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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 pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			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).
			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).
WG371016		Phosphorus, ortho dissolved	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).
			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
	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.
	WG371119	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			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-EACZ 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:** WG371244Analyst: 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 Bergonzio
Company: Tahoe Resources inc
E-mail: M.Bergonzio@smrtafac.com.gt
Address: Bisipuar las pinces 19 calle 24-69 zona 10
Empresarial, Zona Progreso, Torre 14 oficina 1404
Telephone: (502) 59515243

Copy of Report to:

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

Invoice to:

Name: Miguel Bergonzio
Company: Tahoe Resources inc
E-mail: M.Bergonzio@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 #, 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

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

L20461 Chain of Custody

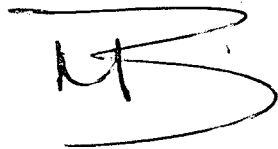
Guatemala September 9th, 2014

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.

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.

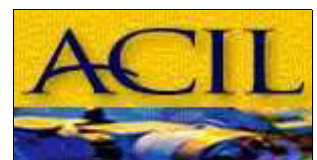
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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	ea
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	ea
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	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.
	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-E

ACZ 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.



Laboratories, Inc.

L20495

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: Finca Los Proceres 18 calle 24-69 zona 10
Empresarial, Zona Pradera, Torre II oficina 1106
Telephone: (502) 54515248

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

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 #, PO#, Reporting state, Matrix, # of Containers, and analysis results for samples SW4-E, SW5-E, SW7-E.

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 for 10/09/2014 and 10/14/2014.

Chain of Custody L20495

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.

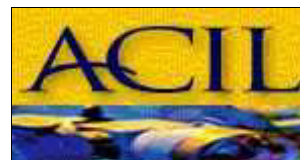
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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	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).
	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	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	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	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).
	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 RecoverableAnalysis 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.

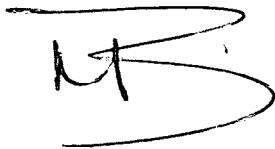
Guatemala September 9th, 2014

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, consisting of a stylized 'M' and 'B' connected together.

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.

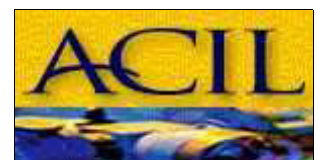
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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-EACZ 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: <i>Miguel Berganza</i>	Address: <i>Buena Vista 105 Box 18 Calle 24-68 Zona 10</i>
Company: <i>Tahoe Resources inc</i>	<i>Empresarial Zona parque Torre 11 oficina 1406</i>
E-mail: <i>M.Berganza@sanrafael.com.gt</i>	Telephone: <i>(502) 59515248</i>

Copy of Report to:

Name: <i>Charlie Muerhoff</i>	E-mail: <i>cmuerhoff@tahoeresourcesinc.com</i>
Company: <i>Tahoe Resources inc</i>	Telephone:

Invoice to:

Name: <i>Miguel Berganza</i>	Address:
Company: <i>Tahoe Resources inc</i>	
E-mail: <i>M.Berganza@sanrafael.com.gt</i>	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: *L.F.* 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

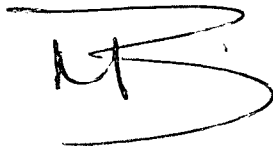
Guatemala September 10th, 2014

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 by a horizontal line above them.

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.

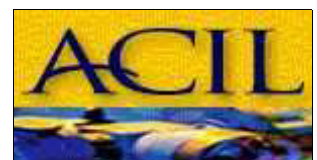
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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-E

ACZ 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

<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: **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-EACZ 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:** WG371244Analyst: 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@sanrafael.com.gt
Address: Barrio Los Praeres 12 calle 24-bis 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@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: Quote #, PO#, Reporting state, Matrix, DATE:TIME, Matrix, # of Containers, and analysis results. Includes handwritten entries for water quality, Escobal, and samples SW11-E, WW12, SW13.

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. Includes signatures and dates for 09-09-2014 and 09-11-14.

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 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

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.

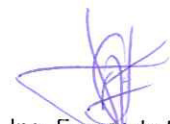
Límites de detección: Cromo hexavalente (0.05 mg/L)

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.

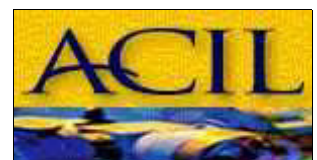
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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.

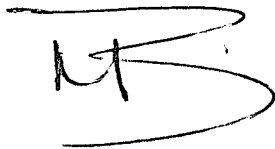
Guatemala September 2nd, 2014

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 together.

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.

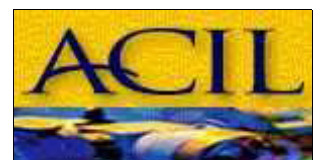
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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 Pradera, Torre 11, oficina 1406</u>
E-mail: <u>M.Berganza@samraiel.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@samraiel.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: _____ 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 3																			
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>MW-3</u>	<u>03/09/14 11:10</u>	<u>GW</u>	<u>1</u>	<input checked="" type="checkbox"/>																
<u>MW-5</u>	<u>03/09/14 10:10</u>	<u>GW</u>	<u>1</u>	<input checked="" type="checkbox"/>																
<u>MW-6</u>	<u>03/09/14 09:30</u>	<u>GW</u>	<u>1</u>	<input checked="" type="checkbox"/>																
<u>MW-7</u>	<u>03/09/14 08:30</u>	<u>GW</u>	<u>1</u>	<input checked="" type="checkbox"/>																
<u>MW-8</u>	<u>03/09/14 10:00</u>	<u>GW</u>	<u>1</u>	<input checked="" type="checkbox"/>																
<u>MW-9</u>	<u>03/09/14 13:30</u>	<u>GW</u>	<u>1</u>	<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

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

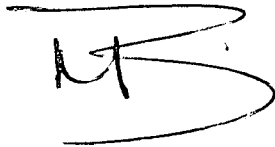
Guatemala September 3rd, 2014

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 stylized 'M' and 'B' connected together.

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.

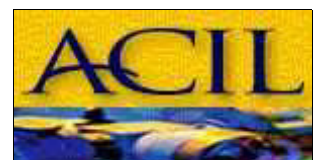
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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.
	WG372357	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	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
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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.



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

Report to:

Name: Miguel Berganza	Address: BUSIENAR 125 PROCEDES 18CALL 2469-6-10
Company: Tahoe Resources Inc	Empresarial Zona Pradera Torre IV oficina 1406
E-mail: M Berganza @sanrafael.com.gt	Telephone: (502) 59-51-52-48

Copy of Report to:

Name: Charrie Mverhoff	E-mail: cmverhoff@tahoeresourcesinc.com
Company: Tahoe Resources Inc	Telephone:

Invoice to:

Name: Miguel Berganza	Address:
Company: Tahoe Resources Inc	
E-mail: M Berganza @sanrafael.com.gt	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 #: WATER quality	# of Containers	SW	GW	total	CN																		
PO#: Escobal																							
Reporting state for compliance testing:																							
Check box if samples include NRC licensed material?																							
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																					
PSA-1	29/09/14 11:00	GW	10	✓																			
MW-11	29/09/14 11:15	GW	10	✓																			
MW-2	29/09/14 11:30	GW	7		✓																		
MW-4	29/09/14 08:10	GW	7		✓																		
WW9	29/09/14 05:00-12:00	WW	1			✓																	
WW10	29/09/14 12:00	SW	1			✓																	

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>	29-09-2014 15:00	<u>[Signature]</u>	29/9/14 15:00
		<u>[Signature]</u>	10-1-14 0957



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.

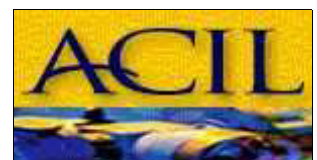
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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	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
L20331-02	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	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
L20331-03	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)

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

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 with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME



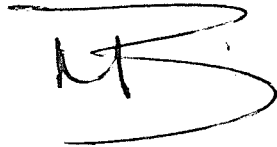
Guatemala September 3rd, 2014

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, 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

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 Mataquesuintla, 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

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.

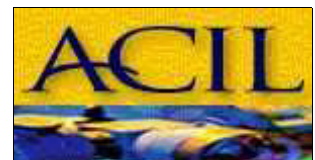
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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.
	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.
	WG373635	Zinc, total (3050)	M7471A CVAA	Q6	Sample was received above recommended temperature.
			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
L21031-08	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.
			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
L21031-10	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	H3	Sample was received and analyzed past holding time.	
	WG373635	Silver, total (3050)	Zinc, total (3050)	M7471A CVAA	Q6	Sample was received above recommended temperature.
				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.
	WG372905	Cyanide, total		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.
				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.
WG373106	Phosphorus, total		M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
			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
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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

21031 Chain of Custody



Laboratories, Inc. C21031

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 los Proceres 18 calle 94-69-2-10
Empresaria Zona Pradera Torre 10 oficina 1106
Telephone: (502) 59-51-52-48

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources Inc

E-mail: cmuerhoff@TahoeResourcesInc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resource 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 #: <u>Water Quality</u>	# of Containers	1	✓	SED																			
PO#: <u>FScobal</u>																							
Reporting state for compliance testing:																							
Check box if samples include NRC licensed material? <input type="checkbox"/>																							
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers																				
<u>SED-2A</u>	<u>09-09-14 11:45</u>	<u>SO</u>	<u>1</u>	<u>✓</u>																			
<u>SED-3</u>	<u>09-09-14 12:20</u>	<u>SO</u>	<u>1</u>	<u>✓</u>																			

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

REMARKS

COC # 3/2 Present results with the indicated chain of custody

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>10-13-14 09:50</u>

Guatemala October 6th, 2014

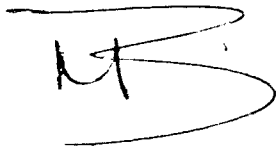
QUARANTINE STATEMENT

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.

11.6 Informes Originales de los Resultados Analíticos Obtenidos del Efluente en los meses de Mayo a Julio 2014.



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: 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)

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Límites Máximos Permisibles Entes
					Generadores Nuevos Acuerdo 236-2006 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

teléfonos: (502) 2254 6156 - 2254 8268

20 calle B 13-08 zona 2 El Roble, Guatemala, Guatemala.
laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt
www.ecosistemas.com.gt

laboratorio ambiental e industrial
acreditado ISO 17025 según OGA-LE 006-04

					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

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Límites 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

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.

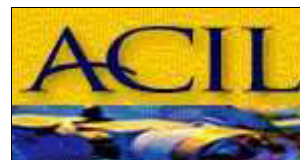
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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)

Table with columns: Quote #, PO#, Reporting state, Check box, 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

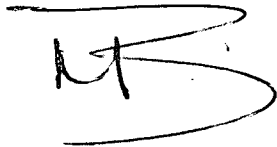
Guatemala August 25th, 2014

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, consisting of a stylized 'M' and 'B' with a horizontal line above the 'M' and a large loop at the end of the 'B'.

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 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: 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
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LÍMITE DE DETECCIÓN	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.

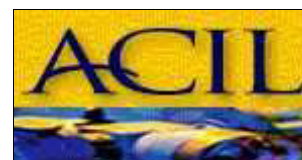
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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 for Quote #, PO#, Reporting state, and a grid for analyses requested. Includes handwritten entries for 'Water Quality', 'Escobal', and 'SW'.

SAMPLE IDENTIFICATION DATE:TIME Matrix

Table with columns for Sample ID, Date/Time, Matrix, and # of Containers. Includes handwritten entries for WWA and WWI samples.

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.

RELINQUISHED BY: DATE:TIME RECEIVED BY: DATE:TIME

Signature and date fields for Relinquished and Received parties.

L20497-1409231111

Page 8 of 8

FRMAD050.12.12.12

White - Return with sample. Yellow - Retain for your records.

20497 Chain of Custody



ECOSISTEMAS

PROYECTOS AMBIENTALES

REG 016 Resultados de Análisis

Ref 2035-14

Pág 1/2

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

teléfonos: (502) 2254 6156 - 2254 8268

20 calle B 13-08 zona 2 El Roble, Guatemala, Guatemala.
 laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt
 www.ecosistemas.com.gt

laboratorio ambiental e industrial
 acreditado ISO 17025 según OGA-LE 006-04

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Límites 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

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.

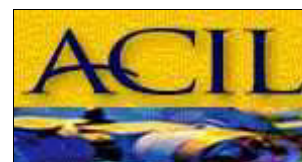
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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@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: 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

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

L21356 Chain of Custody

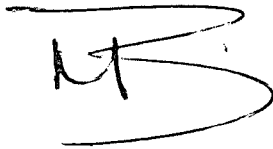
Guatemala October 29th, 2014

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.

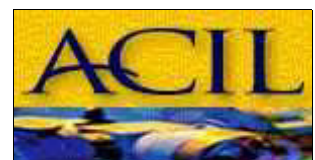
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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

<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: **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
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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: <u>Miguel Barragan</u>	Address: <u>Buena Vista Pradera 13 case 24-19 zona 10</u>
Company: <u>Talco Resources Inc</u>	<u>Empresarial Zona Pradera Torre II Casca 1406</u>
E-mail: <u>M.Barragan@talcoresources.com.gt</u>	Telephone: <u>(502) 5951 5248</u>

Copy of Report to:

Name: <u>Miguel Barragan</u>	E-mail: <u>cmuelcheff@talcoresourcesinc.com</u>
Company: <u>Talco Resources Inc</u>	Telephone:

Invoice to:

Name: <u>Miguel Barragan</u>	Address:
Company: <u>Talco Resources Inc</u>	
E-mail: <u>M.Barragan@talcoresources.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: LT 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 #: <u>Water Quality</u>	# of Containers	3	5																		
PO#: <u>10001</u>																					
Reporting state for compliance testing:																					
Check box if samples include NRC licensed material? <input type="checkbox"/>																					
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers																		
<u>Empres Municipal Pisunas (BARR)</u>	<u>29/10/14 16:20</u>	<u>DW</u>	<u>10</u>	<input checked="" type="checkbox"/>																	
<u>La Chilla / Davlino Miramain</u>	<u>28/10/14 13:30</u>	<u>DW</u>	<u>10</u>	<input checked="" type="checkbox"/>																	
<u>WW10</u>	<u>28/10/14 12:00</u>	<u>DW</u>	<u>10</u>	<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

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.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<u>[Signature]</u>	<u>29-10-2014 11:40</u>	<u>[Signature]</u>	<u>29/10 11:40</u>
		<u>[Signature]</u>	<u>10/31/14 10:13</u>

21359 Chain of Custody