

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

MAYO - JULIO 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 Mayo a Julio de 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), 2 estaciones de pozos de producción y 10 estaciones de agua en pozos de monitoreo ubicadas en el AID del proyecto.
- Sedimentos: Se tomaron muestras de sedimentos en las mismas estaciones de agua superficial ubicadas en el AI del proyecto.
- Calidad de Efluente: Se tomaron muestras mensuales en el efluente de la Planta de tratamiento de aguas proveniente de túneles y del agua contenida en la pileta de cumplimiento ambiental; además de mediciones diarias de datos *In Situ* y kit de cianuro de estos mismos puntos. En el anexo 11.2 se presenta una copia de los registros diarios.

- Vibraciones: Se instalaron tres medidores de vibraciones, los cuales registraron la velocidad de partícula durante cada una de las voladuras. En total se registraron 1031 voladuras durante los meses de Mayo a Julio de 2015.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 24 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 Mayo a Julio de 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 Mayo a Julio 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 de 2015.

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
Mayo 2015										
30.58	12	21.26	53.32	0.31	11.13	80.22	100	19.84	72.61	105.5
Junio 2015										
29.11	15.33	21.35	74.4	0.31	13.93	94.69	100	31.28	75.72	157.37
Julio 2015										
29.7	12.69	21.56	75.19	0.31	14.86	91.71	100	23.85	70.23	98.92

°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 21.26° a los 21.56°C y en el mes de Julio se registró la menor precipitación (98.92mm). El mes que mayor humedad relativa promedio presentó fue Junio con 75.72% y el mes que en promedio presentó la mayor velocidad de vientos fue Julio con 14.86 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.



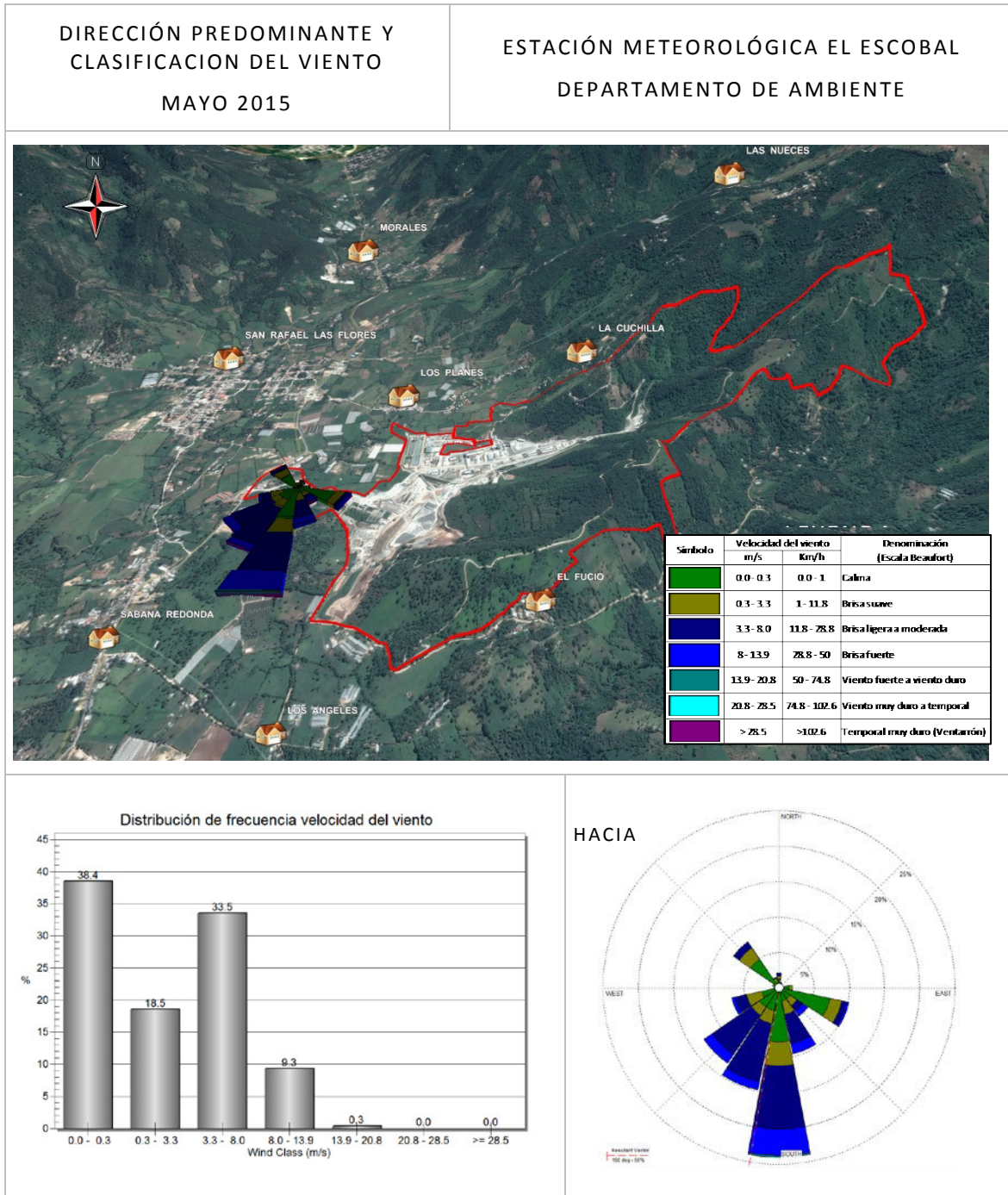
Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa

Fuente: MSR, 2015.

Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 la predominancia de los vientos del trimestre de Mayo a Julio de 2015 fue de norte a sur.

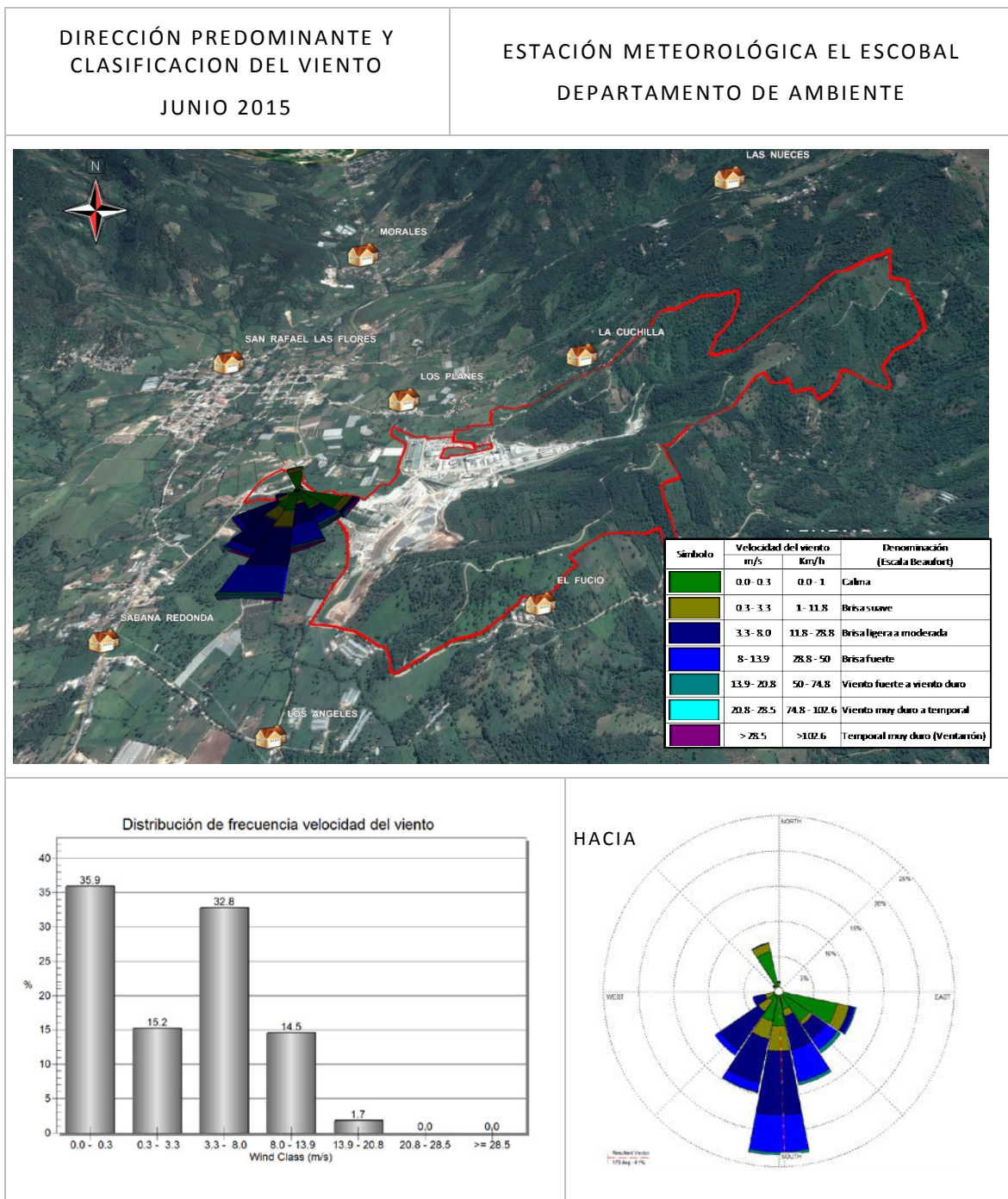
Figura 2-1: Dirección del viento Mayo 2015, Proyecto Minero Escobal

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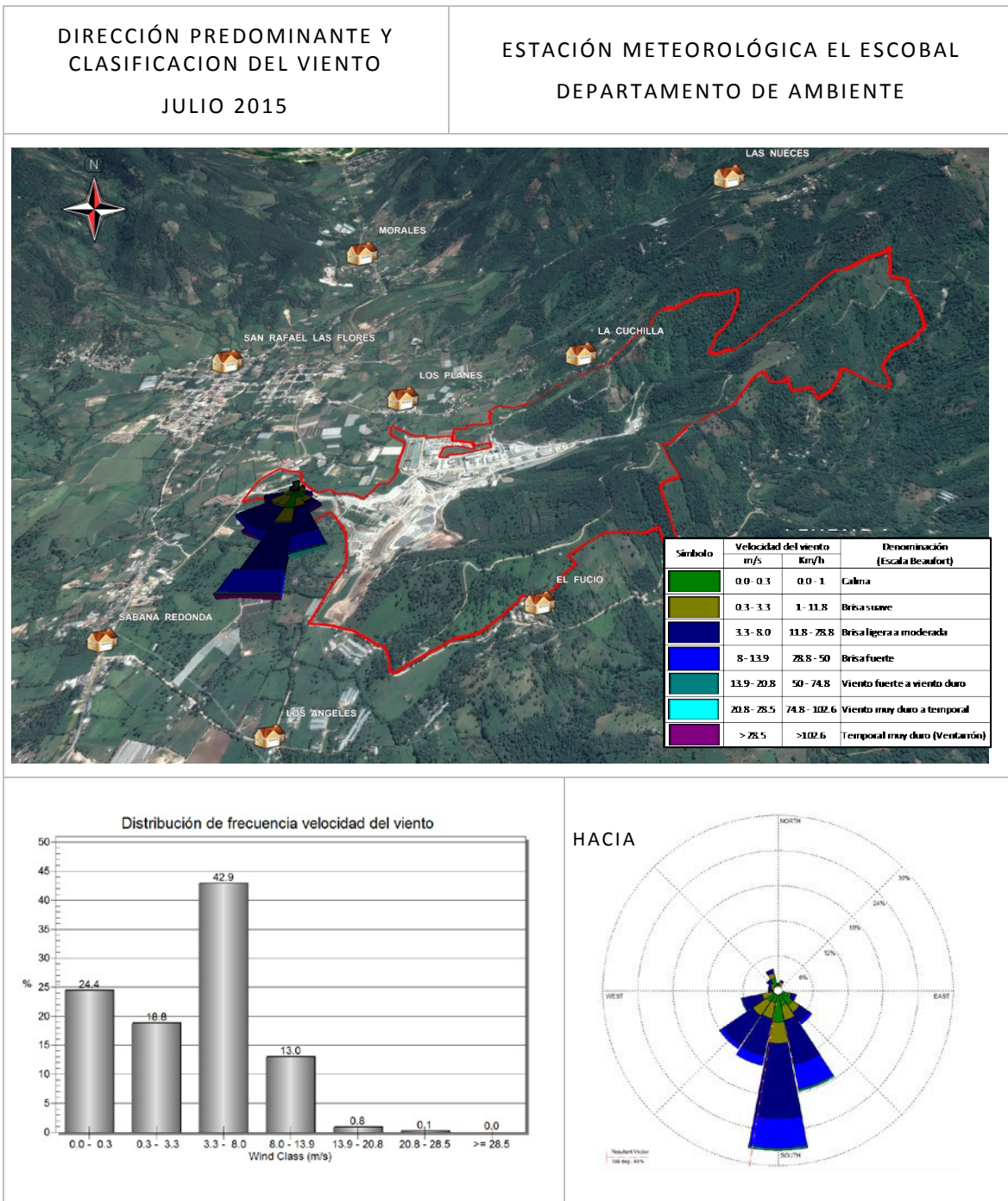
Fuente: MSR, 2015.

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



Fuente: MSR, 2015.

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



Fuente: MSR, 2015.

3 Calidad de Aire

3.1 Material Particulado

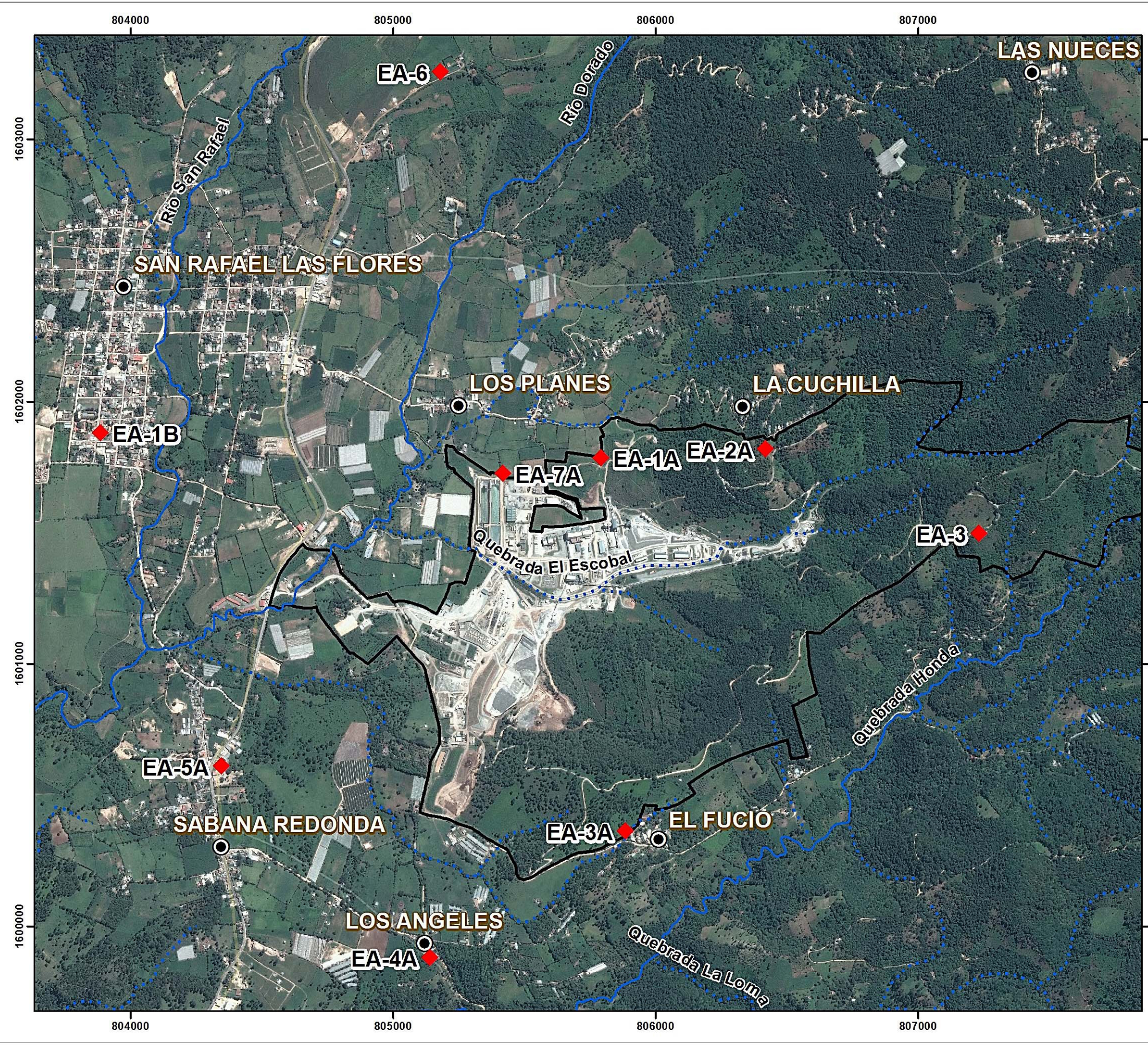
3.1.1 Sitios de Monitoreo

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

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

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

*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2015.



**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
MATERIAL PARTICULADO (PM10)**

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 (PM10)

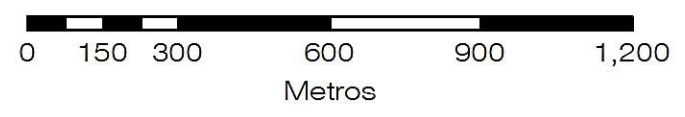
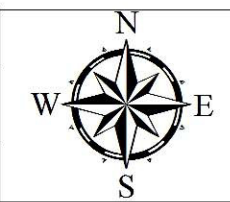
Símbolo	Estación	X	Y
	EA-1A	805791	1601785
	EA-1B	803885	1601881
	EA-2A	806419	1601819
	EA-3	807232	1601498
	EA-3A	805886	1600364
	EA-4A	805140	1599883
	EA-5A	804346	1600611
	EA-6	805181	1603257
	EA-7A	805419	1601726

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: Julio 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 Mayo a Julio de 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	May-15	Jun-15	Jul-15
				(µg/m ³)					
EA-1 ^a	150	150**	50	24.36	89.95	3.67	60.46	1.66	7.07
EA-1B				NR	NR	NR	54.72	NA	NA
EA-2 ^a				21.40	76.20	2.74	58.89	14.14	13.05
EA-3				25.68	78.85	1.25	49.87	3.95	13.34
EA-3 ^a				NR	NR	NR	54.16	NA	NA
EA-4 ^a				103.55	120.40	86.70	108.41	NA	NA
EA-5 ^a				50.73 [¥]	104.80 [¥]	11.80 [¥]	38.43	NA	NA
EA-6				23.05	57.90	1.70	42.13	NA	NA
EA-7 ^a				46.48 [¥]	115.90 [¥]	13.40 [¥]	70.46	19.55	5.41

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 Mayo a Julio de 2015 se encontraron entre los 1.66 a 108.41 µg/m³. En Mayo se registró el menor valor de PM₁₀ en la estación EA-5A (38.43 µg/m³), mientras que en Junio y Julio se registró en la estación EA-1A y EA-7A (1.66 y 5.41 µg/m³ respectivamente). Los valores más altos de PM₁₀ se registraron en la estaciones EA-4A durante Mayo (108.41 µg/m³), mientras que los valores más altos en Junio y Julio se registraron en las estaciones EA-7A y EA-3 (19.55 y 13.34 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.

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 (PM₁₀) 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 PM₁₀, 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 PM₁₀.

Cuadro 3-5: Procedimiento y laboratorio empleado para la determinación de metales en PM₁₀, 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 µg/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.

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 Mayo de 2015, 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. En todas las estaciones se registró mercurio ligeramente por encima del límite de detección del método, a excepción de la estación EA-7A en donde no se registró presencia de mercurio.

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
		2656-0606	2631-1414	2653-0303	2655-0505	2654-0404	2657-0707	2630-1313
Mayo 2015 (µg/m³)								
Mercurio	0.0001	0.00037	0.00067	0.0005	0.00033	0.00021	0.00033	N.D.
Mayo 2014 (µg/m³)								
Mercurio	0.0001	N.D.	N.D.	N.D.	N.D.	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)

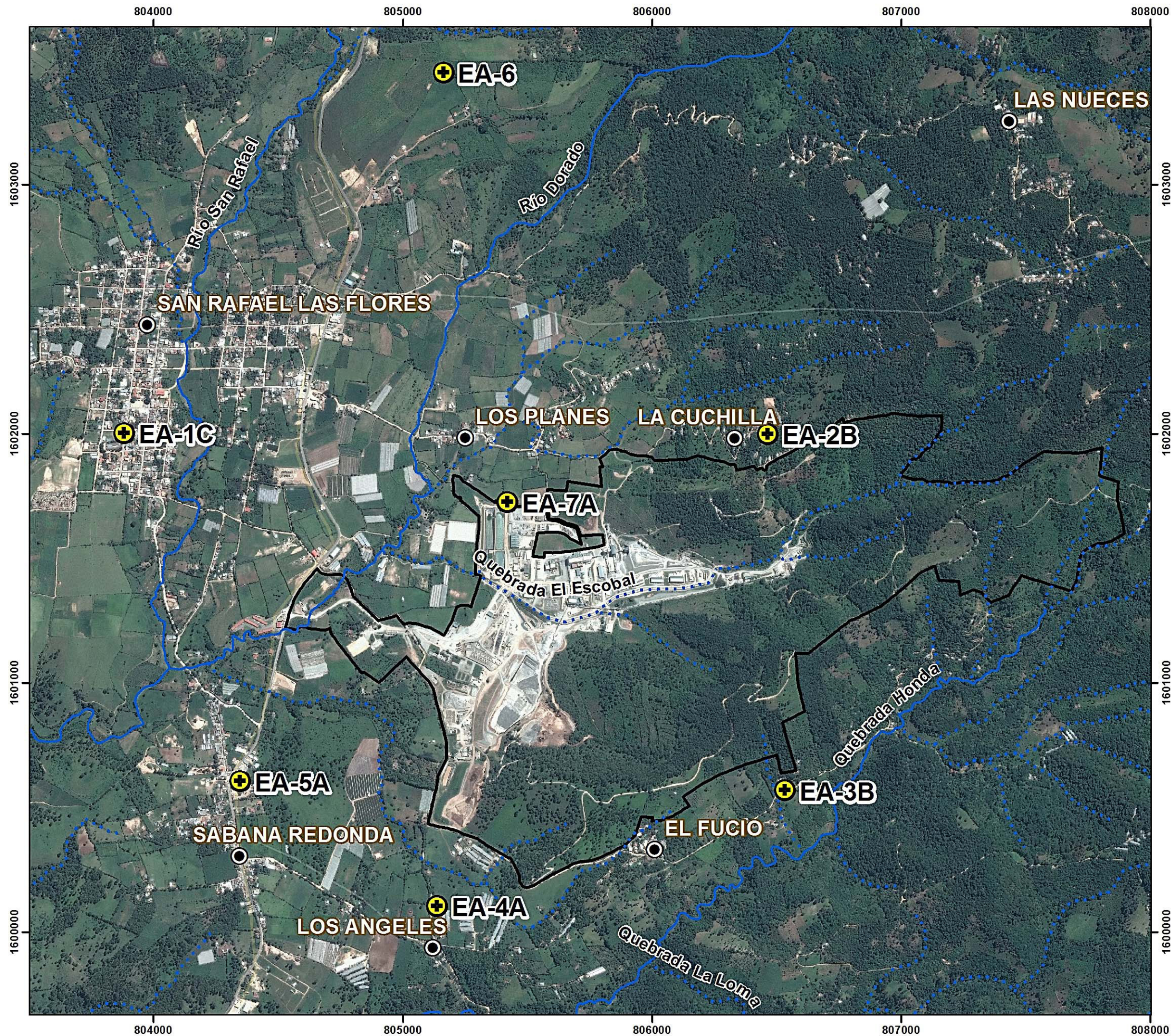
3.3.1 Sitios de Monitoreo

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

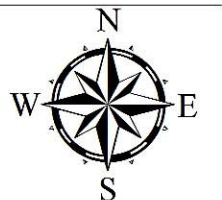
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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: Julio 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 Junio de 2015. 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	Jun-15	Jun-15	Jun-15	Línea Base			Muestreo	Línea Base			Muestreo	Jun-15	Jun-15
						Promedio	Mínimo	Máximo	Jun-15	Promedio	Mínimo	Máximo	Jun-15		
g/(m² x 30 días)															
Sólidos insolubles	ND	ND	6.47	6.61	5.83	6.27	2.60	10.80	15.65	6.50	0.80	16.00	5.58	0.82	1.43
Sólidos solubles			2.69	3.62	0.91	2.12	0.90	2.90	2.05	11.26	2.00	37.00	1.30	0.70	1.42
Sólidos totales			9.16	10.24	6.74	8.37	4.60	13.00	17.71	17.58	3.20	50.00	6.87	1.52	2.85

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. Fuente: MSR, 2015.

Los valores de PST se encuentran entre 1.52 a 17.71 g/(m² x 30 días), los cuales corresponden a las estaciones EA-6 y EA-4A respectivamente. Únicamente el valor para la estación EA-4A (17.71 g/(m² x 30 días)) se encuentra ligeramente arriba de los valores mínimos y máximos registrados durante el establecimiento de la línea base. Sin embargo, los valores de PST en la misma estación han venido descendiendo desde el cuarto trimestre de 2013. 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)

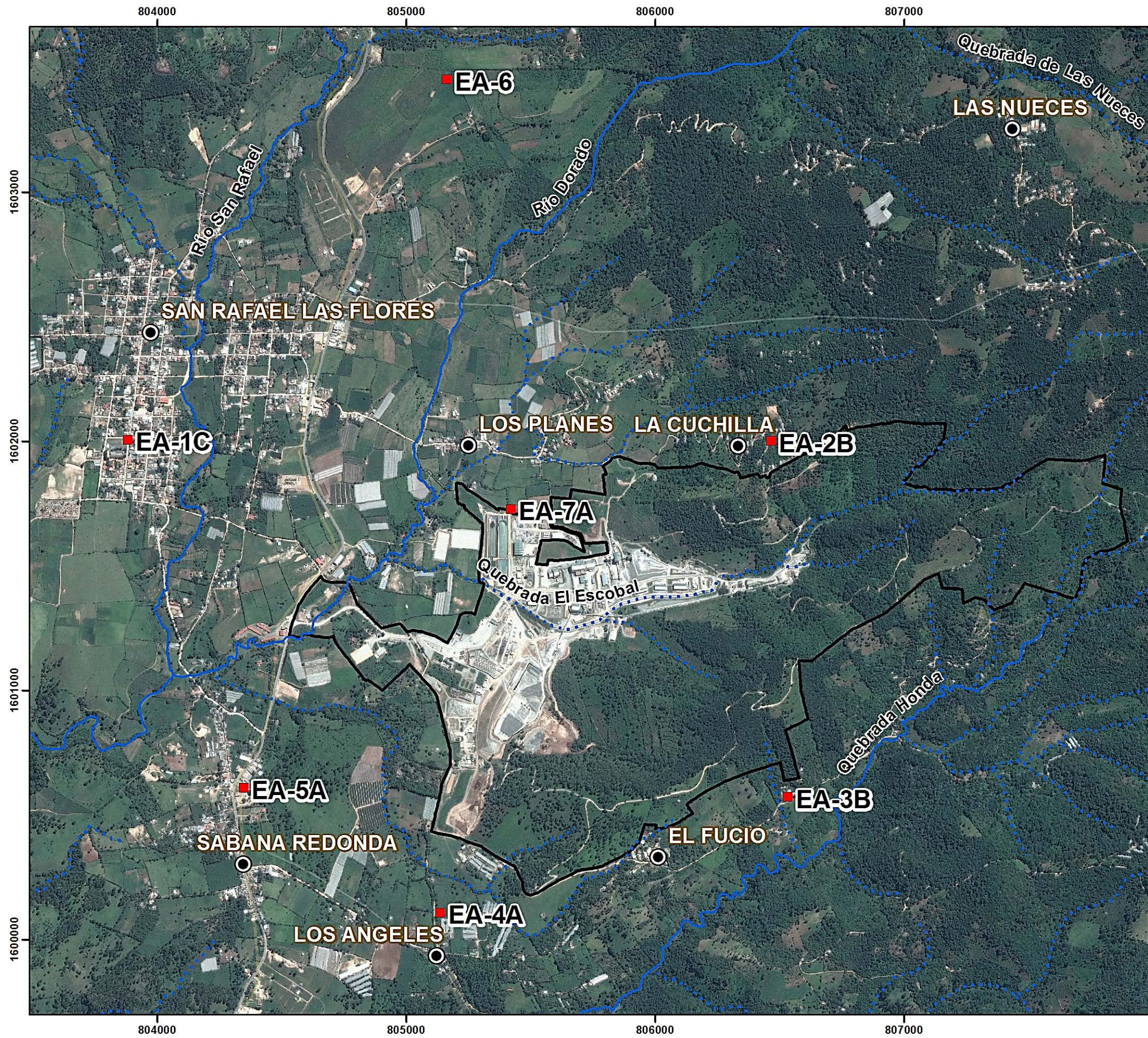
3.4.1 Sitios de Monitoreo

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

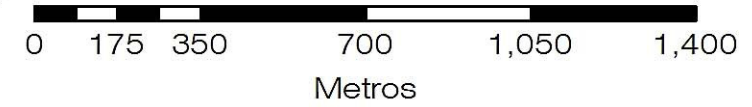
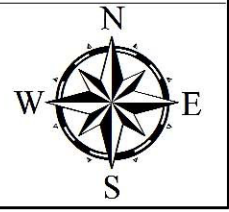
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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: Julio 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-4A) y 11 µg/m³ EA-1C y EA-2B. 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 variado de acuerdo a 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**		Muestreo		
	USEPA ¹	Banco Mundial ²	OMS ³	British Columbia ⁴	Jun-15	Jun-15	Jun-15	Jun-15	Promedio	Mínimo	Máximo	Jun-15	Jun-15	Promedio	Mínimo	Máximo	Jun-15
(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	11	11	<9	10	<9	<9	<9	<9	<9	<9	<9	<9	<9

Nota: µg/m³ = microgramos por metro cúbico; SO₂= dióxido de azufre, NO₂= dióxido de nitrógeno. ¹USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). ²Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. ³Guía de Calidad del Aire, OMS 2005. ⁴Guías para la calidad del aire ambiental. *Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. **Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente. ¥ Este valor corresponde a la concentración promedio anual. Fuente: MSR, 2015.

3.5 Niveles de Presión Sonora

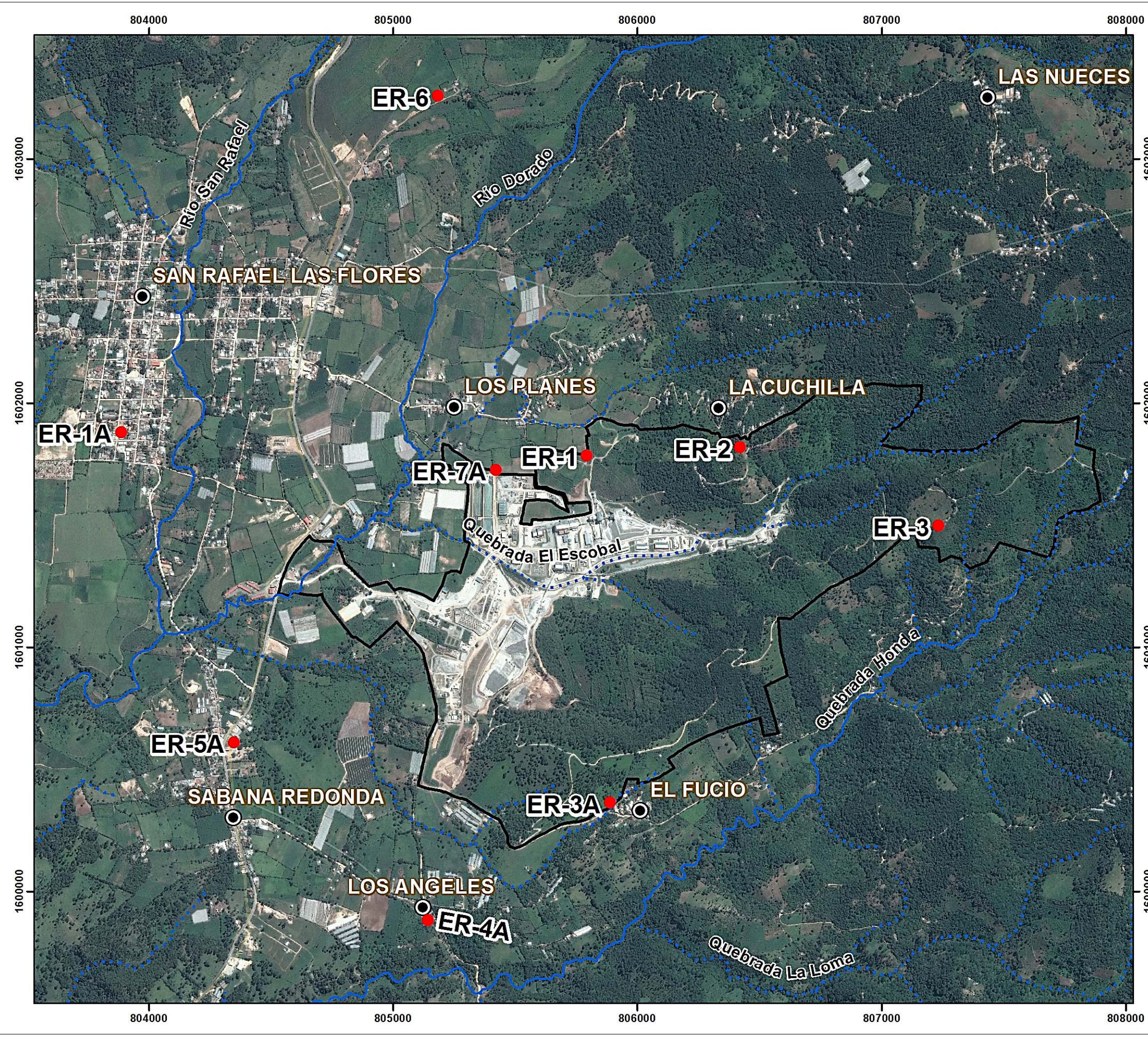
3.5.1 Sitios de Monitoreo

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 Mataquescuintla

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 Intermittente

ESTACIONES DE MONITOREO

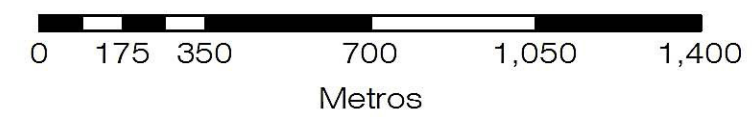
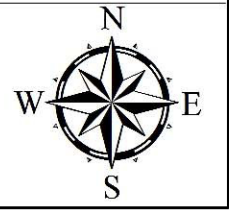
Símbolo	Estación	X	Y
	ER-1	805791	1601785
	ER-1A	803885	1601881
	ER-2	806419	1601819
	ER-3	807232	1601498
	ER-3A	805886	1600364
	ER-4A	805140	1599883
	ER-5A	804346	1600611
	ER-6	805181	1603257
	ER-7A	805419	1601726

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: Julio 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 Junio a Julio de 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 Leq, están dentro del rango de 44.6dBa y 75.1 dBa, los cuales corresponden a las estaciones ER-6 y ER-1 respectivamente.

La estación ER-3 presentó el menor promedio diurno (45.2 dBa) y la estación ER-6 el menor promedio nocturno (42.9 dBa) de todas las mediciones efectuadas durante el monitoreo; mientras que la estación ER-1 presentó el mayor promedio diurno (77.2 dBa) y el mayor promedio nocturno (57.7 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 en promedio diurno de Julio (77.2 dBa) en la estación ER-1 y lo registrado en Mayo (53 dBa) en la estación ER-4A; respecto de las mediciones en promedio nocturno que están fuera del límite máximo de línea base se encuentran lo registrado en Mayo (56 dBa) en la estación ER-1, a las mediciones de Mayo y Julio en ER-2 y ER-7A, y la medición de Mayo en ER-4A. 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 Mayo a Julio de 2015 estuvieron por debajo de la guía establecida por la OMS y Banco Mundial para zonas residenciales; asimismo por debajo de la norma establecida por la USEPA. A excepción de ER 1 en promedio diurno durante Julio y en promedio nocturno durante Mayo, ER-2 durante sus mediciones en el trimestre en promedio diurno y nocturno y ER-1A y ER-4A en promedio diurno y nocturno durante Mayo respectivamente.

Ninguna de las estaciones monitoreadas presentó valores en promedio diurno y nocturno superiores al valor de la guía para jornada diurna y nocturna del Banco Mundial para zonas industriales (70 dBa), a excepción de la estación ER-1.

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			May-15	Jun-15	Jul-15	Línea Base			May-15	Jun-15	Jul-15				
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo							
			dBA																	
Lmax	NL	NL	NL	NL	89.3	99.5	64.6	88.7	91.3	114.1	86.7	97.8	64.9	79.1	NA	95.1				
Lmin					32.5	37.7	27.0	35.2	35.4	37.7	35.2	42.8	26.5	46.9		46.4				
Leq					49.9	57.1	41.2	49	50.5	75.1	49.4	58.7	39.7	56.5		56.4				
PD					55	55	55	70	50.5	59.1	39.7	53.5	51.4	77.2		48.8	57.1	39.8	55.7	56.3
PN					55	50	45	70	47.6	55.7	39.3	56	48.4	49.9		46.6	54.5	37.9	57.7	56.7

Parámetro	Norma*		Guías*		ER-3						ER-7 ^a									
	USEPA ¹	OMS ²	Banco Mundial		Línea Base			May-15	Jun-15	Jul-15	Línea Base**			May-15	Jun-15	Jul-15				
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo							
			dBA																	
Lmax	NL	NL	NL	NL	87.4	100.7	67.2	76	76.4	74.5	87.5	89.0	82.1	82.7	NA	82.7				
Lmin					49.4	56.2	26.9	35.3	31.9	36.1	NR	NR	NR	41.5		39.4				
Leq					56.8	63.2	39.7	47	56.3	45.4	52.8	54.5	50.9	51.5		51.8				
PD					55	55	55	70	56.5	63.1	41.0	46.7	46.3	45.2		52.1	53.5	50.4	51.8	51.8
PN					55	50	45	70	57.2	64.0	34.1	47.6	48.2	45.9		49.7	50.9	48.8	51.2	51.9

*Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. ¹USEPA, 2006. Normas nacionales de niveles de presión sonora. ²Guías sobre ruido comunitario, OMS 1999. ³Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. dBA = decibeles en escala A. PD = promedio diurno (de 07:00 a 22:00)- PN = promedio nocturno (de 22:00 a 7:00). Lmax = lectura máxima registrada de dBA. Lmin= lectura mínima registrada de dBA. NL = no hay límite establecido para este parámetro. NR = cálculo No Realizado por falta de datos de línea base. NA: no analizado por falla en la memoria de almacenamiento del equipo. ** 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			May-15	Línea Base			May-15	Línea Base			May-15
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
			dBA													
Lmax								93.8				77.6	80.6	78.2	82.1	93.2
Lmin	NL	NL	NL	NL				38.9				34	NR	NR	NR	36
Leq					NR	NR	NR	55	NR	NR	NR	51.6	50.2	49.3	50.9	54.3
PD	55	55	55	70				56.2				52.9	49.5	48.4	50.4	53
PN	55	50	45	70				51.7				48.8	48.6	48.2	48.9	56

Parámetro	Norma*		Guías*		ER-5A				ER-6			
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			May-15	Línea Base			May-15
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
			dBA									
Lmax					91.6	85.1	92.2	84.1				89.1
Lmin	NL	NL	NL	NL	NR	NR	NR	34				31.3
Leq					65.8	51.6	67.6	51.2	NR	NR	NR	44.6
PD	55	55	55	70	61.2	50.2	63.8	52.6				45.5
PN	55	50	45	70	62.8	45.9	65.0	47.4				42.9

*Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. ¹USEPA, 2006. Normas nacionales de niveles de presión sonora. ²Guías sobre ruido comunitario, OMS 1999. ³Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. dBA = decibeles en escala A. PD = promedio diurno (de 07:00 a 22:00)- PN = promedio nocturno (de 22:00 a 7:00). Lmax = lectura máxima registrada de dBA. Lmin= lectura mínima registrada de dBA. NL = no hay límite establecido para este parámetro. NR = cálculo No Realizado por falta de datos de línea base. ** Los valores de línea base corresponden a la estación ER-7. Fuente: MSR, 2015.

4 Calidad del Agua

4.1 Sitios de Monitoreo

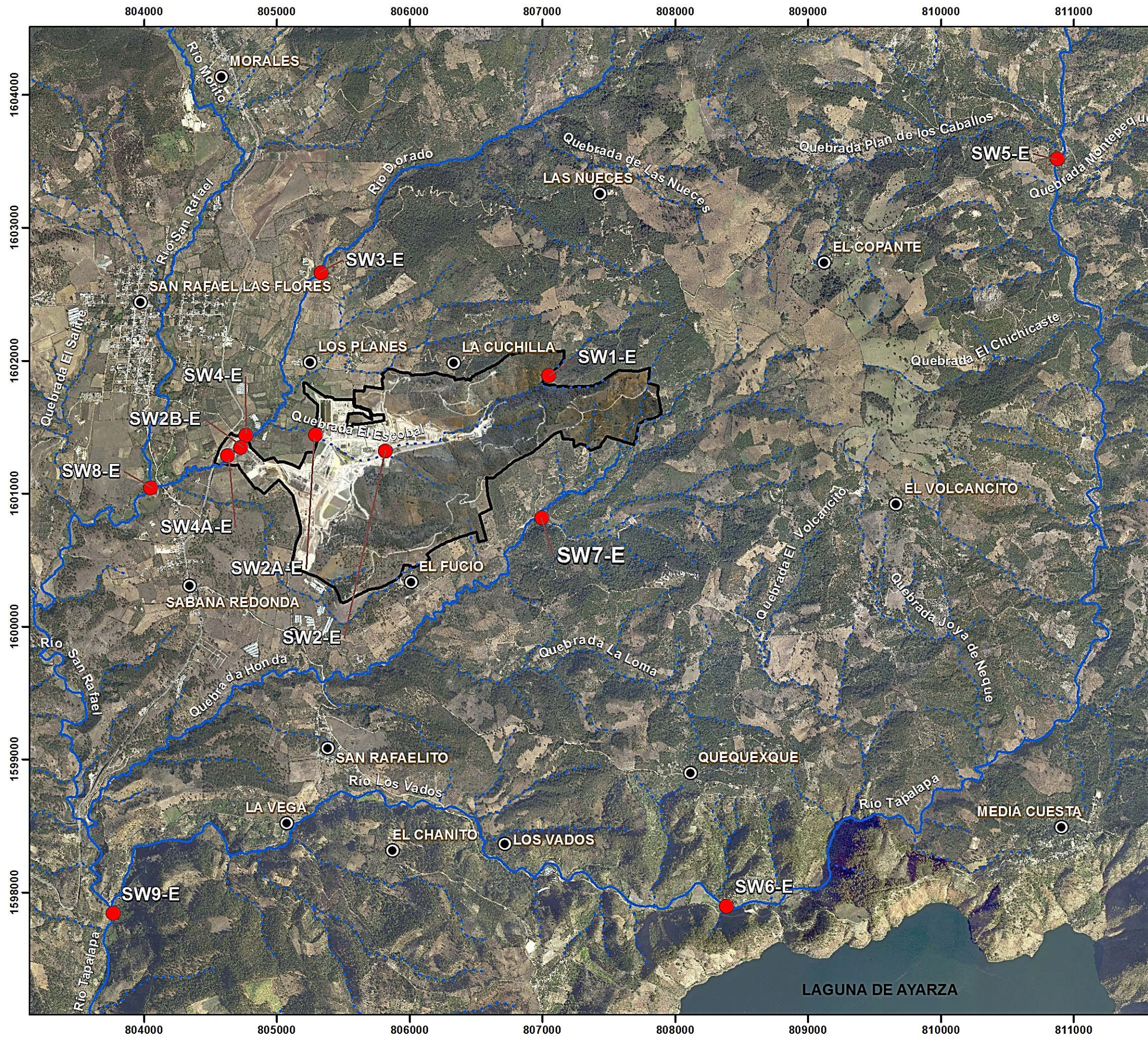
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua 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	Noviembre 2011 a Diciembre 2012
SW-9	803,772	1,597,635	Río Tapalapa, aguas abajo (cercano a la Ceibita)	
Agua Subterránea, Nacimientos				
GW-1A	808,670	1,599,754	Nacimiento de agua permanente, Aldea El Volcancito	Diciembre 2010 a marzo 2011
GW-2	807,515	1,601,059	Nacimiento de agua permanente, Aldea El Fucío	
GW-3	806,193	1,601,194	El Mora, zona central del proyecto (frente a portal Oeste)	
GW-4	805,992	1,600,533	Aguas arriba del depósito de colas y de GW5	Diciembre 2010
GW-5	805,962	1,600,525	Aguas arriba del depósito de colas	No cuenta con línea base
Agua Subterránea, Pozos de monitoreo				
MW-2	805,206	1,600,565	Sur-oeste del depósito de colas	Diciembre 2010 a marzo 2011
MW-3	805,153	1,600,790	Al oeste del depósito de colas	
MW-4	805,186	1,601,009	Al sur de montículos (acuífero somero)	
MW-5	805,304	1,601,277	Al oeste de taller, en el límite de la propiedad de MSR	
MW-6	805,457	1,601,454	Al norte de almacén general	Diciembre 2010 a

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

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

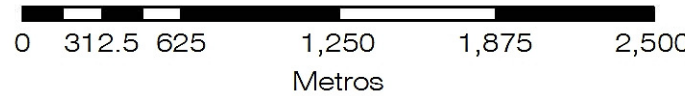
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW6-E	808385	1597892
	SW7-E	806995	1600815
	SW8-E	804048	1601037
	SW9-E	803766	1597838

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

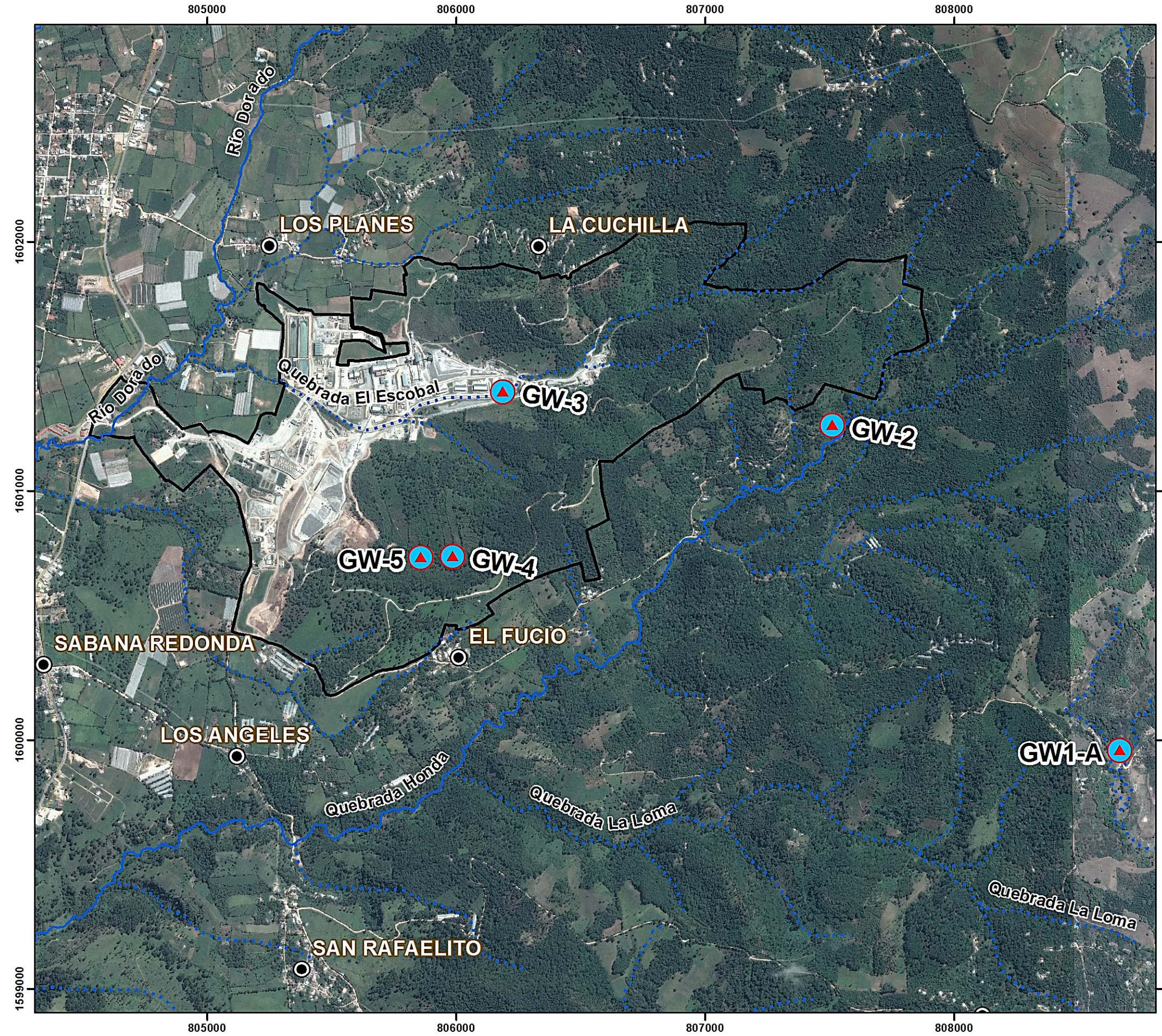
Fecha de Elaboración: Julio de 2015

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)

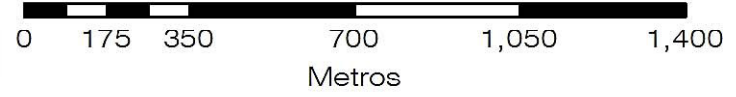
Símbolo	Estación	X	Y
	GW-1A	808664	1599957
	GW-2	807509	1601262
	GW-3	806187	1601397
	GW-4	805986	1600736
	GW-5	805858	1600731

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: Julio 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)

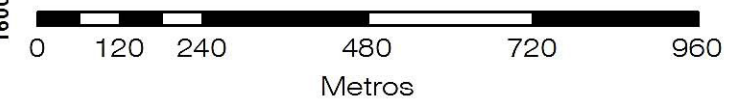
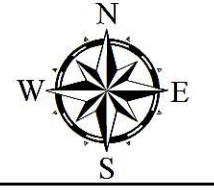
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	MW-2	805201	1600768	
	MW-3	805148	1600993	
	MW-4	805181	1601212	
	MW-5	805299	1601463	
	MW-6	805452	1601657	
	MW-7	805791	1601785	
	MW-8	805298	1601480	
	MW-9	805192	1601222	
	MW-11	805607	1601267	
		RW-1	804803	1601175
		PSA-SR	803672	1602247
HW-1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

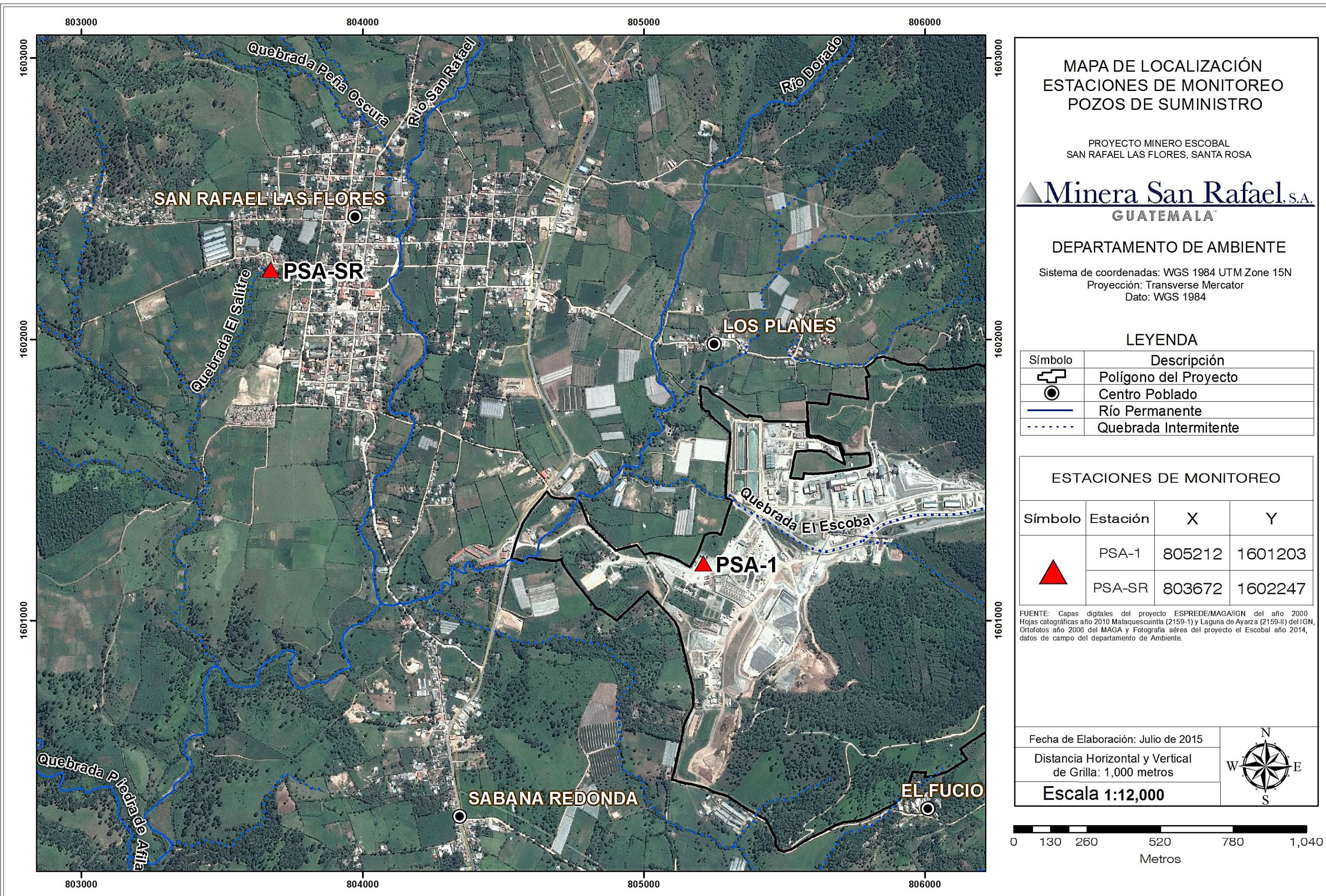
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Julio 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

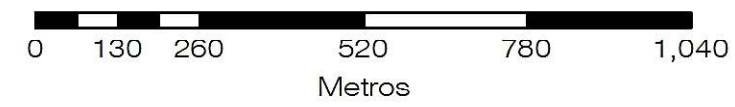
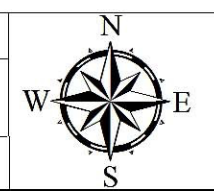
Símbolo	Estación	X	Y
	PSA-1	805212	1601203
	PSA-SR	803672	1602247

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: Julio 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, coniformes 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 Junio se emplearon muestras control para determinar la confiabilidad de los parámetros analizados por el laboratorio encargado del análisis de muestras. En total se efectuaron 3 muestras blanco y tres muestras duplicado. Los resultados obtenidos se presentan en el Cuadro 4-3.

En las tres muestras del control de calidad de los blancos de campo, se detectaron concentraciones mínimas de calcio disuelto (SW10, GW10 y MW20), plomo disuelto (SW10), magnesio disuelto (SW10), mercurio total (SW10) y potasio disuelto (SW10). Sin embargo las concentraciones detectadas están muy cerca a los límites de detección del método, por lo que se considera que no hay un aporte significativo de estos elementos en los resultados obtenidos. Todos los demás parámetros analizados por el laboratorio son confiables tanto en manipulación de las muestras como en precisión del análisis.

Cuadro 4-3: Resultados de control de calidad, blanco y duplicado, para análisis de agua superficial y subterránea

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Cr VI	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO	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	1.7 x 10 ³	240	<2	<2	<2	<2
Color Aparente	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	<1	<1
Color Real		<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	0.04	0.05	<0.03	<0.03	<0.03	<0.03
Aluminio Total		<0.03	NA	NA	0.06	0.07	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0197	0.0197	0.0005	0.0005	<0.0004	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0182	0.0182	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.0105	0.0104	0.0021	0.0022	0.0009	0.0017
Arsénico Total		<0.0002	NA	NA	0.011	0.0108	NA			
Bario Disuelto		<0.003	<0.003	<0.003	0.048	0.048	0.16	0.159	0.049	0.056
Bario Total		<0.003	NA	NA	0.048	0.049	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	0.14	0.14	0.01	0.01	0.06	0.03
Boro Total		<0.01	NA	NA	0.13	0.14	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	0.3	0.2	384	389	102	101	192	44.9
Calcio Total		<0.1	NA	NA	392	394	NA			
Cromo Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total		<0.01	NA	NA	<0.01	<0.01	NA			
Cobalto Disuelto	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobalto Total	<0.01	NA	NA	<0.01	<0.01	NA				
Cobre Disuelto	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobre Total	<0.01	NA	NA	<0.01	<0.01	NA				
Galio Disuelto	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Galio Total	<0.1	NA	NA	<0.1	<0.1	NA				
Hierro Disuelto	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	6.19	
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	0.001	0.001	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
Litio Disuelto	mg/L	<0.008	<0.008	<0.008	0.091	0.09	0.01	0.008	0.017	0.015
Litio Total		<0.008	NA	NA	0.095	0.095	NA			
Magnesio Disuelto		0.3	<0.2	0.2	24.2	24	23.8	23.4	25	7.8
Magnesio Total		<0.2	NA	NA	24.7	24.9	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.193	0.191	0.005	0.006	<0.005	0.084
Manganeso Total		<0.005	NA	NA	0.203	0.205	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	0.03	0.04	<0.02	<0.02	<0.02	<0.02
Molibdeno Total		<0.02	NA	NA	0.03	0.03	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		0.3	<0.2	0.2	11.1	11	10.8	10.6	8.9	4.2
Potasio Total		<0.2	NA	NA	11.5	11.5	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		<0.0002	<0.0001	<0.0001	0.0006	0.0006	0.0003	0.0003	0.0005	<0.001
Selenio Total		<0.0001	NA	NA	0.0006	0.0007	NA			
Plata Disuelta		<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<0.00005	<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵
Plata Total		<0.00005	NA	NA	<0.00005	0.00013	NA			
Sodio Disuelto		<0.2	<0.2	<0.2	76	75.7	24.4	24.2	36.6	25.3
Sodio Total		<0.2	NA	NA	78.8	78.9	NA			
Estroncio Disuelto		<0.005	<0.005	<0.005	4.08	4.03	0.546	0.539	0.729	0.339
Estroncio Total		<0.005	NA	NA	4.13	4.13	NA			
Talio Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0003	<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	<0.005	<0.005	0.006	0.006	0.012	0.007
Titanio Total		<0.005	NA	NA	0.005	0.005	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	0.0005	0.0004	<0.0001	<0.0001	0.0004	<0.0001
Uranio Total		<0.0001	NA	NA	0.0005	0.0005	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	0.009	0.01	<0.005	<0.005	0.007	<0.005
Vanadio Total		<0.005	NA	NA	0.01	0.01	NA			
Zinc Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.01
Zinc Total		<0.01	NA		<0.01	<0.01	NA			
Grasas y Aceites		<2.02	NA		<2	<2	NA			
DQO		<10	NA		<10	<10	NA			
Cloruros		<0.5	<0.5	<0.5	70.3	69.8	14.9	14.9	37.8	8.4
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	1.37	1.33	0.2	0.21	0.20	0.58	
Nitratos/Nitritos como N	<0.02	<0.02	<0.02	2.7	2.79	2.92	2.91	5.47	0.03	
Amonio	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)	<0.1	<0.1	<0.1	0.5	0.4	<0.1	<0.1	<0.1	<0.1	
Fosfatos	<0.03	<0.03	0.03	0.06	0.06	0.03	0.03	0.09	0.47	
Fósforo Disuelto (Orto)	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.03	0.04	0.06	
Fósforo Total	<0.01	<0.01	0.02	0.02	0.02	0.01	0.02	0.04	0.25	
STD (TDS)	<10	<10	<10	1730	1730	674	654	1030	322	
SST (TSS)	<5	<5	<5	<5	<5	<5	<5	10.0	13.0	

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
ST (TS)	mg/L	<10	<10	<10	1810	1810	680	672	1070	348
Sulfatos		<1	<1	<1	1010	1000	302	295	535	79.5
Alcalinidad Total		<2	<2	<2	55.7	55.4	67.3	67.3	80.9	115
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.

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

Las estaciones muestreadas presentaron un pH levemente alcalino (6.96 a 8.87 u.e.). En ninguna de las estaciones se detectaron valores de grasas y aceites, a excepción de la estación SW4A-E y SW9. En ninguna estación se registró 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 únicamente en la estación SW8-E (15 mg/L) y no sobrepasa 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 (10 mg/L) y el Banco Mundial (2 mg/L) para Fósforo total.

En tres 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.

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 ocho estaciones, excepto en SW3, SW5 y SW6 y se detectó en un rango de concentración de 0.0004 – 0.0182 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) y 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 Mercurio. 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			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	
					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	7.51	7.42	6.56	7.87	8.87				8.19	
Temperatura (campo)	°C				17.4	13	19.8	18.05	22.4	20.3	25.6	31.5				26.2	
Conductividad (campo)	µS/cm				277.9	66.3	566.6	305.7	807.3	177.3	1965	1163				2053	
Oxígeno disuelto (campo)					3.6	0.1	6.4	6.53	4.76	3.5	5.8	7.05				7.68	
Cr VI	mg/L							<0.05				<0.05				<0.05	
DBO								<10				<10				<10	
Coliformes Fecales	NMP/100ml							70				23				240	
Color Aparente	U Pt/Co				NR	NR	NR	<1	NR	NR	NR	<1				<1	
Color Real								<1				<1				<1	
Turbidez	NTU							3.54				0.44				1.31	
Aluminio Disuelto	mg/L				0.035	<0.03	0.09	<0.03	0.043	<0.03	0.12	<0.03				0.05	
Aluminio Total		0.2			5.02	<0.03	35.1	0.05	2.35	0.06	8.77	0.1				0.07	
Antimonio Disuelto					<0.0004	<0.0004	0.0006	0.0005	<0.0004	<0.0004	<0.0004	0.0104				0.0197	
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	0.0004	<0.0004	<0.0004	0.0005	0.0101				0.0182	
Arsénico Disuelto					0.00216	0.0005	0.0034	0.0028	0.00184	0.0013	0.0024	0.0088				0.0104	
Arsénico Total		0.01	0.1		0.00339	0.0015	0.0094	0.0029	0.00266	0.0012	0.0054	0.009				0.0108	
Bario Disuelto					0.1361	0.086	0.207	0.121	0.109	0.088	0.133	0.037				0.048	
Bario Total		1			0.186	0.1	0.434	0.144	0.131	0.096	0.186	0.045				0.049	
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	0.04				0.14	
Boro Total					<0.01	<0.01	0.02	0.01	0.11	<0.01	0.28	0.05				0.14	
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		NR	NR	NR	<0.0001
Cadmio Total		0.003	0.1		<0.0001	<0.0001	0.0007	<0.0001	<0.0001	<0.0001	0.0001	<0.0001				<0.0001	
Calcio Disuelto					45.2	18.9	74.5	43.2	144.9	20.7	333	158				389	
Calcio Total					45.5	20.9	70.5	43.5	144.6	20.5	331	182				394	
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	0.02	1.3	0.06	5.19	0.07				0.02		
Plomo Disuelto				<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001	0.0003				0.0002		
Plomo Total	0.015	0.4		0.0025	<0.0001	0.0191	0.0001	0.00088	<0.0001	0.0038	0.0032				0.001		
Litio Disuelto				<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.019				0.09		
Litio Total				<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.026				0.095		
Magnesio Disuelto				3.9	2.6	5.3	4.5	15.9	3.2	37.3	20.1				24		
Magnesio Total				4.2	2.8	5.2	4.5	15.1	3.6	32.2	22.7				24.9		
Manganeso Disuelto				0.0051	<0.005	0.02	<0.005	0.0195	<0.005	0.07	0.02				0.191		
Manganeso Total	0.4			0.1041	<0.005	0.721	<0.005	0.0602	0.007	0.174	0.039				0.205		
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				0.04		

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			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					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				0.03
Níquel Disuelto					<0.01	<0.01	0.03	<0.008	0.013	<0.01	0.04	<0.008				<0.008
Níquel Total		0.61		2	<0.01	<0.01	0.04	<0.008	0.022	<0.01	0.04	<0.008				<0.008
Potasio Disuelto					4.4	3.5	5.1	4.2	6.1	4.9	7.6	9.9				11
Potasio Total					5.3	3.5	13	4.8	6.3	5.2	7.4	11.4				11.5
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00045	<0.0001	0.0002	0.0002				0.0006
Selenio Total		0.17			0.0001	<0.0001	0.0003	<0.0001	0.00011	<0.0001	0.0002	0.0006				0.0007
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005
Plata Total					<0.00005	<0.00005	0.00015	<0.00005	<0.00005	<0.00005	0.00006	0.00007				0.00013
Sodio Disuelto					9.81	8.3	11.6	9.3	40.1	9.4	87.8	31.7				75.7
Sodio Total					9.46	7.8	11.8	9.4	39.8	9.4	85.2	37.5				78.9
Estroncio Disuelto					0.17	0.09	0.26	0.159	1.23	0.1	2.99	1.28				4.03
Estroncio Total					0.18	0.1	0.25	0.188	1.23	0.11	2.91	1.51				4.13
Talio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	0.0001	0.0002				0.0003
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				<0.005
Titanio Total					0.092	<0.005	0.591	<0.005	0.2715	<0.005	0.171	0.007				0.005
Uranio Disuelto					0.00013	<0.0001	0.0003	<0.0001	0.00028	<0.0001	0.0006	0.0002				0.0004
Uranio Total					0.00038	<0.0001	0.0011	<0.0001	0.00024	<0.0001	0.0005	0.0002				0.0005
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	0.0065	<0.005	0.015	0.006				0.01
Vanadio Total					0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	0.009				0.01
Zinc Disuelto					0.053	<0.01	0.1	<0.01	0.046	<0.02	0.1	<0.01				<0.01
Zinc Total		7.4		10	0.064	<0.01	0.12	<0.01	0.041	<0.01	0.06	0.01				<0.01
Grasas y Aceites			10	10	<2.062	<2.062	<2.248	<2	<2.04	<2.04	<2.04	<2.3				<2
DQO			125		15.7	<10	40	<10	<2.04	<2.04	<2.04	<10				<10
Cloruros		250			5	4	7	5.2	<2.04	<2.04	<2.04	32.7				69.8
Cianuro Total		0.14		1	0.004	<0.003	0.015	<0.0003	<0.003	<0.003	<0.003	<0.003				<0.003
Fluoruros		4			0.125	<0.1	0.2	0.15	0.6	0.1	1.2	0.58				1.33
Nitratos/Nitritos como N					1.61	0.08	4.87	0.24	2.46	0.03	4.9	3.73				2.79
Amonio					<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	<0.05				0.08
Nitrógeno Kjeldahl (TKN)					3.53	<0.1	25.9	0.3	0.32	<0.1	0.8	0.5				0.08
Fosfatos					0.185	0.1	0.3	0.19	0.19	0.1	0.4	0.06				0.06
Fósforo Disuelto (Orto)					0.06	0.03	0.1	0.07	0.06	0.02	0.13	0.02				<0.01
Fósforo Total			2	10	0.37	0.04	2.51	0.05	0.08	0.03	0.19	0.03				0.02
STD (TDS)		500			225	170	280	230	754	170	1620	954				1730
SST (TSS)			50	100	163.6	<5	780	<5	67	<5	320	5.0				<5
ST (TS)					346.3	200	1080	228	850	230	1660	990				1810
Sulfatos		250			26.3	10	42	52.6	472.6	14	1600	520				1000
Alcalinidad Total					104	38	161	92.6	80	44	119	46.5				55.4
Hidrocarburos totales (TPH)					<0.1	<0.09	<0.1	<0.1	<0.1	<0.09	<0.1	<0.1				<0.1

Dónde: **u.e.:** unidades exponenciales; **mg/L:** miligramos por litro; **µS/cm:** micro siemens por centímetro; **°C:** grados centígrados; **NMP/100ml:** número más probable en 100ml; **u Pt/Co:** unidades platino cobalto; **NA:** no analizado; **NR** = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 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			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					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	7.95	7.4	6.56	7.94	7.53				7.75
Temperatura (campo)	°C				19.8	17	24	23.2	21	17.2	24	21.9				23.7
Conductividad (campo)	µS/cm				219.7	80	374.5	282.5	308.9	120	612	1689				1846
Oxígeno disuelto (campo)					3.8	0.1	6.8	8.7	4.2	0.1	7.5	6.82				7.00
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							2.4 x 10 ³				9.2 x 10 ³				4.9 x 10 ³
Color Aparente	U Pt/Co				NR	NR	NR	30	NR	NR	NR	<1				<1
Color Real								<1				<1				<1
Turbidez	NTU							4.10				1.16				1.87
Aluminio Disuelto					0.061	<0.03	0.15	<0.03	0.03	<0.03	0.1	<0.03				0.03
Aluminio Total		0.2			3.25	<0.03	17.4	0.23	5.72	0.1	36	0.06				0.06
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0124				0.015
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.0012	0.0005	0.0037	0.0117				0.0141
Arsénico Disuelto					0.00797	0.0041	0.0139	0.009	0.00541	0.0039	0.0072	0.0062				0.0072
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0101	0.00873	0.0043	0.0326	0.0065				0.0076
Bario Disuelto					0.0915	0.051	0.118	0.129	0.1645	0.08	0.234	0.095				0.094
Bario Total		1			0.12445455	0.098	0.253	0.136	0.2356	0.144	0.567	0.109				0.097
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	0.02	0.008	<0.01	0.02	0.09				0.11
Boro Total					<0.01	<0.01	0.02	<0.01	0.012	<0.01	0.02	0.1				0.11
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	36.8	37.4	18.5	61.7	263				327
Calcio Total					27.9272727	12.3	38.7	38	38.3	17.2	58.9	300				340
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	<0.02				<0.02
Hierro Total		0.3			1.9	0.06	10.2	0.32	3.8	0.09	26.5	0.08				0.09
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	0.0002	0.003	<0.0001	0.0198	0.0005				0.0004
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.04				0.061
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.048				0.064
Magnesio Disuelto					2.6	1.3	3.5	3.2	4.2	2.4	7.3	18.7				21.9
Magnesio Total					2.7	1.6	3.5	3.4	4.6	2.5	7.3	21.5				22.8
Manganeso Disuelto					0.07418182	0.01	0.381	0.373	0.116	0.011	0.26	0.444				0.351
Manganeso Total		0.4			0.14745455	0.025	0.403	0.396	0.2844	0.101	1.23	0.501				0.374
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				0.03

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			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15			
					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	0.03			
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.02	<0.008							
Níquel Total					<0.01	<0.01	0.05	<0.008	0.01	<0.01	0.06	<0.008							
Potasio Disuelto					4.2	3.5	5.5	4.8	5.8	4.2	8.7	10.7							
Potasio Total					4.5	3.6	7	5	6.5	4.4	11.7	12.1							
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	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0002							
Selenio Total					<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0006							
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005							
Plata Total					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	<0.00005							
Sodio Disuelto					12.65	7.7	16.6	13.4	12.44	9	15.6	51							
Sodio Total					12.17	7.5	15.4	13.7	12.13	8.6	15.2	59.6							
Estroncio Disuelto					0.19	0.06	0.3	0.226	0.22	0.09	0.36	2.4							
Estroncio Total					0.18818182	0.08	0.3	0.233	0.228	0.11	0.33	2.73							
Talio Disuelto					<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	0.0002							
Talio Total					0.002	<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007							
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04							
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04							
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005							
Titanio Total					0.071	<0.005	0.307	0.009	0.127	0.005	0.534	0.006							
Uranio Disuelto					<0.0001	<0.0001	0.0002	0.0002	0.00012	<0.0001	0.0004	0.0004							
Uranio Total					0.00019	<0.0001	0.0005	0.0002	0.00027	<0.0001	0.0009	0.0004							
Vanadio Disuelto					<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	<0.005							
Vanadio Total					0.0051	<0.005	0.019	<0.005	0.0085	<0.005	0.04	<0.005							
Zinc Disuelto					0.068	<0.01	0.14	<0.01	0.061	0.05	0.14	<0.01							
Zinc Total					7.4	<0.01	1.01	<0.01	0.065	0.01	0.17	<0.01							
Grasas y Aceites						10	10	<2.062	<2.04	<2.326	<2	<2.062				<2.02	<2.084	<2	2.4
DQO						125		10.9	<10	40	<10	16.8				<10	60	<10	<10
Cloruros					250			2.7	2	3	2.8	8.5				4	16	56.1	60.9
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	0.18	0.15				0.1	0.2	0.82	1.04
Nitratos/Nitritos como N								0.59	<0.02	1.51	0.16	4.49				1.96	10.1	4.3	4.02
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	0.5	0.4							
Fosfatos				0.12	0.1	0.4	0.09	0.36	0.1	1.2	0.16	0.34							
Fósforo Disuelto (Orto)				0.04	0.02	0.12	0.04	0.12	0.03	0.39	0.04	0.1							
Fósforo Total		2	10	0.05	0.02	0.14	0.04	0.17	0.04	0.39	0.05	0.12							
STD (TDS)	500			183.636364	140	220	222	233.6	150	350	1400	1510							
SST (TSS)		50	100	48	5	340	<5	115	<5	880	<5	<5							
ST (TS)				231.8	140	500	234	378.2	260	1180	1420	1590							
Sulfatos	250			16.9	4	25	22.8	27.5	10	57	786	842							
Alcalinidad Total				83	38	118	114	80	45	102	73.2	63.1							
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			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					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	8.04	7.4	7.1	7.8	7.33	7.5	6.9	8	6.96
Temperatura (campo)	°C				17.4	14.5	21.5	19	19.4	12.2	27.3	18.9	18.7	15	21.3	20.6
Conductividad (campo)	µS/cm				72.1	0.1	160.2	115	259	60	948	191.8	216	120	416.2	176.5
Oxígeno disuelto (campo)					4	0	8	7.3	4	0	8.3	8.03	3.9	0.1	7.5	7.07
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml				NR	NR	NR	240	NR	NR	NR	2.2 x 10 ³	NR	NR	NR	1.6 x 10 ⁴
Color Aparente	U Pt/Co							15				11				79
Color Real								<1				<1				<1
Turbidez	NTU							14.3				3.40				11.5
Aluminio Disuelto					0.055	<0.03	0.14	<0.03	0.031	<0.03	0.08	<0.03	0.033	<0.03	0.13	<0.03
Aluminio Total	0.2				1.09	<0.03	3.7	0.11	1.89	<0.03	8.1	0.17	3.05	0.1	16.4	1.31
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	0.0009
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	0.0008
Arsénico Disuelto					0.00139	0.0005	0.0024	0.0015	0.0032	0.0007	0.0076	0.0025	0.00382	0.0022	0.0054	0.0027
Arsénico Total	0.01			0.1	0.00177	0.0013	0.0028	0.0019	0.00387	0.0025	0.0074	0.0031	0.00446	0.003	0.0061	0.0033
Bario Disuelto					0.0447	0.023	0.072	0.051	0.0618	0.027	0.136	0.061	0.0946	0.052	0.143	0.068
Bario Total	1				0.0556	0.039	0.069	0.055	0.0806	0.055	0.136	0.064	0.2142	0.088	0.99	0.093
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	0.02	0.361	<0.01	1.8	0.14	<0.01	<0.01	0.01	<0.01
Boro Total					0.01	<0.01	0.02	<0.01	0.379	<0.01	1.93	0.13	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	9	15.1	5.4	38.9	14	23.1	11.2	38.1	15.5
Calcio Total					7.73	3.4	13.1	9.3	14.81	5.9	37.5	14.5	23.04	11.5	36.7	17.8
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total	0.1			0.1	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01
Cobalto Total					<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Cobre Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total	1.3			3	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<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	0.08	0.097	<0.02	0.28	0.1	0.022	<0.02	0.07	<0.02
Hierro Total	0.3				0.7	0.16	1.8	0.3	1.3	0.33	4.8	0.29	1.8	0.08	9.5	0.48
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	0.0001	0.0007	<0.0001	0.0028	0.0001	0.0015	<0.0001	0.0083	0.0005
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	0.13	<0.02	0.67	0.044	<0.02	<0.02	<0.02	<0.008
Litio Total					<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.043	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					1.5	0.8	2.5	1.8	3	1.4	7.4	3	4.1	2.2	6.4	2.9
Magnesio Total					1.5	0.9	2.5	1.9	3.1	1.8	7.5	3.1	4.3	2.6	6.5	3.3
Manganeso Disuelto					0.025	0.006	0.047	0.028	0.114	<0.005	0.551	0.033	0.032	0.014	0.074	0.012
Manganeso Total	0.4				0.0406	0.014	0.062	0.032	0.1482	0.04	0.543	0.041	0.0981	0.019	0.342	0.026
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			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Total	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<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	3.1	4.1	3.2	7.1	3.8	4.1	3.6	5.4	3.4
Potasio Total					3	2.2	4.1	3.2	4.2	3.1	7.5	4	4.5	3.6	7	3.9
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	<0.0002
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	<0.00005
Sodio Disuelto					6.34	3.7	10.8	5.9	32.16	6	135	15.8	11.69	8.7	15.4	7.2
Sodio Total					5.99	3.4	9.4	6.1	31.11	5.3	124	15.7	11.45	8.3	15.5	8.5
Estroncio Disuelto					0.06	0.02	0.09	0.075	0.12	0.03	0.33	0.105	0.17	0.07	0.29	0.106
Estroncio Total					0.057	0.02	0.08	0.078	0.122	0.04	0.35	0.11	0.174	0.09	0.28	0.127
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	<0.005	0.05	<0.005	0.22	0.007	0.069	<0.005	0.325	0.029
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	NA	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	<2.2
DQO			125		6.5	<10	20	<10	<10	<10	30	<10	10	<10	40	<10
Cloruros		250			1.8	1	3	2.3	43.9	3	230	17.3	3	5	3	3.7
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	0.13	0.11	<0.1	0.3	0.13	<0.1	0.2	0.1	0.15	
Nitratos/Nitritos como N				0.13	0.03	0.42	<0.02	0.3	<0.02	1.22	<0.02	<0.1	3.53	0.19	0.70	
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	0.2	
Fosfatos				0.04	<0.03	0.2	<0.03	0.08	<0.03	0.3	0.03	0.1	0.2	0.09	0.09	
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	<0.01	0.04	0.02	0.08	<0.01	0.03	0.19	0.19	0.04	
STD (TDS)	500			84	60	110	86	187	90	540	118	140	240	100	110	
SST (TSS)		50	100	9	<5	32	<5	21	<5	105	<5	<5	330	6	5.0	
ST (TS)				97	70	130	94	221	120	550	142	150	610	140	178	
Sulfatos	250			16.5	<10	47	16.7	14	<10	23	17.3	9	38	19.4	26.3	
Alcalinidad Total				25	13	43	29.0	48	22	108	47.8	30	101	54	48.0	
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			Jun-15	Línea Base			Jun-15
					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	7.23	7.86	7.5	10.7	8.14
Temperatura (campo)	°C				22.1	18.9	25.1	22.4	21.8	19.1	24.2	21
Conductividad (campo)	µS/cm				363.7	186.8	807.6	801.3	267.4	121.8	518	539.4
Oxígeno disuelto (campo)					5.14	0.28	7.48	5.53	6.2	0.8	8.5	7.81
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	1.7 x 10 ⁵	9x10 ⁴	1x10 ²	2x10 ⁵	3.5 x 10 ³
Color Aparente	U Pt/Co				172	19	351	105	342	29	824	25
Color Real					20	22	36	<1	43	10	60	<1
Turbidez	NTU				14.15	6.09	22.2	9.48	25.72	4.93	46.5	3.55
Aluminio Disuelto					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	0.39	2.96	0.4	8.6	0.22
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0041	0.0006	<0.0004	0.0013	0.0015
Antimonio Total	0.006				0.001	<0.0004	0.0027	0.0041	0.0007	<0.0004	0.0012	0.0014
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0053	0.004	0.0023	0.0057	0.0046
Arsénico Total	0.01			0.1	0.006	0.0041	0.0096	0.0063	0.0042	0.002	0.006	0.005
Bario Disuelto					0.107	0.074	0.143	0.122	0.094	0.056	0.135	0.105
Bario Total	1				0.136	0.102	0.185	0.133	0.121	0.09	0.154	0.111
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	0.05	0.043	<0.01	0.09	0.12
Boro Total					0.023	<0.01	0.06	0.05	0.041	<0.01	0.1	0.12
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	105	35.7	18.2	78.3	61.2
Calcio Total					52.1	18.6	156	115	36.2	18.5	79.7	62.9
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	0.1	0.09	<0.02	0.17	0.06
Hierro Total	0.3				1.53	0.05	4.36	0.52	1	0.25	2.2	0.29
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	0.0006	0.0022	0.0002	0.008	0.0002
Litio Disuelto					<0.02	<0.02	0.04	0.025	<0.02	<0.02	0.04	0.04
Litio Total					<0.02	<0.02	0.04	0.026	<0.02	<0.02	0.04	0.042
Magnesio Disuelto					6.3	3.2	14.7	9.3	6	3.3	9.7	7.9
Magnesio Total					6.6	3.3	14.8	10.1	6.2	3.4	10.1	8.2
Manganeso Disuelto					0.095	0.009	0.118	0.381	0.057	0.023	0.148	0.102
Manganeso Total	0.4				0.1808	0.047	0.349	0.405	0.115	0.043	0.187	0.123
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			Jun-15	Línea Base			Jun-15
					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	10.3	6	4.5	8.1	6.6
Potasio Total					6.8	6.4	7.8	10.7	6.1	4.8	8.5	6.8
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	0.0003	<0.0001	<0.0001	0.0001	0.0001
Selenio Total		0.17			0.00011	<0.0001	0.0002	0.0004	<0.0001	<0.0001	0.0001	0.0002
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total					<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					18.8	12.3	33.7	36.5	17.6	10.7	26.9	27.1
Sodio Total					18.4	12.9	34.3	37.7	17.4	11	28.5	27.9
Estroncio Disuelto					0.44	0.16	1.5	1.1	0.29	0.14	0.71	0.559
Estroncio Total					0.44	0.16	1.48	1.19	0.295	0.14	0.73	0.572
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	<0.005	<0.005	<0.005	0.009	<0.005
Titanio Total					0.069	<0.005	0.195	0.017	0.084	0.015	0.237	0.011
Uranio Disuelto					0.00014	<0.0001	0.0003	0.0002	0.00014	<0.0001	0.0002	0.0002
Uranio Total					0.00022	0.0001	0.0003	0.0002	0.00022	0.0002	0.0003	0.0002
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	15	17.8	<10	35	<10
Cloruros		250			10	7	19	26.6	12	6	20	25.8
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	0.39	0.006	<0.003	0.013	0.30
Nitratos/Nitritos como N					3.07	2.01	5.23	2.64	1.97	1.14	3.85	1.15
Amonio					0.24	<0.05	0.58	1.60	0.129	<0.05	0.22	<0.05
Nitrógeno Kjeldahl (TKN)					0.74	<0.1	1.6	2.9	0.57	0.3	0.9	0.4
Fosfatos					0.55	0.3	1	0.93	0.49	0.22	1.3	0.34
Fósforo Disuelto (Orto)					0.18	0.08	0.33	0.24	0.18	0.09	0.49	0.10
Fósforo Total			2	10	0.27	0.12	0.51	0.40	0.25	0.09	0.58	0.12
STD (TDS)		500			312	160	750	584	255	160	440	374
SST (TSS)			50	100	34	<5	102	5.0	73	<5	340	<5
ST (TS)					362	180	750	658	310	200	450	412
Sulfatos		250			91	22	360	237	60	25	169	135
Alcalinidad Total					79	50	110	108	70	45	90	79.1
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. Todos los parámetros analizados en las estaciones GW-1A, GW-2, GW-3, GW-4 y GW-5 cumplen con el Acuerdo 236-2006, a excepción la materia flotante encontrada en GW-2.

La temperatura de las estaciones muestreadas se encontró entre 19.4 y 24.7 °C. La lectura menor de pH se obtuvo en la estación GW-3 (6.16 u.e.) y la mayor en la estación GW-1A (7.04 u.e.). Los Sólidos Suspendidos Totales (**SST**) se registraron únicamente en GW1-A (9.0 mg/L) por debajo de las guías del Acuerdo (100 mg/L) y del Banco Mundial (50 mg/L). Las concentraciones registradas de Cloruros están por debajo de las guías de la USEPA (250 mg/L).

La concentración de sulfatos está por debajo de las guías de la USEPA (250mg/L) en todas las estaciones de monitoreo, a excepción de la estación GW3. Los sólidos disueltos totales (**TDS**) están por debajo de las directrices de la USEPA (500mg/L) en la mayoría de las estaciones a excepción de GW3; se dará seguimiento a este parámetro en la presente estación en futuros muestreos para comprobar o descartar que dicho aumento se deba a las actividades realizadas dentro del Proyecto. De corroborarse que el aumento se deba a las actividades generadas dentro del proyecto, se procederá a tomar las medidas necesarias para su corrección.

El Aluminio, Cadmio, Cianuro, Berilio, Bismuto, Boro, Cobalto, Cobre, Cromo, Galio, Hierro, Litio, Cromo hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Talio, Estaño, Plata, Uranio, Vanadio y Zinc no fueron detectados en ninguna de las estaciones. El Selenio fue detectado en todas las estaciones, y sus concentraciones se registraron 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 GW-3 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			
					Nacimiento Aldea El Volcancito				Nacimiento Aldea El Fucío				Nacimiento – Zona central del Proyecto (frente al portal oeste)				Manantial – Aguas arriba del depósito de colas			
					Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					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	7.04	6.54	6.01	7.16	6.19	6.54	6.21	7.13	6.16	6.13	6.13	6.13	
Temperatura de campo	°C				15.2	14.8	15.6	20.5	21.4	19	23.7	19.6	19.4	18.5	21	24.7	18.1	18.1	18.1	
Conductividad de campo	µS/cm				229.8	223	236.5	412.3	323.4	111.3	500.5	143.2	315.3	236.7	501.1	792.2	147.3	147.3	147.3	
Oxígeno Disuelto de campo	mg/L				0.1	0.03	0.17	7.18	1.18	0.13	2.35	1.95	0.68	0.03	1.26	4.58	0.14	0.14	0.14	
Turbidez	NTU							15.4				14.3				2.97				
Materia Flotante				Ausente				Ausente				Presente				Ausente				
Color Aparente	u Pt/Co			500	NR	NR	NR	155	NR	NR	NR	47	NR	NR	NR	<1	NR	NR	NR	
Color Real	u Pt/Co							8				<1				<1				
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				
Coliformes Fecales	NMP/100mL			<1x10 ⁴				49				540				<2				
Aluminio Disuelto		0.2			<0.03	<0.03	<0.03	<0.03	0.075	<0.03	0.24	<0.03	<0.03	<0.03	0.04	<0.03	1.42	1.42	1.42	
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	0.00078	<0.0004	0.0011	0.0008	0.0004	<0.0004	0.001	0.0005	<0.0004	<0.0004	<0.0004	
Arsénico Disuelto		0.01	0.1		0.001	0.0008	0.0011	0.0011	0.0156	0.0043	0.0299	0.0089	0.0059	0.0037	0.0115	0.0022	0.0008	0.0008	0.0008	
Bario Disuelto		1			0.025	0.022	0.028	0.046	0.24	0.125	0.451	0.113	0.186	0.12	0.328	0.159	0.127	0.127	0.127	
Berilio Disuelto		0.004			<0.01	<0.002	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	
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	
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	
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	
Calcio Disuelto					5.7	5.1	6.2	6	33.5	9.6	65.3	14.9	31.6	25.7	43.4	101	4.4	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	
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	
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	
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	
Hierro Disuelto		0.3			0.02	<0.02	0.03	<0.02	0.103	0.03	0.17	<0.02	0.103	<0.02	0.33	<0.02	0.74	0.74	0.74	
Plomo Disuelto		0.015	0.4		<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0009	0.0009	0.0009	
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	
Magnesio Disuelto					3.1	2.9	3.3	2.5	5.9	1.8	12	2.8	4.9	3.3	8.3	23.4	2.6	2.6	2.6	
Manganeso Disuelto	mg/L	0.05			<0.005	<0.005	<0.005	<0.005	0.123	0.02	0.356	0.083	0.057	<0.005	0.133	0.006	0.069	0.069	0.069	
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	
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	
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	
Potasio Disuelto					7.3	5.9	8.6	4.8	2.9	1.3	4.3	1.7	3.8	2.5	5	10.6	4.6	4.6	4.6	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Selenio Disuelto		0.17			0.0002	<0.0001	0.0003	0.0002	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0003	<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	
Sodio Disuelto					17.6	16.9	18.2	8.2	13.5	7.2	22	7.9	11.5	9.3	16.4	24.2	10.3	10.3	10.3	
Estroncio Disuelto					0.03	0.03	0.03	0.053	0.26	0.08	0.56	0.129	0.2	0.12	0.37	0.539	0.03	0.03	0.03	
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	
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	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.042	0.042	0.042	
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	
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	
Zinc Disuelto		7.4	10		<0.01	<0.01	<0.01	0.02	<0.1	<0.1	0.1	<0.01	0.94	<0.01	3.47	<0.01	0.1	0.1	0.1	
Cloruros		250			15	14	16	3.2	4	2	7	3.3	5	3	6	14.9	4	4	4	

NA

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	GW1-A				GW-2				GW-3				GW-4			
					Nacimiento Aldea El Volcancito				Nacimiento Aldea El Fucío				Nacimiento – Zona central del Proyecto (frente al portal oeste)				Manantial – Aguas arriba del depósito de colas			
					Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Cianuro Total	mg/L	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	NA
Fluoruros					<0.1	<0.1	<0.1	0.16	<0.1	<0.1	<0.1	0.21	0.15	0.1	0.2	0.21	<0.1	<0.1	<0.1	
Nitratos/Nitritos como N					2.19	1.9	2.48	1.93	0.74	0.14	1.1	0.03	1.19	0.05	3.16	2.91	0.07	0.07	0.07	
Amonio					<0.05	<0.05	0.07	0.13	0.059	<0.05	0.16	<0.05	0.065	<0.05	0.14	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)					0.7	0.3	1.1	0.2	0.63	0.2	0.9	0.1	0.46	<0.05	1.2	<0.1	0.3	0.3	0.3	
Fosfatos					0.2	0.1	0.2	0.12	0.4	0.1	0.7	0.09	0.3	0.1	0.5	<0.1	0.09	0.09	0.09	
Fósforo Total			2	10	0.1	0.02	0.17	0.05	0.18	0.09	0.27	0.06	0.1	0.05	0.15	0.01	0.03	0.03	0.03	
STD (TDS)		500			190	190	190	180	223	130	350	142	213	190	260	654	170	170	170	
SST (TSS)			50	100	6.5	6	7	9.0	7.7	6	9	<5	39	5	105	<5	206	206	206	
ST (TS)					200	180	220	194	237.5	140	380	154	217.5	170	270	672	360	360	360	
Sulfatos		250			12.5	11	14	4.2	43	7	90	17.0	30	16	71	295	7	7	7	
Alcalinidad Total					31	31	31	32.7	0.18	0.09	0.27	46.4	83	71	97	67.3	35	35	35	

NA: no analizado por no encontrar agua al momento de la obtención de la muestra. GW-5 fue clausurado y no se reportan resultados para el presente informe trimestral. 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			Jun-15	MW-3				MW-4				MW-5			
					Línea Base				Línea Base				Línea Base				Línea Base			
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	Jun-15	Promedio	Mínimo	Máximo	Jun-15	Promedio	Mínimo	Máximo	Jun-15
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	6.56	6.37	6.77		6.44	6.34	6.49	6.5	6.32	6.23	6.41	6.56	6.19	6.04	6.34	6.18
Temperatura de campo	°C				24.4	23.4	25.1		24.1	23.7	24.5	25.9	23.3	22.2	24.4	25.6	23.4	23	24.6	24.8
Conductividad de campo	µS/cm				427.5	211.9	1001.3		803.9	741.6	829.1	593.9	916.9	872.1	944.8	580.8	469.7	401.4	494.1	1216
Oxígeno Disuelto de campo	mg/L				0.75	0.3	1.21		0.65	0.11	1.44	5.44	0.97	0.48	1.93	4.97	0.82	0.19	1.77	3.86
Turbidez	NTU											1.60				1.85				1.85
Materia flotante	Visual			Ausente								Ausente				Ausente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR		NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1
Color Real	u Pt/Co			500	NR	NR	NR		NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1
Cr (VI)	mg/L			0.1								<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴								4.5				4.50				23
Aluminio Disuelto	mg/L	0.2			0.038	<0.03	0.07		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
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
Arsénico Disuelto		0.01		0.1	0.0011	0.0008	0.0014		0.0023	0.0021	0.0027	0.0022	0.0023	0.0021	0.0028	0.0024	0.0013	0.001	0.0016	0.0008
Bario Disuelto		1			0.03	0.024	0.039		0.036	0.032	0.041	0.036	0.042	0.038	0.047	0.029	0.162	0.157	0.166	0.048
Berilio Disuelto		0.004			<0.002	<0.002	0.003		<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
Boro Disuelto					0.014	<0.01	0.04		0.06	0.05	0.07	0.07	0.078	0.06	0.09	0.07	0.015	<0.01	0.03	0.05
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
Calcio Disuelto					20.6	9.4	48.7		80.3	76.4	83.3	78.6	100	93	107	77.9	40.8	39.2	42.2	192
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
Cobalto Disuelto					<0.01	<0.01	<0.1		<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
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
Hierro Disuelto		0.3			<0.02	<0.02	0.02	NA	<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		<0.0001	<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		<0.02	<0.02	0.02	0.02	<0.02	<0.02	0.02	0.02	<0.02	<0.02	<0.02	0.015
Magnesio Disuelto					3.5	2.4	6.1		10.3	10.1	10.7	9.5	11.3	10.9	11.6	8.6	7.3	6.8	7.6	25.1
Manganeso Disuelto		0.05			0.108	0.03	0.308		<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
Molibdeno Disuelto					<0.01	<0.01	<0.01		<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		<0.01	<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		4.2	3.9	4.6	4	4.7	4.5	5.2	4.2	6	5.5	6.5	8.9
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
Selenio Disuelto		0.17			0.0002	0.0001	0.0002		0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003	0.0004	0.0003	0.0004	0.0005
Plata Disuelta					<0.00005	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Sodio Disuelto					22	17.4	33.6		29.5	28.2	30.9	27.5	32.3	30.4	35.8	26.4	16.9	15.6	19.1	36.5
Estroncio Disuelto					0.18	0.07	0.46		0.74	0.71	0.77	0.737	0.89	0.84	0.98	0.712	0.27	0.26	0.29	0.725
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
Estaño Disuelto					<0.1	<0.1	<0.1		<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	0.009	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.012
Uranio Disuelto					0.00016	<0.0001	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		0.0055	<0.005	0.009	0.007	0.006	<0.005	0.009	0.009	<0.005	<0.005	<0.005	0.007
Zinc Disuelto		7.4		10	0.031	<0.01	0.11		0.053	<0.01	0.1	0.06	<0.01	<0.01	0.1	0.02	<0.01	<0.01	0.1	0.05
Cloruros		250			12	3	28		16	16	17	17.8	20	19	21	16.7	9	8	9	37.9
Cianuro Total		0.14		1	0.0039	<0.003	0.011		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		0.8	0.8	0.8	0.74	0.8	0.8	0.8	0.87	0.18	0.1	0.2	0.22
Nitratos/Nitritos como N					2.48	2.04	2.93		2.2	2.08	2.26	2.45	2.13	1.98	2.32	2.58	3.32	3	3.57	5.4

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Amonio	mg/L				<0.05	<0.05	<0.05	NA	<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	NA	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	
Fosfatos					0.233	0.21	0.27	NA	0.315	0.27	0.37	0.25	0.248	0.24	0.27	0.22	0.203	0.15	0.24	0.09
Fósforo Total			2	10	0.24	0.06	0.44	NA	0.09	0.08	0.1	0.09	0.07	0.06	0.08	0.07	0.06	0.05	0.07	0.04
STD (TDS)		500			253	190	360	NA	470	460	480	488	553	540	560	482	305	290	320	1020
SST (TSS)			50	100	345.8	137	584	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5.0
ST (TS)					597.5	350	810	NA	487.5	450	510	510	555	520	580	492	325	280	350	1090
Sulfatos		250			28.5	4	97	NA	166	162	169	172	212.5	210	220	161	72.3	64	76	500
Alcalinidad Total					64	56	80	NA	84	82	86	81.4	85	83	88	96.3	66	61	68	80.6

NA: no analizado por no encontrar agua al momento de la obtención de la muestra. 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 (2/3)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					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	6.1	6.38	6.14	6.98	6.08	6.16	6.07	6.29	7.15	6.9	7.4	6.68	
Temperatura de campo	°C				22.3	21.6	22.8	24.6	22.4	22	23.1	23.8	23.3	23.2	23.4	27.5	25.9	29	28.3	
Conductividad de campo	µS/cm				538.2	342.9	752.6	859.4	299.6	285.9	323.8	367.4	426.8	424.6	428.1	1595	1569	1621	430.6	
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	3.85	0.61	0.25	1.19	4.74	0.72	0.16	1.45	0.38	0.35	0.41	1.88	
Turbidez	NTU							0.95											62.0	
Materia flotante	Visual			Ausente				Ausente											Ausente	
Color Aparente	u Pt/Co			500	NR	NR	NR	<1	NR	NR	NR	20	NR	NR	NR	NR	NR	NR	<1	
Color Real		<1																		
Cr (VI)	mg/L			0.1				<0.05											<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴				9.3											<2	
Aluminio Disuelto	mg/L	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	
Antimonio Disuelto		0.01			0.00045	<0.0004	0.0012	0.0004	0.00063	0.0005	0.0008	0.0008	0.001	0.0009	0.0011	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01		0.1	0.0028	0.0024	0.0032	0.0025	0.0034	0.0029	0.0041	0.0025	0.0021	0.0019	0.0024	0.003	0.0007	0.0052	0.0017	0.0017
Bario Disuelto		1			0.198	0.134	0.281	0.131	0.156	0.129	0.176	0.408	0.125	0.122	0.129	0.031	0.028	0.034	0.056	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	<0.002	<0.01	<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	0.03	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01	0.09	0.08	0.1	0.03	0.03
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	126	16.7	13.9	19.6	31.8	34.6	32.5	36.3	185.5	170	201	44.9	44.9
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	0.1	<0.02	<0.02	<0.02	5.52	1.53	9.51	6.19	6.19
Plomo Disuelto		0.015		0.4	<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Litio Disuelto					<0.02	<0.02	<0.02	0.009	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.07	0.07	0.07	0.015	0.015
Magnesio Disuelto					7.5	4.9	10.5	15.9	4.8	4.6	5	9.5	6.4	6.3	6.7	35.8	34.4	37.2	7.8	7.8
Manganeso Disuelto		0.05			<0.005	<0.005	0.006	0.012	0.0065	<0.005	0.012	0.067	0.019	0.012	0.029	0.203	0.149	0.257	0.084	0.084
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
Níquel Disuelto		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.008	<0.008
Potasio Disuelto					5.7	5	6.5	7.9	6.2	5.4	6.8	8.6	4.8	4.6	5.1	4.8	4.6	5	4.2	4.2
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto		0.17			0.0005	0.0004	0.0005	0.0004	0.0002	0.0001	0.0002	<0.0001	0.0004	0.0003	0.0006	<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	0.00007	<0.00005	<0.00005
Sodio Disuelto					14	12.3	17	23.5	19.1	15.4	27.5	18.9	15.2	15	15.6	45.1	44.7	45.4	25.3	25.3
Estroncio Disuelto					0.26	0.18	0.35	0.551	0.1	0.09	0.11	0.218	0.22	0.21	0.23	1.64	1.58	1.69	0.339	0.339
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	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.04	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	0.01	<0.005	<0.005	0.006	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.007
Uranio Disuelto					0.00013	0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	<0.0001	0.00017	0.0001	0.0002	<0.0001	<0.0001	0.0004	<0.0001	<0.0001
Vanadio Disuelto					<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	0.007	<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	0.1	0.034	<0.01	0.1	0.48	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01
Cloruros	250			11	6	17	23.7	11	9	12	15.7	6	6	6	37	36	37	8.4	8.4	
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	0.007	<0.003	0.012	<0.003	<0.003	
Fluoruros				0.18	0.1	0.2	0.14	0.13	0.1	0.2	0.12	0.17	0.1	0.2	2.55	2.5	2.6	0.58	0.58	
Nitratos/Nitritos como N				5.08	4.42	6.15	5.94	4.75	4.08	5.24	2.56	2.76	2.63	2.83	<0.02	<0.02	<0.02	0.03	0.03	

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Amonio	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)					<0.1	<0.1	0.2	<0.1	0.21	<0.1	0.4	<0.1	0.09	<0.1	0.2	0.23	<0.1	0.4	<0.1	
Fosfatos					0.173	0.15	0.21	0.16	0.113	0.09	0.18	0.09	0.23	0.21	0.24	<0.03	<0.03	<0.03	0.47	
Fósforo Total			2	10	0.05	0.04	0.06	0.05	0.04	0.01	0.07	0.05	0.07	0.06	0.08	<0.01	<0.01	0.02	0.25	
STD (TDS)		500			340	260	440	560	233	220	250	312	277	270	290	905	890	920	322	
SST (TSS)			50	100	<5	<5	<5	<5	19.75	7	45	15.0	9	6	14	27	25	29	13.0	
ST (TS)					345	240	450	650	260	230	280	324	300	290	310	940	910	970	348	
Sulfatos		250			85.3	33	153	306	19.3	17	23	53.4	54.7	54	55	440	440	440	79.5	
Alcalinidad Total					65	62	68	75.6	48	41	60	90.7	68	66	70	147	136	157	115	

NA: no analizado por no encontrar agua al momento de la obtención de la muestra. 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 (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			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	
					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	6.98	7.45	7.45	7.45	7.52				7.59				6.56				7.18	
Temperatura de campo	°C				30.4	30.4	30.4	31.7	27.8	27.8	27.8	28.3				25.7				23.7				34	
Conductividad de campo	µS/cm				2.243	2.243	2.243	1585	663.9	663.9	663.9	917				725.5				1101				1346	
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	2.53	0.05	0.05	0.05	1.88				8.87				3.99				4.86	
Turbidez	NTU							1.66				62				3.27				5.24				5.93	
Materia flotante	Visual			Ausente				Ausente				NA				NA				Presente				Ausente	
Color Aparente	u Pt/Co			500				139				<1				<1				3				276	
Color Real					NR	NR	NR	<1	NR	NR	NR	<1				<1				<1				<1	
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05				<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2				<2				240				<2	
Aluminio Disuelto	mg/L	0.2			<0.03	<0.03	<0.03	<0.03	0.06	0.06	0.06	<0.03				<0.03				<0.03				<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	0.0029	0.0136	0.0136	0.0136	0.0125	0.0087				0.0087				0.0007				0.0069
Bario Disuelto		1			0.033	0.033	0.033	0.028	0.125	0.125	0.125	0.099	0.077				0.077				0.101				0.022
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	0.19	0.07	0.07	0.07	0.1	0.08				0.08				0.06				0.11
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001				<0.0001				<0.0001
Calcio Disuelto					271	271	271	244	47.5	47.5	47.5	103	76.6				76.6				160				200
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	1.69	0.05	0.05	0.05	<0.02	0.02	NR	NR	NR	<0.02	NR	NR	NR	<0.02	NR	NR	NR	1.98
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
Litio Disuelto					0.06	0.06	0.06	0.083	0.08	0.08	0.08	0.14	0.107				0.107				0.01				0.092
Magnesio Disuelto					41.3	41.3	41.3	36.7	4.1	4.1	4.1	6.6	5.6				5.6				26.9				36.3
Manganeso Disuelto		0.05			0.044	0.044	0.044	0.025	0.03	0.03	0.03	0.029	0.008				0.008				1.06				0.054
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002				<0.0002				<0.0002
Molibdeno Disuelto					0.01	0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02				<0.02				<0.02				<0.02
Níquel Disuelto		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.008				<0.008				<0.008				<0.008
Potasio Disuelto					5	5	5	4.4	2.5	2.5	2.5	2.4	2.4				2.4				12.6				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	70	55.2	55.2	55.2	80.5	62.6				62.6				43.2				46.7
Estroncio Disuelto					2.23	2.23	2.23	2.34	1.33	1.33	1.33	4.36	3.16				3.16				0.983				1.95
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	0.008	<0.005	<0.005	<0.005	0.007	0.006				0.006				0.009				0.009
Uranio Disuelto					0.0007	0.0007	0.0007	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002				0.0002				0.0005				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	0.03	0.12	0.12	0.12	<0.01	<0.01				<0.01				0.01				<0.01	
Cloruros	250			68	68	68	62.8	32	32	32	4.7	4.1				4.1				46.8				44	
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	2.66	0.7	0.7	0.7	0.82	0.65				0.65				0.13				2.58	
Nitratos/Nitritos como N				0.19	0.19	0.19	<0.02	<0.02	<0.02	<0.02	0.09	0.47				0.47				0.78				<0.02	

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1			
					Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15	Línea Base			Jun-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Amonio	mg/L				<0.05	<0.05	<0.05	<0.05	0.06	0.06	0.06	<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				<0.1
Fosfatos					0.03	0.03	0.03	<0.03	0.06	0.06	0.06	0.03								0.16				0.03
Fósforo Total			2	10	0.06	0.06	0.06	<0.01	0.02	0.02	0.02	0.01								0.05				<0.01
STD (TDS)		500			1370	1370	1370	1270	320	320	320	622	NR	NR	NR					844	NR	NR	NR	1010
SST (TSS)			50	100	145	145	145	10.0	<5	<5	<5	<5								5.0				<5
ST (TS)					1000	1000	1000	1320	300	300	300	660								876				1060
Sulfatos		250			700	700	700	654	45	45	45	302								412				520
Alcalinidad Total					133	133	133	140	186	186	186	173								110				156

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 6.08 a 7.59 u.e. y la temperatura en el rango de 23.7 a 34 °C. Las concentraciones registradas de Cloruros están por debajo de las directrices de la USEPA (250 mg/L).

En los pozos MW-5, MW-6, 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, MW7, MW9, MW11 y RW-1 los cuales se encuentran debajo de las guías establecidas por el Banco Mundial y el Acuerdo (50 y 100 mg/L respectivamente) y dentro de los rangos establecidos en la línea base.

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

El Antimonio se detectó en los pozos MW6 y MW7, en concentraciones por debajo de la guía establecida por la USEPA (0.01 mg/L). El Bario fue detectado en todas las estaciones en concentraciones menores a la guía de la USEPA (1 mg/L).

El Hierro fue detectado en los pozos MW-7, MW-9, MW-11 y PSA-1. En los pozos MW-9, MW-11 y PSA-1 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

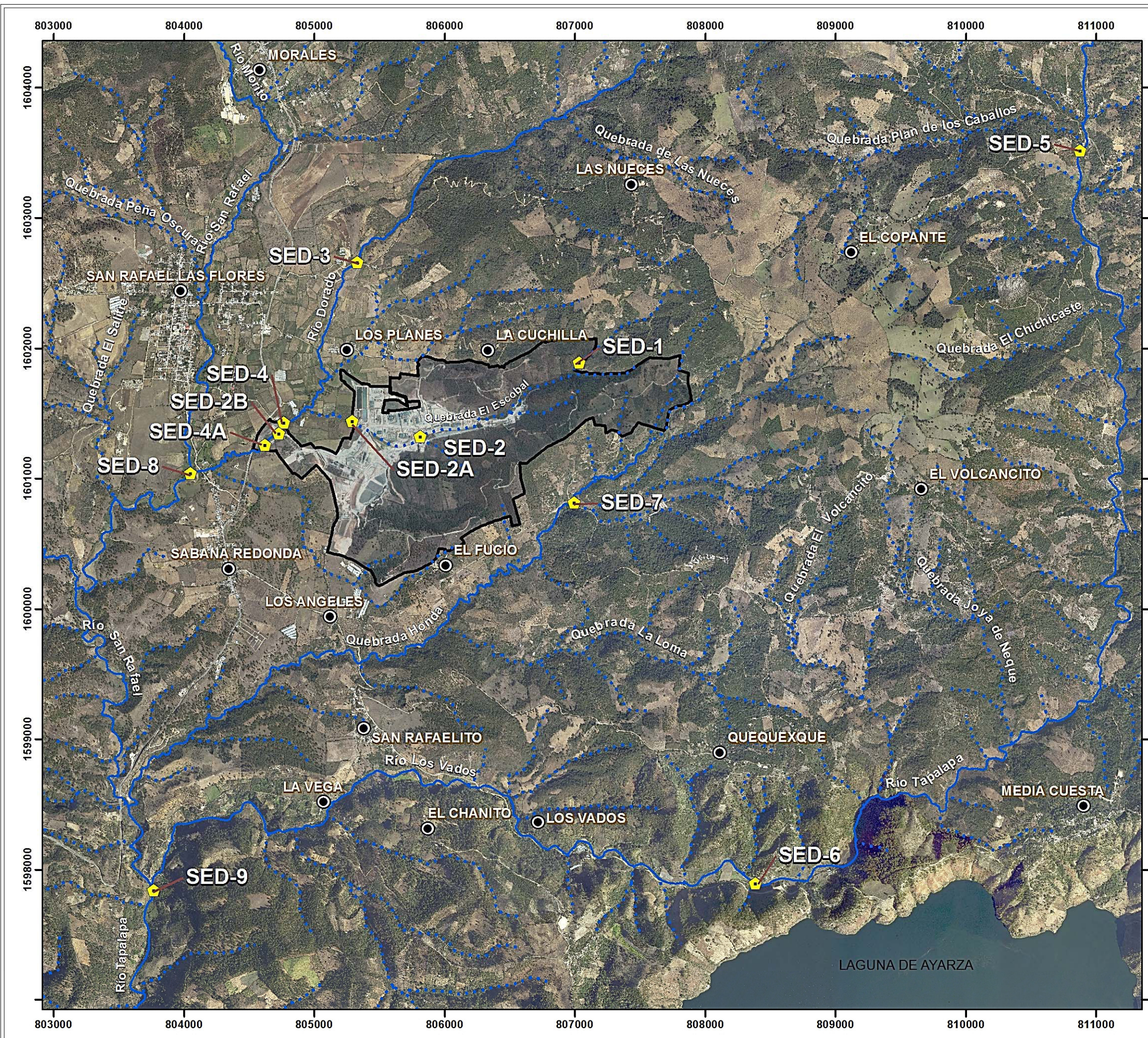
5.1 Sitios de Monitoreo

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: Julio de 2015

Distancia Horizontal y Vertical de Grilla: 1,000 metros

Escala 1:30,000

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

5.2 Metodología

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

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

Parámetros utilizados	
Análisis	Metales Totales, Cianuro Total, Fósforo Total.
Laboratorio contratado	
Nombre	Las muestras fueron analizadas en el laboratorio ACZ, 2773 Downhill Drive Steamboat Springs, Colorado USA, el cual se encuentra acreditado y avalado por la USEPA

Fuente: MSR, 2015.

5.3 Resultados

En el Cuadro 5-3 se presenta los resultados de metales registrados para el mes de Junio de 2015. Los resultados del laboratorio se presentan en el Anexo 11.6.

El porcentaje de fósforo total se encuentra en el rango de 0.0067% (SED-5) a 0.036% (SED-8). No se detectó cianuro en ninguna de las estaciones muestreadas.

El mercurio se detectó en todas las estaciones, excepto en SED-3, SED-4A, SED-6 y SED-7 y 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) y en la estación SED-7 no fue detectado.

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	Jun-15	Jun-15	Jun-15	Jun-15	Jun-15	Jun-15
Arsénico Total	mg/Kg**	50	8.6	36.3	37.8	17	19	20.8
Cadmio Total	mg/Kg**	50	0.19	6.17	3.59	0.17	0.75	1.08
Cromo Total	mg/Kg**	1500	2.1	7.7	7.1	3	4	5.1
Plomo Total	mg/Kg**	500	11.8	254	168	8.62	30.4	50.1
Mercurio Total	mg/Kg**	25	0.05	0.11	0.06	<0.04	0.12	<0.05
Cianuro Total	mg/Kg**		<0.2	<0.1	<0.1	<0.2	<0.2	<0.1
Fósforo Total	%		0.024	0.0324	0.0246	0.012	0.023	0.0255
Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7	SED-8	SED-9	
		Aplicación al suelo	Jun-15	Jun-15	Jun-15	Jun-15	Jun-15	
Arsénico Total	mg/Kg**	50	8.1	25.3	<10	6.7	6.3	
Cadmio Total	mg/Kg**	50	0.11	0.17	0.11	0.27	0.27	
Cromo Total	mg/Kg**	1500	3.8	4.9	1.5	1.8	2.3	
Plomo Total	mg/Kg**	500	5.09	4.73	6.64	24.7	12.6	
Mercurio Total	mg/Kg**	25	0.05	<0.1	<0.05	0.09	0.08	
Cianuro Total	mg/Kg**		<0.2	<0.3	<0.2	<0.2	<0.09	
Fósforo Total	%		0.00677	0.0313	0.00689	0.0366	0.014	

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



1601000

1601000

805000 806000

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

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

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

LEYENDA

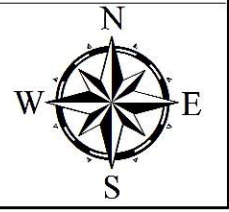
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIÓN DE MONITOREO

Símbolo	Estación	X	Y
	WW9	805461	1601314

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Julio 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	Mayo	Junio	Julio		
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11	WW9
No. Reporte Lab.			905-15	1086-15	1372-15	1373-15	1371-15
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	13	12
Sólidos Sedimentables		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrógeno Total		20	<10	<10	<10	<10	<10
Fósforo Total		10	<0.05	<0.05	<0.05	0.05	<0.05
Arsénico		0.1	<0.002	<0.002	<0.002	0.008	0.007
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	64
Color Real	< 1			< 1	< 1	2	1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	< 2	< 2	< 2	< 2	< 2

*análisis realizado por laboratorio AZC. u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. NA: no analizado. NL = no hay límite establecido para este parámetro. Fuente: MSR, 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 7.12 a 7.92 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)	Mayo	Junio	Julio
Fecha Muestreo					11/05/2015	15/06/2015	27/07/2015
ID Muestra					WW9	WW9	WW9
No. Reporte Lab.					904-15	1085-15	1371-15
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.92	7.32	7.12
Temperatura de campo	°C		+/- 3		27.7	27.5	27.3
Temperatura. Quebrada El Escobal					30.33	28.53	27.2
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	12
Sólidos Sedimentables					< 0.1	< 0.1	< 0.1
Nitrógeno Total		20	10		12	<10	<10
Fósforo Total		10	2		<0.05	<0.05	<0.05
Arsénico		0.1	0.1		0.007	0.008	0.007
Cadmio		0.1	0.05		<0.02	<0.02	<0.02
Cobre		3	0.3	0.3	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	0.1		<0.05	<0.05	<0.05
Cianuro Total*		1	1		<0.003	<0.003	<0.003
Mercurio		0.01	0.002	0.002	<0.004	<0.004	<0.004
Níquel		2	0.5		<0.05	<0.05	<0.05
Plomo		0.4	0.2	0.6	<0.05	<0.05	<0.05
Zinc		10	0.5	1.5	<0.01	<0.01	<0.01
Color Aparente		u Pt/Co	500			< 1	14
Color Real					< 1	< 1	1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	400		23	940	< 2

u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. *: 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

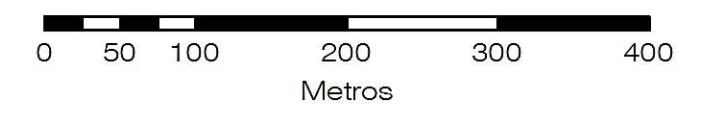
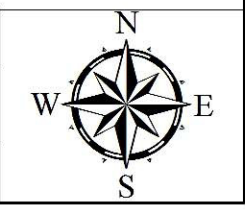
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

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: Julio 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 mayo a julio de 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, 2014.

7.3 Resultados

En el Cuadro 7-3 se presentan todas las mediciones de las voladuras registradas en los instrumentos. Todos 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)
Mayo	1215-TALLER	1	05:30AM	<1.3
	1215-6460	1	05:35AM	<1.3
	1215-6400	1	05:40AM	<1.3
	1215-6480	1	05:45AM	<1.3
	1365-C/F.E.	1	05:50AM	<1.3
	1340-6460	1	05:55AM	<1.3
	1340-6920	1	06:00:AM	<1.3
	1190-C/F,O.E.	1	05:30PM	<1.3
	1190-6460	1	05:35PM	<1.3
	1215-6560	1	05:40PM	<1.3
	1240-C/F.E.	1	05:45PM	<1.3
	1455-ACCESO	1	05:50PM	<1.3
	1315-6840	1	05:55PM	<1.3
	1290-6990	1	06:00PM	<1.3
	1340-6460	1	06:05PM	<1.3
	1190-C/F.O.E.	2	05:30AM	<1.3
	1190-6580	2	05:35AM	<1.3
	1240-6760	2	05:40AM	<1.3
	1240-C/F.E.	2	05:45AM	<1.3
	1190-C/F.E.O	2	05:30PM	<1.3
	1190-6520	2	05:35PM	<1.3
	1240-C/F.O.O	2	05:40PM	<1.3
	1430-RAMPA	2	05:45PM	<1.3
	1340-C/F.E.	2	05:50PM	<1.3
	1215-6940	3	05:30AM	<1.3
	1190-6700	3	05:35AM	<1.3
	1455-RAMPA	3	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1265-6490	3	05:45AM	<1.3
	1340-6460	3	05:50AM	<1.3
	1290-6860	3	05:30PM	<1.3
	1265-6450	3	05:35PM	<1.3
	1365-C/F.O.	3	05:40PM	<1.3
	1190-6480	3	05:45PM	<1.3
	1215-C/F.E.	3	05:50PM	<1.3
	1340-6920	3	05:55PM	<1.3
	1190-C/F.O.E.	4	05:30AM	<1.3
	1190-SERVICIOS	4	05:35AM	<1.3
	1315-6690	4	05:40AM	<1.3
	1340-C/F.E.	4	05:45AM	<1.3
	1340-6920	4	05:50AM	<1.3
	1430-RAMPA	4	05:30PM	<1.3
	1265-6670	4	05:35PM	<1.3
	1215-TALLER	4	05:40PM	<1.3
	1190-C/F.E.O.	4	05:45PM	<1.3
	1340-6920	4	05:50PM	<1.3
	1365-6640	5	05:30AM	<1.3
	1340-C/F.E.	5	05:35AM	<1.3
	1430-RAMPA	5	05:40AM	<1.3
	1455-RAMPA	5	05:30PM	<1.3
	1315-6960	5	05:35PM	<1.3
	1190-6440	5	05:40PM	<1.3
	1290-6490	6	05:30AM	<1.3
	1290-6860	6	05:35AM	<1.3
	1265-6450	6	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1215-6560	6	05:45AM	<1.3
	1215-C/F.E.	6	05:50AM	<1.3
	1190-C/F.E.	6	05:55AM	<1.3
	1315-6960	6	06:00:AM	<1.3
	1215-6440	6	05:30PM	<1.3
	1215-6480	6	05:35PM	<1.3
	1215-6700	6	05:40PM	<1.3
	1340-C/F.O.	6	05:45PM	<1.3
	1365-6840	6	05:50PM	<1.3
	1365-C/F.O.	6	05:55PM	<1.3
	1340-6460	6	06:00PM	<1.3
	1240-6760	7	05:30AM	<1.3
	1215-6700	7	05:35AM	<1.3
	1315-6690	7	05:40AM	<1.3
	1290-6450	7	05:45AM	<1.3
	1365-6880	7	05:50AM	<1.3
	1315-6960	7	05:55AM	<1.3
	1455-RAMPA	7	05:30PM	<1.3
	1265-6670	7	05:35PM	<1.3
	1265-6490	7	05:40PM	<1.3
	1240-6760	7	05:45PM	<1.3
	1215-6880	7	05:50PM	<1.3
	1190-6480	7	05:55PM	<1.3
	1430-RAMPA	7	06:00PM	<1.3
	1290-6450	8	05:30AM	<1.3
	1290-6490	8	05:35AM	<1.3
	1290-C/F.O.	8	05:40AM	<1.3
	1215-C/F.E.	8	05:45AM	<1.3
	1215-6480	8	05:50AM	<1.3
	1365-6670	8	05:55AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1340-C/F.E.	8	05:30PM	<1.3
	1315-6960	8	05:35PM	<1.3
	1190-6440	8	05:40PM	<1.3
	1190-C/F.E.	8	05:45PM	<1.3
	1190-C/F.O.	8	05:50PM	<1.3
	1430-ACCESO	8	05:55PM	<1.3
	1315-6690	9	05:30AM	<1.3
	1265-6490	9	05:35AM	<1.3
	1190-SERVICIOS	9	05:40AM	<1.3
	1190-6480	9	05:45AM	<1.3
	1315-6420	9	05:50AM	<1.3
	1315-6960	9	05:55am	<1.3
	1315-6610	9	05:30PM	<1.3
	1430-RAMPA	9	05:35PM	<1.3
	1215-6560	9	05:40PM	<1.3
	1215-TALLER	9	05:45PM	<1.3
	1265-6810	10	05:30AM	<1.3
	1365-C/F.O.	10	05:35AM	<1.3
	1190-C/F.O.E.	10	05:40AM	<1.3
	1190-6560	10	05:45AM	<1.3
	1190-6520	10	05:50AM	<1.3
	1430-RAMPA	10	05:55am	<1.3
	1215-VENTILACION	10	05:30PM	<1.3
	1190-6440	10	05:35PM	<1.3
	1190-C/F.O.E.	10	05:40PM	<1.3
	1455-ACCESO	10	05:45PM	<1.3
	1240-C/F.O.	10	05:50PM	<1.3
	1315-6960	10	05:55PM	<1.3
	1315-6720	10	06:00PM	<1.3
	1365-6840	11	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1190-6520	11	05:35AM	<1.3
	1190-6560	11	05:40AM	<1.3
	1315-6420	11	05:45AM	<1.3
	1365-6880	11	05:30PM	<1.3
	1240-C/F.O.	11	05:35PM	<1.3
	1240-6440	11	05:40PM	<1.3
	1215-6440	11	05:45PM	<1.3
	1315-6960	11	05:50PM	<1.3
	1340-C/F.O.	11	05:55PM	<1.3
	1315-6690	11	06:00PM	<1.3
	1315-6420	11	06:05PM	<1.3
	1340-C/F.E.	12	05:30AM	<1.3
	1315-6650	12	05:35AM	<1.3
	1430-RAMPA	12	05:40AM	<1.3
	1365-6640	12	05:30PM	<1.3
	1430-C/F.O.	12	05:35PM	<1.3
	1455-ACCESO	12	05:40PM	<1.3
	1315-6720	12	05:45PM	<1.3
	1215-C/F.E.	13	05:30AM	<1.3
	1215-6960	13	05:35AM	<1.3
	1215-6700	13	05:40AM	<1.3
	1455-ACCESO	13	05:45AM	<1.3
	1365-6880	13	05:50AM	<1.3
	1290-6490	13	05:30PM	<1.3
	1190-6440	13	05:35PM	<1.3
	1190-6480	13	05:40PM	<1.3
	1215-6700	13	05:45PM	<1.3
	1315-6880	13	05:50PM	<1.3
	1215-6480	14	05:30AM	<1.3
	1290-6480	14	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1340-C/F.E.	14	05:40AM	<1.3
	1365-C/F.O.	14	05:45AM	<1.3
	1365-6640	14	05:50AM	<1.3
	1315-6860	14	05:55AM	<1.3
	1315-6940	14	05:30PM	<1.3
	1290-6990	14	05:35PM	<1.3
	1290-6490	14	05:40PM	<1.3
	1430-RAMPA	14	05:45PM	<1.3
	1315-6690	14	05:50PM	<1.3
	1215-6560	14	05:55PM	<1.3
	1190-6520	14	06:00PM	<1.3
	1190-C/F,E.	14	06:05PM	<1.3
	1190-C/F.O.	14	06:05PM	<1.3
	1455-ACCESO	15	05:30AM	<1.3
	1430-RAMPA	15	05:35AM	<1.3
	1240-C/F.O.	15	05:40AM	<1.3
	1265-6490	15	05:45AM	<1.3
	1315-6940	15	05:50AM	<1.3
	1315-6490	15	05:55AM	<1.3
	1315-6720	15	06:00:AM	<1.3
	1215-6440	15	05:30PM	<1.3
	1215-6450	15	05:35PM	<1.3
	1315-6940	15	05:40PM	<1.3
	1340-C/F.E.	16	05:30AM	<1.3
	1365-6840	16	05:35AM	<1.3
	1290-6490	16	05:40AM	<1.3
	1190-6700	16	05:45AM	<1.3
	1215-VENTILACION	16	05:50AM	<1.3
	1290-7000	16	05:55AM	<1.3
	1190-6520	16	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1265-6490	16	05:35PM	<1.3
	1290-6330	16	05:40PM	<1.3
	1290-6620	16	05:45PM	<1.3
	1315-6650	16	05:50PM	<1.3
	1315-6620	16	05:55PM	<1.3
	1265-6810	17	05:30AM	<1.3
	1215-6700	17	05:35AM	<1.3
	1290-7000	17	05:40AM	<1.3
	1365-C/F.O.	17	05:45AM	<1.3
	1315-6610	17	05:50AM	<1.3
	1215-C/F.E.	17	05:30PM	<1.3
	1430-RAMPA	17	05:35PM	<1.3
	1365-6880	17	05:40PM	<1.3
	1290-6760	17	05:45PM	<1.3
	1315-6940	17	05:50PM	<1.3
	1290-7000	18	05:30AM	<1.3
	1430-C/F.O.	18	05:35AM	<1.3
	1430-C/F.E.	18	05:40AM	<1.3
	1190-6700	18	05:45AM	<1.3
	1240-6520	18	05:50AM	<1.3
	1190C/F.E.	18	05:55AM	<1.3
	1315-6860	18	06:00:AM	<1.3
	1290-6610	18	06:05AM	<1.3
	1315-6940	18	05:30PM	<1.3
	1190-6560	18	05:35PM	<1.3
	1240-6440	18	05:40PM	<1.3
	1240-C/F.O.	18	05:45PM	<1.3
	1430-C/F.E.	18	05:50PM	<1.3
	1315-6610	19	05:30AM	<1.3
	1240-6610	19	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1290-6560	19	05:40AM	<1.3
	1340-C/F.E.	19	05:45AM	<1.3
	1240-C/F.O.	19	05:30PM	<1.3
	1240-6700	19	05:35PM	<1.3
	1430-RAMPA	19	05:40PM	<1.3
	1315-6990	19	05:45PM	<1.3
	1430-C/F.O.	19	05:50PM	<1.3
	1265-6450	19	05:55PM	<1.3
	1290-6990	19	06:00PM	<1.3
	1315-6940	19	06:05PM	<1.3
	1190-6480	20	05:30AM	<1.3
	1190-6520	20	05:35AM	<1.3
	1265-6490	20	05:40AM	<1.3
	1315-6690	20	05:45AM	<1.3
	1315-6490	20	05:50AM	<1.3
	1315-6940	20	05:55AM	<1.3
	1455-C/F.E.	20	05:30PM	<1.3
	1455-C/F.O.	20	05:35PM	<1.3
	1365-6880	20	05:40PM	<1.3
	1215-6480	20	05:45PM	<1.3
	1215-6560	20	05:50PM	<1.3
	1240-6520	20	05:55PM	<1.3
	1190-6440	20	06:00PM	<1.3
	1240-6610	21	05:30AM	<1.3
	1240-6520	21	05:35AM	<1.3
	1265-6950	21	05:40AM	<1.3
	1215-VENTLACION	21	05:45AM	<1.3
	1290-6490	21	05:50AM	<1.3
	1315-6860	21	05:55AM	<1.3
	1430-RAMPA	21	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1340-C/F.E.	21	05:35PM	<1.3
	1365-6840	21	05:40PM	<1.3
	1190-C/F.O.E.	21	05:45PM	<1.3
	1240-6700	21	05:50PM	<1.3
	1215-6700	21	05:55PM	<1.3
	1315-6610	21	06:00PM	<1.3
	1315-6650	21	06:00PM	<1.3
	1315-6940	21	06:05PM	<1.3
	1315-6900	21	06:05PM	<1.3
	1455-C/F.O.	22	05:30AM	<1.3
	1265-6490	22	05:35AM	<1.3
	1190-6560	22	05:40AM	<1.3
	1290-6610	22	05:45AM	<1.3
	1215-6440	22	05:50AM	<1.3
	1365-C/F.O.	22	05:55AM	<1.3
	1340-C/F.E.	22	06:00:AM	<1.3
	1455-C/F.E	22	06:05AM	<1.3
	1190-6520	22	05:30PM	<1.3
	1190-6400	22	05:35PM	<1.3
	1315-C/F.O	22	05:40PM	<1.3
	1365-6640	22	05:45PM	<1.3
	1290-6610	22	05:50PM	<1.3
	1215-TALLER	22	05:55PM	<1.3
	1315-6900	22	06:00PM	<1.3
	1455-C/F.O.	23	05:30AM	<1.3
	1265-6490	23	05:35AM	<1.3
	1190-6560	23	05:40AM	<1.3
	1290-6610	23	05:45AM	<1.3
	1215-6440	23	05:50AM	<1.3
	1365-C/F.O.	23	05:55AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1340-C/F.E.	23	06:00:AM	<1.3
	1455-C/F.E	23	06:05AM	<1.3
	1190-6520	23	05:30PM	<1.3
	1190-6400	23	05:35PM	<1.3
	1315-C/F.O	23	05:40PM	<1.3
	1365-6640	23	05:45PM	<1.3
	1290-6610	23	05:50PM	<1.3
	1215-TALLER	23	05:55PM	<1.3
	1315-6900	23	06:00PM	<1.3
	1430-C/F.E.	24	05:30AM	<1.3
	1430-C/F.O.	24	05:35AM	<1.3
	1315-6490	24	05:40AM	<1.3
	1190-6700	24	05:45AM	<1.3
	1315-6490	24	05:50AM	<1.3
	1290-6440	24	05:55AM	<1.3
	1190-CONECCIÓN	24	06:00:AM	<1.3
	1315-6900	24	06:05AM	<1.3
	1365-6840	24	05:30PM	<1.3
	1290-6610	24	05:35PM	<1.3
	1215-C/F.E.	24	05:40PM	<1.3
	1240-6520	24	05:45PM	<1.3
	1240-6610	25	05:30AM	<1.3
	1290-6440	25	05:35AM	<1.3
	1340-C/F.E.	25	05:40AM	<1.3
	1365-6880	25	05:45AM	<1.3
	1290-6450	25	05:50AM	<1.3
	1315-6900	25	05:55AM	<1.3
	1430-RAMPA	25	05:30PM	<1.3
	1365-6610	25	05:35PM	<1.3
	1230-SUMIDERO	25	05:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1230-BOMBEO	25	05:45PM	<1.3
	1315-6900	25	05:50PM	<1.3
	1265-6810	25	05:55PM	<1.3
	1290-6640	26	05:30AM	<1.3
	1240-6700	26	05:35AM	<1.3
	1240-6520	26	05:40AM	<1.3
	1240-6610	26	05:45AM	<1.3
	1430-RAMPA	26	05:50AM	<1.3
	1265-6810	26	05:30PM	<1.3
	1215-6480	26	05:35PM	<1.3
	1290-6330	26	05:40PM	<1.3
	1290-6610	26	05:45PM	<1.3
	1290-6860	26	05:50PM	<1.3
	1265-6490	27	05:30AM	<1.3
	1190-6700	27	05:35AM	<1.3
	1190-6480	27	05:40AM	<1.3
	1340-C/F.E.	27	05:45AM	<1.3
	1430-RAMPA	27	05:50AM	<1.3
	1290-6440	27	05:55AM	<1.3
	1190-6560	27	05:30PM	<1.3
	1190-6440	27	05:35PM	<1.3
	1265-6450	27	05:40PM	<1.3
	1455-C/F.E.	27	05:45PM	<1.3
	1455-C/F.O.	27	05:50PM	<1.3
	1315-70120	27	05:55PM	<1.3
	1290-6860	27	06:00PM	<1.3
	1290-6940	27	06:00PM	<1.3
	1365-6880	28	05:30AM	<1.3
	1430-RAMPA	28	05:35AM	<1.3
	1340-C/F.E.	28	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1215-6440	28	05:30PM	<1.3
	1265-6450	28	05:35PM	<1.3
	1315-6690	28	05:40PM	<1.3
	1315-6960	28	05:45PM	<1.3
	1265-6590	28	05:50PM	<1.3
	1315-6490	28	05:55PM	<1.3
	1430-RAMPA	29	05:30AM	<1.3
	1290-6450	29	05:35AM	<1.3
	1230-SUMIDERO	29	05:40AM	<1.3
	1230-BOMBEO	29	05:45AM	<1.3
	1315-6610	29	05:30PM	<1.3
	1315-6600	29	05:35PM	<1.3
	1315-6840	29	05:40PM	<1.3
	1190-6520	29	05:45PM	<1.3
	1190-6560	29	05:50PM	<1.3
	1190-6330	29	05:55PM	<1.3
	1290-6580	30	05:30AM	<1.3
	1265-6810	30	05:35AM	<1.3
	1240-6520	30	05:40AM	<1.3
	1340-C/F.E.	30	05:45AM	<1.3
	1365-6680	30	05:50AM	<1.3
	1365-C/F.O.	30	05:30PM	<1.3
	1315-6860	30	05:35PM	<1.3
	1290-6450	30	05:40PM	<1.3
	1365-6640	30	05:45PM	<1.3
	1215-VENTILACION	30	05:50PM	<1.3
	1190-6520	30	05:55PM	<1.3
	1215-6940	30	06:00PM	<1.3
	1290-6860	30	06:00PM	<1.3
	1340-C/F.E.	31	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Mayo	1365-6880	31	05:35AM	<1.3
	1315-6690	31	05:40AM	<1.3
	1290-6450	31	05:45AM	<1.3
	1240-6520	31	05:50AM	<1.3
	1290-6860	31	05:55AM	<1.3
	1290-6330	31	05:30PM	<1.3
	1315-7020	31	05:35PM	<1.3
	1265-6450	31	05:40PM	<1.3
	1190-6700	31	05:45PM	<1.3
	1430-RAMPA	31	05:50PM	<1.3
	1315-6820	31	05:55PM	<1.3
Junio	1240-6610	1	05:30AM	<1.3
	1240-6520	1	05:35AM	<1.3
	1430-RAMPA	1	05:40AM	<1.3
	1340-C/F.E.	1	05:45AM	<1.3
	1315-6490	1	05:50AM	<1.3
	1315-6900	1	05:55AM	<1.3
	1265-6810	1	05:30PM	<1.3
	136-6840	1	05:35PM	<1.3
	1315-6610	1	05:40PM	<1.3
	1240-6440	2	05:30AM	<1.3
	1240-6700	2	05:35AM	<1.3
	1315-7020	2	05:40AM	<1.3
	1365-6620	2	05:45AM	<1.3
	1315-6820	2	05:50AM	<1.3
	1365-C/F.O.	2	05:55AM	<1.3
	1290-6630	2	06:00:AM	<1.3
	1265-6490	2	05:30PM	<1.3
	1190-6560	2	05:35PM	<1.3
	1365-6680	2	05:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1455-RAMPA	2	05:45PM	<1.3
	1315-6820	2	05:50PM	<1.3
	1290-6620	2	05:55PM	<1.3
	1265-6450	3	05:30AM	<1.3
	1215-6440	3	05:35AM	<1.3
	1215-6480	3	05:40AM	<1.3
	1315-6860	3	05:45AM	<1.3
	1315-6490	3	05:50AM	<1.3
	1430-C/F.E.	3	05:30PM	<1.3
	1455-C/F.O.	3	05:35PM	<1.3
	1340-RAMPA	3	05:40PM	<1.3
	1265-6810	3	05:45PM	<1.3
	1265-6450	3	05:50PM	<1.3
	1240-6520	3	05:55PM	<1.3
	1215-6400	3	06:00PM	<1.3
	1265-6610	3	06:00PM	<1.3
	1190-6440	4	05:30AM	<1.3
	1190-6480	4	05:35AM	<1.3
	1190-6520	4	05:40AM	<1.3
	1430-RAMPA	4	05:45AM	<1.3
	1315-7020	4	05:50AM	<1.3
	1340-6880	4	05:55AM	<1.3
	1215-6560	4	05:30PM	<1.3
	1190-6440	4	05:35PM	<1.3
	1430-C/F.E.	4	05:40PM	<1.3
	1340-C/F.E.	4	05:45PM	<1.3
	1340-6840	4	05:50PM	<1.3
1315-6760	4	05:55PM	<1.3	
1315-6820	4	06:00PM	<1.3	
1240-6700	5	05:30AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1240-6440	5	05:35AM	<1.3
	1265-6810	5	05:40AM	<1.3
	1340-C/F.E.	5	05:45AM	<1.3
	1215-6400	5	05:50AM	<1.3
	1215-C/F.E.	5	05:30PM	<1.3
	1215-VENTILACION	5	05:35PM	<1.3
	1215-6960	5	05:40PM	<1.3
	1455-7400	5	05:45PM	<1.3
	1315-6690	5	05:50PM	<1.3
	1290-6330	5	05:55PM	<1.3
	1215-6400	5	06:00PM	<1.3
	1190-6820	6	05:30AM	<1.3
	1340-6840	6	05:35AM	<1.3
	1290-6490	6	05:40AM	<1.3
	1430-RAMPA	6	05:30PM	<1.3
	1365-C/F.O.	6	05:35PM	<1.3
	1290-6450	6	05:40PM	<1.3
	1290-6610	6	05:45PM	<1.3
	1315-6820	6	05:50PM	<1.3
	1190-6520	6	05:55PM	<1.3
	1430-RAMPA	7	05:30AM	<1.3
	1265-6810	7	05:35AM	<1.3
	1265-6450	7	05:40AM	<1.3
	1315-6560	7	05:45AM	<1.3
	1315-6480	7	05:50AM	<1.3
	1315-7020	7	05:30PM	<1.3
	1315-6610	7	05:35PM	<1.3
	1365-6640	7	05:40PM	<1.3
	1230-SUMIDERO	7	05:45PM	<1.3
	1230-BOMBEO	7	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1265-6490	7	05:55PM	<1.3
	1315-6820	7	06:00PM	<1.3
	1340-C/F.E.	8	05:30AM	<1.3
	1340-SUB ESTACION	8	05:35AM	<1.3
	1365-6680	8	05:40AM	<1.3
	1265-6770	8	05:45AM	<1.3
	1315-6610	8	05:50AM	<1.3
	1265-6730	8	05:55am	<1.3
	1240-6700	8	05:30PM	<1.3
	1240-6520	8	05:35PM	<1.3
	1315-6690	8	05:40PM	<1.3
	1290-6330	8	05:45PM	<1.3
	1290-6450	8	05:50PM	<1.3
	1315-7020	9	05:30AM	<1.3
	1365-6640	9	05:35AM	<1.3
	1190-6420	9	05:40AM	<1.3
	1315-6650	9	05:45AM	<1.3
	1240-6520	9	05:30PM	<1.3
	1265-6610	9	05:35PM	<1.3
	1430-RAMPA	9	05:40PM	<1.3
	1430-RMUK	9	05:45PM	<1.3
	1365-6620	9	05:50PM	<1.3
	1315-6820	9	05:55PM	<1.3
	1290-6490	9	06:00PM	<1.3
	1315-6610	10	05:30AM	<1.3
	1315-6490	10	05:35AM	<1.3
	1215-6480	10	05:40AM	<1.3
	1215-6440	10	05:45AM	<1.3
	1240-6700	10	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1340-SUB ESTACION	10	05:55am	<1.3
	1265-6810	10	05:30PM	<1.3
	1265-6450	10	05:35PM	<1.3
	1215-6560	10	05:40PM	<1.3
	1340-C/F.E.	10	05:45PM	<1.3
	1455-C/F.E.	10	05:50PM	<1.3
	1455-C/F.O.	10	05:55PM	<1.3
	1315-6760	10	06:00PM	<1.3
	1430-RAMPA	11	05:30AM	<1.3
	1290-6450	11	05:35AM	<1.3
	1365-6680	11	05:40AM	<1.3
	1215-VENTILACION	11	05:45AM	<1.3
	1215-6960	11	05:50AM	<1.3
	1365-6840	11	05:55am	<1.3
	1430-RAMPA	11	05:30PM	<1.3
	1430-RMUK	11	05:35PM	<1.3
	1265-6610	11	05:40PM	<1.3
	1240-6520	11	05:45PM	<1.3
	1315-6650	11	05:50PM	<1.3
	1315-6860	11	05:55PM	<1.3
	1430-RAMPA	12	05:30AM	<1.3
	1290-6450	12	05:35AM	<1.3
	1365-6680	12	05:40AM	<1.3
	1215-VENTILACION	12	05:45AM	<1.3
	1215-6960	12	05:50AM	<1.3
	1365-6840	12	05:55am	<1.3
	1430-RAMPA	12	05:30PM	<1.3
	1430-RMUK	12	05:35PM	<1.3
	1265-6610	12	05:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1240-6520	12	05:45PM	<1.3
	1315-6650	12	05:50PM	<1.3
	1315-6860	12	05:55PM	<1.3
	1315-6610	13	05:30AM	<1.3
	1315-6650	13	05:35AM	<1.3
	1315-7020	13	05:40AM	<1.3
	1230-SUMIDERO	13	05:45AM	<1.3
	1230-BOMBEO	13	05:50AM	<1.3
	1240-6760	13	05:55am	<1.3
	1365-6840	13	06:00:AM	<1.3
	1190-6480	13	05:30PM	<1.3
	1265-6450	13	05:35PM	<1.3
	1265-6810	13	05:40PM	<1.3
	1290-6490	13	05:45PM	<1.3
	1340-SUBESTACION	13	05:50PM	<1.3
	1455-7400	13	05:55PM	<1.3
	1240-6440	14	05:30AM	<1.3
	1290-6440	14	05:35AM	<1.3
	1340-SUB-ESTACION	14	05:40AM	<1.3
	1290-6450	14	05:45AM	<1.3
	1365-6840	14	05:50AM	<1.3
	1315-6610	14	05:55am	<1.3
	1430-RAMPA	14	05:30PM	<1.3
	1430-RMUK	14	05:35PM	<1.3
	1315-6680	14	05:40PM	<1.3
	1215-6440	14	05:45PM	<1.3
	1215-6480	14	05:50PM	<1.3
	1455-7400	14	05:55PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1340-SUB-ESTACION	15	05:30AM	<1.3
	1240-6490	15	05:35AM	<1.3
	1230-BOMBEO	15	05:40AM	<1.3
	1215-VENTILACION	15	05:45AM	<1.3
	1455-C/F.E.	15	05:50AM	<1.3
	1365-C/F.O.	15	05:55am	<1.3
	1430-RMUK	15	06:00:AM	<1.3
	1240-6760	15	05:30PM	<1.3
	1240-6520	15	05:35PM	<1.3
	1365-6640	15	05:40PM	<1.3
	1315-6490	15	05:45PM	<1.3
	1315-6690	15	05:50PM	<1.3
	1215-VENTILACION	16	05:30AM	<1.3
	1365-6880	16	05:35AM	<1.3
	1240-6520	16	05:40AM	<1.3
	1340-SUBESTACION	16	05:45AM	<1.3
	1315-6610	16	05:50AM	<1.3
	1265-6810	16	05:30PM	<1.3
	1315-7020	16	05:35PM	<1.3
	1455-7400	16	05:40PM	<1.3
	1365-6880	16	05:45PM	<1.3
	1315-6650	16	05:50PM	<1.3
	1340-6720	16	05:55PM	<1.3
	1365-6840	16	06:00PM	<1.3
	1315-6650	17	05:30AM	<1.3
	1315-7020	17	05:35AM	<1.3
	1240-6520	17	05:40AM	<1.3
	1340-6920	17	05:45AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1340-C/F.E.	17	05:30PM	<1.3
	1315-6690	17	05:35PM	<1.3
	1340-6940	17	05:40PM	<1.3
	1365-6640	17	05:45PM	<1.3
	1315-6860	17	05:50PM	<1.3
	1430-RAMPA	18	05:30AM	<1.3
	1315-6650	18	05:35AM	<1.3
	1230-SUMIDERO	18	05:40AM	<1.3
	1230-BOMBEO	18	05:45AM	<1.3
	1265-6450	18	05:50AM	<1.3
	1365-6620	18	05:30PM	<1.3
	1455-C/F.E.	18	05:35PM	<1.3
	1455-C/F.O.	18	05:40PM	<1.3
	1215-6940	18	05:45PM	<1.3
	1215-6970	18	05:50PM	<1.3
	1215-VENTILACION	18	05:55PM	<1.3
	1340-6960	18	06:00PM	<1.3
	1240-6770	19	05:30AM	<1.3
	1265-6450	19	05:35AM	<1.3
	1430-c/f.e.	19	05:40AM	<1.3
	1455-c/f.o.	19	05:45AM	<1.3
	1455-7400	19	05:50AM	<1.3
	1265-6610	19	05:55am	<1.3
	1315-6690	19	05:30PM	<1.3
	1315-7020	19	05:35PM	<1.3
	1290-6450	19	05:40PM	<1.3
	1290-6490	19	05:45PM	<1.3
	1265-6450	19	05:50PM	<1.3
	1365-6840	19	05:55PM	<1.3
	1455-C/F.E.	20	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1365-6640	20	05:35AM	<1.3
	1240-6720	20	05:40AM	<1.3
	1240-6730	20	05:45AM	<1.3
	1215-6440	20	05:50AM	<1.3
	1430-RAMPA	20	05:55am	<1.3
	1315-6860	20	05:30PM	<1.3
	1365-6680	20	05:35PM	<1.3
	1365-C/F.O.	20	05:40PM	<1.3
	1240-6520	20	05:45PM	<1.3
	1265-6810	20	05:50PM	<1.3
	1190-6880	20	05:55PM	<1.3
	1230-SERVICIOS	20	06:00PM	<1.3
	1455-7400	21	05:30AM	<1.3
	1315-6690	21	05:35AM	<1.3
	1430-c/f.e.	21	05:40AM	<1.3
	1190-6480	21	05:45AM	<1.3
	1240-6770	21	05:50AM	<1.3
	1315-6650	21	05:30PM	<1.3
	1315-6610	21	05:35PM	<1.3
	1215-ventilacion	21	05:40PM	<1.3
	1190-6440	21	05:45PM	<1.3
	1240-6610	21	05:50PM	<1.3
	1265-6610	21	05:55PM	<1.3
	1340-6940	21	06:00PM	<1.3
	1315-6490	22	05:30AM	<1.3
	1315-6650	22	05:35AM	<1.3
	1430-C/F.E.	22	05:40AM	<1.3
	1265-6610	22	05:45AM	<1.3
	1190-6600	22	05:50AM	<1.3
	1190-6620	22	05:55am	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1190-6640	22	06:00:AM	<1.3
	1190-6680	22	06:05AM	<1.3
	1430-RAMPA	22	05:30PM	<1.3
	1365-6680	22	05:35PM	<1.3
	1315-7020	22	05:40PM	<1.3
	1215-6480	22	05:45PM	<1.3
	1365-6640	22	05:50PM	<1.3
	1290-6490	22	05:55PM	<1.3
	1365-6640	23	05:30AM	<1.3
	1265-6610	23	05:35AM	<1.3
	1240-6770	23	05:30PM	<1.3
	1315-6610	23	05:35PM	<1.3
	1340-C/F.E	23	05:40PM	<1.3
	1430-RAMPA	23	05:45PM	<1.3
	1340-6720	23	05:50PM	<1.3
	1315-6650	24	05:30AM	<1.3
	1430-C/F.O.	24	05:35AM	<1.3
	1365-6620	24	05:40AM	<1.3
	1215-6960	24	05:45AM	<1.3
	1190-6440	24	05:50AM	<1.3
	1240-6520	24	05:30PM	<1.3
	1240-C/F.E.	24	05:35PM	<1.3
	1240-6730	24	05:40PM	<1.3
	1455-C/F.E.	24	05:45PM	<1.3
	1455-C/F.O	24	05:50PM	<1.3
	1365-6680	24	05:55PM	<1.3
	1340-C/F.E.	25	05:30AM	<1.3
	1315-6860	25	05:35AM	<1.3
	1265-6810	25	05:40AM	<1.3
	1215-6440	25	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Junio	1215-6560	25	05:35PM	<1.3
	1265-6810	25	05:40PM	<1.3
	1340-6860	25	05:45PM	<1.3
	1365-C/F.O.	25	05:50PM	<1.3
	1430-RAMPA	25	05:55PM	<1.3
	1240-6770	26	05:30AM	<1.3
	1265-6450	26	05:35AM	<1.3
	1190-6440	26	05:40AM	<1.3
	1315-6610	26	05:45AM	<1.3
	1430-C/F.O.	26	05:50AM	<1.3
	1290-6450	26	05:30PM	<1.3
	1290-6490	26	05:35PM	<1.3
	1365-C/F.E.	26	05:40PM	<1.3
	1190-6480	26	05:45PM	<1.3
	1315-6650	27	05:30AM	<1.3
	1315-6690	27	05:35AM	<1.3
	1240-6520	27	05:40AM	<1.3
	1240-C/F.O.	27	05:45AM	<1.3
	1365-6880	27	05:50AM	<1.3
	1365-6640	27	05:55am	<1.3
	1240-6730	27	06:00:AM	<1.3
	1340-C/F.E.	27	05:30PM	<1.3
	1340-6860	27	05:35PM	<1.3
	1430-RMUK	27	05:40PM	<1.3
	1190-6600	27	05:45PM	<1.3
	1215-SERVICIOS	27	05:50PM	<1.3
	1290-6430	28	05:30AM	<1.3
	1365-6600	28	05:35AM	<1.3
	1290-6680	28	05:40AM	<1.3
	1240-6770	28	05:45AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)	
Junio	1290-6330	28	05:50AM	<1.3	
	1455-C/F.E.	28	05:30PM	<1.3	
	1365-6680	28	05:35PM	<1.3	
	1455-7420	28	05:40PM	<1.3	
	1430-C/F.E.	28	05:45PM	<1.3	
	1340-6720	29	05:30AM	<1.3	
	1430-SUMIDERO	29	05:35AM	<1.3	
	1430-C/F.E.	29	05:40AM	<1.3	
	1365-6640	29	05:45AM	<1.3	
	1240-6730	29	05:50AM	<1.3	
	1190-6480	29	05:55am	<1.3	
	1215-6540	29	06:00:AM	<1.3	
	1430-RAMPA	29	05:30PM	<1.3	
	1340-RMUK	29	05:35PM	<1.3	
	1265-6820	29	05:40PM	<1.3	
	1215-VENTILACION	29	05:45PM	<1.3	
	1340-C/F.E.	29	05:50PM	<1.3	
	1190-6660	30	05:30AM	<1.3	
	1190-6680	30	05:35AM	<1.3	
	1315-6610	30	05:40AM	<1.3	
	1430-RAMPA	30	05:45AM	<1.3	
	6770-1240	30	05:50AM	<1.3	
	1190-6620	30	05:30PM	<1.3	
	1190-SERVICIOS	30	05:35PM	<1.3	
	1315-6860	30	05:40PM	<1.3	
	1455-C/F.E.	30	05:45PM	<1.3	
	Julio	1315-6650	1	05:30AM	<1.3
		1340-C/F.E.	1	05:35AM	<1.3
		1240-6520	1	05:40AM	<1.3
		1190-VENTILACION	1	05:45AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1190-6560	1	05:50AM	<1.3
	1290-6330	1	05:55am	<1.3
	1365-6880	1	06:00:AM	<1.3
	1315-6680	1	05:30PM	<1.3
	1455-C/F.O.	1	05:35PM	<1.3
	1435-C/F.E.	1	05:40PM	<1.3
	1240-6420	1	05:45PM	<1.3
	1240-C/F.O.	1	05:50PM	<1.3
	1340-6860	2	05:30AM	<1.3
	1430-RAMPA	2	05:35AM	<1.3
	1430-RMUK	2	05:40AM	<1.3
	1290-6450	2	05:45AM	<1.3
	1240-6730	2	05:50AM	<1.3
	1190-6560	2	05:55am	<1.3
	1315-VENTILACION	2	05:30PM	<1.3
	1315-6600	2	05:35PM	<1.3
	1240-6440	2	05:40PM	<1.3
	1215-VENTILACION	2	05:45PM	<1.3
	1190-6440	3	05:30AM	<1.3
	1215-6480	3	05:35AM	<1.3
	1215-6450	3	05:40AM	<1.3
	1340-C/F.E.	3	05:45AM	<1.3
	1340-RMUK	3	05:50AM	<1.3
	1315-6650	3	05:30PM	<1.3
	1265-6810	3	05:35PM	<1.3
	1190-6480	3	05:40PM	<1.3
	1430-C/F.E.	3	05:45PM	<1.3
	1430-SUMIDERO	3	05:50PM	<1.3
	1365-6880	3	05:55PM	<1.3
	1190-6680	4	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1365-6680	4	05:35AM	<1.3
	1455-C/F.E.	4	05:40AM	<1.3
	1455-7420	4	05:45AM	<1.3
	1190-6480	4	05:50AM	<1.3
	1215-SERVICIOS	4	05:30PM	<1.3
	1215-6440	4	05:35PM	<1.3
	1455-C/F.O.	4	05:40PM	<1.3
	1365-6640	4	05:45PM	<1.3
	1430-C/F.E.	5	05:30AM	<1.3
	1430-C/F.O.	5	05:35AM	<1.3
	1340-C/F.E.	5	05:40AM	<1.3
	1430-7360	5	05:45AM	<1.3
	1190-6440	5	05:50AM	<1.3
	1190-6640	5	05:55am	<1.3
	1365-6640	5	05:30PM	<1.3
	1430-RAMPA	5	05:35PM	<1.3
	1240-6770	5	05:40PM	<1.3
	1240-6330	5	05:45PM	<1.3
	1315-6650	5	05:50PM	<1.3
	1315-7020	5	05:55PM	<1.3
	1365-6880	5	06:00PM	<1.3
	1215-sumidero	6	05:30AM	<1.3
	1365-6680	6	05:35AM	<1.3
	1430-sumidero	6	05:40AM	<1.3
	1290-6450	6	05:30PM	<1.3
	1265-6810	6	05:35PM	<1.3
	1455-7420	6	05:40PM	<1.3
	1315-6860	6	05:45PM	<1.3
	1315-7020	6	05:50PM	<1.3
	1215-SERVICIOS	7	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1190-6600	7	05:35AM	<1.3
	1430-RAMPA	7	05:40AM	<1.3
	1365-6640	7	05:45AM	<1.3
	1365-6600	7	05:50AM	<1.3
	1240-6770	7	05:30PM	<1.3
	1240-6520	7	05:35PM	<1.3
	1215-6440	7	05:40PM	<1.3
	1455-C/F.E.	7	05:45PM	<1.3
	1340-6900	7	05:50PM	<1.3
	1315-7020	7	05:55PM	<1.3
	1190-6680	8	05:30AM	<1.3
	1315-6650	8	05:35AM	<1.3
	1290-6450	8	05:40AM	<1.3
	1340-REMUJ	8	05:45AM	<1.3
	1340-C/F.E.	8	05:30PM	<1.3
	1190-6480	8	05:35PM	<1.3
	1240-6730	8	05:40PM	<1.3
	1340-6960	8	05:45PM	<1.3
	1315-7020	8	05:50PM	<1.3
	1215-6560	9	05:30AM	<1.3
	1430-SUMIDERO	9	05:35AM	<1.3
	1365-6680	9	05:40AM	<1.3
	1365-C/F.O.	9	05:30PM	<1.3
	1365-SERVICIOS	9	05:35PM	<1.3
	1190-6520	9	05:40PM	<1.3
	1240-C/F.E.	9	05:45PM	<1.3
	1340-6860	9	05:50PM	<1.3
	1240-6740	9	05:55PM	<1.3
1315-7020	9	06:00PM	<1.3	
1340-6900	9	06:00PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1430-RAMPA	10	05:30AM	<1.3
	1455-C/F.O.	10	05:35AM	<1.3
	1455-7380	10	05:40AM	<1.3
	1240-6420	10	05:45AM	<1.3
	1190-6600	10	05:50AM	<1.3
	1315-6760	10	05:55am	<1.3
	1315-7020	10	06:00:AM	<1.3
	1190-6640	10	06:05AM	<1.3
	1240-6560	10	05:30PM	<1.3
	1315-6650	10	05:35PM	<1.3
	1240-6730	10	05:40PM	<1.3
	1340-6900	10	05:45PM	<1.3
	1365-6640	11	05:30AM	<1.3
	1365-6680	11	05:35AM	<1.3
	1215-6440	11	05:40AM	<1.3
	1215-6560	11	05:45AM	<1.3
	1340-6900	11	05:50AM	<1.3
	1340-C/F.E.	11	05:30PM	<1.3
	1455-C/F.E.	11	05:35PM	<1.3
	1455-7420	11	05:40PM	<1.3
	1430-C/F.E.	11	05:45PM	<1.3
	1240-C/F.E.	11	05:50PM	<1.3
	1240-6770	11	05:55PM	<1.3
	1215-6440	11	06:00PM	<1.3
	1315-6760	11	06:00PM	<1.3
	1215-6800	12	05:30AM	<1.3
	1240-6730	12	05:35AM	<1.3
	1365-VENTILACION	12	05:40AM	<1.3
	1365-6600	12	05:45AM	<1.3
	1430-RAMPA	12	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1190-6480	12	05:30PM	<1.3
	1290-6490	12	05:35PM	<1.3
	1340-6860	12	05:40PM	<1.3
	1430-C/F.E.	12	05:45PM	<1.3
	1190-6440	12	05:50PM	<1.3
	1315-7020	12	05:55PM	<1.3
	1315-6650	13	05:30AM	<1.3
	1455-C/F.E.	13	05:35AM	<1.3
	1215-6480	13	05:40AM	<1.3
	1215-VENTILACION	13	05:45AM	<1.3
	1215-SERVICIOS	13	05:50AM	<1.3
	1340-6900	13	05:55am	<1.3
	1290-6330	13	05:30PM	<1.3
	1455-C/F.O.	13	05:35PM	<1.3
	1365-C/F.O.	13	05:40PM	<1.3
	1240-C/F.E.	13	05:45PM	<1.3
	1190-6560	13	05:50PM	<1.3
	1315-6760	13	05:55PM	<1.3
	1290-6810	14	05:30AM	<1.3
	1365-6680	14	05:35AM	<1.3
	1190-6560	14	05:40AM	<1.3
	1215-6420	14	05:45AM	<1.3
	1215-6800	14	05:50AM	<1.3
	1290-6950	14	05:55am	<1.3
	1455-7420	14	06:00:AM	<1.3
	1340-RMUK	14	06:05AM	<1.3
	1340-C/F.E.	14	05:30PM	<1.3
	1430-C/F.E.	14	05:35PM	<1.3
	1240-6450	14	05:40PM	<1.3
	1315-6460	14	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1240-6420	15	05:30AM	<1.3
	1430-RAMPA	15	05:35AM	<1.3
	1315-6760	15	05:40AM	<1.3
	1215-6480	15	05:30PM	<1.3
	1190-SERVICIOS	15	05:35PM	<1.3
	1365-6640	15	05:40PM	<1.3
	1455-C/F.O.	15	05:45PM	<1.3
	1290-6760	15	05:50PM	<1.3
	1290-6760	16	05:30AM	<1.3
	1215SERVICIOS	16	05:35AM	<1.3
	1290-6330	16	05:40AM	<1.3
	1215-VENTILACION	16	05:45AM	<1.3
	1455-7380	16	05:50AM	<1.3
	1430-C/F.E.	16	05:55am	<1.3
	1215-6880	16	06:00:AM	<1.3
	1340-C/F.E.	16	05:30PM	<1.3
	1315-6650	16	05:35PM	<1.3
	1290-6950	16	05:40PM	<1.3
	1240-6730	16	05:45PM	<1.3
	1290-6430	17	05:30AM	<1.3
	1215-6480	17	05:35AM	<1.3
	1430-RAMPA	17	05:40AM	<1.3
	1315-6650	17	05:45AM	<1.3
	1365-C/F.O.	17	05:30PM	<1.3
	1430-C/F.O.	17	05:35PM	<1.3
	1240-6770	17	05:40PM	<1.3
	1190-6760	17	05:45PM	<1.3
	1190-6780	17	05:50PM	<1.3
	1215-6560	17	05:55PM	<1.3
	1240-C/F.E.	18	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1365-6650	18	05:35AM	<1.3
	1215-6520	18	05:40AM	<1.3
	1430-C/F.E.	18	05:45AM	<1.3
	1190-6660	18	05:30PM	<1.3
	1190-6620	18	05:35PM	<1.3
	1365-VENTILACION	18	05:40PM	<1.3
	1365-6600	18	05:45PM	<1.3
	1430-RAMPA	19	05:30AM	<1.3
	1365-6680	19	05:35AM	<1.3
	1315-6650	19	05:40AM	<1.3
	1190-6480	19	05:45AM	<1.3
	1215-6800	19	05:50AM	<1.3
	1315-6690	19	05:55am	<1.3
	1190-6560	19	05:30PM	<1.3
	1340-C/F.E.	19	05:35PM	<1.3
	1215-6520	19	05:40PM	<1.3
	1215-6880	19	05:45PM	<1.3
	1315-6690	19	05:50PM	<1.3
	1315-6690	20	05:30AM	<1.3
	1455-C/F.O.	20	05:35AM	<1.3
	1455-7380	20	05:40AM	<1.3
	1365-6640	20	05:45AM	<1.3
	1215-6440	20	05:50AM	<1.3
	1215-6560	20	05:55am	<1.3
	1240-C/F.E.	20	06:00:AM	<1.3
	1290-6950	20	05:30PM	<1.3
	1455-C/F.E.	20	05:35PM	<1.3
	1430-C/F.E.	20	05:40PM	<1.3
	1430-7360	20	05:45PM	<1.3
	1215-6800	21	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1240-C/F.O.	21	05:35AM	<1.3
	1315-6650	21	05:40AM	<1.3
	1215-6800	21	05:45AM	<1.3
	1290-6330	21	05:50AM	<1.3
	1215-6880	21	05:55am	<1.3
	1215-6520	21	05:30PM	<1.3
	1215-6880	21	05:35PM	<1.3
	1265-6950	21	05:40PM	<1.3
	1365-C/F.O.	21	05:45PM	<1.3
	1430-RAMPA	21	05:50PM	<1.3
	1365-6640	22	05:30AM	<1.3
	1365-6680	22	05:35AM	<1.3
	1240-6730	22	05:40AM	<1.3
	1240-6770	22	05:45AM	<1.3
	1215-6820	22	05:50AM	<1.3
	1340-6860	22	05:30PM	<1.3
	1430-C/F.O.	22	05:35PM	<1.3
	1430-RAMPA	22	05:40PM	<1.3
	1240-C/F.E.	22	05:45PM	<1.3
	1215-6480	22	05:50PM	<1.3
	1315-6890	22	05:55PM	<1.3
	1215-6880	22	06:00PM	<1.3
	1340-C/F.E.	23	05:30AM	<1.3
	1430-RAMPA	23	05:35AM	<1.3
	1455-C/F.O	23	05:40AM	<1.3
	1215-6800	23	05:45AM	<1.3
	1215-6440	23	05:50AM	<1.3
	1290-6950	23	05:55am	<1.3
	1430-C/F.E.	23	05:30PM	<1.3
	1215-SERVICIOS	23	05:35PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1240-6420	23	05:40PM	<1.3
	1265-6950	23	05:45PM	<1.3
	1430-7360	23	05:50PM	<1.3
	1315-6690	23	05:55PM	<1.3
	1315-6650	23	06:00PM	<1.3
	1315-6650	24	05:30AM	<1.3
	1190-6480	24	05:35AM	<1.3
	1290-6810	24	05:40AM	<1.3
	1265-6610	24	05:45AM	<1.3
	1290-6450	24	05:30PM	<1.3
	1290-6330	24	05:35PM	<1.3
	1365-6640	24	05:40PM	<1.3
	1265-6450	24	05:45PM	<1.3
	1265-6610	24	05:50PM	<1.3
	1215-6800	25	05:30AM	<1.3
	1365-C/F.O.	25	05:35AM	<1.3
	1315-6650	25	05:40AM	<1.3
	1365-VENTILACION	25	05:45AM	<1.3
	1215-6560	25	05:50AM	<1.3
	1430-C/F.O.	25	05:30PM	<1.3
	1240-C/F.E.	25	05:35PM	<1.3
	1265-6950	25	05:40PM	<1.3
	1455-C/F.E.	26	05:30AM	<1.3
	1455-7400	26	05:35AM	<1.3
	1240-6730	26	05:40AM	<1.3
	1240-6770	26	05:45AM	<1.3
1290-6630	26	05:50AM	<1.3	
1290-6610	26	05:55am	<1.3	
1430-RAMPA	26	05:30PM	<1.3	
1355-C/F.O.	26	05:35PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1455-7380	26	05:40PM	<1.3
	1215-6480	26	05:45PM	<1.3
	1215-6520	26	05:50PM	<1.3
	1240-6420	27	05:30AM	<1.3
	1190-6480	27	05:35AM	<1.3
	1355C/F.E.	27	05:40AM	<1.3
	1240-6610	27	05:45AM	<1.3
	1430-RAMPA	27	05:50AM	<1.3
	1365-6680	27	05:30PM	<1.3
	1290-6450	27	05:35PM	<1.3
	1190-6640	27	05:40PM	<1.3
	1365-VENTILACION	28	05:30AM	<1.3
	1455-C/F.O.	28	05:35AM	<1.3
	1290-6810	28	05:40AM	<1.3
	1190-6560	28	05:45AM	<1.3
	1290-6330	28	05:50AM	<1.3
	1290-6610	28	05:55am	<1.3
	1430-C/F.E.	28	05:30PM	<1.3
	1290-6950	28	05:35PM	<1.3
	1430-C/F.O.	28	05:40PM	<1.3
	1240-C/F.E.	29	05:30AM	<1.3
	1215-6800	29	05:35AM	<1.3
	1455-C/F.E.	29	05:40AM	<1.3
	1455-7330	29	05:45AM	<1.3
	1365-C/F.O.	29	05:50AM	<1.3
	1355-C/F.O.	29	05:30PM	<1.3
	1430-RAMPA	29	05:35PM	<1.3
	1265-6950	29	05:40PM	<1.3
	1250-6610	29	05:45PM	<1.3
	1460-RAMPA	29	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1290-6610	30	05:30AM	<1.3
	1265-6910	30	05:35AM	<1.3
	1290-6910	30	05:40AM	<1.3
	1265-6330	30	05:45AM	<1.3
	1430-C/F.O.	30	05:50AM	<1.3
	1455-C/F.O.	30	05:55am	<1.3
	1215-6330	30	06:00:AM	<1.3
	1430-7380	30	06:05AM	<1.3
	1240-C/F.O.	30	05:30PM	<1.3
	1340-6640	30	05:35PM	<1.3
	1460-RAMPA	30	05:40PM	<1.3
	1430-C/F.E.	30	05:45PM	<1.3
	1240-C/F.E.	30	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Julio	1215-6800	31	05:30AM	<1.3
	1240-6770	31	05:35AM	<1.3
	1460-rampa	31	05:40AM	<1.3
	1290-6810	31	05:45AM	<1.3
	1240-6730	31	05:30PM	<1.3
	1215-SERVICIOS	31	05:35PM	<1.3
	1215-6560	31	05:40PM	<1.3
	1365-6680	31	05:45PM	<1.3
	1430-RAMPA	31	05:50PM	<1.3
	1340-C/F.E.	31	05:55PM	<1.3

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

8 Geoquímica de Roca Estéril

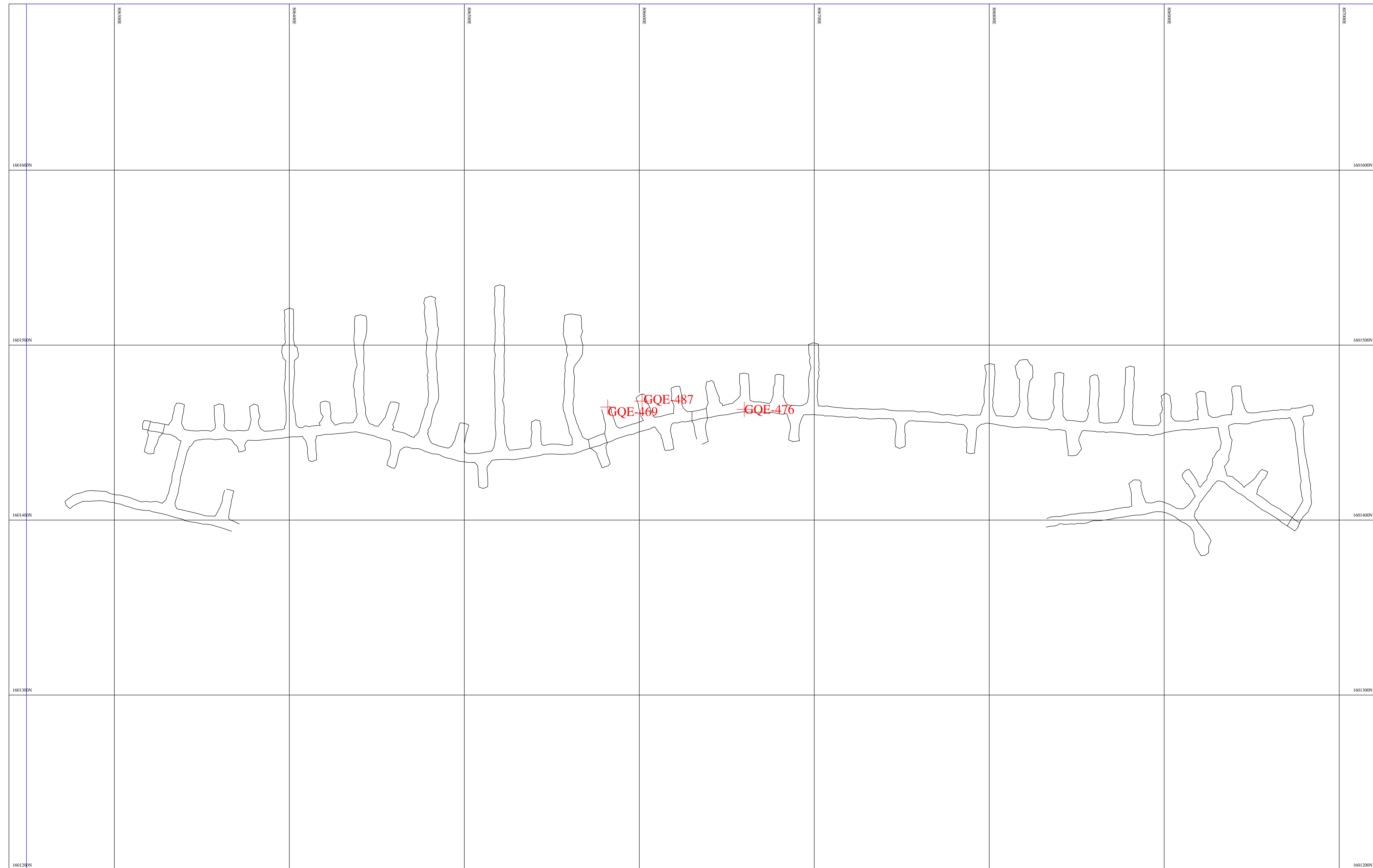
8.1 Sitios de Monitoreo

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 Mayo a Julio de 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, Figura 8-6, Figura 8-7 y Figura 8-8.

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

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-467	1215-6940-EC	806942	1601447.75	1222
GQE-468	1215-6480-OC	806480	1601445.5	1217
GQE-469	1190-6580-OC	806582	1601464.6	1196
GQE-470	1240-6460-OC	806460.5	1601434.9	1242
GQE-471	1215-6440-OC	806439	1601447.3	1217
GQE-472	1240-6760-EC	806760	1601430	1242
GQE-473	1365-6940-EC	806940	1601396	1367
GQE-474	1365-6640-EC	806660.52	1601363.4	1370
GQE-475	1340-CFTE-EC	807119	1601435.5	1351
GQE-476	1190-CFTE-EC	806660	1601463.3	1192
GQE-477	1240-6440-EC	806439.32	1601434.36	1242
GQE-478	1340-CFTE-EC	807172.3	1601450	1352
GQE-479	1365-CFTE-EC	806599	1601348.9	1369
GQE-480	1430-RAMP-ZE	807411.17	1601539.4	1419
GQE-481	1455-7400-ZE	807400	1601595	1451
GQE-482	1455-CFTO-ZE	807381	1601583	1452
GQE-483	1455-CFTE-ZE	807430	1601592	1451
GQE-484	1215-6960-EC	806961	1601453.24	1222
GQE-485	1430-RAMP-ZE	807455.5	1601556	1414
GQE-486	1430-CFTE-ZE	807358.4	1601580	1432
GQE-487	1190-6600-EC	806601.58	1601468	1196
GQE-488	1240-CFTE-EC	806787	1601414	1242
GQE-489	1365-6600	806600	1601364	1369
GQE-490	1430-CFTO-ZE	807308	1601565	1432

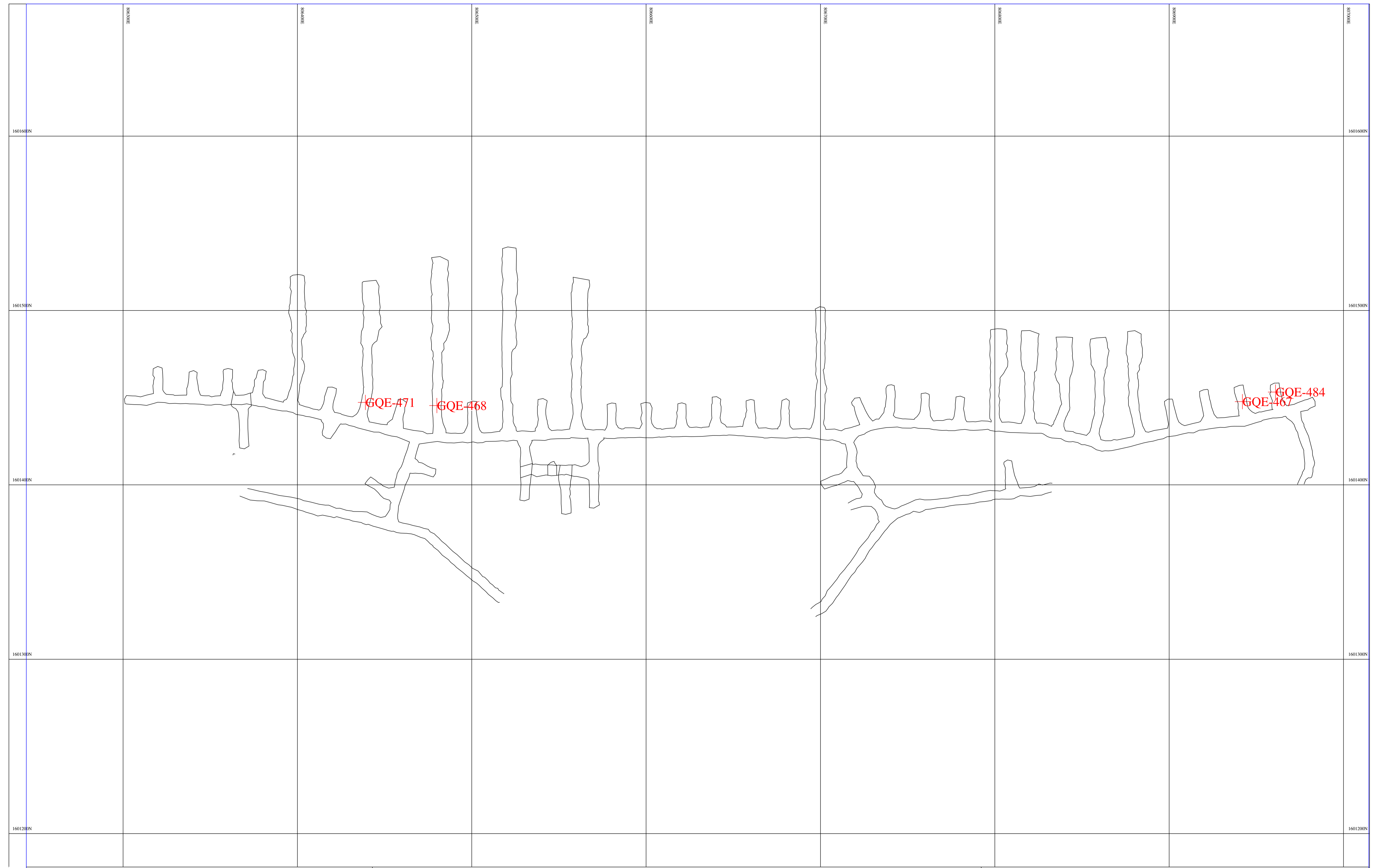
Fuente: MSR, 2015.



Plano ARD Nivel 1190

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

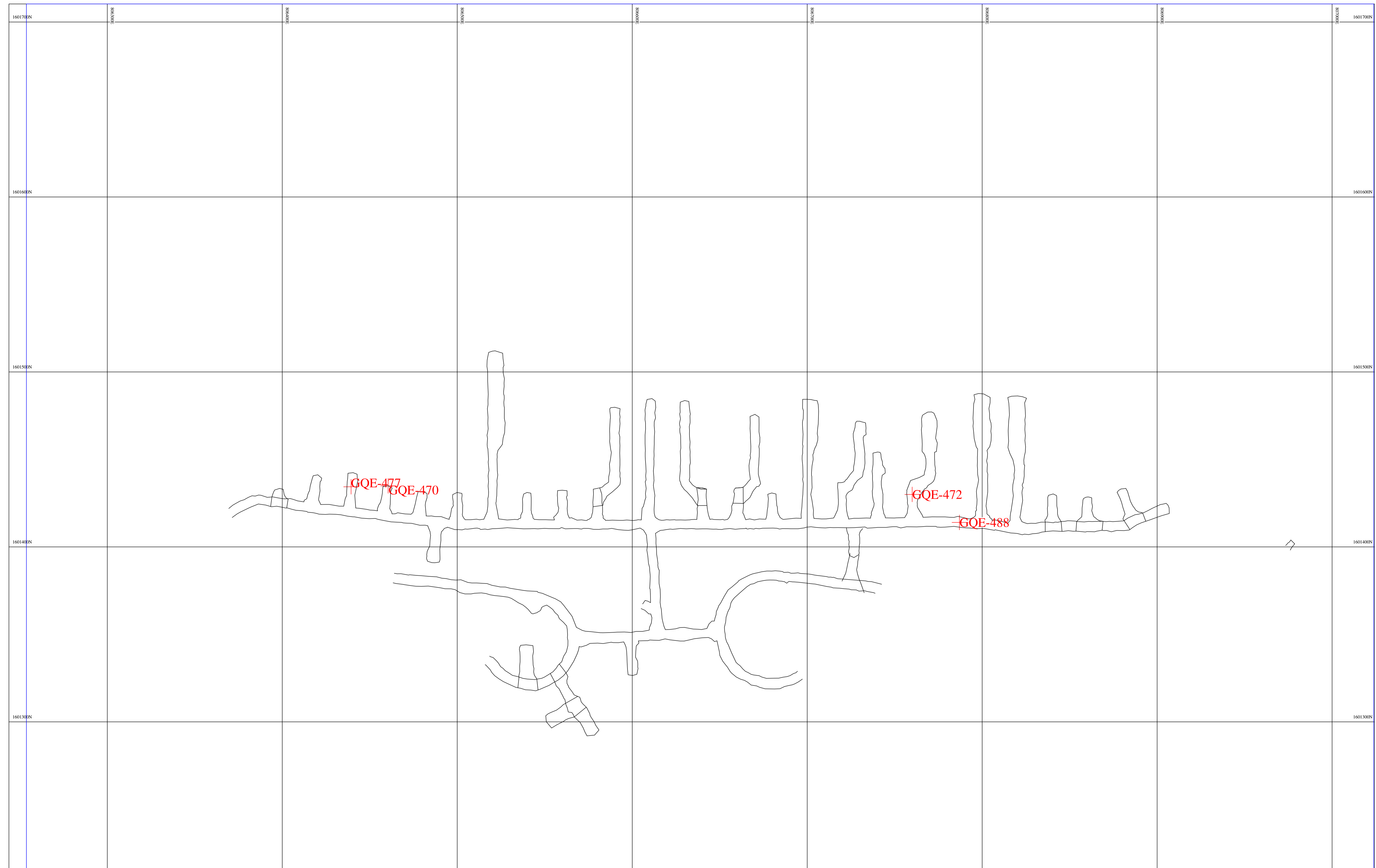
mayo-julio_2015



Plano ARD Nivel 1215

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

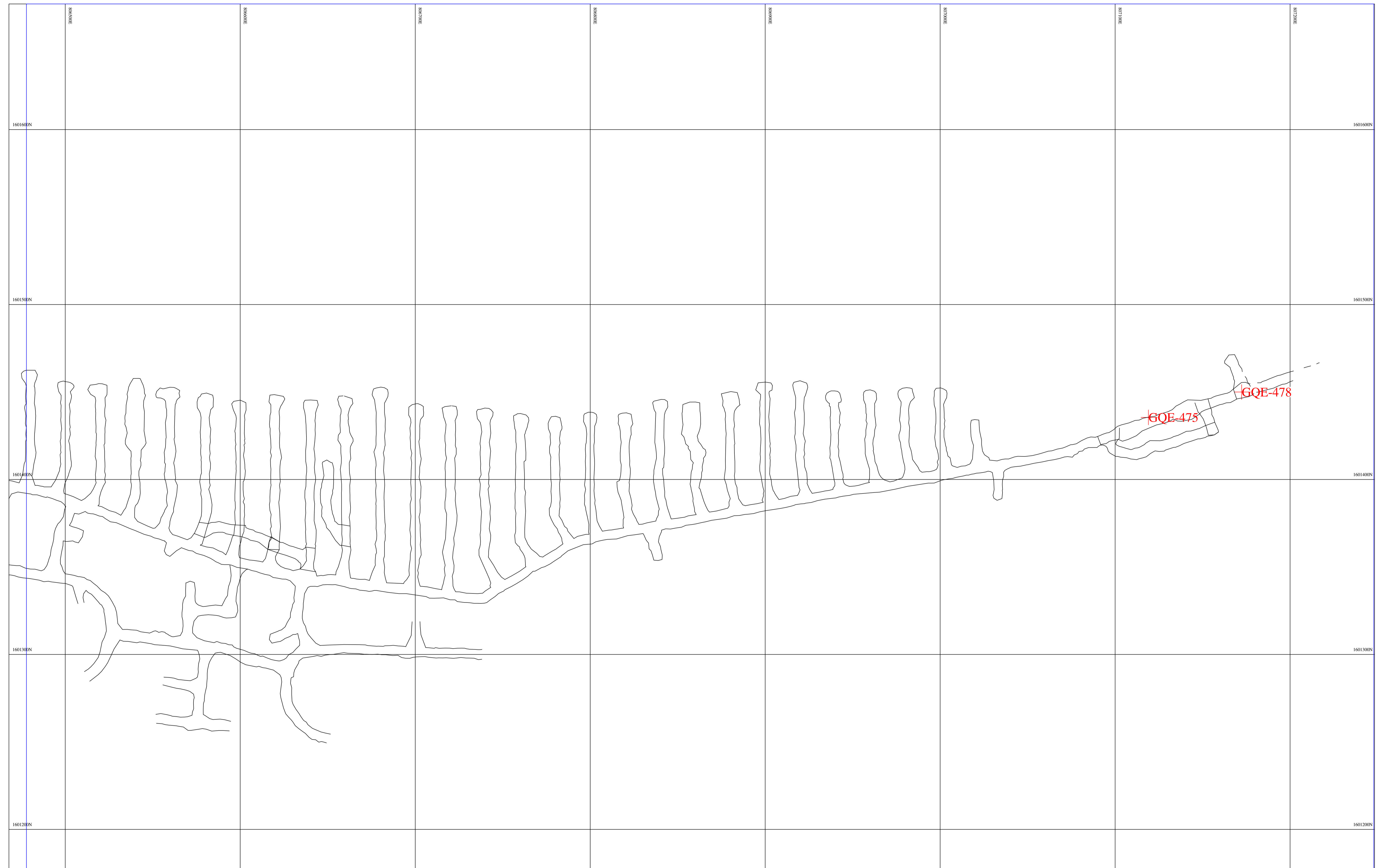
mayo-julio_2015_01



Plano ARD Nivel 1240

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

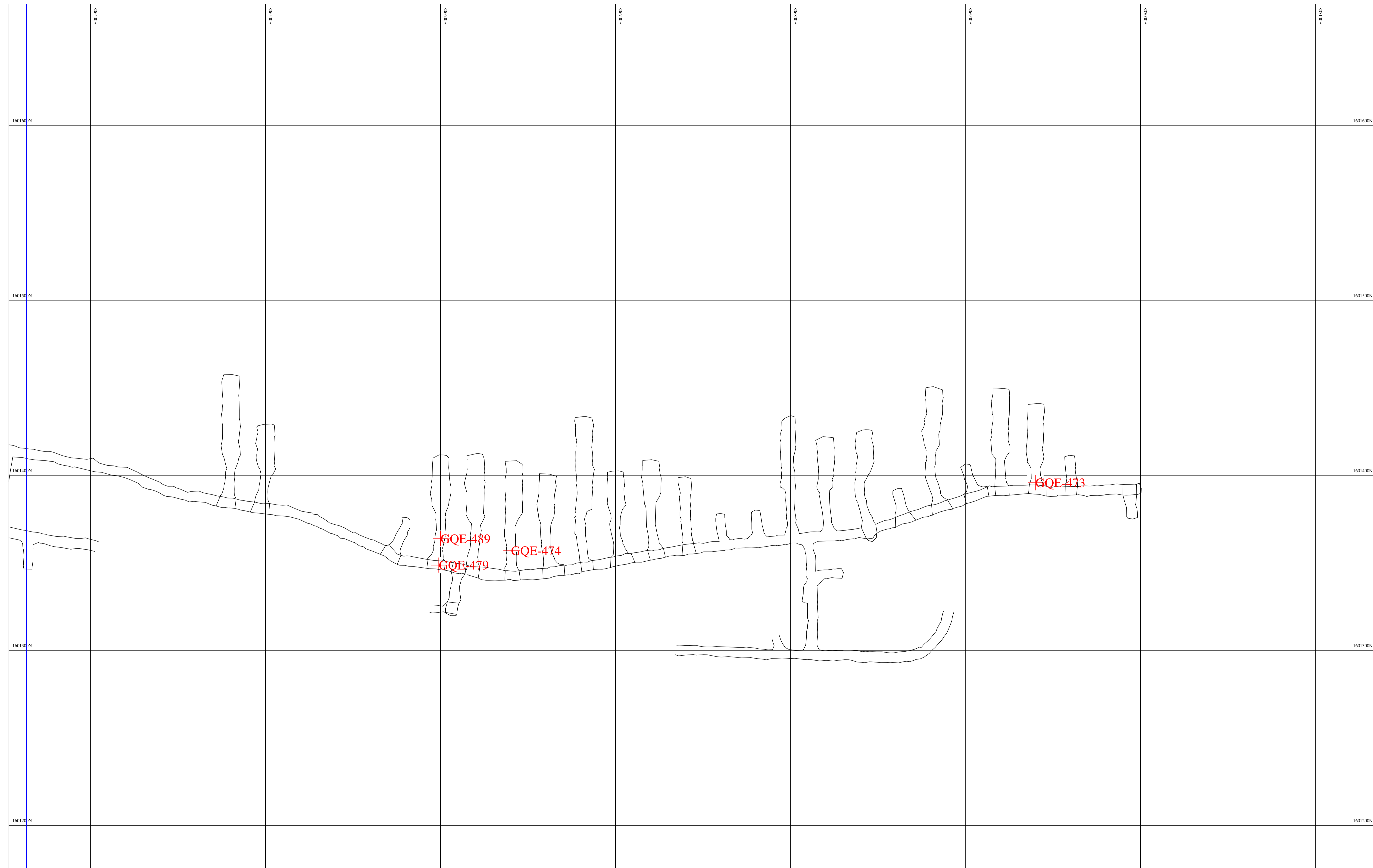
mayo-julio_2015_02



Plano ARD Nivel 1340

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

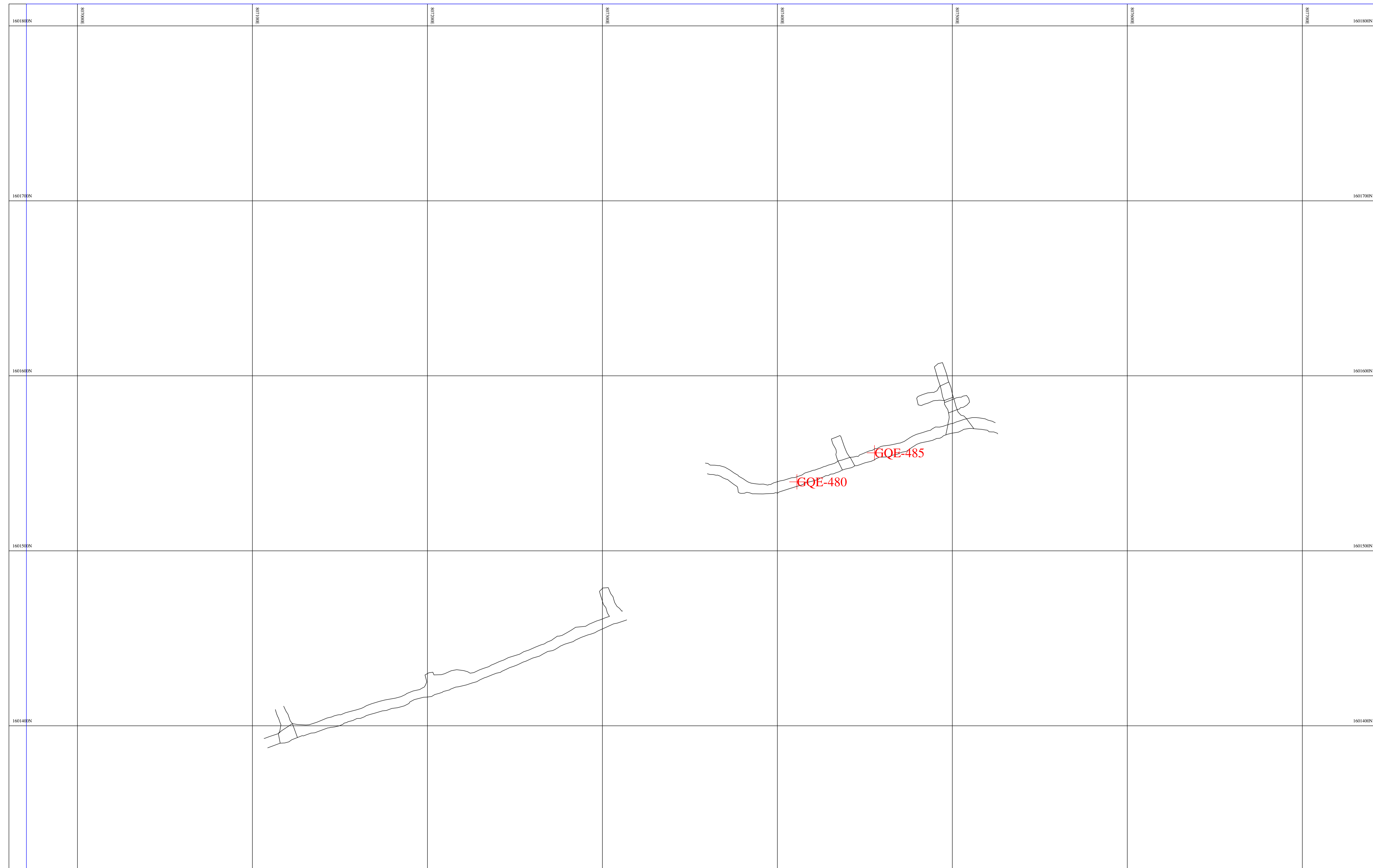
mayo-julio_2015_04



Plano ARD Nivel 1365

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

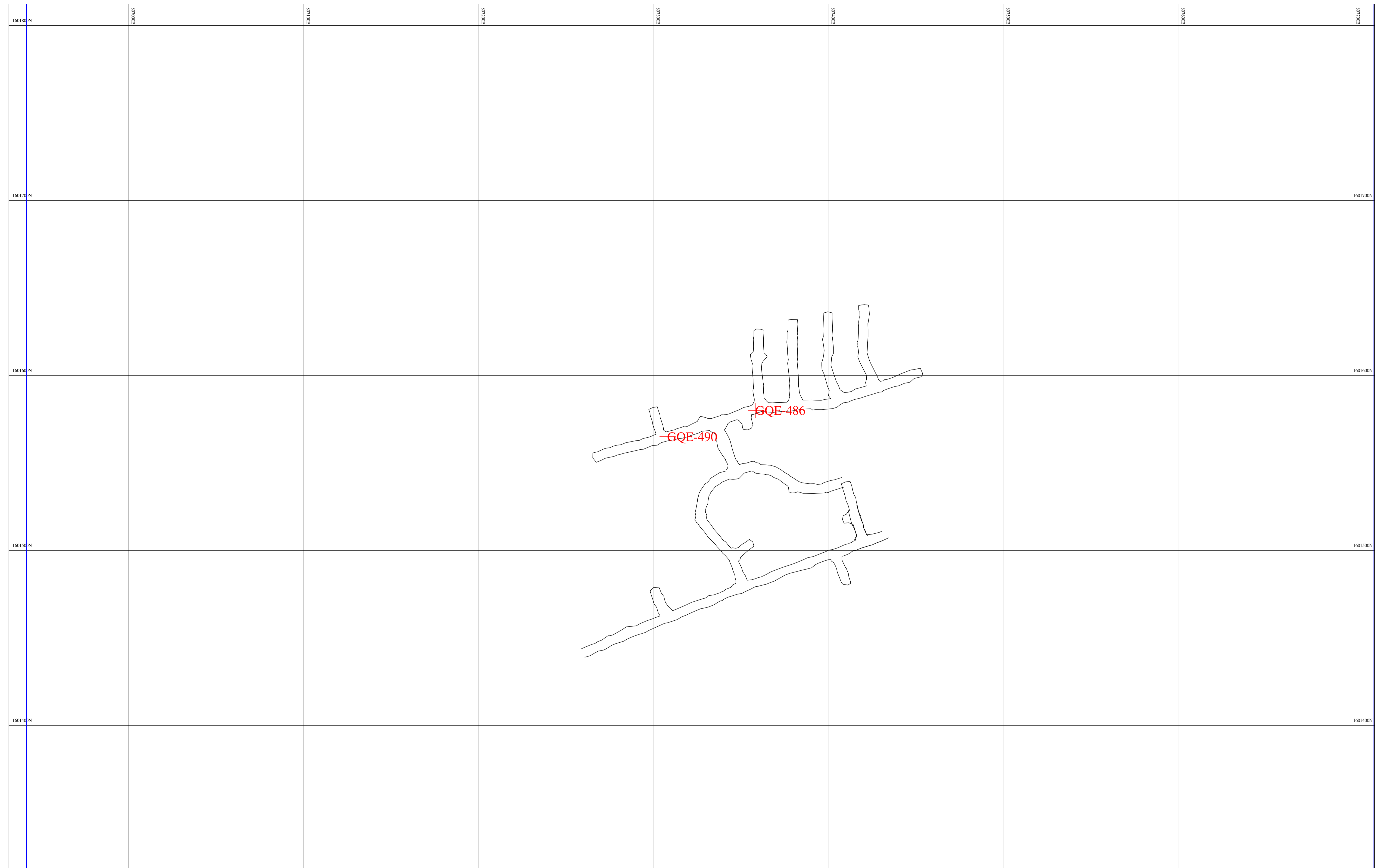
mayo-julio_2015_05



Plano ARD Rampa Nivel 1415 ZE

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

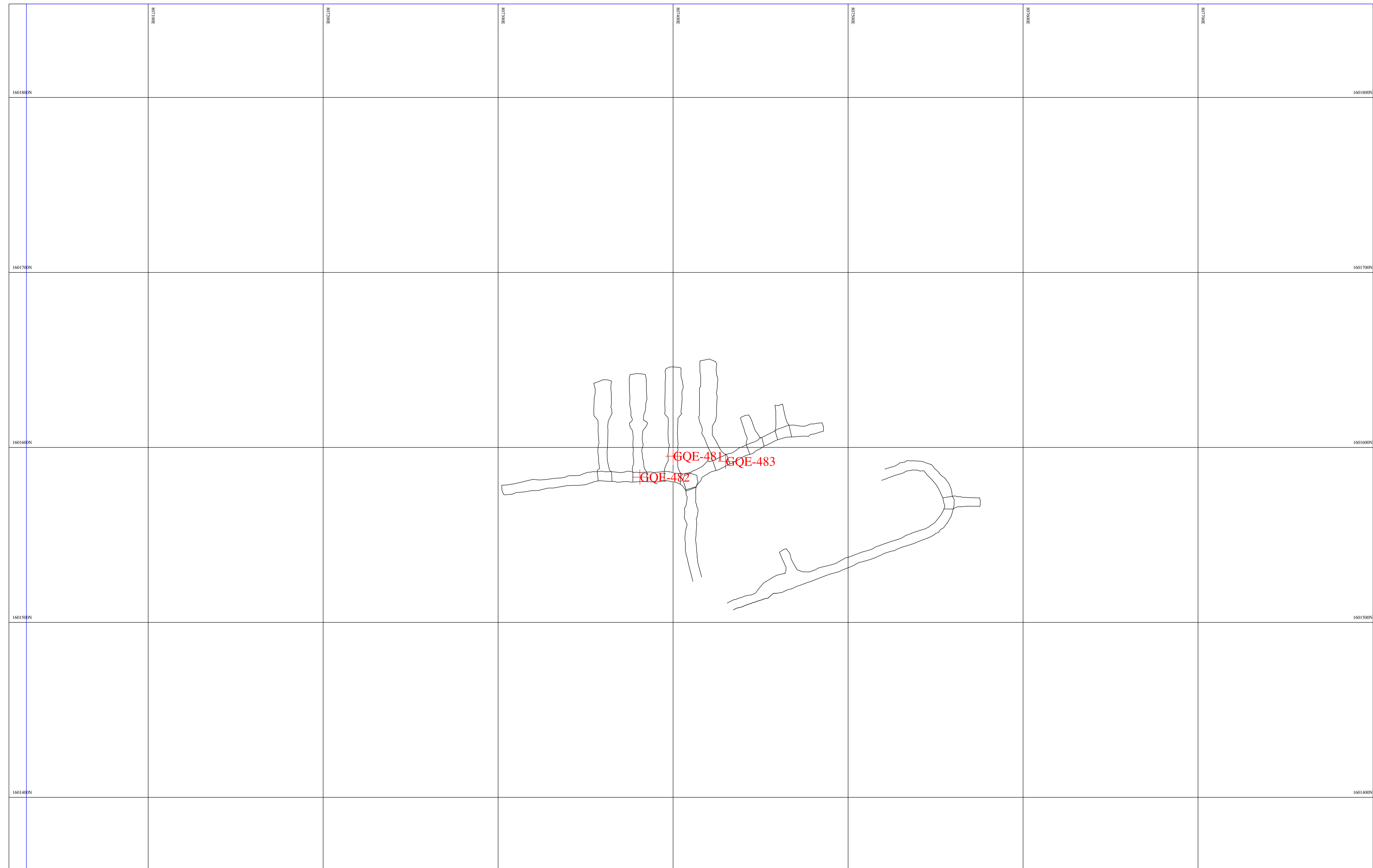
mayo-julio_2015_06



Plano ARD Nivel 1430

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

mayo-julio_2015_08



Plano ARD Nivel 1455

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

mayo-julio_2015_09

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 8.23 a 9.74 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-467	03/05/2015	16/05/2015	8.65	19.4
GQE-468	03/05/2015	16/05/2015	8.75	21.3
GQE-469	07/05/2015	16/05/2015	8.79	21.9
GQE-470	07/05/2015	16/05/2015	8.96	21.8
GQE-471	14/05/2015	16/05/2015	8.87	21.8
GQE-472	17/05/2015	27/05/2015	9.74	19.1
GQE-473	18/05/2015	27/05/2015	9.7	18.9
GQE-474	22/05/2015	27/05/2015	8.63	19.2
GQE-475	23/05/2015	27/05/2015	8.87	19.3
GQE-476	24/05/2015	27/05/2015	8.74	19.7
GQE-477	06/06/2015	08/06/2015	8.64	23.5

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-478	06/06/2015	08/06/2015	8.7	22.9
GQE-479	06/06/2015	08/06/2015	8.39	22.3
GQE-480	06/06/2015	08/06/2015	9.1	21.7
GQE-481	02/07/2015	05/07/2015	8.24	23.9
GQE-482	02/07/2015	05/07/2015	8.54	23.5
GQE-483	02/07/2015	05/07/2015	8.75	23.3
GQE-484	02/07/2015	05/07/2015	8.23	23.8
GQE-485	03/07/2015	05/07/2015	8.86	23.6
GQE-486	03/07/2015	05/07/2015	8.88	24.1
GQE-487	09/07/2015	27/07/2015	8.55	19.0
GQE-488	11/07/2015	27/07/2015	8.67	18.6
GQE-489	20/07/2015	27/07/2015	8.4	18.6
GQE-490	20/07/2015	27/07/2015	8.74	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 Mayo a Julio 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		2015		
Mes		May	Jun	Jul
Fecha		12/05/15	18/06/15	07/07/15
Hora Inicio		7:00	7:00	7:29
Duración		11h	11h	10.5h
Lmax dBA		118	133,9	144,8
Lmin dBA		65	60,8	60,8
Prom. Diurno dBA		87,4	90,8	102,1
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)		87,4	90,8	102,1
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		72,9	76,3	87,6
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	No Aceptable

Superficie Planta de Proceso - MOLINO		2015		
Mes		May	Jun	Jul
Fecha		12/05/15	04/06/15	16/07/15
Hora Inicio		7:00	7:25	7:04
Duración		11h	10h	10h
Lmax dBA		143,7	132,7	142,3
Lmin dBA		64		60,9
Prom. Diurno dBA		95,7	91,6	106,2
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)		95,7	91,6	106,2
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		81,2	77,1	91,7
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	No Aceptable

Superficie Planta de Proceso - FILTROS		2015		
Mes		May	Jun	Jul
Fecha			18/06/15	16/07/15
Hora Inicio			7:26	7:09
Duración			10h	11h
Lmax dBA			143,6	130,2
Lmin dBA			60,9	60,7
Prom. Diurno dBA			92,5	86,9
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*			86	86
Duración de Referencia OSHA			12h	12h
Leq (Normal sin uso de EPP)			92,5	86,9
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)			78	72,4
Resultado (Leq ≤ Límite, entonces es Aceptable)			Aceptable	Aceptable

Puesto de Operador de Scoop		2015		
Mes		May	Jun	Jul
Fecha			11/06/15	15/07/15
Hora Inicio			6:30	7:00
Duración			11h	10.5h
Lmax dBA			139,1	138,1
Lmin dBA				60,7
Prom. Diurno dBA			99,6	102,4
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*			86	86
Duración de Referencia OSHA			12h	12h
Leq (Normal sin uso de EPP)			99,6	102,4
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)			85,1	87,9
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)			Aceptable	Aceptable

Puesto de Operador de Jumbo		2015		
Mes		May	Jun	Jul
Fecha			16/06/15	09/07/15
Hora Inicio			6:55	7:05
Duración			11h	11h
Lmax dBA			133	131,5
Lmin dBA			60,6	60,7
Prom. Diurno dBA			102,7	100,7
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*			86	86
Duración de Referencia OSHA			12h	12h
Leq (Normal sin uso de EPP)			102,7	100,7
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)			88,2	86,2
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)			Aceptable	Aceptable

Puesto de Operador de Boltec		2015		
Mes		May	Jun	Jul
Fecha			11/06/15	15/07/15
Hora Inicio			6:27	6:58
Duración			11h	11h
Lmax dBA			151,4	140,8
Lmin dBA			60,9	60,7
Prom. Diurno dBA			96,2	89,5
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*			86	86
Duración de Referencia OSHA			12h	12h
Leq (Normal sin uso de EPP)			96,2	89,5
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)			81,7	75
Resultado (Leq ajustado ≤ Límite, entonces es 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 7502 y filtro 3M código 60926 P100 Homologación NIOSH.

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

Superficie Planta de Proceso - TRITURACION							XIV		
Trimestre							Mayo	Junio	Julio
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	NORMA µg/m3	GUIA µg/m3		27/05/2015		22/07/2015
Fecha							7:00	7:00	
Hora Inicio									
Duración							11 h	11 h	
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	0,135		0,031
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0,035		0,045

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							XIV		
Trimestre							Mayo	Junio	Julio
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	NORMA µg/m3	GUIA µg/m3		28/05/2015	12/06/2015	22/07/2015
Fecha							7:00	7:00	7:00
Hora Inicio									
Duración							11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	0,024	0,283	0,028
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0,047	0,283	0,05

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							XIV		
Trimestre							Mayo	Junio	Julio
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	NORMA µg/m3	GUIA µg/m3		28/05/2015	12/06/2015	22/07/2015
Fecha							7:00	7:00	7:00
Hora Inicio									
Duración							11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	0,076	0,165	0,029
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0,208	0,183	0,082

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.

Interior Mina General - REZAGA							XIV		
Trimestre							Mayo	Junio	Julio
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	NORMA µg/m3	GUIA µg/m3		19/05/2015		21/07/2015
Fecha							7:00	7:00	
Hora Inicio									
Duración							11 h	11 h	
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	0,7		0,791
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	1,27		0,87

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.

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), los sistemas de ventilación se mantienen trabajando de manera normal. Como se puede apreciar en el Cuadro 9-3 se siguió monitoreando la no presencia de Ácido Sulfhídrico - Sulfuro de Hidrógeno (H_2S) y se omitirá hasta detectarse la primera vez. De igual forma, 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 XIV trimestre 2015, acorde a procedimiento de tomar la primera etapa del ciclo que aparezca.

FECHA	Lugar	Maquinaria	Etapas de Ciclo	CO (PPM)	H2S (PPM)	Hora	Turno	Reportado por
				Límite Máximo Turno 25ppm, Exposición Breve 50 ppm	Límite 10ppm, Valores mayores a 1ppm alertar.			
01-may-15	1340-6920-EC	Ninguna	Medición posterior a voladura	9	0	8:40	Diurno	Lucy Lima/Amarildo Mijangos
	1315-6920-EC	Ninguna	Medición posterior a voladura	35	0	9:00		
	1430-RAMP.ZE	Ninguna	Medición posterior a voladura	11	0	7:15		
	1340-CFTE-EC	Ninguna	Medición posterior a voladura	20	0	7:21		
	1315-6690-EC	Ninguna	Medición posterior a voladura	8	0	7:40		
	1190-CFTE-OC	Ninguna	Medición posterior a voladura	25	0	7:48		
	1190-6580-OC	Ninguna	Medición posterior a voladura	25	0	7:48		
	1190-6480-OC	Ninguna	Medición posterior a voladura	23	0	7:17		
01-jun-15	1365-6880-EC	Ninguna	Medición posterior a voladura	9	0	6:55	Diurno	Marvin López
	1315-6690-EC	Ninguna	Medición posterior a voladura	0	0	7:05		
	1290-6450-O.C	Ninguna	Medición posterior a voladura	0	0	7:15		
	1340-CFTE-EC	Ninguna	Medición posterior a voladura	9	0	7:00		
	1240-6520-O.C	Ninguna	Medición posterior a voladura	12	0	7:25		
	1290-6860-EC	Ninguna	Medición posterior a voladura	70	0	7:10		
	1265-6860-EC	Ninguna	Medición posterior a voladura	8	0	7:25		
	1290-6860-EC	Ninguna	Medición posterior a voladura	45	0	8:00		
	1290-6860-EC	TL-04	Reparación manga	0	0			
	1288-Ramp. O.C	-	Construcción Oficina	0	0			
	Taller mlto. Movil	-	Reparación bomba sumidero	0	0			
01-jul-15	1190-6660-EC	Ninguna	Medición posterior a voladura	12	0	6:57	Diurno	Jose Canillo
	1190-6680-EC	Ninguna	Medición posterior a voladura	12	0	6:57		
	1315-6610-EC	Ninguna	Medición posterior a voladura	3	0	7:12		
	1430-RAMP.ZE	Ninguna	Medición posterior a voladura	16	0	6:54		
	1240-6760-EC	Ninguna	Medición posterior a voladura	15	0	7:10		
	1190-6400-OC	LL-30	Rezaga	29	4	9:10		

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 (**NPS**, **SO₂**, **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 en todas las estaciones, 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 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 y cianuro total 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 lo 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** y **GW** 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, a excepción de **GW3** en sólidos disueltos totales.
- 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 2015.

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 7502 y filtro 3M código 60926 P100 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.

Mayo-15																															
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")	29550.4	29948.5	30319.8	30840	590048	590279	590662	591282	592294	592922	593650	594042	594596	595102	595476	595949	596603	597316	597943	598596	599301	599939	600454	600456	600569	600713	600807	600809	600817	600858	600862
Total Este (tubería 8")	1141869	1305479	1651335	1660580	1802647	1960629	2164297	2303785	2477612	2494337	2572545	2743352	2815167	2815226	2815226	2858333	2917939	2939690	3065830	3123000	3265556	3381888	3444014	3565453	3726095	3735902	3945014	4223334	4558067	4896498	5011252
Portal Oeste (tubería 6")	220989	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	
Portal Oeste (tubería 8")	186098	189546	192723	195453	198337	201235	204035	206084	208710	211550	215218	218607	222238	226122	230068	234057	238371	242806	246398	249863	253267	256716	260467	264487	268590	268590	268596	272236	276172	279852	284142
Clarificador	3174853	3178933	3182727	3186926	3191181	3195877	3200461	3204461	3209083	3212478	3216258	3220284	3223896	3227961	3232422	3236198	3239764	3242798	3245954	3248648	3251895	3256085	3260551	3264824	3269716	3273524	3277427	3280963	3285640	3289911	3293548
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	1119	398	371	520	559208	231	383	620	1012	628	728	392	554	506	374	473	654	713	627	653	705	638	515	2	113	144	94	2	8	41	45
Total Este (tubería 8")	5400	163610	345856	9245	142067	157982	203668	139488	173827	16725	78208	170807	71815	59	0	43107	59606	21751	126140	57170	142556	116332	62126	121439	160642	9807	209112	278320	334733	338431	453185
Portal Oeste (tubería 6")	0	1	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")	2406	3448	3177	2730	2884	2898	2800	2049	2626	2840	3668	3389	3631	3884	3946	3989	4314	4435	3592	3465	3404	3449	3751	4020	4103	0	6	3640	3936	3680	7970
Clarificador	3892	4080	3794	4199	4255	4696	4584	4000	4622	3395	3780	4026	3612	4065	4461	3776	3566	3034	3156	2694	3247	4190	4466	4273	4892	3808	3903	3536	4677	4271	7908
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	205	73	68	95	102521	42	70	114	186	115	133	72	102	93	69	87	120	131	115	120	129	117	94	0	21	26	17	0	1	8	8
Total Este (tubería 8")	990	29995	63407	1695	26046	28963	37339	25573	31868	3066	14338	31315	13166	11	0	7903	10928	3988	23126	10481	26135	21328	11390	22264	29451	1798	38337	51025	61368	62046	83084
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")	441	632	582	501	529	531	513	376	481	521	672	621	666	712	723	731	791	813	659	635	624	632	688	737	752	0	1	667	722	675	1461
Clarificador	714	748	696	770	780	861	840	733	847	622	693	738	662	745	818	692	654	556	579	494	595	768	819	783	897	698	716	648	857	783	1450

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

Junio-15																															
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")	601098	601113	601254	601523	601942	602188	602314	602356	602470	602858	603075	603206	603930	604195	604376	604775	605339	605796	605796	605796	605796	605796	605796	605796	605796	605796	605796	605796	605796	605796	605836
Total Este (tubería 8")	5238725	5434570	5680839	5858087	6106399	6190071	6327167	6524071	6707124	6782815	6836462	6868277	6966398	6989868	7035212	7039526	7039749	7039749	7039775	7039775	7039877	7039877	7040102	7040122	7040188	7041931	7042196	7042211	7043911	7047066	
Portal Oeste (tubería 6")	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	
Portal Oeste (tubería 8")	287742	290548	274708	298214	303205	305626	309858	313791	317687	321726	324391	324483	327031	329685	322796	335408	338162	340587	343164	345190	347788	349847	351024	352706	354211	357036	359360	361191	363003	365963	
Clarificador	3296486	3300347	3304164	3306881	3310923	3313415	3315998	3319221	3323304	3327293	3331621	3336071	3340340	3344970	3349095	3352430	3355882	3359452	3367730	3366163	3369128	3372615	3375818	3379288	3382944	3386393	3389805	3392893	3395930	3399030	
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	236	15	141	269	419	246	126	42	114	388	217	131	724	265	181	399	564	457	0	0	0	0	0	0	0	0	0	0	0	40	
Total Este (tubería 8")	227473	195845	246269	177248	248312	83672	137096	196904	183053	75691	53647	31815	98121	23470	45344	4314	223	0	26	0	102	0	225	20	66	1743	265	15	1700	3155	
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	
Portal Oeste (tubería 8")	3600	2806	-15840	23506	4991	2421	4232	3933	3896	4039	2665	92	2548	2654	-6889	12612	2754	2425	2577	2026	2598	2059	1177	1682	1505	2825	2324	1831	1812	2960	
Clarificador	2938	3861	3817	2717	4042	2492	2583	3223	4083	3989	4328	4450	4269	4630	4125	3335	3452	3570	8278	-1567	2965	3487	3203	3470	3656	3449	3412	3088	3037	3100	
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	43	3	26	49	77	45	23	8	21	71	40	24	133	49	33	73	103	84	0	0	0	0	0	0	0	0	0	0	7		
Total Este (tubería 8")	41703	35905	45149	32495	45524	15340	25134	36099	33560	13877	9835	5833	17989	4303	8313	791	41	0	5	0	19	0	41	4	12	320	49	3	312	578	
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	
Portal Oeste (tubería 8")	660	514	-2904	4309	915	444	776	721	714	740	489	17	467	487	-1263	2312	505	445	472	371	476	377	216	308	276	518	426	336	332	543	
Clarificador	539	708	700	498	741	457	474	591	749	731	793	816	783	849	756	611	633	655	1518	-287	544	639	587	636	670	632	626	566	557	568	

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

Julio-15																															
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")	606023	606122	606333	608406	606599	607065	607628	608478	609054	609792	610513	611133	564.2	1549.45	2318.51	2855.64	3478.52	3917.33	NL	293.5	1157.96	2074.34	2541.21	3358.48	4095.24	4678.8	5644.92	6663.16	8264.5	9499.17	10610.9
Total Este (tubería 8")	7784435	7878541	7962151	8093342	8361049	8640635	8924060	9107624	9303127	9533757	9587815	10230410	10256504	10259855	10383675	10639729	10907346	11176424	NL	316.219	611.263	1120.22	1779.75	2585.5	3270.14	4071.8	4473	4518.96	4572.54	4604.89	4835.11
Portal Oeste (tubería 6")	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	220990	0	0	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	
Portal Oeste (tubería 8")	369047	372527	375812	378954	382058	384951	387639	390465	393632	396413	399178	401814	404814	408037	411534	415197	418433	362.8	38386.2	4161.6	8205.9	11962.8	15696.4	19505.2	23521.6	27467.9	31419.9	35451.4	39237.7	43500.1	47361.2
Clarificador	3402794	3406414	3411008	3414687	3418032	3421899	3425295	3429983	3434432	3438791	3442695	3447849	3451782	3455819	3459921	3464369	3468466	3472751	3477019	3481752	3485987	3490237	3493800	3497605	3501721	3505719	3508689	3513407	3517332	3521119	3524127
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	187	99	211	2073	-1807	466	563	850	576	738	721	620	-610569	985	769	537	623	439	NL	294	864	916	467	817	737	584	966	1018	1601	1235	1112
Total Este (tubería 8")	737369	94106	83610	131191	267707	279586	283425	183564	195503	230630	54058	642595	26094	3351	123820	256054	267617	269078	NL	316	295	509	660	806	685	802	401	46	54	32	230
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-220990	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	3084	3480	3285	3142	3104	2893	2688	2826	3167	2781	2765	2636	3000	3223	3497	3663	3236	-418070	38023	-34225	4044	3757	3734	3809	4016	3946	3952	4032	3786	4262	3861
Clarificador	3764	3620	4594	3679	3345	3867	3396	4688	4449	4359	3904	5154	3933	4037	4102	4448	4097	4285	4268	4733	4235	4250	3563	3805	4116	3998	2970	4718	3925	3787	3008
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	34	18	39	380	-331	85	103	156	106	135	132	114	-111938	181	141	98	114	80	NL	54	158	168	86	150	135	107	177	187	294	226	204
Total Este (tubería 8")	135184	17253	15329	24052	49080	51257	51961	33653	35842	42282	9911	117809	4784	614	22700	46943	49063	49331	NL	58	54	93	121	148	126	147	74	8	10	6	42
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-40515	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	565	638	602	576	569	530	493	518	581	510	507	483	550	591	641	672	593	-76646	6971	-6275	741	689	684	698	736	723	725	739	694	781	708
Clarificador	690	664	842	674	613	709	623	859	816	799	716	945	721	740	752	815	751	786	782	868	776	779	653	698	755	733	545	865	720	694	551

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

Mayo 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.	7.54	6.81	7.41	7.19	7.3	7.25	7.55	7.49	7.46	7.52	7.92	7.09	6.85	7.27	7.14	7.04	6.87	7.33	7.33	6.67	7.15	6.56	7.5	7.02	7.06	6.44	8.91	7.35	7.33	7.33	6.97
Temperatura	°C	27.8	24.1	26.7	26.6	26	27	27.6	27.3	27.1	28.2	27.7	26.7	25.6	28.4	26.7	26.6	28.2	28.6	27	26.9	26.8	27.4	27.7	27.6	27.3	27.8	29.1	28.1	25.9	27.4	NA
Conductividad	µS/cm	2258	2734	1894	1863	2082	2222	1973	1917	1922	1912	1291	2010	2051	1896	1971	2033	1899	1891	2015	1939	2028	1948	1974	1984	1829	1903	2032	2066	1998	1993	18.81
Turbidez	NTU	4.02	11.4	7.69	7.31	6.89	9	10.2	4.8	10.9	9.95	6.2	7.61	7.49	17.1	3.08	13.4	6.51	7.51	7.15	6.62	3.84	5.53	10.5	9.15	3.34	7.11	7.05	15	5.79	7.8	11.6
kit CN	mg/L	0.003	0.004	0.004	0.000	0.006	0.006	0.004	0.002	0.003	0.001	0.007	0.003	0.000	0.007	0.004	0.002	0.003	0.002	0.002	0.003	0.002	0.003	0.000	0.008	0.006	0.007	0.002	0.005	0.004	0.003	0.002
CN Total		0.01	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	NA	0.006	NA	<0.003	NA	NA	NA	NA	NA	0.005	NA	0.004	NA	NA	NA	<0.003	NA	<0.003
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	9.74	9.86	9.87	9.83	9.81	10.24	9.94	10.14	9.61	8.48	8.68	8.48	7.85	8.01	8.27	8.24	8.19	8.77	8.65	8.79	9.4	9.7	9.71	7.69	8.46	8.64	8.51	8.58	7.97	8.7	8.63
Temperatura	°C	20.2	22.1	20.8	19.7	19.6	21	21.3	20	24.5	21.1	21.1	20.7	21.4	24	19.6	20.9	22.1	23	22.2	22.1	23.4	22.8	22.7	21.5	21.7	23.2	23.1	22.9	21.4	22.2	23.6
Conductividad	µS/cm	107.4	110.7	482.4	131	645.4	289.2	143.9	133.4	142.9	141.4	110.6	117.9	114.8	126.5	127.2	117.2	121.1	263.3	126.3	113.5	515	317.6	148.6	112.4	79.01	148.1	88.53	142.4	86.14	92.98	89.34
Turbidez	NTU	127	119	113	111	107	102	103	100	86.6	75.7	62	59	48.3	55.4	42.8	37.2	35.1	38.8	33.8	33.4	27.7	28	26.6	25.5	64.3	55.3	53.8	55.5	46.7	40.6	36.3
Kit CN	mg/L	0.001	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.009	0.003	0.000	0.000	0.000	0.003	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CN Total		NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	<0.003	NA	NA	NA	<0.003	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.

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Junio 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
Efluente Planta de Tratamiento Agua de Túneles (WW9)																															
pH	u.e.	6.77	7.02	6.79	9.57	6.82	7.95	7.97	6.93	7.25	8.06	7.26	7.21	7.58	7.49	7.32	7.34	6.82	7.34	7.65	7.59	7.68	7.59	7.6	7.43	6.5	7.15	7.49	6.61	7.52	7.48
Temperatura	°C	27	26.5	27.5	26.7	26.5	26	26.9	25.3	27.4	27	27.7	28.1	28.1	26.2	27.5	23.3	25.8	27.4	25.7	26	26.8	28.4	26.4	27.7	27.7	27.7	26.8	27.1	27.4	26.9
Conductividad	µS/cm	2090	2051	1968	2450	2084	2070	2027	2226	2042	2143	2059	2193	1981	2125	2124	2065	1952	1956	2491	2057	2076	1926	2053	2036	2396	2017	2008	2066	1895	196
Turbidez	NTU	3.87	5.22	8.78	17	6.04	26.1	12.7	24.2	7.06	6.55	7.13	5.44	8.26	14.6	7.01	11.8	12.4	15.2	19.8	13.4	7.19	14.8	8.55	9.64	6.47	7.06	5.01	6.24	9.32	4.02
kit CN	mg/L	0.002	0.004	0.003	0.004	0.002	0.007	0.004	0.002	0.000	0.003	0.003	0.008	0.005	0.004	0.004	0.001	0.008	0.003	0.003	0.000	0.003	0.002	0.004	0.000	0.003	0.006	0.006	0.001	0.019	0.008
CN Total		NA	NA	NA	NA	NA	NA	NA	NA	0.003	NA	NA	NA	0.003	NA	NA	NA	NA	NA	0.005	NA	NA	0.004	NA	NA	NA	<0.003	NA	NA	NA	<0.003
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																															
pH	u.e.	8.76	8.53	8.16	7.58	8.42	7.12	8.75	8.64	8.21	8.85	8.98	9.05	8.38	8.4	9.17	8.98	9.04	9.02	9.01	8.97	9.14	8.1	8.4	7.97	7.64	7.38	8.16	8.13	8.31	8.35
Temperatura	°C	22.5	20.3	20.8	21	22.3	20.9	23.2	21.6	21.6	22.8	24	23.4	21.8	22.6	15.2	25		24	23.4	22.3	21.7	24.5	21.7	23.7	22.7	23.2	23.2	22.1	26.4	23.4
Conductividad	µS/cm	471.2	111.8	77.19	70.31	78.53	73.07	53.13	79.57	166	123.4	235	412.8	68.46	71.9	1286	1233	1174	1634	2093	1273	1269	1365	1280	1373	1584	1390	1376	1357	1306	1305
Turbidez	NTU	30.9	38	59	53.7	44.9	36.7	28.2	26.2	23.1	22.4	20.6	22	20	23.2	15.2	18.6	28.3	24	10.7	7.88	6.46	9.85	5.63	6.81	3.34	3.84	4.67	5.54	4.91	2.64
Kit CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.010	0.007	0.004	0.000	0.003	0.004	0.002	0.006	0.004	0.004	0.008	0.004	0.007	0.002
CN Total		NA	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	NA	0.005	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	<0.003	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.

Julio 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.	7.28	7.16	7.25	7.37	7.37	7.62	7.95	6.84	7.57	7.5	7.66	7.7	7.78	7.18	7.63	7.52	7.57	7.4	7.31	6.38	7.25	6.27	7.21	7.33	7.14	7.33	7.12	7.32	7.75	7.57	7.59
Temperatura	°C	26.3	27.3	28.1	27.1	26.8	27.5	26.9	26.8	26.4	26.2	26.5	27	26.9	27.5	24.1	25.9	27.6	26.1	25.9	27.3	28.4	27.4	26.7	27.5	26.8	23.4	27.3	26.2	27.2	28.3	26.8
Conductividad	µS/cm	2024	1977	2015	2124	2015	2033	882.5	1895	1848	1863	1895	1820	1841	1883	2009	1911	1916	1927	1808	1976	1830	1856	1887	1990	1858	1850	1729	1955	1600	1655	1849
Turbidez	NTU	7.06	9.03	5.05	5.6	2.43	2.44	4.91	3.22	10.6	3.75	11.7	11.7	14.1	5.94	7.01	7.1	7.36	5.34	10.2	2.69	6.35	10.4	1.2	7.96	5.89	11.7	34.4	5.86	10.9	15.4	9.01
kit CN	mg/L	0.004	0.008	0.002	0.004	0.006	0.002	0.002	0.009	0.001	0.006	0.001	0.001	0.003	0.007	0.002	0.002	0.004	0.000	0.003	0.008	0.003	0.002	0.004	0.003	0.006	0.000	0.004	0.005	0.003	0.002	0.004
CN Total		NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	8.25	8.15	8.35	8.34	8.84	8.04	8.77	8.58	8.36	8.79	8.81	8.85	8.9	8.88	8.77	8.77	8.78	8.85	8.96	8.77	9	8.89	9.25	9.31	9.08	9.47	8.98	8.96	9.21	9.27	9.27
Temperatura	°C	22.6	23.2	24.1	23.3	25.3	23.3	22.6	21.7	21.4	21.2	21.6	23.4	21.2	23.9	26.2	21.8	22.8	22.8	22.9	22.9	28.7	24.5	25.6	24.6	23.6	25.1	23.3	23.7	23.1	22.8	22.9
Conductividad	µS/cm	1311	1459	1300	1312	1302	1291	1300	1304	1331	1325	1307	1312	1359	1329	1377	1273	1174	1196	1154	1149	1102	1149	1140	1142	1148	1136	1085	1537	1027	1037	1427
Turbidez	NTU	2.32	2.12	2.92	2.82	2.79	6.86	3.28	3.42	3.96	2.89	3.14	6	3.53	5.69	16	13.8	9.52	8.26	7.58	6.84	7.85	6.14	10.1	7.41	8.78	11.9	11.3	10.5	9.09	9.15	9
kit CN	mg/L	0.004	0.001	0.002	0.008	0.009	0.004	0.003	0.002	0.001	0.001	0.002	0.000	0.001	0.004	0.004	0.006	0.002	0.000	0.000	0.001	0.004	0.000	0.003	0.006	0.000	0.003	0.000	0.000	0.000	0.000	0.000
CN Total		NA	NA	NA	0.004	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	<0.003	<0.003	NA	<0.003	NA	NA	NA	0.005

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 May 2015

Job Details:

Job Name: EA-1A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	651	646	649	mmHg
TA	33.8	11.8	20.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	5-May-15	14:47:00
Stop:	6-May-15	14:47:00

Mass Concentration Data:

Filter ID:	2629-1212
Final Wt:	147.070 mg
Initial Wt:	145.810 mg
Delta Wt:	1.260 mg
Total Vol:	20.84 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 60.46 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded May 2015

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: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	653	649	651	mmHg
TA	30.0	17.9	21.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	19-May-15	15:40:00
Stop:	20-May-15	15:40:00

Mass Concentration Data:

Filter ID:	2656-0606
Final Wt:	147.830 mg
Initial Wt:	146.690 mg
Delta Wt:	1.140 mg
Total Vol:	20.84 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 54.72 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded May 2015

Job Details:

Job Name: EA-2A
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	630	634	632	mmHg
TA	30.7	17.1	21.9	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	7-May-15	14:10:00
Stop:	8-May-15	14:10:00

Mass Concentration Data:

Filter ID:	2631-1414
Final Wt:	149.130 mg
Initial Wt:	147.940 mg
Delta Wt:	1.190 mg
Total Vol:	20.21 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 58.89 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 May 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	627	622	625	mmHg
TA	31.5	15.9	20.9	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	7-May-15	15:43:00
Stop:	8-May-15	15:43:00

Mass Concentration Data:

Filter ID:	2651-0101
Final Wt:	148.560 mg
Initial Wt:	147.560 mg
Delta Wt:	1.000 mg
Total Vol:	20.05 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 49.87 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 May 2015

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: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	647	643	645	mmHg
TA	31.4	17.2	21.3	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-May-15	11:07:00
Stop:	13-May-15	11:07:00

Mass Concentration Data:

Filter ID:	2653-0303
Final Wt:	151.700 mg
Initial Wt:	150.580 mg
Delta Wt:	1.120 mg
Total Vol:	20.68 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 54.16 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 May 2015

Job Details:

Job Name: EA-4A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	652	647	650	mmHg
TA	31.9	17.0	22.5	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	14-May-15	15:30:00
Stop:	15-May-15	15:30:00

Mass Concentration Data:

Filter ID:	2655-0505
Final Wt:	154.570 mg
Initial Wt:	152.320 mg
Delta Wt:	2.250 mg
Total Vol:	20.75 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 108.41 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded May 2015

Job Details:				Job Code: EA-5A Site Name: Sabana Redonda Station Code: Operators: EvQ User1: NA User2: NA				
Job Name: EA-5A Version: PQ200 Serial No: 3.00 Pump Time: Flags: NA								
BP	Max	Min	Avg	Units	Timer Information:		Mass Concentration Data:	
	653	648	652	mmHg	Date	Time	Filter ID:	2654-0404
TA	31.4	16.1	22.5	°C	dd-mmm	hh:mm:ss	Final Wt:	150.250 mg
Q	---	---	16.71	Lpm	Start:	14-May-15 15:00:00	Initial Wt:	149.450 mg
QCV NA %				Stop:		15-May-15 15:00:00	Delta Wt:	0.800 mg
Max overheat NA °C				ET:		23:59:00	Total Vol:	20.82 m ³
occured NA				Mass Conc:		38.43 µg/m ³		
Notes 1: Aldea Sabana Redonda, San Rafael Las Flores, Santa Rosa								
Notes 2: Minera San Rafael, S.A.								

BGI PQ200 Air Sampling System				Downloaded May 2015				
Job Details:				Job Code: EA-6 Site Name: Carretera a Mataquesquintla Station Code: Operators: EvQ User1: NA User2: NA				
Job Name: EA-6 Version: PQ200 Serial No: 1.00 Pump Time: Flags: NA								
BP	Max	Min	Avg	Units	Timer Information:		Mass Concentration Data:	
	645	641	643	mmHg	Date	Time	Filter ID:	2657-0707
TA	28.4	17.7	20.8	°C	dd-mmm	hh:mm:ss	Final Wt:	147.840 mg
Q	---	---	16.71	Lpm	Start:	19-May-15 14:55:00	Initial Wt:	146.970 mg
QCV NA %				Stop:		20-May-15 14:55:00	Delta Wt:	0.870 mg
Max overheat NA °C				ET:		23:59:00	Total Vol:	20.65 m ³
occured NA				Mass Conc:		42.13 µg/m ³		
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 May 2015				
Job Details:				Job Code: EA-7A Site Name: Los Planes Station Code: Operators: EvQ User1: NA User2: NA				
Job Name: EA-7A Version: PQ200 Serial No: 2.00 Pump Time: Flags: NA								
BP	Max	Min	Avg	Units	Timer Information:		Mass Concentration Data:	
	653	649	651	mmHg	Date	Time	Filter ID:	2630-1313
TA	33.1	12.9	21.4	°C	dd-mmm	hh:mm:ss	Final Wt:	147.950 mg
Q	---	---	16.71	Lpm	Start:	5-May-15 14:25:00	Initial Wt:	146.480 mg
QCV NA %				Stop:		6-May-15 14:25:00	Delta Wt:	1.470 mg
Max overheat NA °C				ET:		23:59:00	Total Vol:	20.86 m ³
occured NA				Mass Conc:		70.46 µg/m ³		
Notes 1: Aldea Los Planes, San Rafael Las Flores, Santa Rosa.								
Notes 2: Minera San Rafael, S.A.								

Reporte Analítico RA-15-11351

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: Mayo 29 a Junio 02 de 2015.
Emisión de reporte: Junio 02 de 2015

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

Análisis: Gravimetría en filtros.

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	2629-1212	0.14581	0.14707
2	EA-1B	2656-0606	0.14669	0.14783
3	EA-2A	2631-1414	0.14794	0.14913
4	EA-3	2651-0101	0.14756	0.14856
5	EA-3A	2653-0303	0.15058	0.15170
6	EA-4A	2655-0505	0.15232	0.15457
7	EA-5A	2654-0404	0.14945	0.15025
8	EA-6	2657-0707	0.14697	0.14784
9	EA-7A	2630-1313	0.14648	0.14795
10	EA-10	2661-1111	0.14733	0.14744

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11336 Y RA-15-11342.

Reporte Analítico RA-15-11351

Anexos:

Anexo 1. Cadena de Custodia R-02-000491.

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
Ingeniero Químico, Gestor de Calidad
Colegiado 1595

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Junio, 02/15	E.M.	Junio, 02/15	A.G.J.	Junio, /15	01

BGI PQ200 Air Sampling System

Downloaded June 2015

Job Details:

Job Name: EA-1A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	652	647	650	mmHg
TA	26.1	18.9	21.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	4-Jun-15	14:42:00
Stop:	5-Jun-15	14:42:00

Mass Concentration Data:

Filter ID:	2668-0101
Final Wt:	147.060 mg
Initial Wt:	147.020 mg
Delta Wt:	0.040 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 1.66 µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded June 2015

Job Details:

Job Name: EA-2A
Version: PQ200
Serial No: 1.00
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	633	629	631	mmHg
TA	27.1	16.9	19.6	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-Jun-15	15:30:00
Stop:	12-Jun-15	15:30:00

Mass Concentration Data:

Filter ID:	2671-0404
Final Wt:	144.170 mg
Initial Wt:	143.830 mg
Delta Wt:	0.340 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 14.14 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 June 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	626	622	624	mmHg
TA	20.6	16.6	17.7	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-Jun-15	14:45:00
Stop:	12-Jun-15	14:45:00

Mass Concentration Data:

Filter ID:	2670-0303
Final Wt:	147.520 mg
Initial Wt:	147.440 mg
Delta Wt:	0.080 mg
Total Vol:	20.24 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 3.95 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 June 2015

Job Details:

Job Name: EA-7A
Version: PQ200
Serial No: 2.00
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	654	649	652	mmHg
TA	26.1	19.1	21.5	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	4-Jun-15	15:00:00
Stop:	5-Jun-15	15:00:00

Mass Concentration Data:

Filter ID:	2669-0202
Final Wt:	143.590 mg
Initial Wt:	143.120 mg
Delta Wt:	0.470 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 19.55 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-15-11367

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: Julio01y02de 2015.
Emisión de reporte: Julio 03 de 2015

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

Análisis: Gravimetría en filtros.

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.

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	2668-0101	0.14702	0.14706
2	EA-2A	2671-0404	0.14383	0.14417
3	EA-3	2670-0303	0.14744	0.14752
4	EA-7A	2669-0202	0.14312	0.14359

¹: Código de filtro asignado por Laboratorio Ambiental, S.A.*:Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11355

Reporte Analítico RA-15-11367

Anexos:

Anexo 1. Cadena de Custodia R-02-000493.

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
Ingeniero Químico, Gestor de Calidad
Colegiado 1595

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Julio, 03/15	D.S.	Julio, 03/15	A.G.J.	Julio, /15	01

BGI PQ200 Air Sampling System

Downloaded July 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	653	648	651	mmHg
TA	30.7	16.4	21.6	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Jul-15	16:30:00
Stop:	17-Jul-15	16:30:00

Mass Concentration Data:

Filter ID:	2704-0303
Final Wt:	151.880 mg
Initial Wt:	151.710 mg
Delta Wt:	0.170 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 7.07 µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded July 2015

Job Details:

Job Name: EA-2A
Version: PQ200
Serial No: 1.00
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	629	632	mmHg
TA	24.6	16.0	18.6	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	9-Jul-15	15:33:00
Stop:	10-Jul-15	15:33:00

Mass Concentration Data:

Filter ID:	2674-0707
Final Wt:	144.250 mg
Initial Wt:	143.990 mg
Delta Wt:	0.260 mg
Total Vol:	19.92 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 19:53:00

Mass Conc: 13.05 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 July 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	23.3	15.3	18.6	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	9-Jul-15	14:46:00
Stop:	10-Jul-15	14:46:00

Mass Concentration Data:

Filter ID:	2702-0101
Final Wt:	144.360 mg
Initial Wt:	144.090 mg
Delta Wt:	0.270 mg
Total Vol:	20.24 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 13.34 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 July 2015

Job Details:

Job Name: EA-7A
Version: PQ200
Serial No: 1.00
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	654	649	651	mmHg
TA	30.7	16.7	21.7	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Jul-15	15:25:00
Stop:	17-Jul-15	15:25:00

Mass Concentration Data:

Filter ID:	2703-0222
Final Wt:	151.280 mg
Initial Wt:	151.150 mg
Delta Wt:	0.130 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 5.41 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-15-11379

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: Julio 27 y 28 de 2015.
Emisión de reporte: Julio 29 de 2015

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

Análisis: Gravimetría en filtros.

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**

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	2704-0303	0.15171	0.15188
2	EA-2A	2674-0707	0.14399	0.14425
3	EA-3	2702-0101	0.14409	0.14436
4	EA-7A	2703-0222	0.15115	0.15128

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11355 y RA-15-11371

Reporte Analítico RA-15-11379

Anexos:

Anexo 1. Cadena de Custodia R-02-000495.

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
Ingeniero Químico, Gestor de Calidad
Colegiado 1595

Lic. Eddy Mendoza
Director de Laboratorio

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Julio, 29/15	D.S.	Julio, 30/15	E.M.	Julio, 31/15	01

11.3.2 Informe de Metales en PM₁₀

Reporte Analítico

RA-15-11352

Cliete: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-058 (El Escobal)
Análisis de muestras: Junio, 18 de 2015
Emisión del reporte: Junio, 22 de 2015

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

Análisis: Mercurio en filtros por ICP de Masas (digestión).

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

*Parámetros	LDM (µg)	Estación							
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A	EA-10
Código de filtro		2656-0606	2631-1414	2653-0303	2655-0505	2654-0404	2657-0707	2630-1313	2661-1111
Mercurio (Hg)	0.002	0.013	0.020	0.016	0.012	0.009	0.012	0.017	0.004

*: Análisis realizados por laboratorio subcontratado (laboratorio acreditado CAN-P-1585, CAN-P-1587, CAN-P-4E (ISO/IEC 17025:2005)). µg: microgramos. LDM: límite de detección del método.

Anexos:

Anexo 1. Cadena de Custodia R-02-000491

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:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Junio, 22/15	A.G.J	Junio, 22/15	A.G.J.	Junio, 22/15	01

11.3.3 Informe sobre PST y Gases de Combustión.



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

Junio 2015

San Rafael Las Flores, Santa Rosa, Guatemala

Julio de 2015

Este resumen presenta los resultados del monitoreo de calidad del aire realizado para el proyecto minero Escobal (**el Proyecto**) ubicado en San Rafael Las Flores, San Rosa, en las comunidades adyacentes, mediante la medición de la concentración de:

- Gases de combustión (**SO₂** y **NO₂**); y
- Partículas Sedimentables Totales (**PST**).

El monitoreo fue realizado por Consultoría y Tecnología Ambiental, S.A. (**CTA**) entre el 01 y 04 de junio de 2015 para gases de combustión y del 01 al 30 de junio para partículas sedimentables totales (PST). Las estaciones de medición se presentan en el Cuadro 1 y la metodología utilizada para el muestreo y análisis se presentan en el Cuadro 2.

Cuadro 1: Estaciones de monitoreo de SO₂ y NO₂ y PST

Estación	Ubicación	Coordenadas
EA-1C	Frente a Escuela San Rafael	E (m): 803,887N (m): 1,601,801
EA-2B	Aldea La Cuchilla	E (m): 806,470N (m): 1,601,796
EA-3B	Aldea El Fucío	E (m): 806,538N (m): 1,600,367
EA-4A	Aldea La Puerta de Los Ángeles	E (m): 805,142N (m): 1,599,903
EA-5A	Aldea Sabana Redonda	E (m): 804,352N (m): 1,600,404
EA-6	Norte del proyecto, ruta a Mataquescuintla	E (m): 805,168N (m): 1,603,247
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	E (m): 805,425N (m): 1,601,523

Coordenadas en metros (m). Datum: NAD27 UTM zona 15 N. Fuente: CTA, 2015.

Cuadro 2: Metodologías utilizadas para SO₂ y NO₂ y PST

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

Fuente: CTA, 2015.

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en junio de 2015; y en el Cuadro 4 se presentan los resultados de la medición de PST para el período de 30 días de junio 01 a junio 30 de 2015.

Cuadro 3: Resultados de la medición de gases de combustión en $\mu\text{g}/\text{m}^3$

Estaciones de Muestreo	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guías del Banco
SO₂	<13	<13	<13	<13	<13	<13	<13	20 $\mu\text{g}/\text{m}^3$
NO₂	11	11	< 9	10	< 9	< 9	< 9	*40 $\mu\text{g}/\text{m}^3$

SO₂: dióxido de azufre. NO₂: dióxido de nitrógeno. *: Promedio anual.

Guías del Banco Mundial (**el Banco**)¹, tomadas de International Finance Corporation (IFC) Industry Sector Guidelines for Mining, December 10, 2007 y General Environment Health and Safety Guidelines, December 19/2008.

Fuente: Laboratorio Ambiental, S. A., 2015.

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

Parámetros	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía de BC
Sólidos Insolubles	6.47	6.61	5.83	15.65	5.58	0.82	1.43	NA
Sólidos Solubles	2.69	3.62	0.91	2.05	1.30	0.70	1.42	
Sólidos Totales	9.16	10.24	6.74	17.71	6.87	1.52	2.85	
Partículas sedimentables totales mg/(dm ² *día)	3.05	3.41	2.25	5.90	2.29	0.51	0.95	°2.90

g: gramos. m²: metro cuadrado. mg: miligramos. dm²: decímetro cuadrado. °: valor referido para un período promedio de un mes. Guías de BC: valores guía reportados en el Ministerio de Ambiente de la provincia canadiense British Columbia (**BC**)² con respecto a las partículas sedimentables totales para industrias mineras, de fundición y relacionadas (BC air quality objectives for total suspended particulates and dustfall, agosto 12, 2013).

Fuente: Laboratorio Ambiental, S. A., 2015.

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

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

Gases de Combustión

Como se puede apreciar en el Cuadro 3, el SO₂ se presentó por debajo del límite de detección del método analítico utilizado en todas las estaciones monitoreadas. Mientras que el NO₂ se presentó por debajo del límite de detección del método analítico en las estaciones EA-3B, EA-5A, EA-6 y EA-7A. Las estaciones que presentaron lecturas detectables de NO₂ fueron la EA-1C (11 µg/m³), EA-2B (11 µg/m³) y EA-4A (10 µg/m³). Todas presentan valores que se encuentran por debajo del valor sugerido por la guía de referencia utilizada para comparación.

Partículas Sedimentables Totales

Tres de las siete estaciones presentan valores de PST que superan el valor guía de comparación. La estación que presentó la mayor concentración de PST fue la EA-4A (5.90 mg/(dm² x día), en esta estación se están realizando trabajos de construcción y se encuentra cerca de un camino de terracería bastante transitado. Las estaciones EA-1C y EA-2B, presentan concentraciones de 3.05 y 3.41 mg/(dm² x día); esto puede atribuirse parcialmente a que estas estaciones de muestreo se encuentran cerca de caminos de terracería en los que el paso de vehículos (especialmente motos y picops) es frecuente. Además se observó que se hicieron trabajos de mantenimiento en el camino de terracería de la estación EA-2B durante los días de muestreo.

Las estaciones que presentaron la menor concentración de PST durante el período de monitoreo y que se encuentran por debajo del valor guía utilizado, fueron la EA-3B, EA-5A, EA-6 y EA-7A con 2.25 mg/(dm²x día), 2.29 mg/(dm² x día), 0.51 mg/(dm² x día) y 0.95 mg/(dm² x día) respectivamente. La estación con la concentración más baja fue la EA-6, esta estación se encuentra en un terreno en donde el paso de vehículos es poco frecuente.



Anexos

Anexo 1-1: Reportes analíticos

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-057 (CTA)
Fecha de muestreo: Junio, 01 al 04 de 2015
Fecha de análisis: Junio, 22 al 23 de 2015
Emisión del reporte: Junio, 26 de 2015

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

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

Métodos analíticos:

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

Cuadro 1: Ubicación de estaciones de muestreo

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-1C	Frente a Escuela San Rafael	E (m): 803,887 N (m): 1,601,801		Casa dentro del pueblo, caminos pavimentados con flujo de vehículos medio, vientos fuertes. Campo de fútbol de tierra frente a la casa. Fecha de muestreo: 02/06/15 al 03/06/15. Al momento de colocar el equipo se tenía presencia de lluvia en el área.
EA-2B	Aldea La Cuchilla	E (m): 806,470 N (m): 1,601,796		Camino de terracería poco tráfico vehicular, transitan especialmente motos. Construcción de casas con adobe en los alrededores, uso de leña para cocinar en la vivienda y en casas cercanas. Fecha de muestreo: 01/06/15 al 02/06/15. Al momento de retirar el equipo se tenía presencia de lluvia.

EA-3B	Aldea El Fucío	E (m): 806,538 N (m): 1,600,367		Camino de terracería cercano al terreno, tráfico vehicular moderado. Fecha de muestreo: 02/06/15 al 03/06/15.
EA-4A	Aldea La Puerta de Los Ángeles	E (m): 805,142 N (m): 1,599,903		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan cantidades considerables de polvo. Evidencia de quema de leña para cocinar. Fecha de muestreo: 02/06/15 al 03/06/15.
EA-5A	Aldea Sábana Redonda	E (m): 804,352 N (m): 1,600,404		El terreno está cerca de la carretera principal, está en campo abierto y cercano a una fábrica de block. Fecha de muestreo: 01/06/15 al 02/06/15. Al momento de retirar el equipo se tenía presencia de lluvia.
EA-6	Norte del proyecto, ruta a Mataquescuintla	E (m): 805,168 N (m): 1,603,247		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno, uso de leña en casas cercanas (más de 20 m). Fecha de muestreo: 03/06/15 al 04/06/15.
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	E (m): 805,425 N (m): 1,601,523		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino. Fecha de muestreo: 01/06/15 al 02/06/15. Al momento de retirar el equipo se tenía presencia de lluvia.

Coordenadas en metros (m). Datum: NAD27 UTM zona 16 N. Fuente: CTA, 2015.*: Factores ambientales que pueden influir en los resultados.

Cuadro 2: Resultados gases de combustión SO₂ y NO₂

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

LDM: límite de detección del método. **µg/m³:** microgramos por metro cúbico, **ppm:** partes por millón.

Cuadro 3: Concentraciones de SO₂ y NO₂ en controles de laboratorio

Parámetro	Control con duplicado			CDL		
	Unidades	DEA-1C	DEA-4A	Unidades	Teórica	Real
SO ₂	µg/m ³	NA	< 13	µg	7.35	7.47
	ppm	NA	< 0.005			
NO ₂	µg/m ³	11	NA	µg/mL	1.000	0.994
	ppm	0.006	NA			

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

Anexos:

- Anexo 1. Cadena de custodia R-02-000638.
- Anexo 2. Cadena de custodia R-02-000639.
- Anexo 3. Cadena de custodia R-02-000640.

Este Reporte Analítico ha sido elaborado para uso confidencial y exclusivo del cliente; se prohíbe su reproducción, sin la aprobación escrita del Laboratorio. Los resultados aquí expresados representan el mejor juicio del Laboratorio y son válidos únicamente para la porción de muestra presentada a éste. Laboratorio Ambiental, S.A. no asume ninguna responsabilidad ni garantiza la utilización final que se le dé a la información aquí presentada. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte.

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Junio, 26/15	E.M.	Junio, 26/15	A.G.J.	Junio, /15	01

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-057 (CTA)
Fecha de muestreo: Junio 01 – Junio 30 de 2015
Lugar de muestreo: San Rafael las Flores, Santa Rosa, Guatemala
Fecha de análisis: Julio, 06 al 07 de 2015
Emisión del reporte: Julio, 08 de 2015

Tipo de muestras: Partículas sedimentables en aire durante un período de 30 días.
Análisis: Muestreo y determinación de material particulado total sedimentable en el aire (tasa de sedimentación).
Método analítico: ASTM D1739-98 (Reapproved 2004) Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter)¹. * **Acreditado ISO 17025**

Cuadro 1: Ubicación de estaciones de muestreo

Estación	Ubicación	Fotografía	Factores ambientales
EA-1C	Frente a Escuela San Rafael		Casa dentro del pueblo, caminos pavimentados, vientos fuertes. Campo de foot ball de tierra frente a la casa.
EA-2B	Aldea La Cuchilla		Camino de terracería poco tráfico vehicular, transitan especialmente motos. Construcción de casas con adobe en los alrededores. Se observó evidencia de que el camino de terracería recibió mantenimiento.

¹ Como complemento del método se agrega sulfato de cobre para evitar el crecimiento de algas durante el periodo de muestreo, según IT-ATM-09 inspecciones reglamentarias de emisiones fugitivas de partículas sedimentables y en suspensión. Consejería de medio ambiente de Andalucía.

Estación	Ubicación	Fotografía	Factores ambientales
EA-3B	Aldea El Fucío		Camino de terracería cercano al terreno, tráfico vehicular moderado.
	Aldea La Puerta de Los Ángeles		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan cantidades considerables de polvo. Evidencia de quema de leña para cocinar, se estaban realizando trabajos de construcción.
EA-5A	Aldea Sabana Redonda		El terreno está cerca de la carretera principal (asfaltada), está en campo abierto y cercano a una fábrica de block.
	Norte del proyecto, ruta a Mataquescuintla		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno.
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino.

²: Factores ambientales que pueden influir en los resultados.

Cuadro 2: Resultados Partículas Sedimentables Totales (PST)

No.	Identificación de la muestra	Tasa de sedimentación			
		Material insoluble en agua [g/(m ² ·30 días)]	Material soluble en agua [g/(m ² ·30 días)]	Total* para un periodo de 30 días [g/(m ² ·30 días)].	Total* para un periodo de 1 día [mg/(dm ² · día)].
LDM		0.0019	0.017	0.019	0.006
1	EA-1C	6.47	2.69	9.16	3.05
2	EA-2B	6.61	3.62	10.24	3.41
3	EA-3A	5.83	0.91	6.74	2.25
4	EA-4A	15.65	2.05	17.71	5.90
5	EA-5A	5.58	1.30	6.87	2.29
6	EA-6	0.82	0.70	1.52	0.51
7	EA-7A	1.43	1.42	2.85	0.95

LDM: límite de detección del método. **g:** gramos; **mg:** miligramos. **m²:** metros cuadrados. **dm²:** decímetro cuadrado

Anexos:

Anexo 1. Cadena de Custodia R-02-000648

Este Reporte Analítico ha sido elaborado para uso confidencial y exclusivo del cliente; se prohíbe su reproducción, sin la aprobación escrita del Laboratorio. Los resultados aquí expresados representan el mejor juicio del Laboratorio y son válidos únicamente para la porción de muestra presentada a éste. Laboratorio Ambiental, S.A. no asume ninguna responsabilidad ni garantiza la utilización final que se le dé a la información aquí presentada. En caso de requerir alguna modificación en este reporte analítico, solicitarla dentro de los siguientes 30 días a partir de la fecha en que el Laboratorio envió el reporte.

Ing. Diego Silva
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Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Julio, 08/15	D.S.	Julio, 08/15	A.G.J.	Julio, 09/15	01

11.3.4 Presión Sonora

ER-1

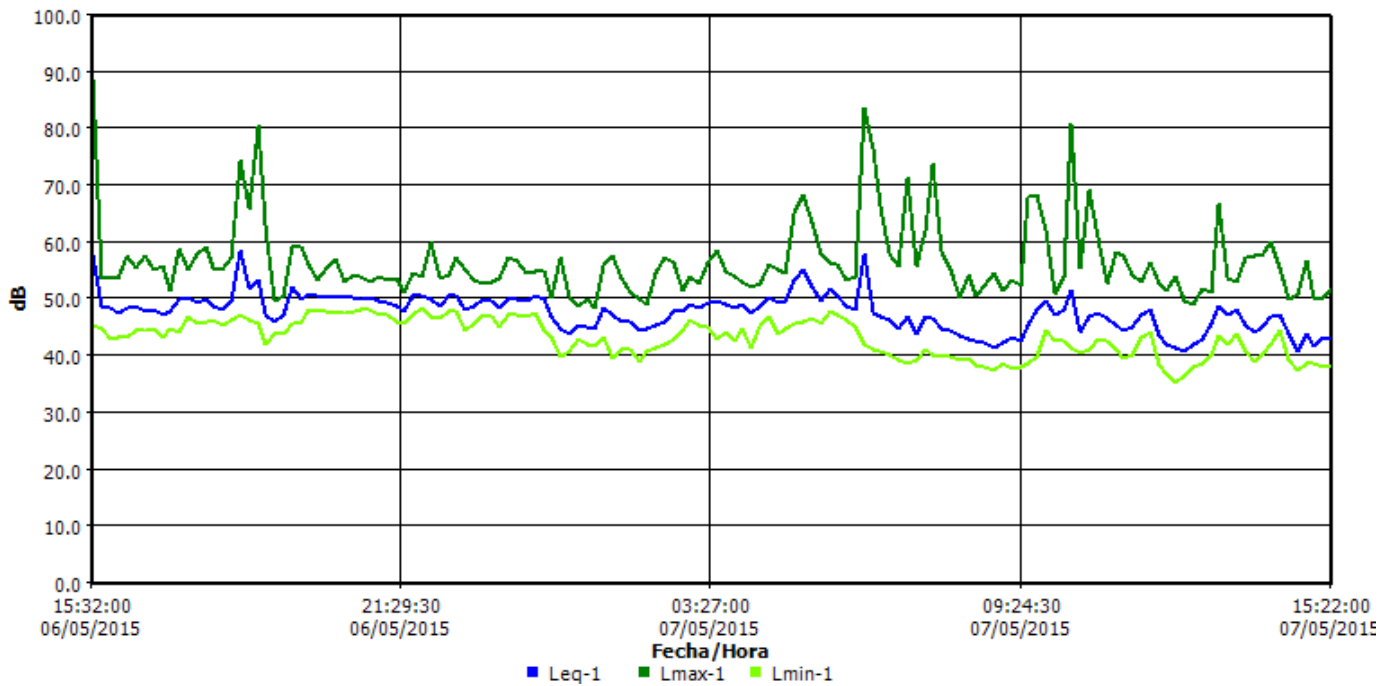
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S165
Hora de inicio Miércoles, 06 de Mayo de 2015 15:22:00
Hora de paro Jueves, 07 de Mayo de 2015 15:22:00
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	FAST
Lmin	1	35.2 dB	Lmax	1	88.7 dB
Lpk	1	108.2 dB	Leq	1	49 dB

Gráfica de datos de registro



ER-1A

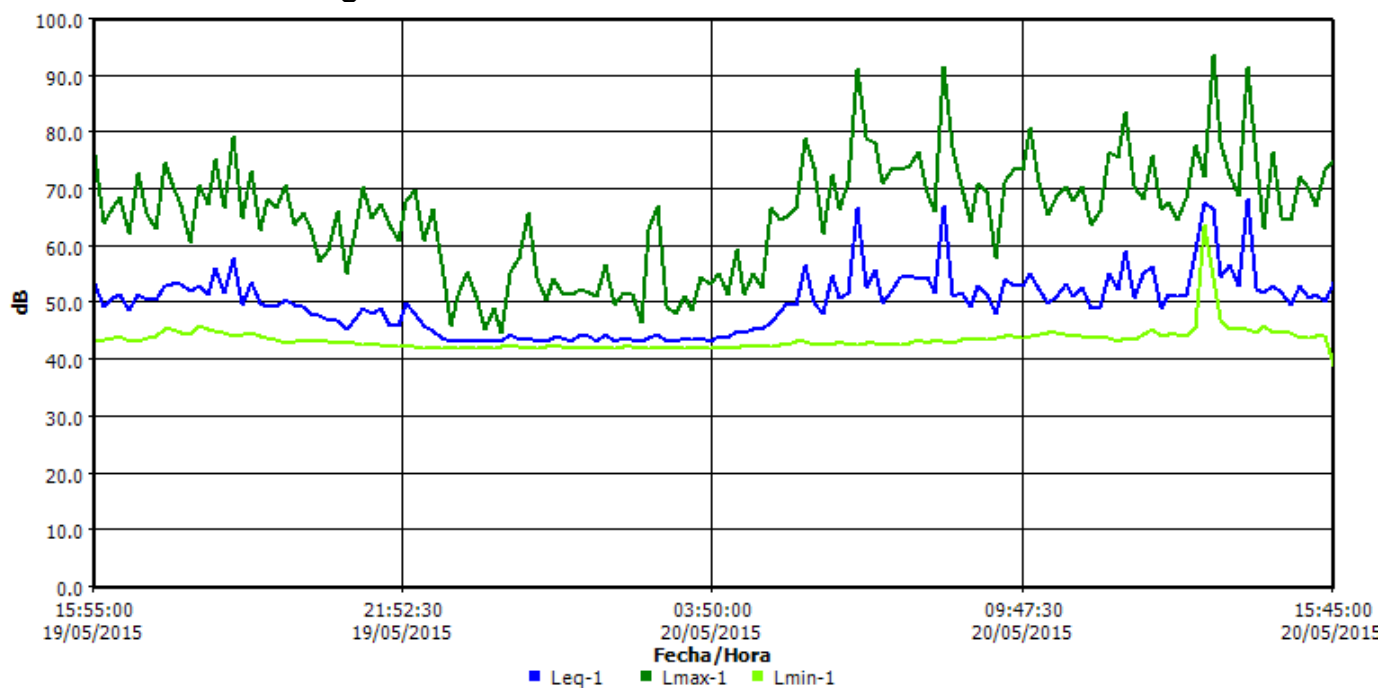
Panel de información

Ubicación San Rafael Las Flores
Nombre ER-1A
Sesión padre S189
Hora de inicio Martes, 19 de Mayo de 2015 15:45:00
Hora de paro Miércoles, 20 de Mayo de 2015 15:45:00
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	FAST
Lmin	1	38.9 dB	Lmax	1	93.8 dB
Lpk	1	111.1 dB	Leq	1	55 dB

Gráfica de datos de registro



ER-2

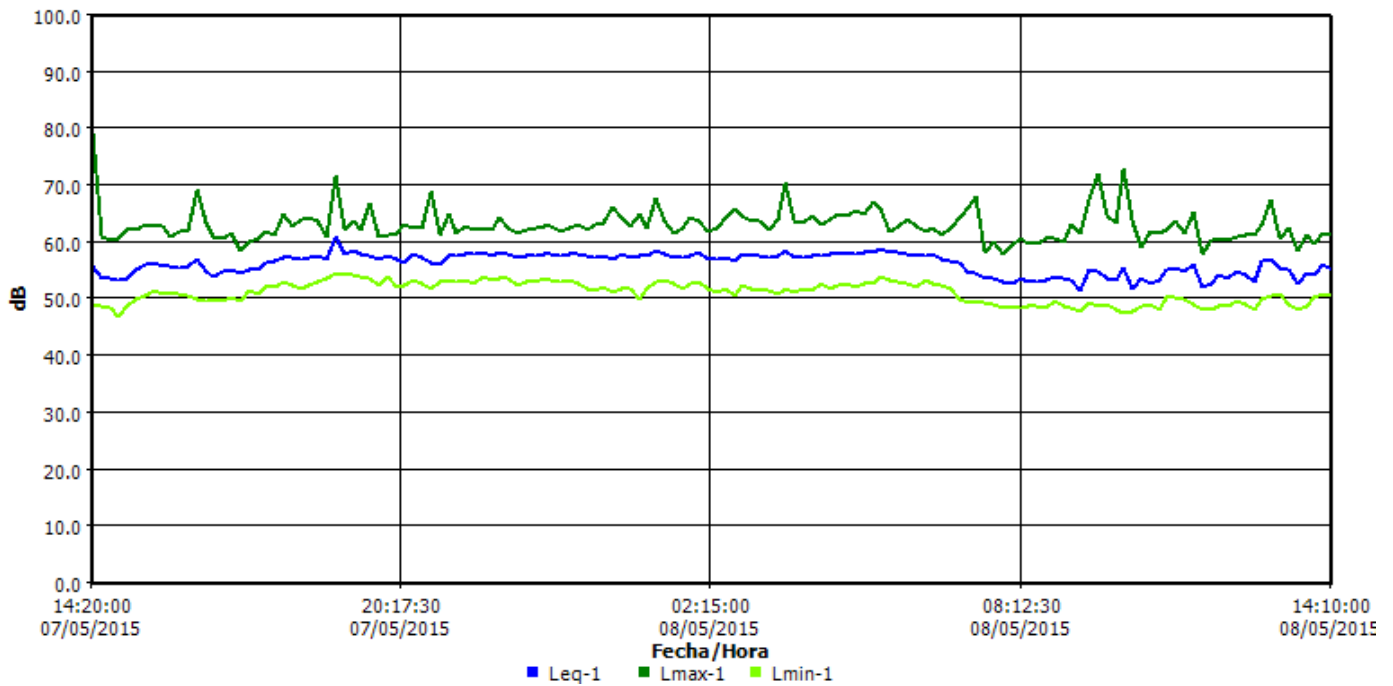
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S092
Hora de inicio Jueves, 07 de Mayo de 2015 14:10:00
Hora de paro Viernes, 08 de Mayo de 2015 14:10:00
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	FAST
Lmin	1	46.9 dB	Lmax	1	79.1 dB
Lpk	1	110.7 dB	Leq	1	56.5 dB

Gráfica de datos de registro



ER-3

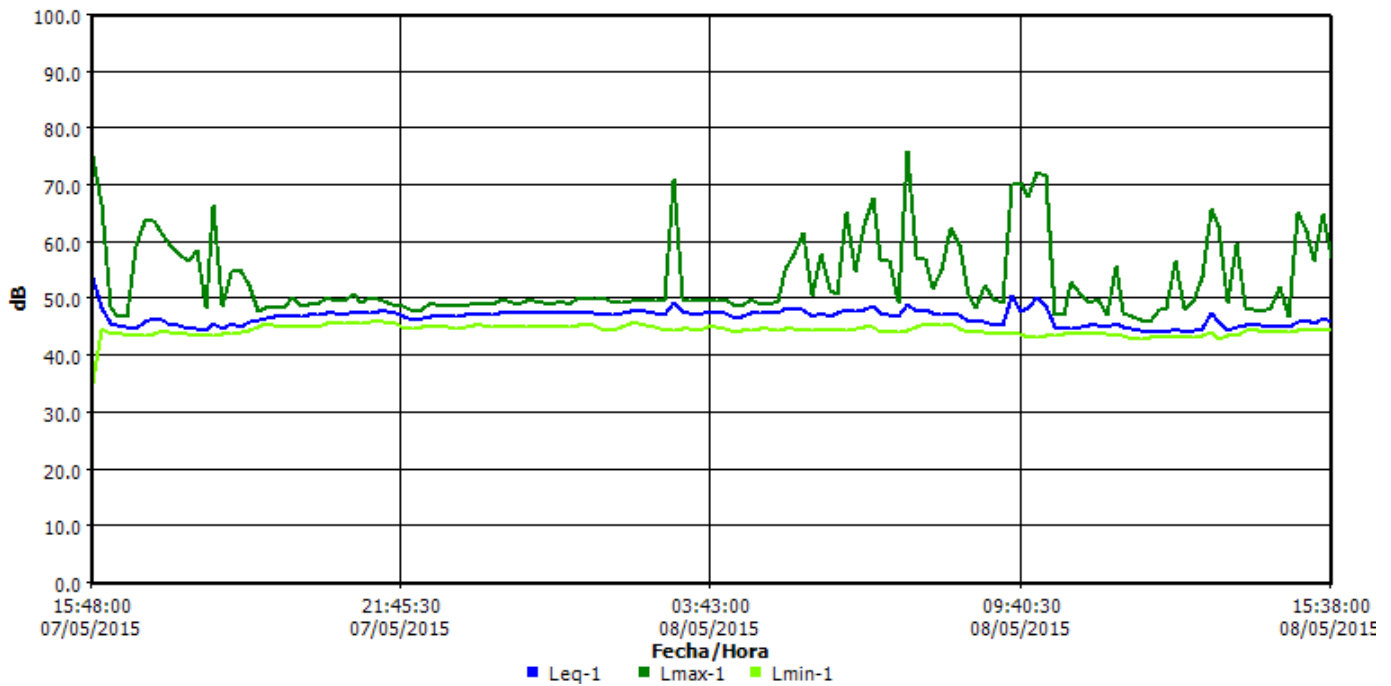
Panel de información

Ubicación Aledaño a Aldea El Fucío
Nombre ER-3
Sesión padre S187
Hora de inicio Jueves, 07 de Mayo de 2015 15:38:00
Hora de paro Viernes, 08 de Mayo de 2015 15:38:00
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	FAST
Lmin	1	35.3 dB	Lmax	1	76 dB
Lpk	1	96.6 dB	Leq	1	47 dB

Gráfica de datos de registro



ER-3A

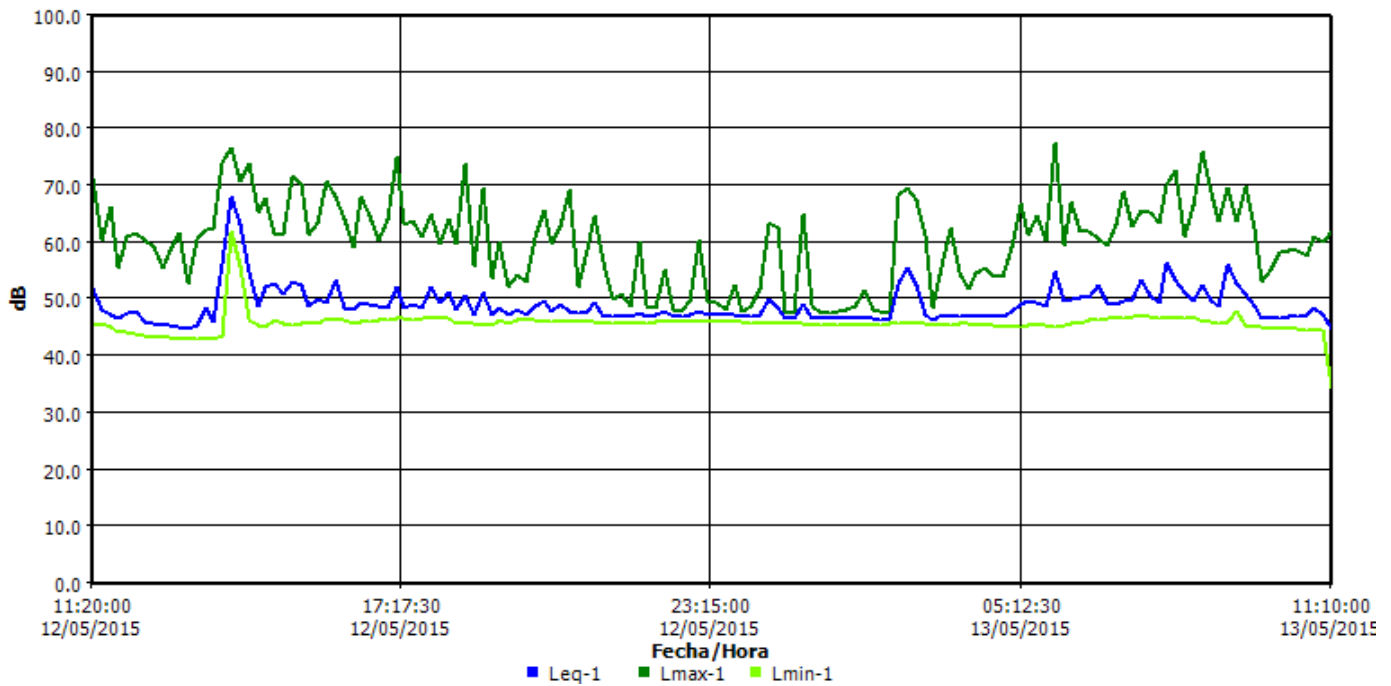
Panel de información

Ubicación Aledaño a aldea El Fucío
Nombre ER-3A
Sesión padre S093
Hora de inicio Martes, 12 de Mayo de 2015 11:10:00
Hora de paro Miércoles, 13 de Mayo de 2015 11:10:00
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	FAST
Lmin	1	34 dB	Lmax	1	77.6 dB
Lpk	1	101.9 dB	Leq	1	51.6 dB

Gráfica de datos de registro



ER-4A

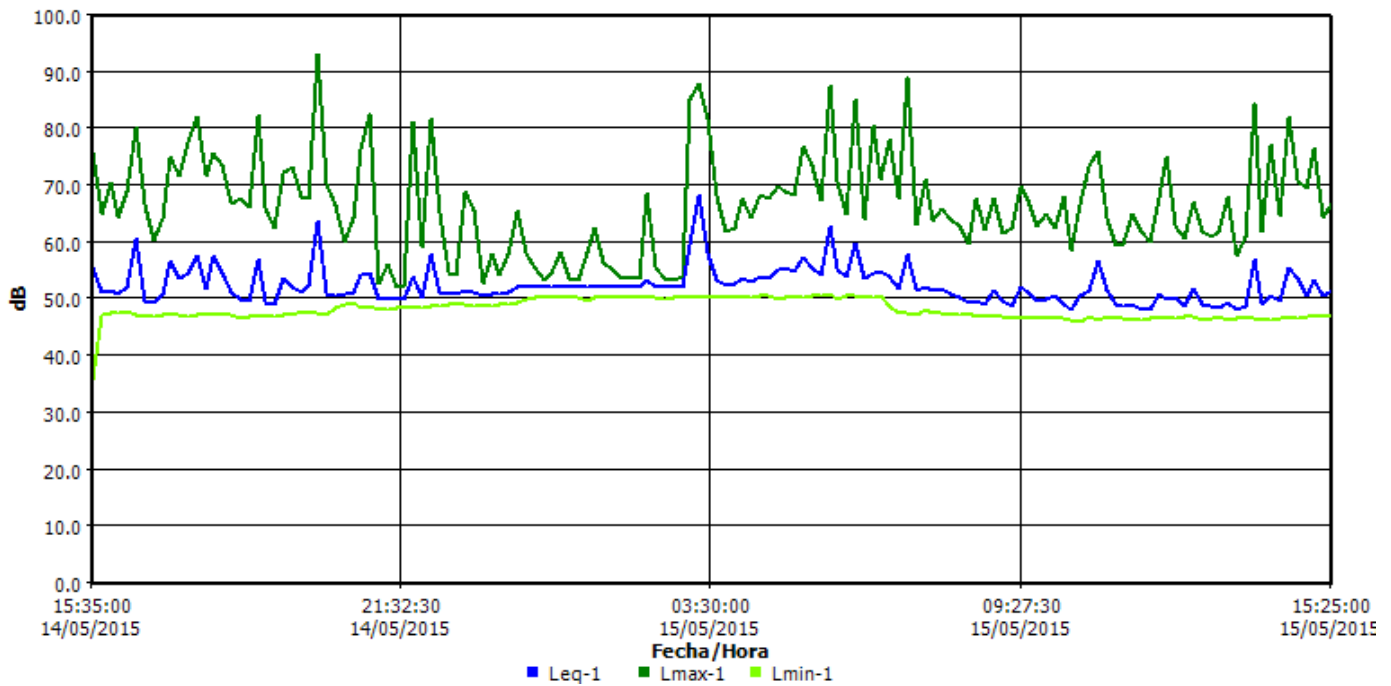
Panel de información

Ubicación Caserío El Portón de los Ángeles
Nombre ER-4A
Sesión padre S188
Hora de inicio Jueves, 14 de Mayo de 2015 15:25:00
Hora de paro Viernes, 15 de Mayo de 2015 15:25:00
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	FAST
Lmin	1	36 dB	Lmax	1	93.2 dB
Lpk	1	106 dB	Leq	1	54.3 dB

Gráfica de datos de registro



ER-5A

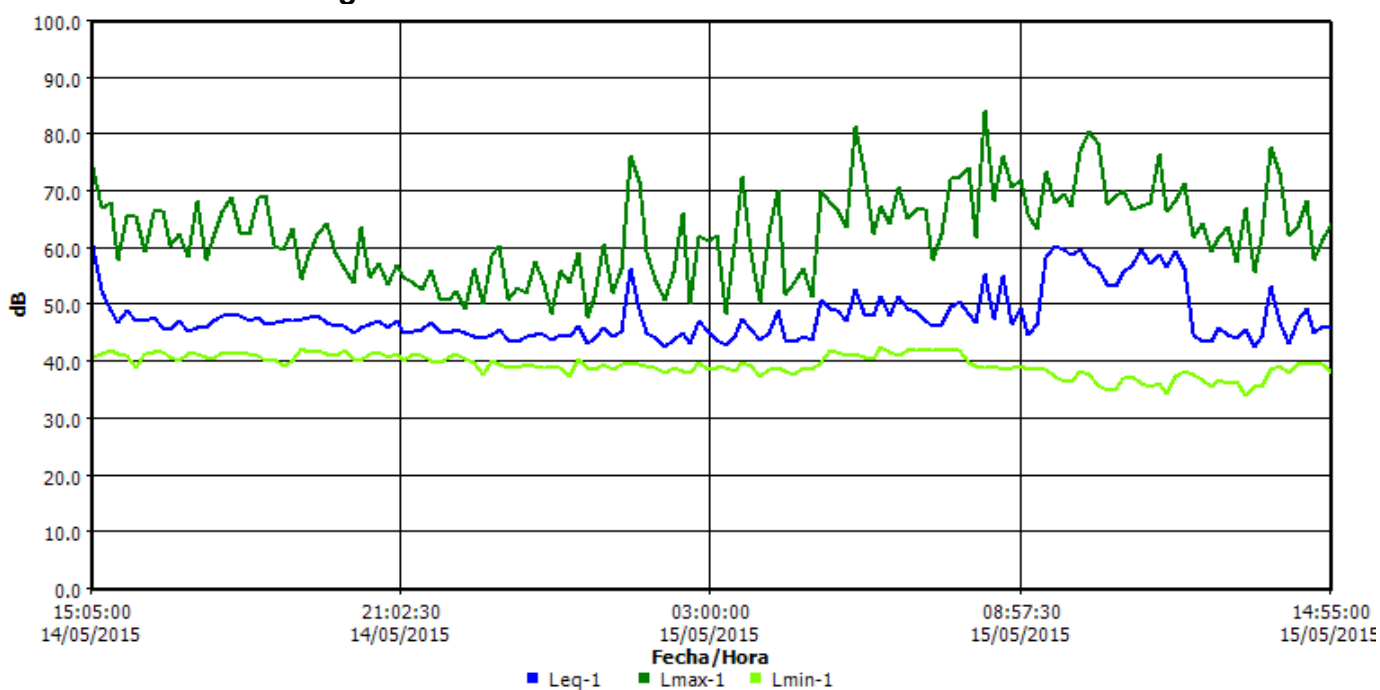
Panel de información

Ubicación Aldea Sabana Redonda
Nombre ER-5A
Sesión padre S094
Hora de inicio Jueves, 14 de Mayo de 2015 14:55:00
Hora de paro Viernes, 15 de Mayo de 2015 14:55:00
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	FAST
Lmin	1	34 dB	Lmax	1	84.1 dB
Lpk	1	100.2 dB	Leq	1	51.2 dB

Gráfica de datos de registro



ER-6

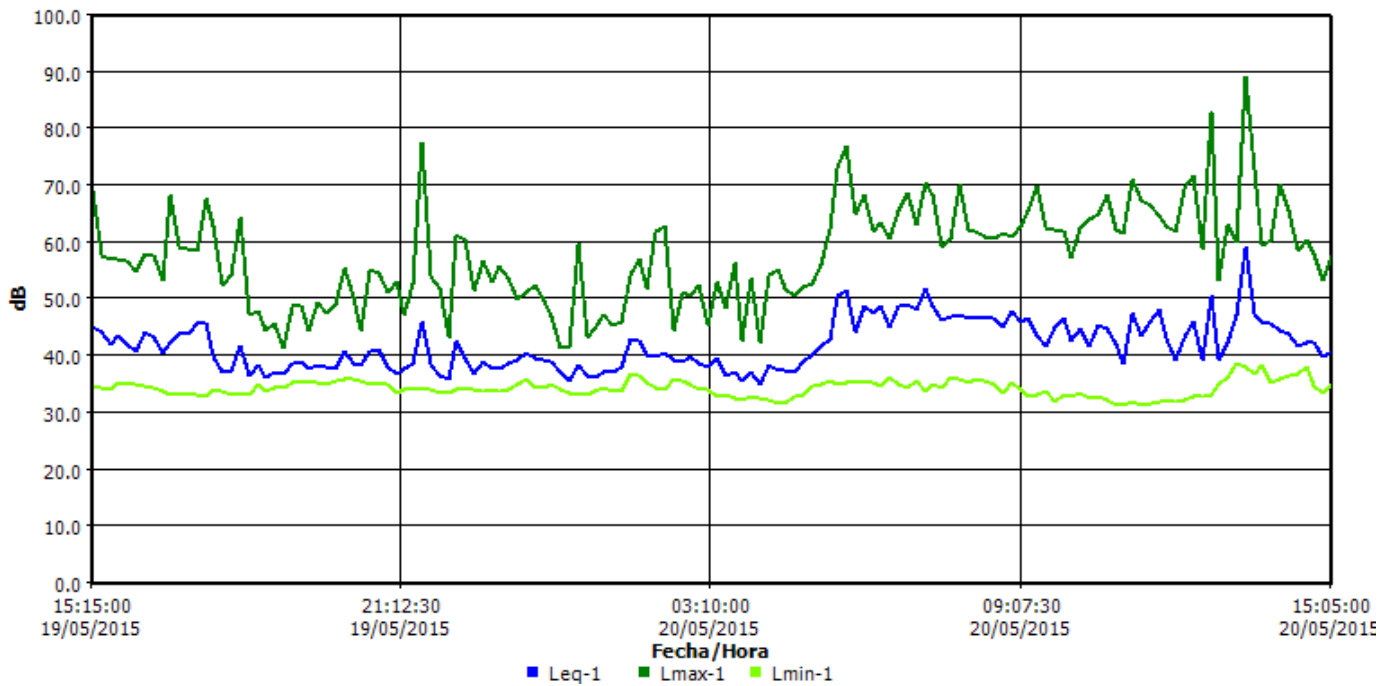
Panel de información

Ubicación Al norte del Proyecto, ruta a Mataquescuintla
Nombre ER-6
Sesión padre S166
Hora de inicio Martes, 19 de Mayo de 2015 15:05:00
Hora de paro Miércoles, 20 de Mayo de 2015 15:05:00
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	FAST
Lmin	1	31.3 dB	Lmax	1	89.1 dB
Lpk	1	104.4 dB	Leq	1	44.6 dB

Gráfica de datos de registro



ER-7A

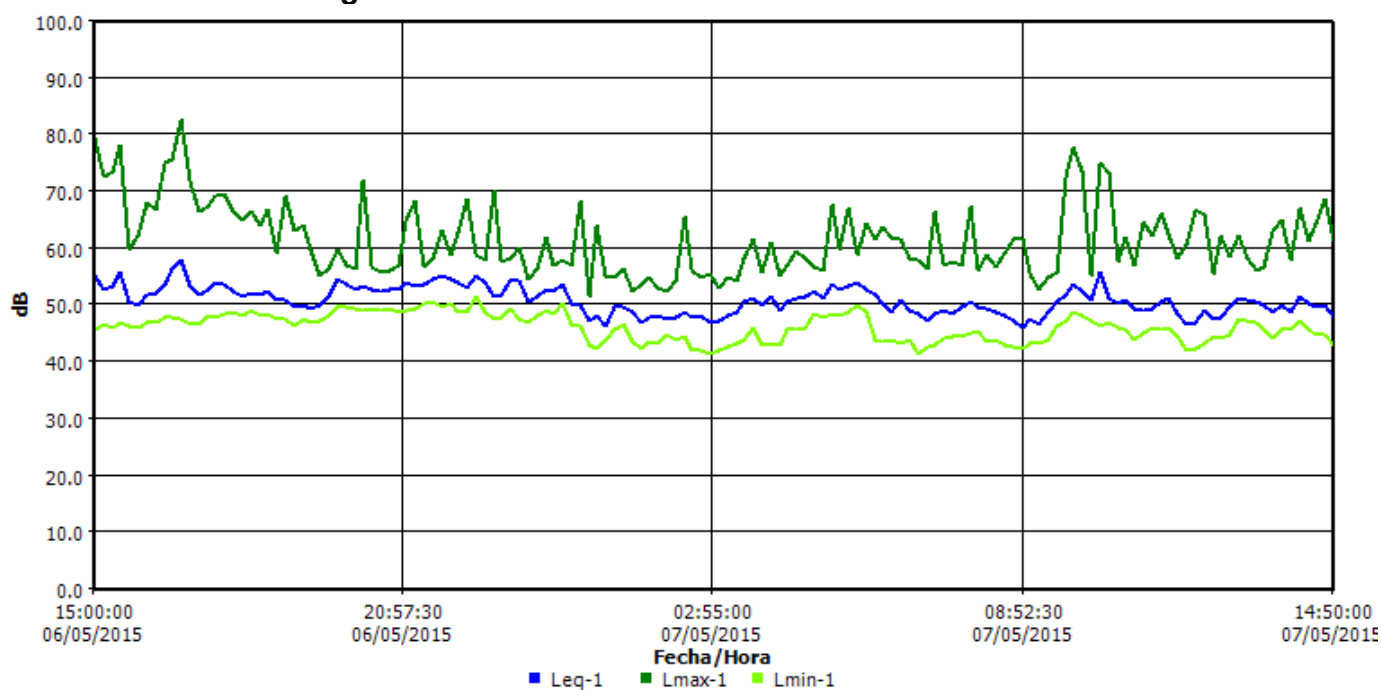
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S186
Hora de inicio Miércoles, 06 de Mayo de 2015 14:50:00
Hora de paro Jueves, 07 de Mayo de 2015 14:50:00
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	FAST
Lmin	1	41.5 dB	Lmax	1	82.7 dB
Lpk	1	95.2 dB	Leq	1	51.5 dB

Gráfica de datos de registro



ER-3

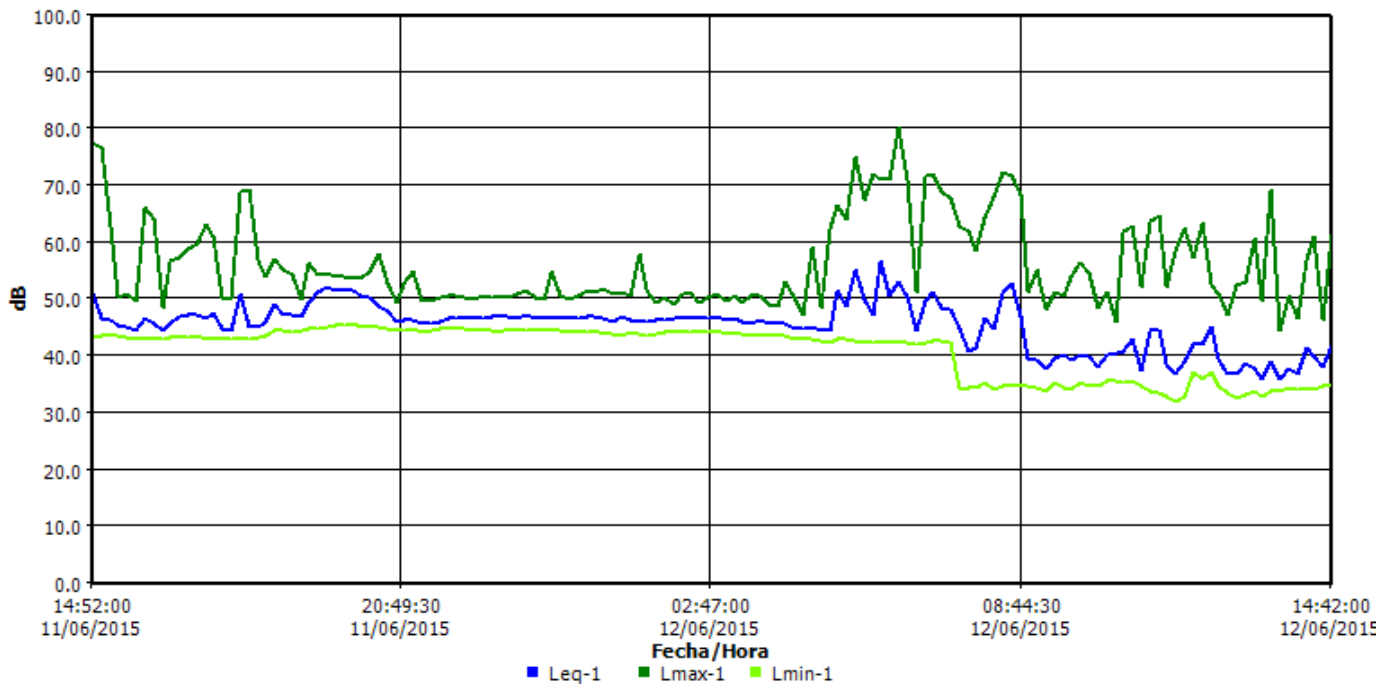
Panel de información

Ubicación Aledaño a Aldea El Fucío
Nombre ER-3
Sesión padre S096
Hora de inicio Jueves, 11 de Junio de 2015 14:42:00
Hora de paro Viernes, 12 de Junio de 2015 14:42:00
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	FAST
Lmin	1	31.9 dB	Lmax	1	80.4 dB
Lpk	1	102.6 dB	Leq	1	47.1 dB

Gráfica de datos de registro



ER-1

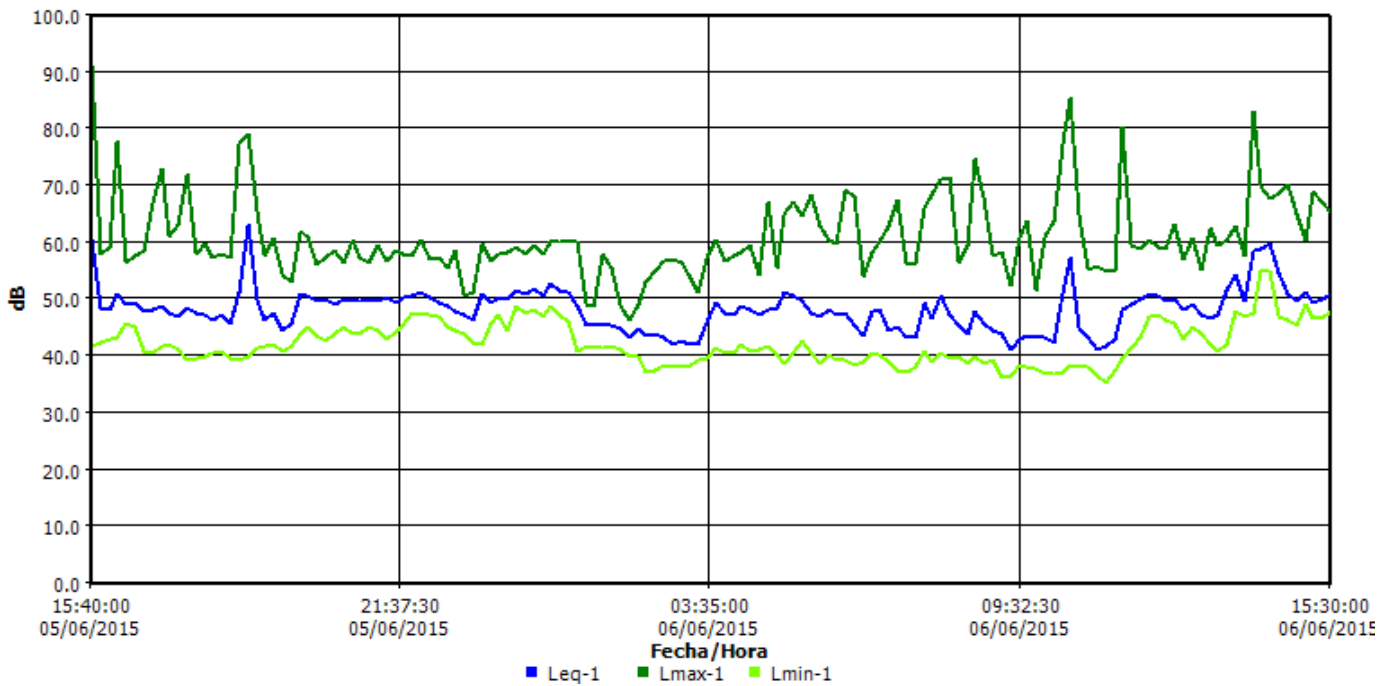
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S095
Hora de inicio Viernes, 05 de Junio de 2015 15:30:00
Hora de paro Sábado, 06 de Junio de 2015 15:30:00
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	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	35.4 dB	Lmax	1	91.3 dB
Lpk	1	123.5 dB	Leq	1	50.5 dB

Gráfica de datos de registro



ER-7A

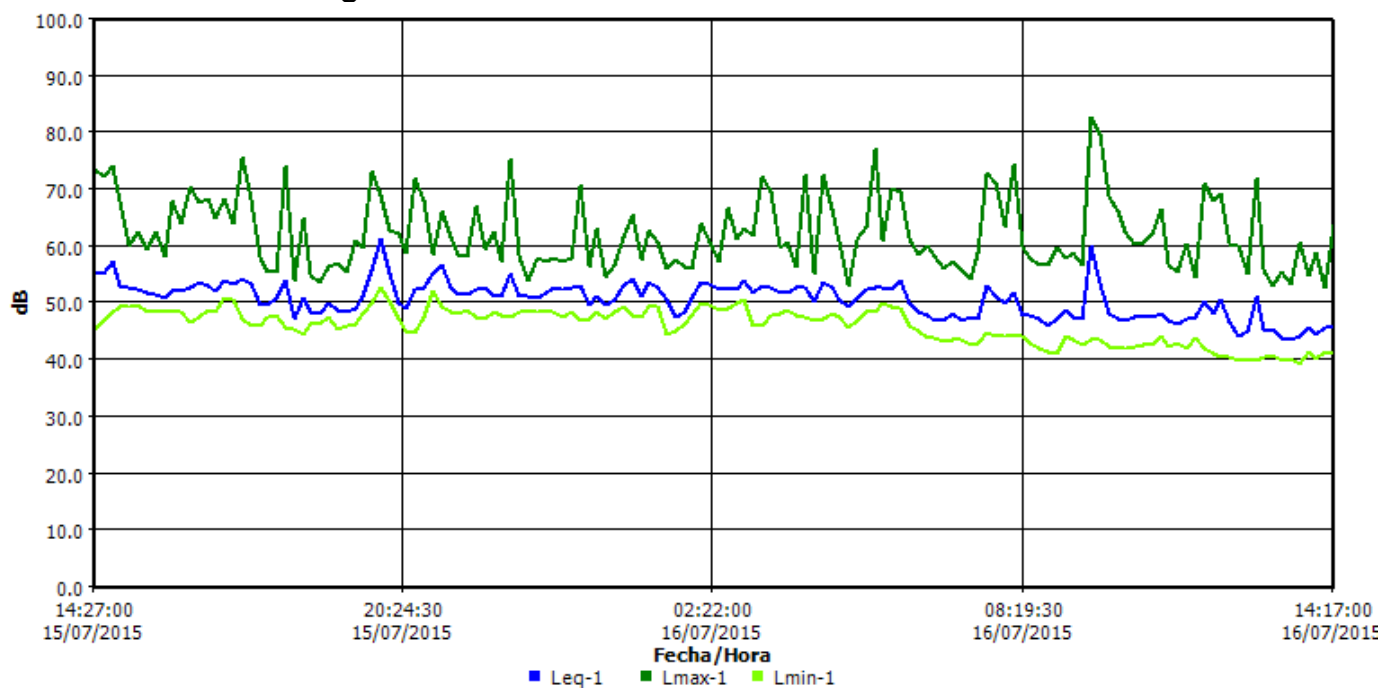
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S103
Hora de inicio Miércoles, 15 de Julio de 2015 14:17:00
Hora de paro Jueves, 16 de Julio de 2015 14:17:00
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	FAST
Lmin	1	39.4 dB	Lmax	1	82.7 dB
Lpk	1	96.5 dB	Leq	1	51.8 dB

Gráfica de datos de registro



ER-3

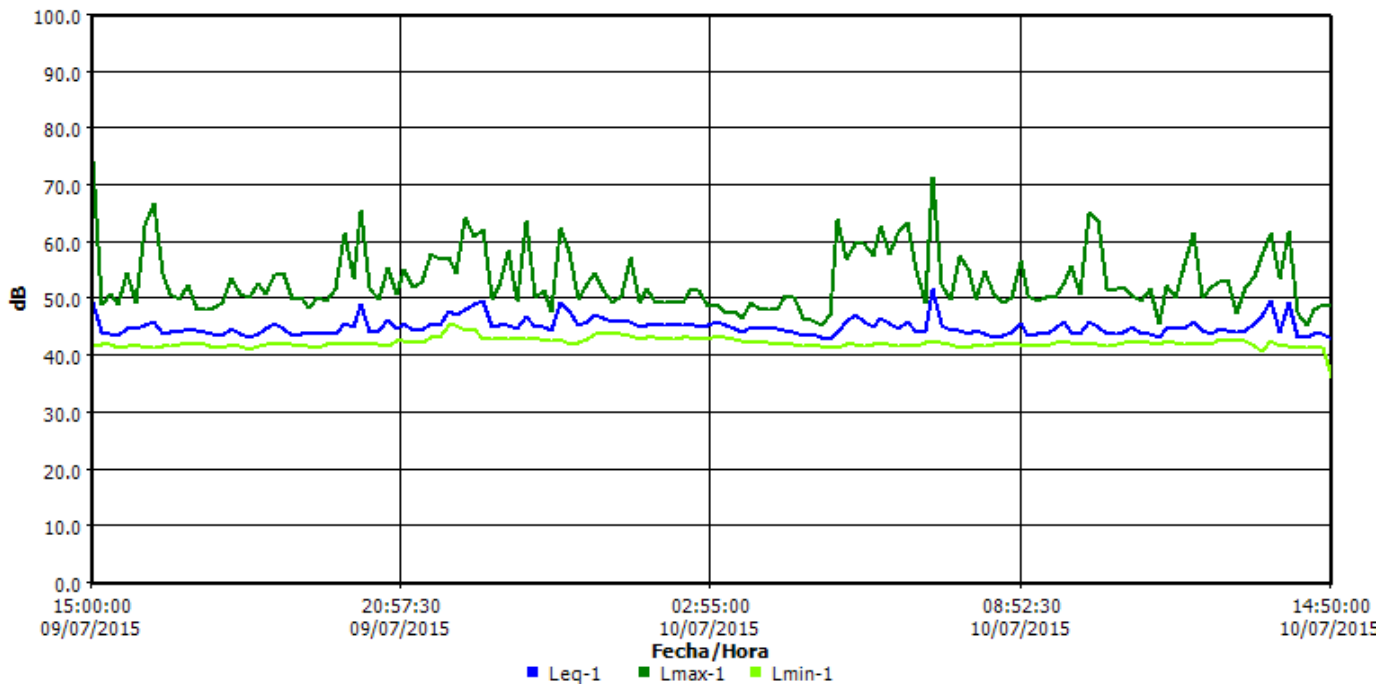
Panel de información

Ubicación Aledaño a Aldea El Fucío.
Nombre ER-3
Sesión padre S194
Hora de inicio Jueves, 09 de Julio de 2015 14:50:00
Hora de paro Viernes, 10 de Julio de 2015 14:50:00
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	FAST
Lmin	1	36.1 dB	Lmax	1	74.5 dB
Lpk	1	97.1 dB	Leq	1	45.4 dB

Gráfica de datos de registro



ER-2

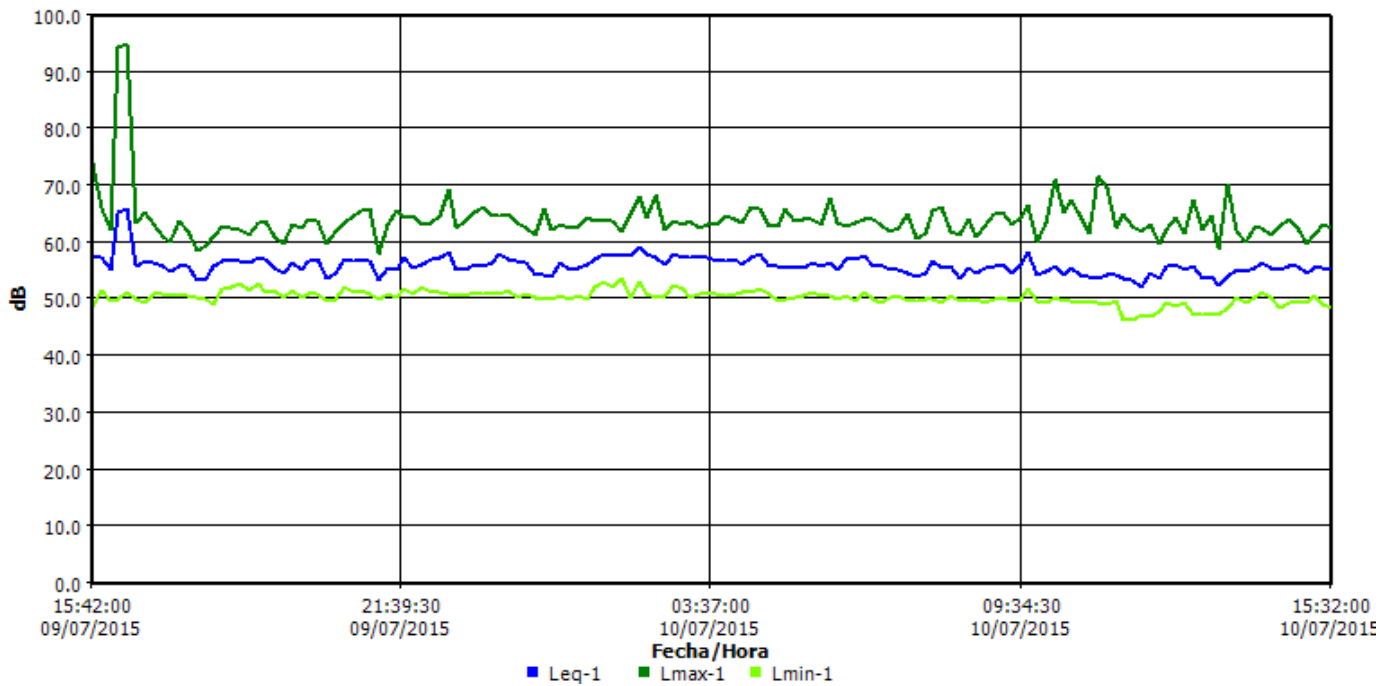
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S102
Hora de inicio Jueves, 09 de Julio de 2015 15:32:00
Hora de paro Viernes, 10 de Julio de 2015 15:32:00
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	FAST
Lmin	1	46.4 dB	Lmax	1	95.1 dB
Lpk	1	105.6 dB	Leq	1	56.4 dB

Gráfica de datos de registro



ER-1

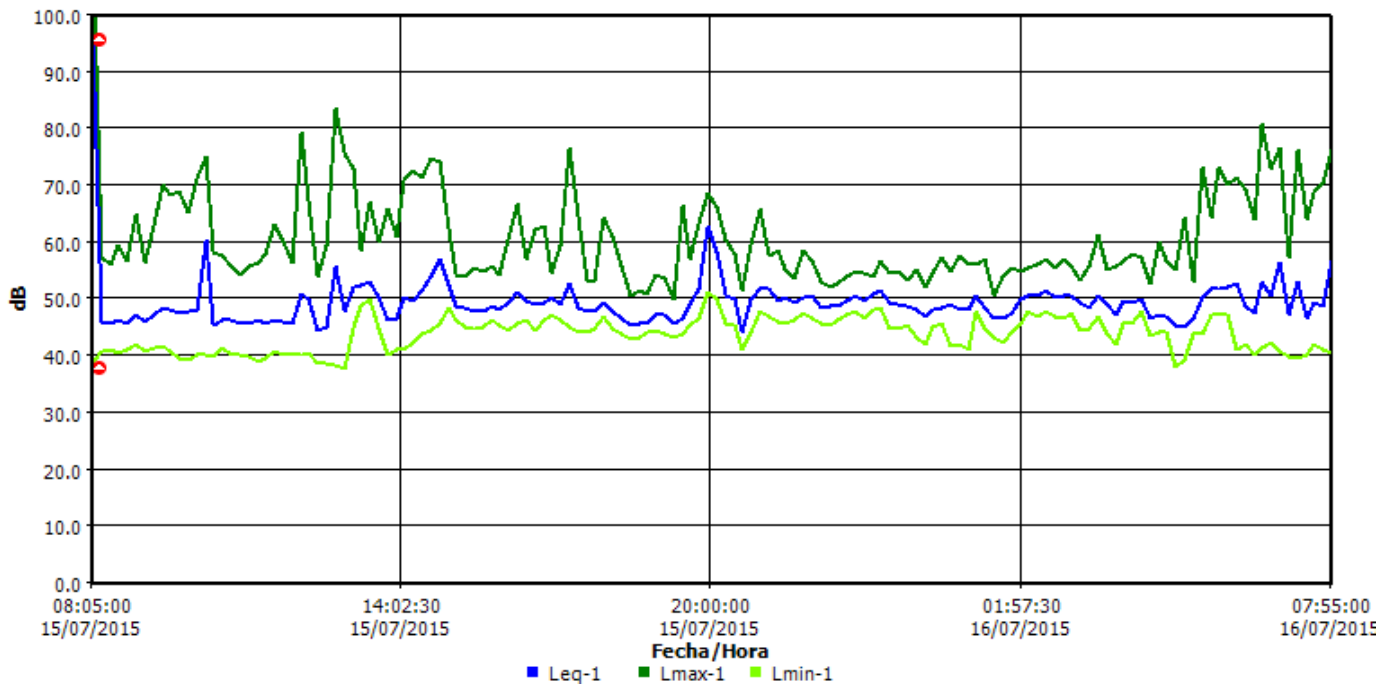
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S196
Hora de inicio Miércoles, 15 de Julio de 2015 07:55:00
Hora de paro Jueves, 16 de Julio de 2015 07:55:00
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	FAST
Lmin	1	37.7 dB	Lmax	1	114.1 dB
Lpk	1	120.1 dB	Leq	1	75.1 dB

Gráfica de datos de registro



11.4 Certificados de verificación de los equipos utilizados

11.4.1 Material Particulado (PM₁₀) y Presión Sonora

Mesa Labs 10 Park Place Butler, NJ 07405
NIST Traceable Calibration Facility, ISO 9001:2008 Registered



CERTIFICATE OF CALIBRATION - NIST TRACEABILITY

(Refer to instruction manual for further details of calibration)

tetraCal Serial Number: 508

DATE: 31-Mar-2015

Calibration Operator E. Albuja

Critical Venturi Flow Meter: Max Uncertainty = 0.346%

Serial Number: 1A CEESI NVLAP NIST Data File 07BGI-0001

Serial Number: 2A CEESI NVLAP NIST Data File 07BGI-0003

Serial Number: 3A CEESI NVLAP NIST Data File 07BGI-0004

Serial Number: 4A CEESI NVLAP NIST Data File 07BGI-0002

Room Temperature: Uncertainty=0.071% Room Temperature: 24.3 °C

Brand: Accu-Safe Serial Number: 254881

NIST Traceability No. 516837

tetraCal:

Ambient Temperature (set): 24.3 °C

Aux (filter) Temperature (set): °C

Barometric Pressure and Absolute Pressure

Vaisala Model PTB330(50-1100) Digital Accuracy: 0.03371%

S/N DH085001

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

tetraCal:

Barometric pressure (set): 744 mm of Hg

Results of Venturi Calibration

Flow Rate (Q) vs. Pressure Drop (ΔP).

Where: Q=Lpm, ΔP = Cm of H₂O

No. 1 C 5.92373 ΔP ^ 0.52396

No. 2 C 1.16297 ΔP ^ 0.52701

No. 3 C 0.33840 ΔP ^ 0.54737

Overall Uncertainty: 0.35%

Date Placed In Service _____

(To be filled in by operator upon receipt)

Recommended Recalibration Date _____

(12 months from date placed in service)

Revised: October 2014
Cal102-03T1 Rev A

To Check a Tetra Cal
 6 - 30.00 Lpm
 VER.

31-Mar-2015 E. Albuja

Pre-recert
 BP= 746 mm of Hg

3.41P

Maximum allowable error at any flow rate is .75%.

Serial No. 508

Reading		CV				
Abs. P		Qa		Qa		
Crit. Vent.	Room	Flow		TriCal	% Error	
mm of Hg	TEMP	Lpm		Indicated		
173.41	24.2	6.95		6.91	-0.62	
406.46	24.2	16.50		16.28	-1.36	Average %
732.92	24.2	29.88		29.62	-0.89	-0.95

To Check a Tetra Cal
 1.20 - 6.00 Lpm

BP= 746 mm of Hg

Reading		CV				
Abs. P		Qa		Qa		
Crit. Vent.	Room	Flow		Tri Cal	% Error	
mm of Hg	TEMP	Lpm		Indicated		
125.2	24.5	1.42		1.41	-0.59	
329.9	24.5	3.83		3.76	-1.74	Average %
514.7	24.5	6.00		5.92	-1.30	-1.21

To Check a Tetra Cal
 0.10 - 1.20 Lpm

BP= 746 mm of Hg

Reading		CV				
Abs. P		Qa		Qa		
Crit. Vent.	Room	Flow		TriCal	% Error	
mm of Hg	TEMP	Lpm		Indicated		
207.98	24.7	0.377		0.376	-0.16	
457.94	24.7	0.860		0.866	0.70	Average %
621.05	24.7	1.175		1.197	1.84	0.79

To Check a Tetra Cal
 6 - 30.00 Lpm
 VER.

31-Mar-2015 E. Albuja

BP= 744 mm of Hg

3.41P

Maximum allowable error at any flow rate is .75%.

Serial No. 508

Reading		CV				
Abs. P		Qa		Qa		
Crit. Vent.	Room	Flow		TriCal	% Error	
mm of Hg	TEMP	Lpm		Indicated		
164.19	24.2	6.59		6.63	0.56	
465.76	24.2	18.99		18.95	-0.19	
718.29	24.2	29.36		29.44	0.26	
						Average % 0.21

To Check a Tetra Cal
 1.20 - 6.00 Lpm

BP= 744 mm of Hg

Reading		CV				
Abs. P		Qa		Qa		
Crit. Vent.	Room	Flow		Tri Cal	% Error	
mm of Hg	TEMP	Lpm		Indicated		
130.4	24.1	1.49		1.49	0.51	
317.6	24.1	3.69		3.68	-0.19	
510.1	24.1	5.95		5.97	0.31	
						Average % 0.21

To Check a Tetra Cal
 0.10 - 1.20 Lpm

BP= 744 mm of Hg

Reading		CV				
Abs. P		Qa		Qa		
Crit. Vent.	Room	Flow		TriCal	% Error	
mm of Hg	TEMP	Lpm		Indicated		
215.15	24.5	0.391		0.394	0.70	
474.62	24.5	0.894		0.896	0.22	
626.6	24.5	1.189		1.195	0.54	
						Average % 0.49

**CERTIFICADO DE VERIFICACIÓN DE CALIBRACIÓN DE
SONÓMETROS
jul-15**

Certificado Numero: 1937

Características del Equipo

Nombre de equipo: Sound Level Meter
Modelo: SoundPro SE/DL
Fabricante: Quest Technologies
Unidades de medición: Decibeles
0.5 dB a 25°C; 1.0 dB arriba del rango de temperatura de -10°C a 50°C.
Precisión: Segundo Detector de picos: 1.5dB desde 40 hasta +10dB relativo al límite superior del rango. Análisis en frecuencia desde 16Hz hasta 16KHz en bandas de octavas y desde 12.5Hz hasta 20KHz en tercios de bandas de octavas
Rango de medición: 4 hz (-3dB) a 50kHz (-3dB) en carga lineal únicamente.



Información de la Calibración

Equipo No.: 2	Fecha de Verificación de Calibración: 03/07/2015	m/d/a
Número de Serie : BGJ100009	Vigencia: 30 Días	

Valores Ambientales	
Temperatura °C	21.00
Presion (Pulg. Hg)	24.40
Humedad Relativa (%):	61.00

Lectura de Calibración	114.00	dB
Relectura	114.10	dB

Estado del Equipo: CALIBRADO

Características del Equipo de Calibración

Equipo: QC-10 Calibrator
Numero Serie: QIC100169
Fabricante: Quest Technologies
Rango: 94-114 dB
Fecha Emisión: 12/05/2016
Certificado No.: ICA- 4863114

Responsables

Luis Rey
Responsable

Ing. Hasan Zolata
Supervisor

Falla reportada

Cliente solicita revisión y mantenimiento general.

Observaciones

Mantenimiento / Reparación cavidad de batería (dañada por qué voltearon el equipo).

Diagnostico

Después de revisar el equipo, se encontró que funciona correctamente solo necesita mantenimiento general.

Trabajos realizados

Mantenimiento de los siguientes componentes:

- Revisión y mantenimiento general de consola de muestreo y kit outdoor.

Al finalizar el mantenimiento se efectuaron las siguientes verificaciones:

- Calibración del equipo.
- Verificación de funciones.
- Test de muestreo de sonido.
- Revisión de kit outdoor.



Repuestos utilizados

- Ninguno

Responsables:

Luis Rey
Responsable

Ing. Hasan Zolata
Supervisor

Reporte de sesión

04/11/2016

Información general

Nombre S243_BGJ100009_28092016_130505

Comentarios

Hora de inicio 22/09/2016 12:22:36 p.m.

Hora de paro 25/09/2016 12:22:36 p.m.

Duración: 3.00:00:00

Tipo de modelo SoundPro DL

Número de serie BGJ100009

Revisión del firmware del dispositivo R.13F

Nombre de la compañía

Descripción

Ubicación

Nombre del usuario

Datos de resumen

Descripción	Medidor	Valor	Descripción	Medidor	Valor
Dosis	1	1.3 %	Pdose (8:00)	1	0.1 %
Lavg	1	--	Lpk	1	122.7 dB
Leq	1	61.5 dB	Promedio ponderado de tiempo (TWA)	1	71.1 dB
UL, tiempo límite superior	1	00:00:00	SEL	1	115.7 dB
ProjectedTWA (8:00)	1	61.5 dB	Mntime	1	24/09/2016 03:09:58 a.m.
Mxtime	1	23/09/2016 04:53:44 p.m.	PKtime	1	22/09/2016 12:22:49 p.m.
Weighting	1	--	Range Ceiling	1	--
Criterion Level	1	--	ULL	1	--
Dynamic Range	1	--	Exchange Rate	1	--
Response	1	--	Int Threshold	1	--
Alarm Level 1	1	--	AlarmLevel2	1	--
Dosimeter Name	1	--			
Dosis	2	8.9 %	Pdose (8:00)	2	1 %
Lavg	2	56.7 dB	Lpk	2	122.6 dB
Leq	2	--	Promedio ponderado de tiempo (TWA)	2	72.5 dB

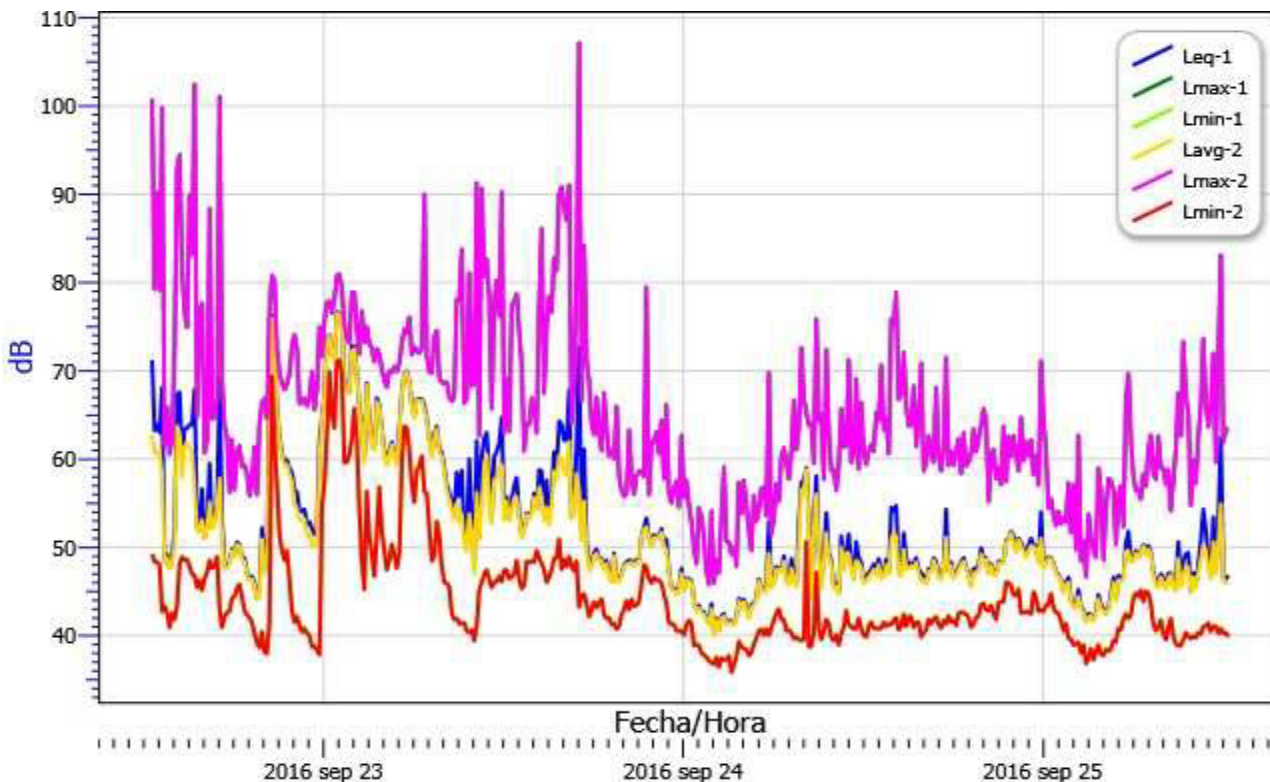
Descripción	Medidor	Valor	Descripción	Medidor	Valor
UL, tiempo límite superior	2	00:00:00	SEL	2	146.6 dB
ProjectedTWA (8:00)	2	56.7 dB	Mntime	2	24/09/2016 03:09:58 a.m.
Mxtime	2	23/09/2016 04:53:44 p.m.	PKtime	2	22/09/2016 12:22:49 p.m.
Ponderación	2	C	Range Ceiling	2	--
Nivel de criterio	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Índice de intercambio	2	5 dB
Respuesta	2	FAST	Umbral de integración	2	80 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	--			

Historial de calibración

Fecha	Acción de calibración	Nivel	Tipo de modelo del calibrador	Número de serie	Fecha de certificación
22/09/2016 12:20:30 p.m.	Calibración	114.0			

Gráfica de datos de registro

S243_BGJ100009_28092016_130505: Gráfica de datos de registro - Read Only



11.5 Informe Original de los Resultados Analíticos Obtenidos de Muestras de Agua del Laboratorio ACZ Laboratories, INC. Correspondiente al Monitoreo de Junio 2015.

11.5.1 Muestras de Agua Superficial (SW)

March 26, 2015

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: L23234

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 11, 2015. This project has been assigned to ACZ's project number, L23234. 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 L23234. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

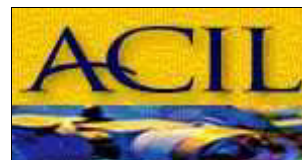
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 25, 2015. 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.

March 26, 2015

Project ID: Escobal

ACZ Project ID: L23234

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on March 11, 2015. 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 L23234. 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.
2. For Oil and Grease values flagged with an "N1", the SOP states that samples should be left in the desiccator and dried for at least 30 minutes before being reweighed for oil and grease results. The analyst only allowed the samples to be dried for 28 minutes and 57 seconds.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L23234-01**
Date Sampled: 03/09/15 10:40
Date Received: 03/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/18/15 0:06	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/16/15 11:30	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/19/15 8:38	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 11:21	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 12:18	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								03/16/15 18:35	pmc
Total Hot Plate Digestion	M200.2 ICP								03/13/15 10:44	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L23234-01**

Date Sampled: 03/09/15 10:40

Date Received: 03/11/15

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	03/13/15 15:54	aeb
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	03/14/15 0:53	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/20/15 22:07	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/18/15 18:24	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0024			mg/L	0.0002	0.001	03/20/15 22:07	msh
Arsenic, total	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	03/18/15 18:24	msh
Barium, dissolved	M200.7 ICP	1	0.197			mg/L	0.003	0.02	03/13/15 15:54	aeb
Barium, total	M200.7 ICP	1	0.201			mg/L	0.003	0.02	03/14/15 0:53	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:54	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:53	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 10:58	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 0:53	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:54	aeb
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	03/14/15 0:53	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/20/15 22:07	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/18/15 18:24	msh
Calcium, dissolved	M200.7 ICP	1	57.6		*	mg/L	0.1	0.5	03/13/15 15:54	aeb
Calcium, total	M200.7 ICP	1	58.5			mg/L	0.1	0.5	03/14/15 0:53	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:54	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:53	jjc
Cobalt, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	03/13/15 15:54	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:53	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:54	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:53	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/13/15 15:54	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/16/15 12:03	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	03/13/15 15:54	aeb
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	03/14/15 0:53	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/24/15 2:51	msh
Lead, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	03/18/15 18:24	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/13/15 15:54	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/14/15 0:53	jjc
Magnesium, dissolved	M200.7 ICP	1	6.3			mg/L	0.2	1	03/13/15 15:54	aeb
Magnesium, total	M200.7 ICP	1	6.3			mg/L	0.2	1	03/14/15 0:53	jjc
Manganese, dissolved	M200.7 ICP	1	0.021	B	*	mg/L	0.005	0.03	03/13/15 15:54	aeb
Manganese, total	M200.7 ICP	1	0.021	B		mg/L	0.005	0.03	03/14/15 0:53	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/17/15 11:21	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/18/15 13:12	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/13/15 15:54	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/14/15 0:53	jjc
Nickel, dissolved	M200.7 ICP	1		U	*	mg/L	0.008	0.04	03/13/15 15:54	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/14/15 0:53	jjc
Potassium, dissolved	M200.7 ICP	1	5.8			mg/L	0.2	1	03/13/15 15:54	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L23234-01**
Date Sampled: 03/09/15 10:40
Date Received: 03/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.9			mg/L	0.2	1	03/14/15 0:53	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/13/15 15:54	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/14/15 0:53	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/20/15 22:07	msh
Selenium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/18/15 18:24	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/20/15 22:07	msh
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/18/15 18:24	msh
Sodium, dissolved	M200.7 ICP	1	11.3			mg/L	0.2	1	03/13/15 15:54	aeb
Sodium, total	M200.7 ICP	1	11.2			mg/L	0.2	1	03/14/15 0:53	jjc
Strontium, dissolved	M200.7 ICP	1	0.256			mg/L	0.005	0.03	03/13/15 15:54	aeb
Strontium, total	M200.7 ICP	1	0.256			mg/L	0.005	0.03	03/14/15 0:53	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/20/15 22:07	msh
Thallium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/18/15 18:24	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/14/15 10:58	jjc
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	03/14/15 13:00	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/13/15 15:54	aeb
Titanium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/14/15 0:53	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	03/20/15 22:07	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	03/18/15 18:24	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/13/15 15:54	aeb
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/14/15 0:53	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 10:58	jjc
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:53	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW1-E

ACZ Sample ID: **L23234-01**
 Date Sampled: 03/09/15 10:40
 Date Received: 03/11/15
 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	150		*	mg/L	2	20	03/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Total Alkalinity		1	150		*	mg/L	2	20	03/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			03/25/15 16:54	calc
Sum of Anions			4.1			meq/L			03/25/15 16:54	calc
Sum of Cations			4.1			meq/L			03/25/15 16:54	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/18/15 10:06	enb
Chloride	SM4500Cl-E	1	4.8		*	mg/L	0.5	2	03/17/15 14:30	tcd
Conductivity @25C	SM2510B	1	388		*	umhos/cm	1	10	03/16/15 18:45	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/18/15 15:17	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/17/15 11:51	thf
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	03/20/15 20:42	enb
Hardness as CaCO3	SM2340B - Calculation		170			mg/L	0.8	4	03/25/15 16:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.08	B	*	mg/L	0.02	0.1	03/19/15 22:54	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 13:55	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	03/20/15 11:44	mss2
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	03/16/15 0:00	enb
pH measured at		1	20.3		*	C	0.1	0.1	03/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	03/25/15 16:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	03/18/15 11:09	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	03/11/15 21:03	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	03/18/15 12:24	bsi
Residue, Filterable (TDS) @180C	SM2540C	1	294		*	mg/L	10	20	03/12/15 15:24	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/12/15 11:40	eea
Residue, Total (TS) @ 105C	SM2540B	1	288		*	mg/L	10	20	03/11/15 15:35	id
Sulfate	D516-02/-07 - Turbidimetric	5	43.3		*	mg/L	5	25	03/18/15 10:53	bsu
Sulfide as S	SM4500S2-D	1	0.05	B	*	mg/L	0.02	0.1	03/12/15 15:03	eea
TDS (calculated)	Calculation		221			mg/L			03/25/15 16:54	calc
TDS (ratio - measured/calculated)	Calculation		1.33						03/25/15 16:54	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L23234-02**
Date Sampled: 03/09/15 09:50
Date Received: 03/11/15
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/18/15 0:45	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/16/15 11:39	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/19/15 9:13	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 11:27	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 12:24	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								03/16/15 19:06	pmc
Total Hot Plate Digestion	M200.2 ICP								03/13/15 10:56	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L23234-02**
Date Sampled: 03/09/15 09:50
Date Received: 03/11/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	03/13/15 15:57	aeb
Aluminum, total	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	03/14/15 0:56	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0088			mg/L	0.0004	0.002	03/20/15 22:10	msh
Antimony, total	M200.8 ICP-MS	1	0.0086			mg/L	0.0004	0.002	03/18/15 18:31	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0067			mg/L	0.0002	0.001	03/20/15 22:10	msh
Arsenic, total	M200.8 ICP-MS	1	0.0066			mg/L	0.0002	0.001	03/18/15 18:31	msh
Barium, dissolved	M200.7 ICP	1	0.046			mg/L	0.003	0.02	03/13/15 15:57	aeb
Barium, total	M200.7 ICP	1	0.047			mg/L	0.003	0.02	03/14/15 0:56	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:57	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:56	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 11:01	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 0:56	jjc
Boron, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	03/13/15 15:57	aeb
Boron, total	M200.7 ICP	1	0.09			mg/L	0.01	0.05	03/14/15 0:56	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/20/15 22:10	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/18/15 18:31	msh
Calcium, dissolved	M200.7 ICP	1	276		*	mg/L	0.1	0.5	03/13/15 15:57	aeb
Calcium, total	M200.7 ICP	1	285			mg/L	0.1	0.5	03/14/15 0:56	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:57	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:56	jjc
Cobalt, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	03/13/15 15:57	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:56	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:57	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:56	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/13/15 15:57	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/16/15 12:06	jjc
Iron, dissolved	M200.7 ICP	1	0.14		*	mg/L	0.02	0.05	03/13/15 15:57	aeb
Iron, total	M200.7 ICP	1	0.16			mg/L	0.02	0.05	03/14/15 0:56	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	03/24/15 2:54	msh
Lead, total	M200.8 ICP-MS	1	0.0073			mg/L	0.0001	0.0005	03/18/15 18:31	msh
Lithium, dissolved	M200.7 ICP	1	0.079			mg/L	0.008	0.04	03/13/15 15:57	aeb
Lithium, total	M200.7 ICP	1	0.083			mg/L	0.008	0.04	03/14/15 0:56	jjc
Magnesium, dissolved	M200.7 ICP	1	16.6			mg/L	0.2	1	03/13/15 15:57	aeb
Magnesium, total	M200.7 ICP	1	16.7			mg/L	0.2	1	03/14/15 0:56	jjc
Manganese, dissolved	M200.7 ICP	1	0.058		*	mg/L	0.005	0.03	03/13/15 15:57	aeb
Manganese, total	M200.7 ICP	1	0.065			mg/L	0.005	0.03	03/14/15 0:56	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/17/15 11:31	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/18/15 13:14	mfm
Molybdenum, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	03/13/15 15:57	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/14/15 0:56	jjc
Nickel, dissolved	M200.7 ICP	1		U	*	mg/L	0.008	0.04	03/13/15 15:57	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/14/15 0:56	jjc
Potassium, dissolved	M200.7 ICP	1	9.3			mg/L	0.2	1	03/13/15 15:57	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L23234-02**
Date Sampled: 03/09/15 09:50
Date Received: 03/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	9.6		mg/L	0.2	1	03/14/15 0:56	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/13/15 15:57	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/14/15 0:56	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	03/20/15 22:10	msh
Selenium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	03/18/15 18:31	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	03/20/15 22:10	msh
Silver, total	M200.8 ICP-MS	1	0.00008	B	mg/L	0.00005	0.0003	03/18/15 18:31	msh
Sodium, dissolved	M200.7 ICP	1	60.1		mg/L	0.2	1	03/13/15 15:57	aeb
Sodium, total	M200.7 ICP	1	61.2		mg/L	0.2	1	03/14/15 0:56	jjc
Strontium, dissolved	M200.7 ICP	1	3.160		mg/L	0.005	0.03	03/13/15 15:57	aeb
Strontium, total	M200.7 ICP	1	3.220		mg/L	0.005	0.03	03/14/15 0:56	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/20/15 22:10	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/18/15 18:31	msh
Tin, dissolved	M200.7 ICP	1	0.04	B	mg/L	0.04	0.2	03/14/15 11:01	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/14/15 13:03	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/13/15 15:57	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/14/15 0:56	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/20/15 22:10	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/18/15 18:31	msh
Vanadium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	03/13/15 15:57	aeb
Vanadium, total	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	03/14/15 0:56	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 11:01	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 0:56	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2-E

ACZ Sample ID: **L23234-02**
 Date Sampled: 03/09/15 09:50
 Date Received: 03/11/15
 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	90.5		*	mg/L	2	20	03/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Total Alkalinity		1	90.5		*	mg/L	2	20	03/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.9			%			03/25/15 16:54	calc
Sum of Anions			17			meq/L			03/25/15 16:54	calc
Sum of Cations			18			meq/L			03/25/15 16:54	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/18/15 10:11	enb
Chloride	SM4500Cl-E	1	50.8		*	mg/L	0.5	2	03/17/15 14:30	tcd
Conductivity @25C	SM2510B	1	1550		*	umhos/cm	1	10	03/16/15 18:53	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/18/15 15:17	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/17/15 11:52	thf
Fluoride	SM4500F-C	1	0.98		*	mg/L	0.05	0.3	03/20/15 20:46	enb
Hardness as CaCO3	SM2340B - Calculation		758			mg/L	0.8	4	03/25/15 16:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.13		*	mg/L	0.02	0.1	03/19/15 22:55	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.07	B	*	mg/L	0.05	0.2	03/16/15 13:56	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	03/20/15 11:45	mss2
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	03/16/15 0:00	enb
pH measured at		1	19.9		*	C	0.1	0.1	03/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	03/25/15 16:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	03/18/15 11:10	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	03/11/15 21:04	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	03/18/15 12:25	bsi
Residue, Filterable (TDS) @180C	SM2540C	1	1250		*	mg/L	10	20	03/12/15 15:26	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/12/15 11:42	eea
Residue, Total (TS) @ 105C	SM2540B	1	1300		*	mg/L	10	20	03/11/15 15:37	id
Sulfate	D516-02/-07 - Turbidimetric	50	671		*	mg/L	50	250	03/18/15 10:56	bsu
Sulfide as S	SM4500S2-D	1	0.03	B	*	mg/L	0.02	0.1	03/12/15 15:13	eea
TDS (calculated)	Calculation		1140			mg/L			03/25/15 16:54	calc
TDS (ratio - measured/calculated)	Calculation		1.10						03/25/15 16:54	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L23234-03**
Date Sampled: 03/09/15 09:05
Date Received: 03/11/15
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/18/15 1:25	mss2
Cyanide, WAD	SM4500-CN I- distillation		-						03/16/15 11:48	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/19/15 9:49	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 11:40	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 12:30	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								03/16/15 19:17	pmc
Total Hot Plate Digestion	M200.2 ICP								03/13/15 11:07	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L23234-03**

Date Sampled: 03/09/15 09:05

Date Received: 03/11/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.03	0.2	03/13/15 16:00	aeb
Aluminum, total	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	03/14/15 0:59	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0122			mg/L	0.0004	0.002	03/20/15 22:14	msh
Antimony, total	M200.8 ICP-MS	1	0.0119			mg/L	0.0004	0.002	03/18/15 18:33	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0086			mg/L	0.0002	0.001	03/20/15 22:14	msh
Arsenic, total	M200.8 ICP-MS	1	0.0083			mg/L	0.0002	0.001	03/18/15 18:33	msh
Barium, dissolved	M200.7 ICP	1	0.048			mg/L	0.003	0.02	03/13/15 16:00	aeb
Barium, total	M200.7 ICP	1	0.047			mg/L	0.003	0.02	03/14/15 0:59	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 16:00	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:59	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 11:04	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 0:59	jjc
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	03/13/15 16:00	aeb
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	03/14/15 0:59	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/20/15 22:14	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/18/15 18:33	msh
Calcium, dissolved	M200.7 ICP	1	328			mg/L	0.1	0.5	03/23/15 12:15	aeb
Calcium, total	M200.7 ICP	1	339			mg/L	0.1	0.5	03/14/15 0:59	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 16:00	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:59	jjc
Cobalt, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	03/13/15 16:00	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:59	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 16:00	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:59	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/13/15 16:00	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/16/15 12:15	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	03/13/15 16:00	aeb
Iron, total	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	03/14/15 0:59	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	03/24/15 2:57	msh
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	03/18/15 18:33	msh
Lithium, dissolved	M200.7 ICP	1	0.082			mg/L	0.008	0.04	03/13/15 16:00	aeb
Lithium, total	M200.7 ICP	1	0.086			mg/L	0.008	0.04	03/14/15 0:59	jjc
Magnesium, dissolved	M200.7 ICP	1	17.7			mg/L	0.2	1	03/23/15 12:15	aeb
Magnesium, total	M200.7 ICP	1	17.6			mg/L	0.2	1	03/14/15 0:59	jjc
Manganese, dissolved	M200.7 ICP	1		U	*	mg/L	0.005	0.03	03/13/15 16:00	aeb
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/14/15 0:59	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/17/15 11:33	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/18/15 13:16	mfm
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	03/13/15 16:00	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/14/15 0:59	jjc
Nickel, dissolved	M200.7 ICP	1		U	*	mg/L	0.008	0.04	03/13/15 16:00	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/14/15 0:59	jjc
Potassium, dissolved	M200.7 ICP	1	11.9			mg/L	0.2	1	03/23/15 12:15	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L23234-03**

Date Sampled: 03/09/15 09:05

Date Received: 03/11/15

Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	12.3		mg/L	0.2	1	03/14/15 0:59	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/13/15 16:00	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/14/15 0:59	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0008		mg/L	0.0001	0.0003	03/20/15 22:14	msh
Selenium, total	M200.8 ICP-MS	1	0.0008		mg/L	0.0001	0.0003	03/18/15 18:33	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	03/20/15 22:14	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	03/18/15 18:33	msh
Sodium, dissolved	M200.7 ICP	1	73.6		mg/L	0.2	1	03/23/15 12:15	aeb
Sodium, total	M200.7 ICP	1	75.1		mg/L	0.2	1	03/14/15 0:59	jjc
Strontium, dissolved	M200.7 ICP	1	3.650		mg/L	0.005	0.03	03/13/15 16:00	aeb
Strontium, total	M200.7 ICP	1	3.670		mg/L	0.005	0.03	03/14/15 0:59	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	03/20/15 22:14	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/18/15 18:33	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	03/14/15 11:04	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/14/15 13:12	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/13/15 16:00	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/14/15 0:59	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	03/20/15 22:14	msh
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	03/18/15 18:33	msh
Vanadium, dissolved	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	03/13/15 16:00	aeb
Vanadium, total	M200.7 ICP	1	0.010	B	mg/L	0.005	0.03	03/14/15 0:59	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 11:04	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 0:59	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2B-E

ACZ Sample ID: **L23234-03**
 Date Sampled: 03/09/15 09:05
 Date Received: 03/11/15
 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	33.1		*	mg/L	2	20	03/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Total Alkalinity		1	33.1		*	mg/L	2	20	03/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			03/25/15 0:00	calc
Sum of Anions			22			meq/L			03/25/15 0:00	calc
Sum of Cations			22			meq/L			03/25/15 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/18/15 10:16	enb
Chloride	SM4500Cl-E	1	68.5		*	mg/L	0.5	2	03/23/15 12:27	mss2
Conductivity @25C	SM2510B	1	1840		*	umhos/cm	1	10	03/16/15 19:01	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/18/15 15:18	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/17/15 11:53	thf
Fluoride	SM4500F-C	1	1.36		*	mg/L	0.05	0.3	03/20/15 20:50	enb
Hardness as CaCO3	SM2340B - Calculation		892			mg/L	0.8	4	03/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.46		*	mg/L	0.02	0.1	03/19/15 22:56	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 13:57	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	03/20/15 11:46	mss2
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	03/16/15 0:00	enb
pH measured at		1	19.6		*	C	0.1	0.1	03/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	03/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	03/18/15 11:13	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	03/11/15 21:06	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	03/18/15 12:26	bsi
Residue, Filterable (TDS) @180C	SM2540C	1	1510		*	mg/L	10	20	03/12/15 15:27	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/12/15 11:43	eea
Residue, Total (TS) @ 105C	SM2540B	1	1580		*	mg/L	10	20	03/11/15 15:39	id
Sulfate	D516-02/-07 - Turbidimetric	50	896		*	mg/L	50	250	03/24/15 12:02	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/12/15 15:23	eea
TDS (calculated)	Calculation		1420			mg/L			03/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.06						03/25/15 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: **L23234**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23234-01	WG380324	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.
		Cobalt, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Iron, 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.
		Manganese, 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.
		Nickel, 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.
	WG380447	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380535	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).
	WG380510	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG380447	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG380585	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).
	WG380495	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).
	WG380717	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).
	WG380447	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380670	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).
	WG380435	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
	WG380688	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.
	WG380447	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG380547	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).
	WG380237	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.

Tahoe Resources, Inc.

ACZ Project ID: **L23234**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
WG380560		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG380297		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RO	The duplicate originally assigned to this sample was not used for precision assessment because residue density exceeded the method limits. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.
WG380271		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).
WG380223		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG380552		Sulfate	D516-02/-07 - Turbidimetric	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG380285		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).
WG380447		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23234**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23234-02	WG380324	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.
		Cobalt, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Iron, 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.
		Manganese, 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.
		Nickel, 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.
	WG380447	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380535	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).
	WG380510	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG380447	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG380585	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).
	WG380495	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).
	WG380717	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).
	WG380447	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380670	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).
	WG380435	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
	WG380688	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.
	WG380447	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG380547	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	H3	Sample was received and analyzed past holding time.
	WG380237	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			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

Tahoe Resources, Inc.

ACZ Project ID: **L23234**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG380560		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG380297		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RO	The duplicate originally assigned to this sample was not used for precision assessment because residue density exceeded the method limits. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.
WG380271		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).
WG380223		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG380552		Sulfate	D516-02/-07 - Turbidimetric	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG380285		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).
WG380447		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23234**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23234-03	WG380324	Cobalt, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Iron, 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.
		Manganese, 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.
		Nickel, 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.
	WG380447	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380535	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).
	WG380794	Chloride	SM4500Cl-E	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG380447	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG380585	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).
	WG380495	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).
	WG380717	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).
	WG380447	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380670	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).
WG380435	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.	
WG380688	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.	
WG380447	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG380547	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	H3	Sample was received and analyzed past holding time.	
WG380237	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
		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	

Tahoe Resources, Inc.

ACZ Project ID: **L23234**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG380560		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG380297		Residue, Filterable (TDS) @180C	SM2540C SM2540C	Q6 RO	Sample was received above recommended temperature. The duplicate originally assigned to this sample was not used for precision assessment because residue density exceeded the method limits. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.
WG380271		Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG380223		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG380817		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).
WG380285		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).
WG380447		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L23234-01**
Date Sampled: 03/09/15 10:40
Date Received: 03/11/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380620Analyst: drh
Extract Date: 03/13/15 13:48
Analysis Date: 03/17/15 20:30

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.1	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	80.6		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L23234-01**
Date Sampled: 03/09/15 10:40
Date Received: 03/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG380642

Analyst: DRH

Extract Date:

Analysis Date: 03/19/15 14:22

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L23234-02**

Date Sampled: 03/09/15 9:50

Date Received: 03/11/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG380620

Analyst: drh

Extract Date: 03/13/15 13:51

Analysis Date: 03/17/15 20:57

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	86.7		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L23234-02**
Date Sampled: 03/09/15 9:50
Date Received: 03/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG380642

Analyst: DRH

Extract Date:

Analysis Date: 03/19/15 14:36

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: **L23234-03**

Date Sampled: 03/09/15 9:05

Date Received: 03/11/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG380620

Analyst: drh

Extract Date: 03/13/15 13:54

Analysis Date: 03/17/15 21:23

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	90.3		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L23234-03**
Date Sampled: 03/09/15 9:05
Date Received: 03/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG380642

Analyst: DRH

Extract Date:

Analysis Date: 03/19/15 14:50

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: **L23234**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23234-01	WG380620	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG380642	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.
L23234-02	WG380620	*All Compounds*	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			M3520	Q9	Insufficient sample received to meet method QC requirements.
	WG380642	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.
L23234-03	WG380620	*All Compounds*	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			M3520	Q9	Insufficient sample received to meet method QC requirements.
	WG380642	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.
L23234-03	WG380620	*All Compounds*	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			M3520	Q9	Insufficient sample received to meet method QC requirements.
	WG380642	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.
L23234-03	WG380620	*All Compounds*	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			M3520	Q9	Insufficient sample received to meet method QC requirements.
	WG380642	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.

Tahoe Resources, Inc.

ACZ Project ID: **L23234**

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: L23234
 Date Received: 03/11/2015 09:59
 Received By: ddp
 Date Printed: 3/11/2015

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 ID Line 3 and Date:Time Line 3 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

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3616	10.2	14	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: L23234
Date Received: 03/11/2015 09:59
Received By: ddp
Date Printed: 3/11/2015



Laboratories, Inc. L23234

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

CHAIN of CUSTODY

Report to:

Name: <u>Miguel Berganza</u>	Address: <u>Bulevar Los Proceres 18 calle 24-69 zona 10</u> <u>Empresarial Zona Proceres Torre IV oficina 1406</u> Telephone: <u>(502) 5951 5248</u>
Company: <u>Tahoe Resources inc.</u>	
E-mail: <u>M.Berganza@sanrafael.com.gt</u>	

Copy of Report to:

Name: <u>Charlie Merhoff</u>	E-mail: <u>Cmerhoff@tahoresourcesinc.com</u>
Company: <u>Tahoe Resources inc</u>	Telephone:

Invoice to:

Name: <u>Miguel Berganza</u>	Address:
Company: <u>Tahoe Resources inc.</u>	
E-mail: <u>M.Berganza@sanrafael.com.gt</u>	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

Sampler's Name: 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 intentionally 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	<u>SW</u>																		
PO#: <u>Escobal</u>																				
Reporting state for compliance testing:																				
Check box if samples include NRC licensed material?																				
SAMPLE IDENTIFICATION		DATE:TIME	Matrix	# of Containers																
<u>SW1-E</u>	<u>09103/15</u>	<u>10:40</u>	<u>SW</u>	<u>10</u>	<input checked="" type="checkbox"/>															
<u>SW2-E</u>	<u>09103/15</u>	<u>09:50</u>	<u>SW</u>	<u>10</u>	<input checked="" type="checkbox"/>															
<u>SW4-E SW28-E</u>	<u>09103/15</u>	<u>09:05</u> <u>08:30</u>	<u>SW</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 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>09-03-2015</u> <u>16:05</u>	<u>[Signature]</u>	<u>9.3.15</u> <u>16:05</u> <u>3-11-15</u> <u>09:59</u>

L23234 Chain of Custody

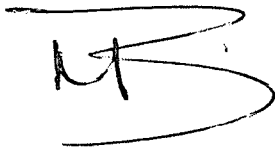
Guatemala March 9th, 2015

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.

April 06, 2015

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: L23468

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 25, 2015. This project has been assigned to ACZ's project number, L23468. Please reference this number in all future inquiries.

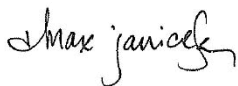
All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L23468. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

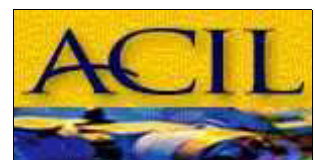
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 06, 2015. 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.



Max Janicek has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2A-E

ACZ Sample ID: **L23468-01**
 Date Sampled: 03/23/15 13:40
 Date Received: 03/25/15
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/31/15 11:00	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/31/15 10:19	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/30/15 22:01	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/30/15 17:32	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 11:55	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								03/30/15 13:48	scp
Total Hot Plate Digestion	M200.2 ICP								03/28/15 10:57	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L23468-01**

Date Sampled: 03/23/15 13:40

Date Received: 03/25/15

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	03/26/15 18:09	aeb
Aluminum, total	M200.7 ICP	1	0.07	B		mg/L	0.03	0.2	03/30/15 12:01	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0123			mg/L	0.0004	0.002	04/02/15 19:03	msh
Antimony, total	M200.8 ICP-MS	1	0.0123			mg/L	0.0004	0.002	04/01/15 18:05	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0083			mg/L	0.0002	0.001	04/02/15 19:03	msh
Arsenic, total	M200.8 ICP-MS	1	0.0085			mg/L	0.0002	0.001	04/01/15 18:05	msh
Barium, dissolved	M200.7 ICP	1	0.042			mg/L	0.003	0.02	03/26/15 18:09	aeb
Barium, total	M200.7 ICP	1	0.043			mg/L	0.003	0.02	03/30/15 12:01	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:09	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:01	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 18:09	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/30/15 12:01	aeb
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	03/26/15 18:09	aeb
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	03/30/15 12:01	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:03	msh
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	04/01/15 18:05	msh
Calcium, dissolved	M200.7 ICP	1	318		*	mg/L	0.1	0.5	03/26/15 18:09	aeb
Calcium, total	M200.7 ICP	1	322			mg/L	0.1	0.5	03/30/15 12:01	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:09	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:01	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:09	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:01	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:09	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:01	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:09	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:01	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/26/15 18:09	aeb
Iron, total	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	03/30/15 12:01	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	04/02/15 19:03	msh
Lead, total	M200.8 ICP-MS	1	0.0033			mg/L	0.0001	0.0005	04/01/15 18:05	msh
Lithium, dissolved	M200.7 ICP	1	0.088			mg/L	0.008	0.04	03/26/15 18:09	aeb
Lithium, total	M200.7 ICP	1	0.092			mg/L	0.008	0.04	03/30/15 12:01	aeb
Magnesium, dissolved	M200.7 ICP	1	20.2			mg/L	0.2	1	03/26/15 18:09	aeb
Magnesium, total	M200.7 ICP	1	20.5			mg/L	0.2	1	03/30/15 12:01	aeb
Manganese, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.005	0.03	03/26/15 18:09	aeb
Manganese, total	M200.7 ICP	1	0.026	B		mg/L	0.005	0.03	03/30/15 12:01	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/30/15 12:28	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/01/15 11:16	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 18:09	aeb
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	03/30/15 12:01	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 18:09	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 12:01	aeb
Potassium, dissolved	M200.7 ICP	1	9.8			mg/L	0.2	1	03/26/15 18:09	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L23468-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	10.1			mg/L	0.2	1	03/30/15 12:01	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:09	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:01	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	04/02/15 19:03	msh
Selenium, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	04/01/15 18:05	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	04/02/15 19:03	msh
Silver, total	M200.8 ICP-MS	1	0.00011	B		mg/L	0.00005	0.0003	04/01/15 18:05	msh
Sodium, dissolved	M200.7 ICP	1	68.8			mg/L	0.2	1	03/26/15 18:09	aeb
Sodium, total	M200.7 ICP	1	69.3			mg/L	0.2	1	03/30/15 12:01	aeb
Strontium, dissolved	M200.7 ICP	1	3.470		*	mg/L	0.005	0.03	03/26/15 18:09	aeb
Strontium, total	M200.7 ICP	1	3.520			mg/L	0.005	0.03	03/30/15 12:01	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/02/15 19:03	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/01/15 18:05	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/26/15 18:09	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	03/30/15 12:01	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/26/15 18:09	aeb
Titanium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/30/15 12:01	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	04/02/15 19:03	msh
Uranium, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	04/01/15 18:05	msh
Vanadium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	03/26/15 18:09	aeb
Vanadium, total	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	03/30/15 12:01	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:09	aeb
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:01	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2A-E

ACZ Sample ID: **L23468-01**
 Date Sampled: 03/23/15 13:40
 Date Received: 03/25/15
 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	53.2		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	53.2		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			04/06/15 12:58	calc
Sum of Anions			21			meq/L			04/06/15 12:58	calc
Sum of Cations			21			meq/L			04/06/15 12:58	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 12:18	enb
Chloride	SM4500Cl-E	1	61.6		*	mg/L	0.5	2	04/02/15 11:19	bsu
Conductivity @25C	SM2510B	1	1800		*	umhos/cm	1	10	03/30/15 22:14	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 20:35	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 17:32	pjb
Fluoride	SM4500F-C	1	1.80		*	mg/L	0.05	0.3	03/31/15 16:00	abd
Hardness as CaCO3	SM2340B - Calculation		877			mg/L	0.8	4	04/06/15 12:58	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	5	4.7		*	mg/L	0.1	0.5	04/01/15 23:27	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.18	B	*	mg/L	0.05	0.2	04/01/15 12:57	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	04/01/15 22:56	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	22.7		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	04/06/15 12:58	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	04/01/15 0:46	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	03/25/15 20:26	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	04/02/15 22:18	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1480		*	mg/L	10	20	03/27/15 15:04	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	03/27/15 12:06	abd
Residue, Total (TS) @ 105C	SM2540B	1	1540		*	mg/L	10	20	03/25/15 15:10	id
Sulfate	D516-02/-07 - Turbidimetric	100	845		*	mg/L	100	500	04/01/15 15:52	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 12:05	eea
TDS (calculated)	Calculation		1360			mg/L			04/06/15 12:58	calc
TDS (ratio - measured/calculated)	Calculation		1.09						04/06/15 12:58	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L23468-02**
Date Sampled: 03/23/15 11:30
Date Received: 03/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/31/15 11:12	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/31/15 10:26	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/30/15 22:50	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/30/15 17:45	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 12:04	mss2
Total Hot Plate Digestion	M200.2 ICP								03/28/15 11:09	aeb
Total Hot Plate Digestion	M200.2 ICP-MS								03/30/15 14:00	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L23468-02**
Date Sampled: 03/23/15 11:30
Date Received: 03/25/15
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	03/26/15 18:12	aeb
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	03/30/15 12:04	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	04/02/15 19:05	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	04/01/15 18:13	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0093			mg/L	0.0002	0.001	04/02/15 19:05	msh
Arsenic, total	M200.8 ICP-MS	1	0.0096			mg/L	0.0002	0.001	04/01/15 18:13	msh
Barium, dissolved	M200.7 ICP	1	0.128			mg/L	0.003	0.02	03/26/15 18:12	aeb
Barium, total	M200.7 ICP	1	0.132			mg/L	0.003	0.02	03/30/15 12:04	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:12	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:04	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 18:12	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/30/15 12:04	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:12	aeb
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	03/30/15 12:04	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:05	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:13	msh
Calcium, dissolved	M200.7 ICP	1	43.9		*	mg/L	0.1	0.5	03/26/15 18:12	aeb
Calcium, total	M200.7 ICP	1	44.3			mg/L	0.1	0.5	03/30/15 12:04	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:12	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:04	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:12	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:04	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:12	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:04	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:12	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:04	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/26/15 18:12	aeb
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	03/30/15 12:04	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:05	msh
Lead, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	04/01/15 18:13	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 18:12	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 12:04	aeb
Magnesium, dissolved	M200.7 ICP	1	3.3			mg/L	0.2	1	03/26/15 18:12	aeb
Magnesium, total	M200.7 ICP	1	3.4			mg/L	0.2	1	03/30/15 12:04	aeb
Manganese, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.005	0.03	03/26/15 18:12	aeb
Manganese, total	M200.7 ICP	1	0.027	B		mg/L	0.005	0.03	03/30/15 12:04	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/30/15 12:31	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/01/15 11:18	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 18:12	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/30/15 12:04	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 18:12	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 12:04	aeb
Potassium, dissolved	M200.7 ICP	1	4.5			mg/L	0.2	1	03/26/15 18:12	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L23468-02**
Date Sampled: 03/23/15 11:30
Date Received: 03/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4.6		mg/L	0.2	1	03/30/15 12:04	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/26/15 18:12	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/30/15 12:04	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	04/02/15 19:05	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	04/01/15 18:13	msh
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	04/02/15 19:05	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	04/01/15 18:13	msh
Sodium, dissolved	M200.7 ICP	1	14.4		mg/L	0.2	1	03/26/15 18:12	aeb
Sodium, total	M200.7 ICP	1	14.4		mg/L	0.2	1	03/30/15 12:04	aeb
Strontium, dissolved	M200.7 ICP	1	0.273		mg/L	0.005	0.03	03/26/15 18:12	aeb
Strontium, total	M200.7 ICP	1	0.280		mg/L	0.005	0.03	03/30/15 12:04	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/02/15 19:05	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/01/15 18:13	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	03/26/15 18:12	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/30/15 12:04	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/26/15 18:12	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/30/15 12:04	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	04/02/15 19:05	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	04/01/15 18:13	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/26/15 18:12	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/30/15 12:04	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/26/15 18:12	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/30/15 12:04	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW3-E

ACZ Sample ID: **L23468-02**
 Date Sampled: 03/23/15 11:30
 Date Received: 03/25/15
 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	134		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	134		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.0			%			04/06/15 12:58	calc
Sum of Anions			3.4			meq/L			04/06/15 12:58	calc
Sum of Cations			3.2			meq/L			04/06/15 12:58	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 12:24	enb
Chloride	SM4500Cl-E	1	2.5		*	mg/L	0.5	2	04/02/15 11:19	bsu
Conductivity @25C	SM2510B	1	317		*	umhos/cm	1	10	03/30/15 22:23	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 20:36	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 17:33	pjb
Fluoride	SM4500F-C	1	0.23	B	*	mg/L	0.05	0.3	03/31/15 16:04	abd
Hardness as CaCO3	SM2340B - Calculation		123			mg/L	0.8	4	04/06/15 12:58	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.04	B	*	mg/L	0.02	0.1	04/01/15 23:11	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	04/01/15 13:33	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	04/01/15 22:57	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	22.9		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	04/06/15 12:58	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	04/01/15 0:47	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	03/25/15 20:27	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	04/02/15 22:19	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	228		*	mg/L	10	20	03/27/15 15:06	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/27/15 12:07	abd
Residue, Total (TS) @ 105C	SM2540B	1	244		*	mg/L	10	20	03/25/15 15:11	id
Sulfate	D516-02/-07 - Turbidimetric	1	29.8		*	mg/L	1	5	04/01/15 15:44	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 12:09	eea
TDS (calculated)	Calculation		181			mg/L			04/06/15 12:58	calc
TDS (ratio - measured/calculated)	Calculation		1.26						04/06/15 12:58	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L23468-03**
Date Sampled: 03/23/15 13:05
Date Received: 03/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/31/15 11:24	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/31/15 10:33	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/30/15 23:39	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/30/15 17:57	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 12:14	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								03/30/15 14:12	scp
Total Hot Plate Digestion	M200.2 ICP								03/28/15 11:20	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L23468-03**

Date Sampled: 03/23/15 13:05

Date Received: 03/25/15

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	03/26/15 18:15	aeb
Aluminum, total	M200.7 ICP	1	0.12	B		mg/L	0.03	0.2	03/30/15 12:07	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0100			mg/L	0.0004	0.002	04/02/15 19:13	msh
Antimony, total	M200.8 ICP-MS	1	0.0097			mg/L	0.0004	0.002	04/01/15 18:15	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0069			mg/L	0.0002	0.001	04/02/15 19:13	msh
Arsenic, total	M200.8 ICP-MS	1	0.0072			mg/L	0.0002	0.001	04/01/15 18:15	msh
Barium, dissolved	M200.7 ICP	1	0.079			mg/L	0.003	0.02	03/26/15 18:15	aeb
Barium, total	M200.7 ICP	1	0.081			mg/L	0.003	0.02	03/30/15 12:07	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:15	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:07	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 18:15	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/30/15 12:07	aeb
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	03/26/15 18:15	aeb
Boron, total	M200.7 ICP	1	0.11			mg/L	0.01	0.05	03/30/15 12:07	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:13	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:15	msh
Calcium, dissolved	M200.7 ICP	1	306		*	mg/L	0.1	0.5	03/26/15 18:15	aeb
Calcium, total	M200.7 ICP	1	313			mg/L	0.1	0.5	03/30/15 12:07	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:15	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:07	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:15	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:07	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:15	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:07	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:15	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:07	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/26/15 18:15	aeb
Iron, total	M200.7 ICP	1	0.11			mg/L	0.02	0.05	03/30/15 12:07	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:13	msh
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	04/01/15 18:15	msh
Lithium, dissolved	M200.7 ICP	1	0.073			mg/L	0.008	0.04	03/26/15 18:15	aeb
Lithium, total	M200.7 ICP	1	0.078			mg/L	0.008	0.04	03/30/15 12:07	aeb
Magnesium, dissolved	M200.7 ICP	1	20.6			mg/L	0.2	1	03/26/15 18:15	aeb
Magnesium, total	M200.7 ICP	1	20.7			mg/L	0.2	1	03/30/15 12:07	aeb
Manganese, dissolved	M200.7 ICP	1	0.147			mg/L	0.005	0.03	03/26/15 18:15	aeb
Manganese, total	M200.7 ICP	1	0.168			mg/L	0.005	0.03	03/30/15 12:07	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/30/15 12:42	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/01/15 11:24	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 18:15	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/30/15 12:07	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 18:15	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 12:07	aeb
Potassium, dissolved	M200.7 ICP	1	11.6			mg/L	0.2	1	03/26/15 18:15	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L23468-03**
Date Sampled: 03/23/15 13:05
Date Received: 03/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.7			mg/L	0.2	1	03/30/15 12:07	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:15	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:07	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	04/02/15 19:13	msh
Selenium, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	04/01/15 18:15	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	04/03/15 20:11	msh
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	04/01/15 18:15	msh
Sodium, dissolved	M200.7 ICP	1	64.2			mg/L	0.2	1	03/26/15 18:15	aeb
Sodium, total	M200.7 ICP	1	65.3			mg/L	0.2	1	03/30/15 12:07	aeb
Strontium, dissolved	M200.7 ICP	1	3.170		*	mg/L	0.005	0.03	03/26/15 18:15	aeb
Strontium, total	M200.7 ICP	1	3.260			mg/L	0.005	0.03	03/30/15 12:07	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/02/15 19:13	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/01/15 18:15	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/26/15 18:15	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	03/30/15 12:07	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/26/15 18:15	aeb
Titanium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/30/15 12:07	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/02/15 19:13	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/01/15 18:15	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	03/26/15 18:15	aeb
Vanadium, total	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	03/30/15 12:07	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:15	aeb
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:07	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4A-E

ACZ Sample ID: **L23468-03**
 Date Sampled: 03/23/15 13:05
 Date Received: 03/25/15
 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	62.2		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	62.2		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			04/06/15 12:59	calc
Sum of Anions			20			meq/L			04/06/15 12:59	calc
Sum of Cations			20			meq/L			04/06/15 12:59	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 12:56	enb
Chloride	SM4500Cl-E	1	61.7		*	mg/L	0.5	2	04/02/15 11:19	bsu
Conductivity @25C	SM2510B	1	1750		*	umhos/cm	1	10	03/30/15 22:31	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 20:37	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 17:34	pjb
Fluoride	SM4500F-C	1	1.21		*	mg/L	0.05	0.3	03/31/15 16:08	abd
Hardness as CaCO3	SM2340B - Calculation		849			mg/L	0.8	4	04/06/15 12:59	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	4.88		*	mg/L	0.06	0.3	04/01/15 23:29	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	04/01/15 13:34	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	04/01/15 22:58	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	23.1		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.28			mg/L	0.03	0.2	04/06/15 12:59	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.01	0.05	04/01/15 0:48	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	03/25/15 20:28	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.01	0.05	04/02/15 22:20	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1430		*	mg/L	10	20	03/27/15 15:08	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1	6.0	B	*	mg/L	5	20	03/27/15 12:09	abd
Residue, Total (TS) @ 105C	SM2540B	1	1490		*	mg/L	10	20	03/25/15 15:13	id
Sulfate	D516-02/-07 - Turbidimetric	100	811		*	mg/L	100	500	04/01/15 15:52	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 12:12	eea
TDS (calculated)	Calculation		1320			mg/L			04/06/15 12:59	calc
TDS (ratio - measured/calculated)	Calculation		1.08						04/06/15 12:59	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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L23468**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23468-01	WG381014	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.
	WG381389	Silver, 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].
			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.
	WG381014	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.
	WG381165	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.
	WG381128	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).
	WG381371	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381239	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).
	WG381238	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).
	WG381198	Fluoride	SM4500F-C	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381165	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381346	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).
	WG381283	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).
	WG381345	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.
	WG381165	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG381247	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).
	WG380972	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

Tahoe Resources, Inc.

ACZ Project ID: **L23468**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					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).
WG381413		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).
WG381093		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG381079		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).
WG380955		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG381323		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.
WG381003		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).
WG381165		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23468**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23468-02	WG381014	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.
	WG381389	Silver, 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].
			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.
	WG381014	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.
	WG381165	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.
	WG381128	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).
	WG381371	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381239	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).
	WG381238	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).
	WG381198	Fluoride	SM4500F-C	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381165	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381346	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).
	WG381283	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).
	WG381345	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.
	WG381165	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG381247	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).
	WG380972	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

Tahoe Resources, Inc.

ACZ Project ID: **L23468**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					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).
WG381413		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).
WG381093		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG381079		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).
WG380955		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG381323		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.
WG381003		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).
WG381165		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23468**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23468-03	WG381014	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.
	WG381471	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
	WG381014	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.
	WG381165	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381128	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).
	WG381371	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381239	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).
	WG381238	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).
	WG381198	Fluoride	SM4500F-C	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381165	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381346	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).
	WG381283	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).
	WG381345	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.	
WG381165	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG381247	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).	
WG380972	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	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L23468**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			Acid		
			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).
			Acid		
	WG381413	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).
	WG381093	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG381079	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).
	WG380955	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG381323	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.
	WG381003	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).
	WG381165	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L23468-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG381192Analyst: drh
Extract Date: 03/27/15 16:55
Analysis Date: 03/31/15 2:22

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	90.2		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L23468-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG381358

Analyst: DRH

Extract Date:

Analysis Date: 04/02/15 10:45

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: **L23468-02**
Date Sampled: 03/23/15 11:30
Date Received: 03/25/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG381192

Analyst: drh
Extract Date: 03/27/15 16:58
Analysis Date: 03/31/15 2:48

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.6		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L23468-02**
Date Sampled: 03/23/15 11:30
Date Received: 03/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG381358

Analyst: DRH

Extract Date:

Analysis Date: 04/02/15 11:00

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: SW4A-EACZ Sample ID: **L23468-03**
Date Sampled: 03/23/15 13:05
Date Received: 03/25/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG381192Analyst: drh
Extract Date: 03/27/15 17:01
Analysis Date: 03/31/15 3:41

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	91.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L23468-03**
Date Sampled: 03/23/15 13:05
Date Received: 03/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG381358

Analyst: DRH

Extract Date:

Analysis Date: 04/02/15 11:15

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		5.6	B	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 unless omitted or equal to the PQL (see comment #4) 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. Synonymous with the EPA term "minimum level".
<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: **L23468**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23468-01	WG381192	*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).
	WG381358	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.
L23468-02	WG381192	*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).
	WG381358	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.
L23468-03	WG381192	*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).
	WG381358	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.

Tahoe Resources, Inc.

ACZ Project ID: **L23468**

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: L23468
 Date Received: 03/25/2015 10:24
 Received By: ddp
 Date Printed: 3/25/2015

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?
4412	13.2	14	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.

L23468

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 Proceres 18 Calle 24-69 zona 10
Empresarial, zona Proceres, Torre IV Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc.

E-mail: cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

Sampler's Name: IF 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 intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

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

REMARKS

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

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

Handwritten signatures and dates for relinquished and received parties.

L23468 Chain of Custody

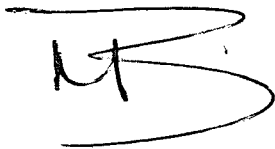
Guatemala March 23rd, 2015

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).

Yours sincerely,

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.

March 24, 2015

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: L23232

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 11, 2015. This project has been assigned to ACZ's project number, L23232. 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 L23232. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

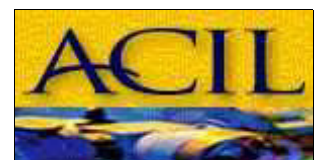
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 23, 2015. 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.

March 24, 2015

Project ID: Escobal

ACZ Project ID: L23232

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 2 miscellaneous samples from Tahoe Resources, Inc. on March 11, 2015. 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 L23232. 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", 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 Oil and Grease values flagged with an "N1", the SOP states that samples should be left in the desiccator and dried for at least 30min before being reweighed for oil and grease results. The analyst only allowed the samples to be dried for 28 minutes and 57 seconds.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L23232-01**
Date Sampled: 03/09/15 08:30
Date Received: 03/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/17/15 22:07	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/16/15 11:03	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/19/15 6:52	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 11:02	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 12:00	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								03/16/15 18:04	pmc
Total Hot Plate Digestion	M200.2 ICP								03/13/15 10:09	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L23232-01**
Date Sampled: 03/09/15 08:30
Date Received: 03/11/15
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	03/13/15 15:45	aeb
Aluminum, total	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	03/14/15 0:37	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0086			mg/L	0.0004	0.002	03/20/15 22:00	msh
Antimony, total	M200.8 ICP-MS	1	0.0083			mg/L	0.0004	0.002	03/18/15 18:18	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0054			mg/L	0.0002	0.001	03/20/15 22:00	msh
Arsenic, total	M200.8 ICP-MS	1	0.0052			mg/L	0.0002	0.001	03/18/15 18:18	msh
Barium, dissolved	M200.7 ICP	1	0.094			mg/L	0.003	0.02	03/13/15 15:45	aeb
Barium, total	M200.7 ICP	1	0.095			mg/L	0.003	0.02	03/14/15 0:37	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:45	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:37	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 10:43	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 0:37	jjc
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	03/13/15 15:45	aeb
Boron, total	M200.7 ICP	1	0.10			mg/L	0.01	0.05	03/14/15 0:37	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/20/15 22:00	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/18/15 18:18	msh
Calcium, dissolved	M200.7 ICP	1	279		*	mg/L	0.1	0.5	03/13/15 15:45	aeb
Calcium, total	M200.7 ICP	1	283			mg/L	0.1	0.5	03/14/15 0:37	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:45	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:37	jjc
Cobalt, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	03/13/15 15:45	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:37	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:45	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:37	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/13/15 15:45	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/16/15 11:53	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	03/13/15 15:45	aeb
Iron, total	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	03/14/15 0:37	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	03/24/15 2:37	msh
Lead, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	03/18/15 18:18	msh
Lithium, dissolved	M200.7 ICP	1	0.059			mg/L	0.008	0.04	03/13/15 15:45	aeb
Lithium, total	M200.7 ICP	1	0.061			mg/L	0.008	0.04	03/14/15 0:37	jjc
Magnesium, dissolved	M200.7 ICP	1	16.9			mg/L	0.2	1	03/13/15 15:45	aeb
Magnesium, total	M200.7 ICP	1	16.7			mg/L	0.2	1	03/14/15 0:37	jjc
Manganese, dissolved	M200.7 ICP	1	0.150		*	mg/L	0.005	0.03	03/13/15 15:45	aeb
Manganese, total	M200.7 ICP	1	0.165			mg/L	0.005	0.03	03/14/15 0:37	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/17/15 11:14	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/18/15 13:06	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/13/15 15:45	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/14/15 0:37	jjc
Nickel, dissolved	M200.7 ICP	1		U	*	mg/L	0.008	0.04	03/13/15 15:45	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/14/15 0:37	jjc
Potassium, dissolved	M200.7 ICP	1	11.4			mg/L	0.2	1	03/13/15 15:45	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L23232-01**
Date Sampled: 03/09/15 08:30
Date Received: 03/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.5		mg/L	0.2	1	03/14/15 0:37	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/13/15 15:45	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/14/15 0:37	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	03/20/15 22:00	msh
Selenium, total	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	03/18/15 18:18	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	03/20/15 22:00	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	03/18/15 18:18	msh
Sodium, dissolved	M200.7 ICP	1	61.8		mg/L	0.2	1	03/13/15 15:45	aeb
Sodium, total	M200.7 ICP	1	61.5		mg/L	0.2	1	03/14/15 0:37	jjc
Strontium, dissolved	M200.7 ICP	1	2.800		mg/L	0.005	0.03	03/13/15 15:45	aeb
Strontium, total	M200.7 ICP	1	2.820		mg/L	0.005	0.03	03/14/15 0:37	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/20/15 22:00	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/18/15 18:18	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	03/14/15 10:43	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/14/15 12:50	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/13/15 15:45	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/14/15 0:37	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	03/20/15 22:00	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	03/18/15 18:18	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	03/13/15 15:45	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/14/15 0:37	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 10:43	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 0:37	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4-E

ACZ Sample ID: **L23232-01**
 Date Sampled: 03/09/15 08:30
 Date Received: 03/11/15
 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	60.4		*	mg/L	2	20	03/14/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/14/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/14/15 0:00	abd
Total Alkalinity		1	60.4		*	mg/L	2	20	03/14/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			03/24/15 13:30	calc
Sum of Anions			18			meq/L			03/24/15 13:30	calc
Sum of Cations			18			meq/L			03/24/15 13:30	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/18/15 9:50	enb
Chloride	SM4500Cl-E	1	57		*	mg/L	0.5	2	03/17/15 14:30	tcd
Conductivity @25C	SM2510B	1	1590		*	umhos/cm	1	10	03/14/15 4:57	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/18/15 15:12	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/17/15 11:47	thf
Fluoride	SM4500F-C	1	0.95		*	mg/L	0.05	0.3	03/20/15 19:54	enb
Hardness as CaCO3	SM2340B - Calculation		766			mg/L	0.8	4	03/24/15 13:30	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.75		*	mg/L	0.02	0.1	03/19/15 22:48	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.13	B	*	mg/L	0.05	0.2	03/16/15 14:07	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	03/20/15 11:40	mss2
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	03/14/15 0:00	abd
pH measured at		1	20.8		*	C	0.1	0.1	03/14/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	03/24/15 13:30	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	03/18/15 11:06	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	03/11/15 20:57	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	03/18/15 12:20	bsi
Residue, Filterable (TDS) @180C	SM2540C	1	1290		*	mg/L	10	20	03/11/15 16:15	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/12/15 11:36	eea
Residue, Total (TS) @ 105C	SM2540B	1	1350		*	mg/L	10	20	03/11/15 15:30	id
Sulfate	D516-02/-07 - Turbidimetric	20	740		*	mg/L	20	100	03/18/15 10:10	bsu
Sulfide as S	SM4500S2-D	1	0.03	B	*	mg/L	0.02	0.1	03/12/15 14:34	eea
TDS (calculated)	Calculation		1210			mg/L			03/24/15 13:30	calc
TDS (ratio - measured/calculated)	Calculation		1.07						03/24/15 13:30	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L23232-02**
Date Sampled: 03/09/15 12:00
Date Received: 03/11/15
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/17/15 22:46	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/16/15 11:12	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/19/15 7:27	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 11:08	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 12:06	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								03/16/15 18:14	pmc
Total Hot Plate Digestion	M200.2 ICP								03/13/15 10:21	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L23232-02**

Date Sampled: 03/09/15 12:00

Date Received: 03/11/15

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	03/13/15 15:48	aeb
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	03/14/15 0:40	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/20/15 22:04	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/18/15 18:20	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	03/20/15 22:04	msh
Arsenic, total	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	03/18/15 18:20	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	03/13/15 15:48	aeb
Barium, total	M200.7 ICP	1		U		mg/L	0.003	0.02	03/14/15 0:40	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:48	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:40	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 10:46	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/14/15 0:40	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:48	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:40	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/20/15 22:04	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/18/15 18:20	msh
Calcium, dissolved	M200.7 ICP	1	0.2	B	*	mg/L	0.1	0.5	03/13/15 15:48	aeb
Calcium, total	M200.7 ICP	1	0.1	B		mg/L	0.1	0.5	03/14/15 0:40	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:48	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:40	jjc
Cobalt, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	03/13/15 15:48	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:40	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/13/15 15:48	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/14/15 0:40	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/13/15 15:48	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/16/15 11:56	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	03/13/15 15:48	aeb
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	03/14/15 0:40	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/24/15 2:41	msh
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/18/15 18:20	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/13/15 15:48	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/14/15 0:40	jjc
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	03/13/15 15:48	aeb
Magnesium, total	M200.7 ICP	1	0.2	B		mg/L	0.2	1	03/14/15 0:40	jjc
Manganese, dissolved	M200.7 ICP	1		U	*	mg/L	0.005	0.03	03/13/15 15:48	aeb
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/14/15 0:40	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/17/15 11:16	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/18/15 13:08	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/13/15 15:48	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/14/15 0:40	jjc
Nickel, dissolved	M200.7 ICP	1		U	*	mg/L	0.008	0.04	03/13/15 15:48	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/14/15 0:40	jjc
Potassium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.2	1	03/13/15 15:48	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L23232-02**
Date Sampled: 03/09/15 12:00
Date Received: 03/11/15
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	0.2	B	mg/L	0.2	1	03/14/15 0:40	jjc
Scandium, dissolved	M200.7 ICP	1		U	mg/L	0.1	0.5	03/13/15 15:48	aeb
Scandium, total	M200.7 ICP	1		U	mg/L	0.1	0.5	03/14/15 0:40	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	03/20/15 22:04	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	03/18/15 18:20	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	03/20/15 22:04	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	03/18/15 18:20	msh
Sodium, dissolved	M200.7 ICP	1	0.3	B	mg/L	0.2	1	03/13/15 15:48	aeb
Sodium, total	M200.7 ICP	1		U	mg/L	0.2	1	03/14/15 0:40	jjc
Strontium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/13/15 15:48	aeb
Strontium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/14/15 0:40	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	03/20/15 22:04	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	03/18/15 18:20	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	03/14/15 10:46	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/14/15 12:54	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/13/15 15:48	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/14/15 0:40	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	03/20/15 22:04	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	03/18/15 18:20	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/13/15 15:48	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/14/15 0:40	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 10:46	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/14/15 0:40	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW10-E

ACZ Sample ID: **L23232-02**
 Date Sampled: 03/09/15 12:00
 Date Received: 03/11/15
 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	03/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Total Alkalinity		1		U	*	mg/L	2	20	03/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			03/24/15 13:30	calc
Sum of Anions			N/A			meq/L			03/24/15 13:30	calc
Sum of Cations				U		meq/L			03/24/15 13:30	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/18/15 9:56	enb
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	03/17/15 14:30	tcd
Conductivity @25C	SM2510B	1	1.5	B	*	umhos/cm	1	10	03/16/15 18:29	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/18/15 15:13	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/17/15 11:47	thf
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	03/20/15 20:07	enb
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	03/24/15 13:30	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	03/19/15 22:49	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 13:52	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/20/15 11:41	mss2
pH (lab)	SM4500H+ B									
pH		1	6.3	H	*	units	0.1	0.1	03/16/15 0:00	enb
pH measured at		1	19.6		*	C	0.1	0.1	03/16/15 0:00	enb
Phosphate			0.03	B		mg/L	0.03	0.2	03/24/15 13:30	calc
Phosphorus, dissolved	Calculation based on dissolved Phosphorus									
Phosphorus, ortho dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	03/18/15 11:07	bsu
Phosphorus, total	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	03/11/15 21:01	pjb
Residue, Filterable (TDS) @180C	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	03/18/15 12:21	bsi
Residue, Non-Filterable (TSS) @105C	M365.1 - Auto Ascorbic Acid (digest)	1		B	*	mg/L	0.01	0.05	03/18/15 12:21	bsi
Residue, Total (TS) @ 105C	SM2540C	1		U	*	mg/L	10	20	03/11/15 16:17	enb
Sulfate	SM2540D	1		U	*	mg/L	5	20	03/12/15 11:37	eea
Sulfide as S	SM2540B	1		U	*	mg/L	10	20	03/11/15 15:32	id
TDS (calculated)	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	03/18/15 10:01	bsu
TDS (ratio - measured/calculated)	SM4500S2-D	1	0.07	B	*	mg/L	0.02	0.1	03/12/15 14:44	eea
	Calculation		0.7			mg/L			03/24/15 13:30	calc
	Calculation		n/a						03/24/15 13:30	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: **L23232**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23232-01	WG380324	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.
		Cobalt, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Iron, 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.
		Manganese, 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.
		Nickel, 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.
	WG380359	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380535	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).
	WG380510	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG380359	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG380585	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).
	WG380495	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).
	WG380717	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG380359	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380670	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).
	WG380435	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
	WG380688	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.
	WG380359	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG380547	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).
	WG380237	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).
	WG380560	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23232**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG380225	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG380271	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).
	WG380223	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG380541	Sulfate	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).
	WG380285	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).
	WG380359	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23232**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23232-02	WG380324	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.
		Cobalt, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Iron, 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.
		Manganese, 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.
		Nickel, 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.
WG380447		Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG380535		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).
WG380510		Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
WG380447		Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
WG380585		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).
WG380495		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).
WG380717		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).
WG380447		Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG380670		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).
WG380435		Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
WG380688		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.
WG380447		pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG380547		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).
WG380237		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.

Tahoe Resources, Inc.

ACZ Project ID: **L23232**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG380560	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG380225	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG380271	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).
	WG380223	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG380541	Sulfate	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).
	WG380285	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).
	WG380447	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L23232-01**

Date Sampled: 03/09/15 8:30

Date Received: 03/11/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG380620

Analyst: drh

Extract Date: 03/13/15 13:39

Analysis Date: 03/17/15 19:11

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	82.7		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L23232-01**

Date Sampled: 03/09/15 8:30

Date Received: 03/11/15

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

Extract Method:

Workgroup: WG380642

Analyst: DRH

Extract Date:

Analysis Date: 03/19/15 13:39

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: SW10-E

ACZ Sample ID: **L23232-02**
Date Sampled: 03/09/15 12:00
Date Received: 03/11/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG380620

Analyst: drh
Extract Date: 03/13/15 13:42
Analysis Date: 03/17/15 19:38

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	83.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L23232-02**
Date Sampled: 03/09/15 12:00
Date Received: 03/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG380642

Analyst: DRH

Extract Date:

Analysis Date: 03/19/15 13:53

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: **L23232**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23232-01	WG380620	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG380642	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG380357	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L23232-02	WG380620	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG380642	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG380357	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23232**

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: L23232
 Date Received: 03/11/2015 09:57
 Received By: ddp
 Date Printed: 3/11/2015

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?
3631	12.6	14	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*
 Company: *Tahoe Resources inc.*
 E-mail: *M.Berganza@samrafuel.com.gt*

Address: *BULEVAR LOS PROGRESOS 18 CALLE 24-69 ZONA 10*
Empresarial zona Progreso, Torre 11 oficina 1406
 Telephone: *(502) 5951 5248*

Copy of Report to:

Name: *Charlie Muechoff*
 Company: *Tahoe Resources inc.*

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

Invoice to:

Name: *Miguel Berganza*
 Company: *Tahoe Resources inc.*
 E-mail: *M.Berganza@samrafuel.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 intentionally 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	#																	
<i>1. SWU-E</i>	<i>09/03/15 08:30</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>																
<i>2. SW10-E</i>	<i>09/03/15 12:00</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>																
<i>WW6</i>	<i>09/03/15 11:45</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

Present results of WW 6 in a different report.

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>09-03-2015 16:05</i>	<i>[Signature]</i>	<i>9.3.15 16:05</i>
		<i>NPL</i>	<i>3/1/15 0957</i>



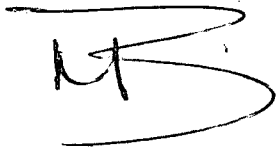
Guatemala March 9th, 2015

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.

April 08, 2015

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: L23514

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 27, 2015. This project has been assigned to ACZ's project number, L23514. Please reference this number in all future inquiries.

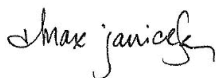
All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L23514. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

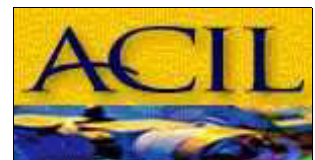
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 08, 2015. 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.



Max Janicek has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L23514-01**
 Date Sampled: 03/25/15 07:40
 Date Received: 03/27/15
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/31/15 13:48	mss2
Cyanide, WAD	SM4500-CN I- distillation								04/02/15 14:44	tcd
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								04/01/15 14:30	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 13:31	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 11:45	mss2
Total Hot Plate Digestion	M200.2 ICP								03/30/15 13:38	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								04/01/15 15:00	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L23514-01**

Date Sampled: 03/25/15 07:40

Date Received: 03/27/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.03	0.2	04/01/15 14:43	aeb
Aluminum, total	M200.7 ICP	1	0.13	B		mg/L	0.03	0.2	03/31/15 20:41	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	04/03/15 21:52	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	04/03/15 1:13	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0012			mg/L	0.0002	0.001	04/03/15 21:52	msh
Arsenic, total	M200.8 ICP-MS	1	0.0014			mg/L	0.0002	0.001	04/03/15 1:13	pmc
Barium, dissolved	M200.7 ICP	1	0.058			mg/L	0.003	0.02	04/01/15 14:43	aeb
Barium, total	M200.7 ICP	1	0.062			mg/L	0.003	0.02	03/31/15 20:41	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	04/01/15 14:43	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/31/15 20:41	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	04/01/15 14:43	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/31/15 20:41	jjc
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	04/01/15 14:43	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	04/01/15 14:47	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/03/15 21:52	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/03/15 1:13	pmc
Calcium, dissolved	M200.7 ICP	1	10.3		*	mg/L	0.1	0.5	04/01/15 14:43	aeb
Calcium, total	M200.7 ICP	1	10.4			mg/L	0.1	0.5	03/31/15 20:41	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	04/01/15 14:43	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/31/15 20:41	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	04/01/15 14:43	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/31/15 20:41	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	04/01/15 14:43	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/31/15 20:41	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	04/01/15 14:43	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/31/15 20:41	jjc
Iron, dissolved	M200.7 ICP	1	0.06			mg/L	0.02	0.05	04/01/15 14:43	aeb
Iron, total	M200.7 ICP	1	0.26			mg/L	0.02	0.05	03/31/15 20:41	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/03/15 21:52	msh
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/03/15 1:13	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	04/01/15 14:43	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/31/15 20:41	jjc
Magnesium, dissolved	M200.7 ICP	1	1.9			mg/L	0.2	1	04/01/15 14:43	aeb
Magnesium, total	M200.7 ICP	1	1.9			mg/L	0.2	1	03/31/15 20:41	jjc
Manganese, dissolved	M200.7 ICP	1	0.056			mg/L	0.005	0.03	04/01/15 14:43	aeb
Manganese, total	M200.7 ICP	1	0.068			mg/L	0.005	0.03	03/31/15 20:41	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/07/15 10:45	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/07/15 13:42	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	04/01/15 14:43	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/31/15 20:41	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	04/01/15 14:43	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/31/15 20:41	jjc
Potassium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	04/01/15 14:43	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L23514-01**
Date Sampled: 03/25/15 07:40
Date Received: 03/27/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.1		mg/L	0.2	1	03/31/15 20:41	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	04/01/15 14:43	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/31/15 20:41	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	04/03/15 21:52	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	04/03/15 1:13	pmc
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	04/03/15 21:52	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	04/03/15 1:13	pmc
Sodium, dissolved	M200.7 ICP	1	6.7		mg/L	0.2	1	04/01/15 14:43	aeb
Sodium, total	M200.7 ICP	1	6.8		mg/L	0.2	1	03/31/15 20:41	jjc
Strontium, dissolved	M200.7 ICP	1	0.088		mg/L	0.005	0.03	04/01/15 14:43	aeb
Strontium, total	M200.7 ICP	1	0.085		mg/L	0.005	0.03	03/31/15 20:41	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/03/15 21:52	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/03/15 1:13	pmc
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	04/01/15 14:43	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/31/15 20:41	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	04/01/15 14:43	aeb
Titanium, total	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	03/31/15 20:41	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/03/15 21:52	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/03/15 1:13	pmc
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	04/01/15 14:43	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/31/15 20:41	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	04/01/15 14:43	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/31/15 20:41	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L23514-01**

Date Sampled: 03/25/15 07:40

Date Received: 03/27/15

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	29.5		*	mg/L	2	20	04/03/15 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	04/03/15 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	04/03/15 0:00	id
Total Alkalinity		1	29.5		*	mg/L	2	20	04/03/15 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			04/08/15 8:56	calc
Sum of Anions			1.1			meq/L			04/08/15 8:56	calc
Sum of Cations			1.1			meq/L			04/08/15 8:56	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 14:00	enb
Chloride	SM4500Cl-E	1	2.2		*	mg/L	0.5	2	04/02/15 14:33	bsu
Conductivity @25C	SM2510B	1	119		*	umhos/cm	1	10	04/03/15 15:47	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 20:49	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	04/03/15 21:04	pjb
Fluoride	SM4500F-C	1	0.08	B	*	mg/L	0.05	0.3	04/02/15 12:37	enb
Hardness as CaCO3	SM2340B - Calculation		34			mg/L	0.8	4	04/08/15 8:56	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.03	B	*	mg/L	0.02	0.1	04/03/15 22:33	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	04/01/15 15:52	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	04/02/15 0:16	pjb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	04/03/15 0:00	id
pH measured at		1	21.3		*	C	0.1	0.1	04/03/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	04/08/15 8:56	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	04/03/15 13:33	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	03/27/15 22:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	04/02/15 23:02	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	102		*	mg/L	10	20	03/31/15 15:37	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	04/01/15 10:46	eea
Residue, Total (TS) @ 105C	SM2540B	1	104		*	mg/L	10	20	03/30/15 16:14	abd
Sulfate	D516-02/-07 - Turbidimetric	1	20.1		*	mg/L	1	5	04/06/15 12:41	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/31/15 12:04	enb
TDS (calculated)	Calculation		62.6			mg/L			04/08/15 8:56	calc
TDS (ratio - measured/calculated)	Calculation		1.63						04/08/15 8:56	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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L23514**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23514-01	WG381282	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.
	WG381473	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.
	WG381282	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.
	WG381452	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381128	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).
	WG381383	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG381452	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381239	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).
	WG381484	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).
	WG381360	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381452	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381487	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).
	WG381286	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).
	WG381347	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.
	WG381452	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG381456	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG381102	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).
	WG381415	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: **L23514**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG381217	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG381273	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).
	WG381173	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG381518	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG381191	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
	WG381452	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L23514-01**

Date Sampled: 03/25/15 7:40

Date Received: 03/27/15

Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG381192

Analyst: drh

Extract Date: 03/27/15 17:26

Analysis Date: 03/31/15 7:09

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.5		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L23514-01**

Date Sampled: 03/25/15 7:40

Date Received: 03/27/15

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

Extract Method:

Workgroup: WG381358

Analyst: DRH

Extract Date:

Analysis Date: 04/02/15 15:15

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 unless omitted or equal to the PQL (see comment #4) 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. Synonymous with the EPA term "minimum level".
<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: **L23514**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23514-01	WG381192	*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).
	WG381358	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.

Tahoe Resources, Inc.

ACZ Project ID: **L23514**

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: L23514
 Date Received: 03/27/2015 09:45
 Received By: ddp
 Date Printed: 3/27/2015

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?
4373	11.5	16	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.

03514

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@sonnatafact.com.gt

Address: Bulevar Las Proceras 12 calle 2469 zona 10
Empresarial Zona Proceras Torre W oficina 14-06
 Telephone: (502) 5951 5248

Copy of Report to:

Name: Christie Wexhoff
 Company: Tahoe Resources inc.

E-mail: cmwexhoff@tahorerresourcesinc.com
 Telephone:

Invoice to:

Name: Miguel Berganza
 Company: Tahoe Resources inc.
 E-mail: M.Berganza@sonnatafact.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 intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

Quote #: <u>Water Quality</u>	# of Containers	SW dissolved	SW																			
PO#: <u>Escobal</u>																						
Reporting state for compliance testing:																						
Check box if samples include NRC licensed material? <input type="checkbox"/>																						

SAMPLE IDENTIFICATION

Matrix	DATE:TIME	Matrix	# of Containers	SW dissolved	SW																	
WW6 SCH	25/03/15 10:20	WW	9	✓																		
WW9 SCH	25/03/15 10:00	WW	9	✓																		
SWS-E	25/03/15 07:40	SW	10		✓																	

COPY

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

REMARKS

Analyze all dissolved parameters, nothing further in samples WW6 and WW9
 Present results of SWS-E in a different report.

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>	25-03-2015 15:50	<u>Comer B</u>	25.3.15 15:50
		<u>Bill</u>	3-27-15 0945



23514 Chain of Custody

April 06, 2015

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: L23469

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 25, 2015. This project has been assigned to ACZ's project number, L23469. Please reference this number in all future inquiries.

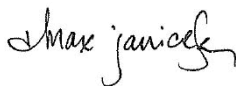
All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L23469. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

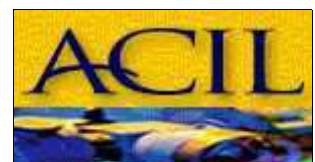
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 06, 2015. 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.



Max Janicek has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SW6-E

ACZ Sample ID: **L23469-01**

Date Sampled: 03/23/15 08:05

Date Received: 03/25/15

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/31/15 11:36	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/31/15 10:40	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/31/15 0:28	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/30/15 18:10	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 12:33	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								03/30/15 14:24	scp
Total Hot Plate Digestion	M200.2 ICP								03/28/15 11:32	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L23469-01**
Date Sampled: 03/23/15 08:05
Date Received: 03/25/15
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	03/26/15 18:25	aeb
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	03/30/15 12:10	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	04/02/15 19:15	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	04/01/15 18:18	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0040			mg/L	0.0002	0.001	04/02/15 19:15	msh
Arsenic, total	M200.8 ICP-MS	1	0.0042			mg/L	0.0002	0.001	04/01/15 18:18	msh
Barium, dissolved	M200.7 ICP	1	0.071			mg/L	0.003	0.02	03/26/15 18:25	aeb
Barium, total	M200.7 ICP	1	0.075			mg/L	0.003	0.02	03/30/15 12:10	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:25	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:10	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 18:25	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/30/15 12:10	aeb
Boron, dissolved	M200.7 ICP	1	0.28			mg/L	0.01	0.05	03/26/15 18:25	aeb
Boron, total	M200.7 ICP	1	0.29			mg/L	0.01	0.05	03/30/15 12:10	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:15	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:18	msh
Calcium, dissolved	M200.7 ICP	1	18.9		*	mg/L	0.1	0.5	03/26/15 18:25	aeb
Calcium, total	M200.7 ICP	1	19.2			mg/L	0.1	0.5	03/30/15 12:10	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:25	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:10	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:25	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:10	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:25	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:10	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:25	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:10	aeb
Iron, dissolved	M200.7 ICP	1	0.06			mg/L	0.02	0.05	03/26/15 18:25	aeb
Iron, total	M200.7 ICP	1	0.14			mg/L	0.02	0.05	03/30/15 12:10	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:15	msh
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:18	msh
Lithium, dissolved	M200.7 ICP	1	0.096			mg/L	0.008	0.04	03/26/15 18:25	aeb
Lithium, total	M200.7 ICP	1	0.101			mg/L	0.008	0.04	03/30/15 12:10	aeb
Magnesium, dissolved	M200.7 ICP	1	3.6			mg/L	0.2	1	03/26/15 18:25	aeb
Magnesium, total	M200.7 ICP	1	3.7			mg/L	0.2	1	03/30/15 12:10	aeb
Manganese, dissolved	M200.7 ICP	1	0.024	B		mg/L	0.005	0.03	03/26/15 18:25	aeb
Manganese, total	M200.7 ICP	1	0.031			mg/L	0.005	0.03	03/30/15 12:10	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/30/15 12:44	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/01/15 11:26	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 18:25	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/30/15 12:10	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 18:25	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 12:10	aeb
Potassium, dissolved	M200.7 ICP	1	4.4			mg/L	0.2	1	03/26/15 18:25	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L23469-01**
Date Sampled: 03/23/15 08:05
Date Received: 03/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4.4		mg/L	0.2	1	03/30/15 12:10	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/26/15 18:25	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/30/15 12:10	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	04/02/15 19:15	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	04/01/15 18:18	msh
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	04/03/15 20:19	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	04/01/15 18:18	msh
Sodium, dissolved	M200.7 ICP	1	28		mg/L	0.2	1	03/26/15 18:25	aeb
Sodium, total	M200.7 ICP	1	28.1		mg/L	0.2	1	03/30/15 12:10	aeb
Strontium, dissolved	M200.7 ICP	1	0.139		mg/L	0.005	0.03	03/26/15 18:25	aeb
Strontium, total	M200.7 ICP	1	0.144		mg/L	0.005	0.03	03/30/15 12:10	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/02/15 19:15	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/01/15 18:18	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	03/26/15 18:25	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/30/15 12:10	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/26/15 18:25	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/30/15 12:10	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/02/15 19:15	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/01/15 18:18	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/26/15 18:25	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/30/15 12:10	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/26/15 18:25	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/30/15 12:10	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW6-E

ACZ Sample ID: **L23469-01**
 Date Sampled: 03/23/15 08:05
 Date Received: 03/25/15
 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	58.8		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	58.8		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.7			%			04/06/15 13:08	calc
Sum of Anions			2.8			meq/L			04/06/15 13:08	calc
Sum of Cations			2.6			meq/L			04/06/15 13:08	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 13:02	enb
Chloride	SM4500Cl-E	1	33.8		*	mg/L	0.5	2	04/02/15 11:19	bsu
Conductivity @25C	SM2510B	1	293		*	umhos/cm	1	10	03/30/15 22:39	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 20:38	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 17:35	pjb
Fluoride	SM4500F-C	1	0.17	B	*	mg/L	0.05	0.3	03/31/15 16:11	abd
Hardness as CaCO3	SM2340B - Calculation		62			mg/L	0.8	4	04/06/15 13:08	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	04/01/15 23:15	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	04/01/15 13:35	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	04/01/15 22:59	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	22.8		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	04/06/15 13:08	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	04/01/15 0:49	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	03/25/15 20:31	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	04/02/15 22:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	182		*	mg/L	10	20	03/27/15 15:09	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/27/15 12:10	abd
Residue, Total (TS) @ 105C	SM2540B	1	192		*	mg/L	10	20	03/25/15 15:15	id
Sulfate	D516-02/-07 - Turbidimetric	1	31.2		*	mg/L	1	5	04/01/15 15:44	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 12:23	eea
TDS (calculated)	Calculation		156			mg/L			04/06/15 13:08	calc
TDS (ratio - measured/calculated)	Calculation		1.17						04/06/15 13:08	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L23469-02**
Date Sampled: 03/23/15 10:15
Date Received: 03/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/31/15 11:48	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/31/15 10:55	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/31/15 2:07	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 12:22	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 12:52	mss2
Total Hot Plate Digestion	M200.2 ICP								03/28/15 11:44	aeb
Total Hot Plate Digestion	M200.2 ICP-MS								03/30/15 14:36	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L23469-02**
Date Sampled: 03/23/15 10:15
Date Received: 03/25/15
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	03/26/15 18:29	aeb
Aluminum, total	M200.7 ICP	1	0.22			mg/L	0.03	0.2	03/30/15 12:13	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0045			mg/L	0.0004	0.002	04/02/15 19:18	msh
Antimony, total	M200.8 ICP-MS	1	0.0044			mg/L	0.0004	0.002	04/01/15 18:20	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0049			mg/L	0.0002	0.001	04/02/15 19:18	msh
Arsenic, total	M200.8 ICP-MS	1	0.0054			mg/L	0.0002	0.001	04/01/15 18:20	msh
Barium, dissolved	M200.7 ICP	1	0.100			mg/L	0.003	0.02	03/26/15 18:29	aeb
Barium, total	M200.7 ICP	1	0.107			mg/L	0.003	0.02	03/30/15 12:13	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:29	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:13	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 18:29	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/30/15 12:13	aeb
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	03/26/15 18:29	aeb
Boron, total	M200.7 ICP	1	0.06			mg/L	0.01	0.05	03/30/15 12:13	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:18	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:20	msh
Calcium, dissolved	M200.7 ICP	1	179		*	mg/L	0.1	0.5	03/26/15 18:29	aeb
Calcium, total	M200.7 ICP	1	183			mg/L	0.1	0.5	03/30/15 12:13	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:29	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:13	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:29	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:13	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:29	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:13	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:29	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:13	aeb
Iron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	03/26/15 18:29	aeb
Iron, total	M200.7 ICP	1	0.27			mg/L	0.02	0.05	03/30/15 12:13	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:18	msh
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	04/01/15 18:20	msh
Lithium, dissolved	M200.7 ICP	1	0.042			mg/L	0.008	0.04	03/26/15 18:29	aeb
Lithium, total	M200.7 ICP	1	0.044			mg/L	0.008	0.04	03/30/15 12:13	aeb
Magnesium, dissolved	M200.7 ICP	1	13.7			mg/L	0.2	1	03/26/15 18:29	aeb
Magnesium, total	M200.7 ICP	1	13.9			mg/L	0.2	1	03/30/15 12:13	aeb
Manganese, dissolved	M200.7 ICP	1	0.113			mg/L	0.005	0.03	03/26/15 18:29	aeb
Manganese, total	M200.7 ICP	1	0.154			mg/L	0.005	0.03	03/30/15 12:13	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/30/15 12:46	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/01/15 11:28	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 18:29	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/30/15 12:13	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 18:29	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 12:13	aeb
Potassium, dissolved	M200.7 ICP	1	9			mg/L	0.2	1	03/26/15 18:29	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L23469-02**
Date Sampled: 03/23/15 10:15
Date Received: 03/25/15
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	9.2		mg/L	0.2	1	03/30/15 12:13	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/26/15 18:29	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/30/15 12:13	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	04/02/15 19:18	msh
Selenium, total	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	04/01/15 18:20	msh
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	04/03/15 20:21	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	04/01/15 18:20	msh
Sodium, dissolved	M200.7 ICP	1	44.2		mg/L	0.2	1	03/26/15 18:29	aeb
Sodium, total	M200.7 ICP	1	44.6		mg/L	0.2	1	03/30/15 12:13	aeb
Strontium, dissolved	M200.7 ICP	1	1.860	*	mg/L	0.005	0.03	03/26/15 18:29	aeb
Strontium, total	M200.7 ICP	1	1.890		mg/L	0.005	0.03	03/30/15 12:13	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/02/15 19:18	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	04/01/15 18:20	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	03/26/15 18:29	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/30/15 12:13	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/26/15 18:29	aeb
Titanium, total	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	03/30/15 12:13	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	04/02/15 19:18	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	04/01/15 18:20	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/26/15 18:29	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/30/15 12:13	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/26/15 18:29	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/30/15 12:13	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L23469-02**
Date Sampled: 03/23/15 10:15
Date Received: 03/25/15
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	87.3		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	87.3		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-4.0			%			04/06/15 13:09	calc
Sum of Anions			13			meq/L			04/06/15 13:09	calc
Sum of Cations			12			meq/L			04/06/15 13:09	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 13:21	enb
Chloride	SM4500Cl-E	1	39.3		*	mg/L	0.5	2	04/02/15 11:19	bsu
Conductivity @25C	SM2510B	1	1140		*	umhos/cm	1	10	03/30/15 22:48	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 20:38	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 17:37	pjb
Fluoride	SM4500F-C	1	0.69		*	mg/L	0.05	0.3	03/31/15 16:28	abd
Hardness as CaCO3	SM2340B - Calculation		503			mg/L	0.8	4	04/06/15 13:09	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.51		*	mg/L	0.02	0.1	04/01/15 23:16	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.40		*	mg/L	0.05	0.2	04/01/15 13:05	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	04/01/15 23:01	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	22.5		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.37			mg/L	0.03	0.2	04/06/15 13:09	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.12		*	mg/L	0.01	0.05	04/03/15 13:26	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.11	H	*	mg/L	0.01	0.05	03/25/15 20:33	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.01	0.05	04/02/15 22:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	878		*	mg/L	10	20	03/27/15 15:10	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1	12.0	B	*	mg/L	5	20	03/27/15 12:11	abd
Residue, Total (TS) @ 105C	SM2540B	1	918		*	mg/L	10	20	03/25/15 15:16	id
Sulfate	D516-02/-07 - Turbidimetric	20	472		*	mg/L	20	100	04/01/15 15:57	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 12:27	eea
TDS (calculated)	Calculation		814			mg/L			04/06/15 13:09	calc
TDS (ratio - measured/calculated)	Calculation		1.08						04/06/15 13:09	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L23469-03**
Date Sampled: 03/23/15 09:00
Date Received: 03/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/31/15 12:12	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/31/15 11:09	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/31/15 3:45	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 12:45	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 13:02	mss2
Total Hot Plate Digestion	M200.2 ICP								03/28/15 11:55	aeb
Total Hot Plate Digestion	M200.2 ICP-MS								03/30/15 14:48	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L23469-03**

Date Sampled: 03/23/15 09:00

Date Received: 03/25/15

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	03/26/15 18:38	aeb
Aluminum, total	M200.7 ICP	1	0.08	B		mg/L	0.03	0.2	03/30/15 12:16	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0015	B		mg/L	0.0004	0.002	04/02/15 19:25	msh
Antimony, total	M200.8 ICP-MS	1	0.0015	B		mg/L	0.0004	0.002	04/01/15 18:23	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0044			mg/L	0.0002	0.001	04/02/15 19:25	msh
Arsenic, total	M200.8 ICP-MS	1	0.0046			mg/L	0.0002	0.001	04/01/15 18:23	msh
Barium, dissolved	M200.7 ICP	1	0.089			mg/L	0.003	0.02	03/26/15 18:38	aeb
Barium, total	M200.7 ICP	1	0.094			mg/L	0.003	0.02	03/30/15 12:16	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:38	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:16	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 18:38	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/30/15 12:16	aeb
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	03/26/15 18:38	aeb
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	03/30/15 12:16	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:25	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:23	msh
Calcium, dissolved	M200.7 ICP	1	73.8		*	mg/L	0.1	0.5	03/26/15 18:38	aeb
Calcium, total	M200.7 ICP	1	75.7			mg/L	0.1	0.5	03/30/15 12:16	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:38	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:16	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:38	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:16	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:38	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:16	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:38	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:16	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/26/15 18:38	aeb
Iron, total	M200.7 ICP	1	0.08			mg/L	0.02	0.05	03/30/15 12:16	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:25	msh
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:23	msh
Lithium, dissolved	M200.7 ICP	1	0.038	B		mg/L	0.008	0.04	03/26/15 18:38	aeb
Lithium, total	M200.7 ICP	1	0.041			mg/L	0.008	0.04	03/30/15 12:16	aeb
Magnesium, dissolved	M200.7 ICP	1	9.4			mg/L	0.2	1	03/26/15 18:38	aeb
Magnesium, total	M200.7 ICP	1	9.5			mg/L	0.2	1	03/30/15 12:16	aeb
Manganese, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.005	0.03	03/26/15 18:38	aeb
Manganese, total	M200.7 ICP	1	0.035			mg/L	0.005	0.03	03/30/15 12:16	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/30/15 12:48	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/01/15 11:30	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 18:38	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/30/15 12:16	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 18:38	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 12:16	aeb
Potassium, dissolved	M200.7 ICP	1	6.6			mg/L	0.2	1	03/26/15 18:38	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L23469-03**
Date Sampled: 03/23/15 09:00
Date Received: 03/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	6.8			mg/L	0.2	1	03/30/15 12:16	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 18:38	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 12:16	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	04/02/15 19:25	msh
Selenium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	04/01/15 18:23	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	04/03/15 20:24	msh
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	04/01/15 18:23	msh
Sodium, dissolved	M200.7 ICP	1	31.7			mg/L	0.2	1	03/26/15 18:38	aeb
Sodium, total	M200.7 ICP	1	31.9			mg/L	0.2	1	03/30/15 12:16	aeb
Strontium, dissolved	M200.7 ICP	1	0.692		*	mg/L	0.005	0.03	03/26/15 18:38	aeb
Strontium, total	M200.7 ICP	1	0.709			mg/L	0.005	0.03	03/30/15 12:16	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 19:25	msh
Thallium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/01/15 18:23	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/26/15 18:38	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	03/30/15 12:16	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/26/15 18:38	aeb
Titanium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/30/15 12:16	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	04/02/15 19:25	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	04/01/15 18:23	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/26/15 18:38	aeb
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	03/30/15 12:16	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 18:38	aeb
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 12:16	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW9-E

ACZ Sample ID: **L23469-03**
 Date Sampled: 03/23/15 09:00
 Date Received: 03/25/15
 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	93.7		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	93.7		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.4			%			04/06/15 13:09	calc
Sum of Anions			6.3			meq/L			04/06/15 13:09	calc
Sum of Cations			6.0			meq/L			04/06/15 13:09	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 13:28	enb
Chloride	SM4500Cl-E	1	28.7		*	mg/L	0.5	2	04/02/15 11:19	bsu
Conductivity @25C	SM2510B	1	625		*	umhos/cm	1	10	03/30/15 22:56	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 20:40	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 17:38	pjb
Fluoride	SM4500F-C	1	0.39		*	mg/L	0.05	0.3	03/31/15 16:32	abd
Hardness as CaCO3	SM2340B - Calculation		223			mg/L	0.8	4	04/06/15 13:09	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.39		*	mg/L	0.02	0.1	04/01/15 23:20	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	04/01/15 14:28	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	04/01/15 23:04	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	22.3		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.31			mg/L	0.03	0.2	04/06/15 13:09	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.10		*	mg/L	0.01	0.05	04/03/15 13:29	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	03/25/15 20:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.10		*	mg/L	0.01	0.05	04/02/15 22:26	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	438		*	mg/L	10	20	03/27/15 15:12	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/27/15 12:13	abd
Residue, Total (TS) @ 105C	SM2540B	1	480		*	mg/L	10	20	03/25/15 15:18	id
Sulfate	D516-02/-07 - Turbidimetric	5	171		*	mg/L	5	25	04/01/15 15:50	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 12:30	eea
TDS (calculated)	Calculation		379			mg/L			04/06/15 13:09	calc
TDS (ratio - measured/calculated)	Calculation		1.16						04/06/15 13:09	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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L23469**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23469-01	WG381014	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.
	WG381471	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
	WG381014	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.
	WG381165	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381128	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).
	WG381371	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381239	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).
	WG381238	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).
	WG381198	Fluoride	SM4500F-C	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381165	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381346	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).
	WG381283	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).
	WG381345	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).
	WG381165	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG381247	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).
	WG380972	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).

Tahoe Resources, Inc.

ACZ Project ID: **L23469**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG381413		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).
WG381093		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG381079		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).
WG380955		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG381323		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.
WG381003		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).
WG381165		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23469**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23469-02	WG381014	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.
	WG381471	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
	WG381014	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.
	WG381165	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381128	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).
	WG381371	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381239	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).
	WG381238	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).
	WG381198	Fluoride	SM4500F-C	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381165	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381346	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).
	WG381283	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).
WG381345	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).	
WG381165	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG381456	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG380972	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).	
WG381413	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: **L23469**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG381093		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG381079		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).
WG380955		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG381323		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.
WG381003		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).
WG381165		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23469**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23469-03	WG381014	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.
	WG381471	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
	WG381014	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.
	WG381165	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381128	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).
	WG381371	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381239	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).
	WG381238	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).
	WG381198	Fluoride	SM4500F-C	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381165	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381346	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).
	WG381283	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).
	WG381345	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).	
WG381165	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG381456	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG380972	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).	
WG381413	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: **L23469**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG381093		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG381079		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).
WG380955		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG381323		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.
WG381003		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).
WG381165		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L23469-01**

Date Sampled: 03/23/15 8:05

Date Received: 03/25/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG381192

Analyst: drh

Extract Date: 03/27/15 17:04

Analysis Date: 03/31/15 4:07

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	92.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L23469-01**

Date Sampled: 03/23/15 8:05

Date Received: 03/25/15

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

Extract Method:

Workgroup: WG381358

Analyst: DRH

Extract Date:

Analysis Date: 04/02/15 11:30

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: **L23469-02**
Date Sampled: 03/23/15 10:15
Date Received: 03/25/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG381192Analyst: drh
Extract Date: 03/27/15 17:07
Analysis Date: 03/31/15 4:33

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	80.9		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW8-EACZ Sample ID: **L23469-02**
Date Sampled: 03/23/15 10:15
Date Received: 03/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG381358

Analyst: DRH

Extract Date:

Analysis Date: 04/02/15 11:45

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: SW9-EACZ Sample ID: **L23469-03**

Date Sampled: 03/23/15 9:00

Date Received: 03/25/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG381192

Analyst: drh

Extract Date: 03/27/15 17:10

Analysis Date: 03/31/15 4:59

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L23469-03**

Date Sampled: 03/23/15 9:00

Date Received: 03/25/15

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

Extract Method:

Workgroup: WG381358

Analyst: DRH

Extract Date:

Analysis Date: 04/02/15 12:00

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 unless omitted or equal to the PQL (see comment #4) 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. Synonymous with the EPA term "minimum level".
<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: **L23469**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23469-01	WG381192	*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).
	WG381358	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.
L23469-02	WG381192	*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).
	WG381358	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.
L23469-03	WG381192	*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).
	WG381358	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.

Tahoe Resources, Inc.

ACZ Project ID: **L23469**

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: L23469
 Date Received: 03/25/2015 10:25
 Received By: ddp
 Date Printed: 3/25/2015

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?
3669	14.8	16	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.

L23469

CHAIN of CUSTODY

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

Report to:

Name: Miguel BERGANZA	Address: BULEVAR LOS PROCERES 12 calle 24-69 zona 10 Empresarial, zona Pradera, Torre IV oficina 14 06 Telephone: (502) 5951 5248
Company: Tahoe Resources inc.	
E-mail: MBERGANZA@sanrafael.com.gt	

Copy of Report to:

Name: Charlie Muerhoff	E-mail: Cmuerhoff@tahoeresourcesinc.com
Company: Tahoe Resources inc.	Telephone:

Invoice to:

Name: Miguel BERGANZA	Address: Telephone:
Company: Tahoe Resources inc.	
E-mail: MBERGANZA@sanrafael.com.gt	

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

If "NO" then ACZ will contact client for further 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 intentionally 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	MS																				
PO#: Escobal																						
Reporting state for compliance testing:																						
Check box if samples include NRC licensed material?																						
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers																			
SW1-E	23-03-15 08:15	SW	10	✓																		
SW2-E	23-03-15 10:15	SW	10	✓																		
SW3-E	23-03-15 09:00	SW	10	✓																		

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

REMARKS

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	23-03-2015 17:50	Comerz [Signature]	23-03-15 12:50

23469 Chain of Custody

Guatemala March 23rd, 2015

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).

Yours sincerely,

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

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

April 08, 2015

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: L23466

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 25, 2015. This project has been assigned to ACZ's project number, L23466. Please reference this number in all future inquiries.

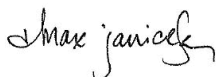
All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L23466. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

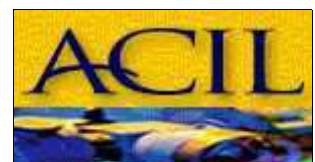
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 08, 2015. 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.



Max Janicek has reviewed and approved this report.



Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW11-EACZ Sample ID: **L23466-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/30/15 10:53	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/31/15 9:50	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								04/01/15 10:00	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/30/15 16:18	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 10:57	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								03/30/15 12:36	scp
Total Hot Plate Digestion	M200.2 ICP								03/28/15 9:48	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L23466-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
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	03/26/15 17:47	aeb
Aluminum, total	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	03/30/15 11:35	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0122			mg/L	0.0004	0.002	04/02/15 20:58	msh
Antimony, total	M200.8 ICP-MS	1	0.0123			mg/L	0.0004	0.002	04/01/15 17:50	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0079			mg/L	0.0002	0.001	04/02/15 20:58	msh
Arsenic, total	M200.8 ICP-MS	1	0.0088			mg/L	0.0002	0.001	04/01/15 17:50	msh
Barium, dissolved	M200.7 ICP	1	0.041			mg/L	0.003	0.02	03/26/15 17:47	aeb
Barium, total	M200.7 ICP	1	0.043			mg/L	0.003	0.02	03/30/15 11:35	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:47	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 11:35	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 17:47	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/30/15 11:35	aeb
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	03/26/15 17:47	aeb
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	03/30/15 11:35	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	04/02/15 20:58	msh
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	04/01/15 17:50	msh
Calcium, dissolved	M200.7 ICP	1	313		*	mg/L	0.1	0.5	03/26/15 17:47	aeb
Calcium, total	M200.7 ICP	1	321			mg/L	0.1	0.5	03/30/15 11:35	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:47	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 11:35	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:47	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 11:35	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:47	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	03/30/15 11:35	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 17:47	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/30/15 11:35	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/26/15 17:47	aeb
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	03/30/15 11:35	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	04/02/15 20:58	msh
Lead, total	M200.8 ICP-MS	1	0.0036			mg/L	0.0001	0.0005	04/01/15 17:50	msh
Lithium, dissolved	M200.7 ICP	1	0.085			mg/L	0.008	0.04	03/26/15 17:47	aeb
Lithium, total	M200.7 ICP	1	0.092			mg/L	0.008	0.04	03/30/15 11:35	aeb
Magnesium, dissolved	M200.7 ICP	1	20			mg/L	0.2	1	03/26/15 17:47	aeb
Magnesium, total	M200.7 ICP	1	20.3			mg/L	0.2	1	03/30/15 11:35	aeb
Manganese, dissolved	M200.7 ICP	1	0.014	B	*	mg/L	0.005	0.03	03/26/15 17:47	aeb
Manganese, total	M200.7 ICP	1	0.027	B		mg/L	0.005	0.03	03/30/15 11:35	aeb
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	03/30/15 12:18	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	04/07/15 10:00	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 17:47	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	03/30/15 11:35	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 17:47	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	03/30/15 11:35	aeb
Potassium, dissolved	M200.7 ICP	1	9.7			mg/L	0.2	1	03/26/15 17:47	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L23466-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	10.1		mg/L	0.2	1	03/30/15 11:35	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/26/15 17:47	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	03/30/15 11:35	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	04/02/15 20:58	msh
Selenium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	04/01/15 17:50	msh
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	04/03/15 20:06	msh
Silver, total	M200.8 ICP-MS	1	0.00020	B	mg/L	0.00005	0.0003	04/01/15 17:50	msh
Sodium, dissolved	M200.7 ICP	1	67.4		mg/L	0.2	1	03/26/15 17:47	aeb
Sodium, total	M200.7 ICP	1	69.6		mg/L	0.2	1	03/30/15 11:35	aeb
Strontium, dissolved	M200.7 ICP	1	3.390	*	mg/L	0.005	0.03	03/26/15 17:47	aeb
Strontium, total	M200.7 ICP	1	3.510		mg/L	0.005	0.03	03/30/15 11:35	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	04/02/15 20:58	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	04/01/15 17:50	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	03/26/15 17:47	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	03/30/15 11:35	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	03/26/15 17:47	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	03/30/15 11:35	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	04/02/15 20:58	msh
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	04/01/15 17:50	msh
Vanadium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	03/26/15 17:47	aeb
Vanadium, total	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	03/30/15 11:35	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	03/26/15 17:47	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	03/30/15 11:35	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW11-E

ACZ Sample ID: **L23466-01**

Date Sampled: 03/23/15 13:40

Date Received: 03/25/15

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	53.1		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	53.1		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			04/07/15 16:06	calc
Sum of Anions			21			meq/L			04/07/15 16:06	calc
Sum of Cations			21			meq/L			04/07/15 16:06	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	03/30/15 11:40	enb
Chloride	SM4500Cl-E	1	61.6		*	mg/L	0.5	2	04/02/15 11:05	bsu
Conductivity @25C	SM2510B	1	1770		*	umhos/cm	1	10	03/30/15 20:58	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 16:38	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 17:27	pjb
Fluoride	SM4500F-C	1	1.37		*	mg/L	0.05	0.3	03/31/15 15:20	abd
Hardness as CaCO3	SM2340B - Calculation		864			mg/L	0.8	4	04/07/15 16:06	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	4.85		*	mg/L	0.06	0.3	04/02/15 22:52	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.24		*	mg/L	0.05	0.2	04/01/15 12:48	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	04/01/15 23:51	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	22.6		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	04/07/15 16:06	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	04/01/15 0:37	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	03/25/15 20:18	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	04/02/15 22:54	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1470		*	mg/L	10	20	03/27/15 14:47	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/27/15 11:57	abd
Residue, Total (TS) @ 105C	SM2540B	1	1530		*	mg/L	10	20	03/25/15 15:00	id
Sulfate	D516-02/-07 - Turbidimetric	100	868		*	mg/L	100	500	04/01/15 15:38	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 11:40	eea
TDS (calculated)	Calculation		1380			mg/L			04/07/15 16:06	calc
TDS (ratio - measured/calculated)	Calculation		1.07						04/07/15 16:06	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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L23466**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23466-01	WG381400	Cadmium, dissolved	M200.8 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.
	WG381014	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.
		Manganese, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG381098	Mercury, dissolved	M245.1 CVAA	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG381471	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
	WG381014	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.
	WG381165	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381128	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).
	WG381371	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381228	Cyanide, total	M335.4 - Colorimetric w/ distillation	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG381238	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).
	WG381198	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).
	WG381165	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381412	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG381283	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).
	WG381347	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).
	WG381165	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG381247	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).

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG380972		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).
WG381415		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).
WG381092		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG381078		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).
WG380955		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG381323		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.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
WG381003		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).
			SM4500S2-D	Q6	Sample was received above recommended temperature.
WG381165		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L23466-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG381192

Analyst: drh
Extract Date: 03/27/15 16:42
Analysis Date: 03/31/15 0:38

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	89.7		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW11-EACZ Sample ID: **L23466-01**
Date Sampled: 03/23/15 13:40
Date Received: 03/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG381255

Analyst: DRH

Extract Date:

Analysis Date: 04/01/15 13:16

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 unless omitted or equal to the PQL (see comment #4) 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. Synonymous with the EPA term "minimum level".
<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: **L23466**

Diesel Range Organics (C10-C28)

M8015D GC/FID

WG381145

MS	Sample ID: L23414-01MS		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 13:55			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5	.2	2.16	mg/L	78.0	70	130			
OTP (surr)				%	96.1	70	130			

DUP	Sample ID: L23441-01DUP		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 20:53			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28		.2	.16	mg/L		70	130	22	20	RA
OTP (surr)				%	81.3	70	130			RA

LCSW	Sample ID: WG380930LCSW		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 11:44			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.25	mg/L	90.0	70	130			
OTP (surr)				%	94.6	70	130			

LCSWD	Sample ID: WG380930LCSWD		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 12:10			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.18	mg/L	87.0	70	130	3	20	
OTP (surr)				%	94.4	70	130			

PBW	Sample ID: WG380930PBW		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 11:18			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28			U	mg/L		-5	.5			
OTP (surr)				%	88.7	70	130			

WG381192

MS	Sample ID: L23473-01MS		PCN/SCN: TPH150211-1				Analyzed: 03/31/15 5:51			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5	U	2.23	mg/L	87.0	70	130			
OTP (surr)				%	96.4	70	130			

DUP	Sample ID: L23504-01DUP		PCN/SCN: TPH150211-1				Analyzed: 03/31/15 6:43			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28		U	U	mg/L		70	130	0	20	RA
OTP (surr)				%	89.9	70	130			

LCSW	Sample ID: WG381099LCSW		PCN/SCN: TPH150211-1				Analyzed: 03/30/15 23:19			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.14	mg/L	86.0	70	130			
OTP (surr)				%	96.0	70	130			

LCSWD	Sample ID: WG381099LCSWD		PCN/SCN: TPH150211-1				Analyzed: 03/30/15 23:45			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.07	mg/L	83.0	70	130	3	20	
OTP (surr)				%	93.9	70	130			

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

PBW		Sample ID: WG381099PBW						Analyzed: 03/30/15 22:53			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
TPH C10 TO C28			U	mg/L		-5	.5				
OTP (surr)				%	90.4	70	130				

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

Oil & Grease, Total Recoverable

1664A - Gravimetric

WG381255

MS		Sample ID: L23451-01MS			PCN/SCN: OP150304-2			Analyzed: 04/01/15 12:31			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE	40	U	35.4	mg/L	89.0	78	114			Q5	

LCSW		Sample ID: WG381255LCSW			PCN/SCN: OP150304-2			Analyzed: 04/01/15 14:33			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE	40		32.8	mg/L	82.0	78	114				

LCSWD		Sample ID: WG381255LCSWD			PCN/SCN: OP150304-2			Analyzed: 04/01/15 14:44			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE	40		32.4	mg/L	81.0	78	114	1	18		

PBW		Sample ID: WG381255PBW			PCN/SCN: OP150304-2			Analyzed: 04/01/15 10:30			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE			U	mg/L							

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23466-01	WG381192	*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).
	WG381255	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L23466-02	WG381145	*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).

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

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: L23466
 Date Received: 03/25/2015 10:24
 Received By: ddp
 Date Printed: 3/25/2015

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 sample 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? L23466-02 : A Orange container not received and the associated analysis could not be run.		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?
2647	8	15	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.

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L23466
Date Received: 03/25/2015 10:24
Received By: ddp
Date Printed: 3/25/2015

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



Laboratories, Inc.

L23466

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 PROCESOS 12 CALLE 24-69 ZONA 10
Empresarial, zona Procesa, Torre 11 Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc

E-mail:
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 intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATICS

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 various analysis columns (SW, GW+FPH, TOTAL CN).

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.



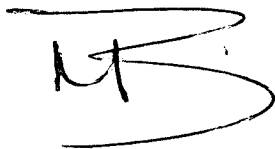
Guatemala March 23rd, 2015

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).

Yours sincerely,

A handwritten signature in black ink, appearing to be the initials 'MB' followed by a large, sweeping flourish that extends to the right and then loops back down.

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

REG 016 Resultados de Análisis

Muestra: 5 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: 090315
 Fecha de ingreso de muestras: 090315
 Fecha de análisis: 090315-190315
 Fecha de informe: 190315

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)
442	SW1-E	< 1	< 1	< 10	< 25	N.D.	23
443	SW2-E	< 1	< 1	< 10	< 25	N.D.	49
444	SW2B-E	< 1	< 1	< 10	< 25	N.D.	23
445	SW4-E	< 1	< 1	< 10	< 25	N.D.	430
446	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: 230315
Fecha de ingreso de muestras: 230315
Fecha de análisis: 230315-060415
Fecha de informe: 060415

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)
578	SW2A-E	< 1	< 1	< 10	< 25	N.D.	49
579	SW3-E	< 1	< 1	< 10	< 25	N.D.	1.6 x 10 ³
580	SW4A-E	< 1	< 1	< 10	< 25	N.D.	5.4 x 10 ³
581	SW6-E	< 1	< 1	< 10	< 25	N.D.	540
582	SW8-E	10	< 1	< 10	< 25	N.D.	5.4 x 10 ⁵
583	SW9-E	< 1	< 1	< 10	< 25	N.D.	700
584	SW11-E	< 1	< 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.

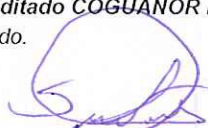
Límites de detección: Cromo hexavalente (0.05 mg/L)

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. Silvia Argueta
Gerente de Calidad

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua
 Análisis solicitado por: Ing. Miguel Berganza
 Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
 Procedencia de la muestra: Proyecto Escobal
 Fecha de muestreo: 250315
 Fecha de ingreso de muestras: 250315
 Fecha de análisis: 250315-090415
 Fecha de informe: 090415

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)
605	SW5-E	< 1	< 1	< 10	< 25	N.D.	2.8 x 10 ³

Notas:

Captación de muestras: La muestra fue captada 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

March 19, 2015

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: L23162

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 06, 2015. This project has been assigned to ACZ's project number, L23162. 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 L23162. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

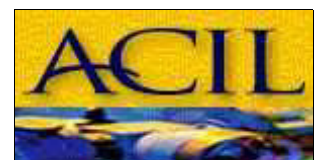
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 18, 2015. 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.

March 19, 2015

Project ID: Escobal

ACZ Project ID: L23162

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 ground water samples from Tahoe Resources, Inc. on March 6, 2015. 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 L23162. 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 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 the DRO values flagged with an "N1", there were non-hydrocarbon peaks seen in samples. These non-hydrocarbon peaks elute between the C10 and C28 window and are integrated as TPH per the SOP.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW2

ACZ Sample ID: **L23162-01**
Date Sampled: 03/04/15 09:30
Date Received: 03/06/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 11:41	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 12:48	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 17:09	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 10:37	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:55	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.91			mg/L	0.03	0.2	03/11/15 21:38	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 20:07	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	03/13/15 12:54	msh
Barium, dissolved	M200.7 ICP	1	0.146			mg/L	0.003	0.02	03/11/15 21:38	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:38	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/12/15 13:46	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:38	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:07	msh
Calcium, dissolved	M200.7 ICP	1	8.8			mg/L	0.1	0.5	03/11/15 21:38	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:38	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:38	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:38	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/11/15 21:38	aeb
Iron, dissolved	M200.7 ICP	1	1.78		*	mg/L	0.02	0.05	03/11/15 21:38	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0040			mg/L	0.0001	0.0005	03/12/15 20:07	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/11/15 21:38	aeb
Magnesium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	03/11/15 21:38	aeb
Manganese, dissolved	M200.7 ICP	1	0.845		*	mg/L	0.005	0.03	03/11/15 21:38	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/10/15 12:51	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/11/15 21:38	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/11/15 21:38	aeb
Potassium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	03/11/15 21:38	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/11/15 21:38	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	03/13/15 12:54	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 20:07	msh
Sodium, dissolved	M200.7 ICP	1	14.6			mg/L	0.2	1	03/11/15 21:38	aeb
Strontium, dissolved	M200.7 ICP	1	0.063			mg/L	0.005	0.03	03/11/15 21:38	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:07	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/11/15 21:38	aeb
Titanium, dissolved	M200.7 ICP	1	0.023	B		mg/L	0.005	0.03	03/11/15 21:38	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	03/12/15 20:07	msh
Vanadium, dissolved	M200.7 ICP	1	0.020	B		mg/L	0.005	0.03	03/11/15 21:38	aeb
Zinc, dissolved	M200.7 ICP	1	0.09		*	mg/L	0.01	0.05	03/11/15 21:38	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW2

ACZ Sample ID: **L23162-01**
 Date Sampled: 03/04/15 09:30
 Date Received: 03/06/15
 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	46.5			mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	46.5		*	mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			13.3			%			03/19/15 11:05	calc
Sum of Anions			1.3			meq/L			03/19/15 11:05	calc
Sum of Cations			1.7			meq/L			03/19/15 11:05	calc
Chloride	SM4500Cl-E	1	4.9			mg/L	0.5	2	03/13/15 12:55	bsu
Conductivity @25C	SM2510B	1	140		*	umhos/cm	1	10	03/13/15 1:08	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:08	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:36	mss2
Fluoride	SM4500F-C	1	0.37		*	mg/L	0.05	0.3	03/10/15 13:58	abd
Hardness as CaCO3	SM2340B - Calculation		33			mg/L	0.8	4	03/19/15 11:05	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.71			mg/L	0.02	0.1	03/13/15 23:01	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.08	B	*	mg/L	0.05	0.2	03/16/15 12:37	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.8			mg/L	0.1	0.5	03/12/15 11:56	thf
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	21.4			C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	03/19/15 11:05	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	03/18/15 10:59	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	03/06/15 20:46	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.50		*	mg/L	0.01	0.05	03/11/15 23:17	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	270			mg/L	10	20	03/09/15 13:59	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	10	970		*	mg/L	50	200	03/10/15 16:50	eea
Residue, Total (TS) @ 105C	SM2540B	2	1480			mg/L	20	40	03/10/15 14:12	id
Sulfate	D516-02/-07 - Turbidimetric	1	8.5		*	mg/L	1	5	03/13/15 15:36	bsu
Sulfide as S	SM4500S2-D	15		U	*	mg/L	0.3	2	03/11/15 12:48	eea
TDS (calculated)	Calculation		75.1			mg/L			03/19/15 11:05	calc
TDS (ratio - measured/calculated)	Calculation		3.60						03/19/15 11:05	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW3

ACZ Sample ID: **L23162-02**
Date Sampled: 03/04/15 10:50
Date Received: 03/06/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 11:50	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 12:57	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 17:20	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 10:43	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:09	mss2

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	03/11/15 21:41	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 20:09	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0021			mg/L	0.0002	0.001	03/13/15 12:56	msh
Barium, dissolved	M200.7 ICP	1	0.037			mg/L	0.003	0.02	03/11/15 21:41	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:41	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/12/15 13:49	aeb
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	03/11/15 21:41	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:09	msh
Calcium, dissolved	M200.7 ICP	1	76			mg/L	0.1	0.5	03/11/15 21:41	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:41	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:41	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:41	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/11/15 21:41	aeb
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	03/11/15 21:41	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:09	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	03/11/15 21:41	aeb
Magnesium, dissolved	M200.7 ICP	1	9.4			mg/L	0.2	1	03/11/15 21:41	aeb
Manganese, dissolved	M200.7 ICP	1		U	*	mg/L	0.005	0.03	03/11/15 21:41	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/10/15 12:53	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/11/15 21:41	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/11/15 21:41	aeb
Potassium, dissolved	M200.7 ICP	1	4			mg/L	0.2	1	03/11/15 21:41	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/11/15 21:41	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	03/13/15 12:56	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 20:09	msh
Sodium, dissolved	M200.7 ICP	1	27.2			mg/L	0.2	1	03/11/15 21:41	aeb
Strontium, dissolved	M200.7 ICP	1	0.733			mg/L	0.005	0.03	03/11/15 21:41	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:09	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/11/15 21:41	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/11/15 21:41	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	03/12/15 20:09	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	03/11/15 21:41	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B	*	mg/L	0.01	0.05	03/11/15 21:41	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW3

ACZ Sample ID: **L23162-02**
Date Sampled: 03/04/15 10:50
Date Received: 03/06/15
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	81.6			mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	81.6			mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.9			%			03/19/15 11:05	calc
Sum of Anions			5.8			meq/L			03/19/15 11:05	calc
Sum of Cations			5.9			meq/L			03/19/15 11:05	calc
Chloride	SM4500Cl-E	1	16.3			mg/L	0.5	2	03/13/15 12:55	bsu
Conductivity @25C	SM2510B	1	599			umhos/cm	1	10	03/13/15 1:16	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:09	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:37	mss2
Fluoride	SM4500F-C	1	0.69		*	mg/L	0.05	0.3	03/10/15 14:04	abd
Hardness as CaCO3	SM2340B - Calculation		228			mg/L	0.8	4	03/19/15 11:05	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	2.42			mg/L	0.06	0.3	03/13/15 23:51	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 12:38	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U		mg/L	0.1	0.5	03/12/15 11:57	thf
pH (lab)	SM4500H+ B									
pH		1	7.6	H		units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	21.8			C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	03/19/15 11:05	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	03/18/15 11:00	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	03/06/15 20:47	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	03/11/15 23:19	pjb
Residue, Filterable (TDS) @180C	SM2540C	5	450			mg/L	50	100	03/10/15 13:23	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/10/15 16:52	eea
Residue, Total (TS) @ 105C	SM2540B	1	490			mg/L	10	20	03/10/15 14:14	id
Sulfate	D516-02/-07 - Turbidimetric	5	177		*	mg/L	5	25	03/13/15 15:43	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 13:01	eea
TDS (calculated)	Calculation		361			mg/L			03/19/15 11:05	calc
TDS (ratio - measured/calculated)	Calculation		1.25						03/19/15 11:05	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW4

ACZ Sample ID: **L23162-03**
Date Sampled: 03/04/15 11:45
Date Received: 03/06/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 12:00	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 13:06	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 17:32	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 10:50	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:16	mss2

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	03/11/15 21:44	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 20:12	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	03/13/15 12:58	msh
Barium, dissolved	M200.7 ICP	1	0.032			mg/L	0.003	0.02	03/11/15 21:44	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:44	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/12/15 13:58	aeb
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	03/11/15 21:44	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:12	msh
Calcium, dissolved	M200.7 ICP	1	78.7			mg/L	0.1	0.5	03/11/15 21:44	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:44	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:44	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/11/15 21:44	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/11/15 21:44	aeb
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	03/11/15 21:44	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	03/12/15 20:12	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	03/11/15 21:44	aeb
Magnesium, dissolved	M200.7 ICP	1	8.8			mg/L	0.2	1	03/11/15 21:44	aeb
Manganese, dissolved	M200.7 ICP	1		U	*	mg/L	0.005	0.03	03/11/15 21:44	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/10/15 12:55	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/11/15 21:44	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/11/15 21:44	aeb
Potassium, dissolved	M200.7 ICP	1	4.2			mg/L	0.2	1	03/11/15 21:44	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/11/15 21:44	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	03/13/15 12:58	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 20:12	msh
Sodium, dissolved	M200.7 ICP	1	26.8			mg/L	0.2	1	03/11/15 21:44	aeb
Strontium, dissolved	M200.7 ICP	1	0.737			mg/L	0.005	0.03	03/11/15 21:44	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:12	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/11/15 21:44	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/11/15 21:44	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	03/12/15 20:12	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	03/11/15 21:44	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B	*	mg/L	0.01	0.05	03/11/15 21:44	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW4

ACZ Sample ID: **L23162-03**
 Date Sampled: 03/04/15 11:45
 Date Received: 03/06/15
 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	86.8			mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	86.8			mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.7			%			03/19/15 11:06	calc
Sum of Anions			5.8			meq/L			03/19/15 11:06	calc
Sum of Cations			6			meq/L			03/19/15 11:06	calc
Chloride	SM4500Cl-E	1	15.5			mg/L	0.5	2	03/13/15 12:55	bsu
Conductivity @25C	SM2510B	1	602			umhos/cm	1	10	03/13/15 1:24	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:09	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:38	mss2
Fluoride	SM4500F-C	1	0.83		*	mg/L	0.05	0.3	03/10/15 14:08	abd
Hardness as CaCO3	SM2340B - Calculation		233			mg/L	0.8	4	03/19/15 11:06	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.54			mg/L	0.02	0.1	03/13/15 23:06	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 12:40	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U		mg/L	0.1	0.5	03/12/15 11:58	thf
pH (lab)	SM4500H+ B									
pH		1	7.7	H		units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	22.0			C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	03/19/15 11:06	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	03/18/15 11:25	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.01	0.05	03/06/15 20:48	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	03/11/15 23:20	pjb
Residue, Filterable (TDS) @180C	SM2540C	5	410			mg/L	50	100	03/10/15 13:25	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/10/15 16:53	eea
Residue, Total (TS) @ 105C	SM2540B	1	498			mg/L	10	20	03/10/15 14:15	id
Sulfate	D516-02/-07 - Turbidimetric	5	170		*	mg/L	5	25	03/13/15 15:44	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 13:06	eea
TDS (calculated)	Calculation		359			mg/L			03/19/15 11:06	calc
TDS (ratio - measured/calculated)	Calculation		1.14						03/19/15 11:06	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: **L23162**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23162-01	WG380198	Iron, 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.
		Manganese, 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.
		Zinc, 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.
	WG380278	Conductivity @25C	SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG380300	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).
	WG380295	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).
	WG380105	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380421	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).
	WG380278	pH	SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG380547	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380022	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380242	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380141	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).
	WG380382	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.
			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	QD	Reported value is the background-corrected concentration, as described by the method.
	WG380177	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).
			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).
	WG380278	Total Alkalinity	SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

Tahoe Resources, Inc.

ACZ Project ID: **L23162**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23162-02	WG380198	Iron, 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.
		Manganese, 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.
		Zinc, 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.
	WG380300	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).
	WG380295	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).
	WG380105	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380421	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).
	WG380547	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380022	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380242	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380141	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).
	WG380382	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.
	WG380177	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.

ACZ Project ID: **L23162**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23162-03	WG380198	Iron, 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.
		Manganese, 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.
		Zinc, 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.
	WG380300	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).
	WG380295	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).
	WG380105	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380421	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).
	WG380547	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380022	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
M365.1 - Automated Ascorbic Acid			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
	WG380242	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380141	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).
	WG380382	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.
	WG380177	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: MW2ACZ Sample ID: **L23162-01**
Date Sampled: 03/04/15 9:30
Date Received: 03/06/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380472Analyst: drh
Extract Date: 03/11/15 13:56
Analysis Date: 03/16/15 16:54

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.1	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.4		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW3

ACZ Sample ID: **L23162-02**

Date Sampled: 03/04/15 10:50

Date Received: 03/06/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG380472

Analyst: drh

Extract Date: 03/11/15 13:58

Analysis Date: 03/16/15 17:20

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.6		1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	87		1.01	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW4

ACZ Sample ID: **L23162-03**

Date Sampled: 03/04/15 11:45

Date Received: 03/06/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG380472

Analyst: drh

Extract Date: 03/11/15 13:59

Analysis Date: 03/16/15 17:47

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.6		1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	88.7		1.01	*	%	70	130

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: **L23162**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23162-01	WG380472	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L23162-02	WG380472	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L23162-03	WG380472	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23162**

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: L23162
 Date Received: 03/06/2015 12:00
 Received By: ddp
 Date Printed: 3/6/2015

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?
4458	3.3	14	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.

23162

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5403

Report to:

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

Address: Bulevar los Pinos 18 calle 24-69 zona 10
Empresarial zona Pradera Torre IV oficina 1406
Telephone: (507) 5951 52 48

Copy of Report to:

Name: charlie Mueshoff
Company: Tahoe Resources Inc.

E-mail: cmueshoff@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 intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

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

REMARKS

Please 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



23162 Chain of Custody

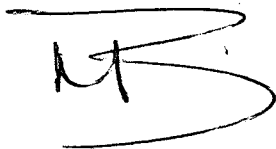
Guatemala March 4th, 2015

To whom it may concern:

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

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

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together, with a long horizontal stroke underneath.

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

March 18, 2015

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: L23160

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 06, 2015. This project has been assigned to ACZ's project number, L23160. 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 L23160. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

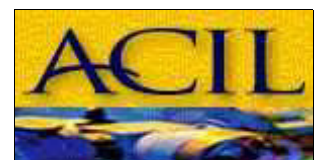
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 17, 2015. 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.

March 18, 2015

Project ID: Escobal

ACZ Project ID: L23160

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 ground water samples from Tahoe Resources, Inc. on March 6, 2015. 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 L23160. 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 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 the DRO values flagged with an "N1", there were non-hydrocarbon peaks seen in samples. These non-hydrocarbon peaks elute between the C10 and C28 window and were integrated as TPH per SOP.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW5

ACZ Sample ID: **L23160-01**
Date Sampled: 03/04/15 10:10
Date Received: 03/06/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 10:18	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 11:36	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 15:25	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:31	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 14:57	mss2

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	03/09/15 22:11	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 19:40	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	03/13/15 12:27	msh
Barium, dissolved	M200.7 ICP	1	0.049			mg/L	0.003	0.02	03/09/15 22:11	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:11	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/10/15 13:47	aeb
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	03/09/15 22:11	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:40	msh
Calcium, dissolved	M200.7 ICP	1	151			mg/L	0.1	0.5	03/09/15 22:11	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:11	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:11	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:11	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:11	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/09/15 22:11	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:40	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:11	aeb
Magnesium, dissolved	M200.7 ICP	1	20.7			mg/L	0.2	1	03/09/15 22:11	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:11	aeb
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	03/10/15 12:27	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/09/15 22:11	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:11	aeb
Potassium, dissolved	M200.7 ICP	1	8.4			mg/L	0.2	1	03/10/15 13:47	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:11	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	03/13/15 12:27	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 19:40	msh
Sodium, dissolved	M200.7 ICP	1	31.7			mg/L	0.2	1	03/09/15 22:11	aeb
Strontium, dissolved	M200.7 ICP	1	0.587			mg/L	0.005	0.03	03/09/15 22:11	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:40	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/09/15 22:11	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:11	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	03/12/15 19:40	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:11	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	03/09/15 22:11	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW5

ACZ Sample ID: **L23160-01**

Date Sampled: 03/04/15 10:10

Date Received: 03/06/15

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	88.6			mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	88.6			mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			03/17/15 15:13	calc
Sum of Anions			11			meq/L			03/17/15 15:13	calc
Sum of Cations			11			meq/L			03/17/15 15:13	calc
Chloride	SM4500Cl-E	1	26.9			mg/L	0.5	2	03/13/15 12:54	bsu
Conductivity @25C	SM2510B	1	1030			umhos/cm	1	10	03/13/15 0:05	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:58	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:28	mss2
Fluoride	SM4500F-C	1	0.36		*	mg/L	0.05	0.3	03/17/15 10:40	enb
Hardness as CaCO3	SM2340B - Calculation		462			mg/L	0.8	4	03/17/15 15:13	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	7.37			mg/L	0.08	0.4	03/13/15 23:43	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U		mg/L	0.05	0.2	03/16/15 12:24	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/12/15 11:44	thf
pH (lab)	SM4500H+ B									
pH		1	7.5	H		units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	21.8			C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	03/17/15 15:13	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	03/11/15 22:37	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	03/06/15 20:33	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B		mg/L	0.01	0.05	03/11/15 23:06	pjb
Residue, Filterable (TDS) @180C	SM2540C	2	824			mg/L	20	40	03/09/15 13:49	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	03/10/15 16:40	eea
Residue, Total (TS) @ 105C	SM2540B	1	868			mg/L	10	20	03/10/15 14:02	id
Sulfate	D516-02/-07 - Turbidimetric	20	381		*	mg/L	20	100	03/13/15 16:15	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 12:07	eea
TDS (calculated)	Calculation		675			mg/L			03/17/15 15:13	calc
TDS (ratio - measured/calculated)	Calculation		1.22						03/17/15 15:13	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW6

ACZ Sample ID: **L23160-02**
Date Sampled: 03/04/15 09:15
Date Received: 03/06/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 10:36	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 11:54	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 15:36	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:38	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:04	mss2

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	03/09/15 22:14	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 19:43	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	03/13/15 12:30	msh
Barium, dissolved	M200.7 ICP	1	0.114			mg/L	0.003	0.02	03/09/15 22:14	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:14	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/10/15 13:50	aeb
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	03/09/15 22:14	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:43	msh
Calcium, dissolved	M200.7 ICP	1	202			mg/L	0.1	0.5	03/09/15 22:14	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:14	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:14	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:14	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:14	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/09/15 22:14	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	03/12/15 19:43	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:14	aeb
Magnesium, dissolved	M200.7 ICP	1	24.6			mg/L	0.2	1	03/09/15 22:14	aeb
Manganese, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.005	0.03	03/09/15 22:14	aeb
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	03/10/15 12:29	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/09/15 22:14	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:14	aeb
Potassium, dissolved	M200.7 ICP	1	9.1			mg/L	0.2	1	03/10/15 13:50	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:14	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	03/13/15 12:30	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 19:43	msh
Sodium, dissolved	M200.7 ICP	1	29.8			mg/L	0.2	1	03/09/15 22:14	aeb
Strontium, dissolved	M200.7 ICP	1	0.890			mg/L	0.005	0.03	03/09/15 22:14	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:43	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/09/15 22:14	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:14	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	03/12/15 19:43	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:14	aeb
Zinc, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	03/09/15 22:14	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW6

ACZ Sample ID: **L23160-02**
 Date Sampled: 03/04/15 09:15
 Date Received: 03/06/15
 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	74.9			mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	74.9			mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.7			%			03/17/15 15:13	calc
Sum of Anions			13			meq/L			03/17/15 15:13	calc
Sum of Cations			14			meq/L			03/17/15 15:13	calc
Chloride	SM4500Cl-E	1	30			mg/L	0.5	2	03/13/15 12:54	bsu
Conductivity @25C	SM2510B	1	1210			umhos/cm	1	10	03/13/15 0:13	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:00	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:29	mss2
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	03/10/15 13:04	abd
Hardness as CaCO3	SM2340B - Calculation		606			mg/L	0.8	4	03/17/15 15:13	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	8.16			mg/L	0.08	0.4	03/13/15 23:47	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U		mg/L	0.05	0.2	03/16/15 12:25	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/12/15 11:45	thf
pH (lab)	SM4500H+ B									
pH		1	7.1	H		units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	22.0			C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	03/17/15 15:13	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	03/11/15 22:38	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	03/06/15 20:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B		mg/L	0.01	0.05	03/11/15 23:07	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	992			mg/L	10	20	03/09/15 13:51	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/10/15 16:41	eea
Residue, Total (TS) @ 105C	SM2540B	1	1020			mg/L	10	20	03/10/15 14:04	id
Sulfate	D516-02/-07 - Turbidimetric	20	503		*	mg/L	20	100	03/13/15 15:47	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 12:12	eea
TDS (calculated)	Calculation		845			mg/L			03/17/15 15:13	calc
TDS (ratio - measured/calculated)	Calculation		1.17						03/17/15 15:13	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW7

ACZ Sample ID: **L23160-03**
Date Sampled: 03/04/15 08:20
Date Received: 03/06/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 10:55	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 12:03	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 15:48	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:45	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:12	mss2

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	03/09/15 22:17	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	03/12/15 19:45	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	03/13/15 12:32	msh
Barium, dissolved	M200.7 ICP	1	0.420			mg/L	0.003	0.02	03/09/15 22:17	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:17	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/10/15 13:53	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:17	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:45	msh
Calcium, dissolved	M200.7 ICP	1	27.6			mg/L	0.1	0.5	03/09/15 22:17	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:17	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:17	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:17	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:17	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/09/15 22:17	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	03/12/15 19:45	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:17	aeb
Magnesium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	03/09/15 22:17	aeb
Manganese, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.005	0.03	03/09/15 22:17	aeb
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	03/10/15 12:31	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/09/15 22:17	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:17	aeb
Potassium, dissolved	M200.7 ICP	1	8.6			mg/L	0.2	1	03/10/15 13:53	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:17	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/13/15 12:32	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 19:45	msh
Sodium, dissolved	M200.7 ICP	1	18			mg/L	0.2	1	03/09/15 22:17	aeb
Strontium, dissolved	M200.7 ICP	1	0.201			mg/L	0.005	0.03	03/09/15 22:17	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:45	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/09/15 22:17	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:17	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:45	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:17	aeb
Zinc, dissolved	M200.7 ICP	1	0.34			mg/L	0.01	0.05	03/09/15 22:17	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW7

ACZ Sample ID: **L23160-03**
 Date Sampled: 03/04/15 08:20
 Date Received: 03/06/15
 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	77.9			mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	77.9			mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.6			%			03/17/15 15:14	calc
Sum of Anions			3.2			meq/L			03/17/15 15:14	calc
Sum of Cations			3.1			meq/L			03/17/15 15:14	calc
Chloride	SM4500Cl-E	1	14.2			mg/L	0.5	2	03/13/15 12:54	bsu
Conductivity @25C	SM2510B	1	337			umhos/cm	1	10	03/13/15 0:21	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:02	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:30	mss2
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	03/10/15 13:18	abd
Hardness as CaCO3	SM2340B - Calculation		106			mg/L	0.8	4	03/17/15 15:14	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.58			mg/L	0.02	0.1	03/13/15 22:53	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U		mg/L	0.05	0.2	03/16/15 12:26	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/12/15 11:46	thf
pH (lab)	SM4500H+ B									
pH		1	7.1	H		units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	22.2			C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	03/17/15 15:14	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	03/11/15 22:39	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	03/06/15 20:38	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B		mg/L	0.01	0.05	03/11/15 23:10	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	284			mg/L	10	20	03/09/15 13:53	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/10/15 16:43	eea
Residue, Total (TS) @ 105C	SM2540B	1	300			mg/L	10	20	03/10/15 14:05	id
Sulfate	D516-02/-07 - Turbidimetric	5	56.4		*	mg/L	5	25	03/13/15 15:43	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 12:16	eea
TDS (calculated)	Calculation		182			mg/L			03/17/15 15:14	calc
TDS (ratio - measured/calculated)	Calculation		1.56						03/17/15 15:14	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: **L23160**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23160-01	WG380089	Mercury, dissolved	M245.1 CVAA	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG380300	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).
	WG380295	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).
	WG380479	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380248	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).
	WG380238	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380022	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380141	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).
	WG380382	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.
	WG380177	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L23160**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23160-02	WG380089	Mercury, dissolved	M245.1 CVAA	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG380300	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).
	WG380295	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).
	WG380105	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380248	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).
	WG380238	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380022	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380141	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).
	WG380382	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.
	WG380177	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L23160**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23160-03	WG380089	Mercury, dissolved	M245.1 CVAA	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG380300	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).
	WG380295	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).
	WG380105	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380248	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).
	WG380238	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380022	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG380141	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).
	WG380382	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.
	WG380177	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
SM4500S2-D			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).	

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW5ACZ Sample ID: **L23160-01**
Date Sampled: 03/04/15 10:10
Date Received: 03/06/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380472Analyst: drh
Extract Date: 03/11/15 13:43
Analysis Date: 03/16/15 13:25

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.6		1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.8		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW6ACZ Sample ID: **L23160-02**
Date Sampled: 03/04/15 9:15
Date Received: 03/06/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380472Analyst: drh
Extract Date: 03/11/15 13:44
Analysis Date: 03/16/15 13:51

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	89.8		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW7

ACZ Sample ID: **L23160-03**

Date Sampled: 03/04/15 8:20

Date Received: 03/06/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG380472

Analyst: drh

Extract Date: 03/11/15 13:46

Analysis Date: 03/16/15 14:17

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	89.7		1	*	%	70	130

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: **L23160**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23160-01	WG380472	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L23160-02	WG380472	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L23160-03	WG380472	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23160**

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: L23160
 Date Received: 03/06/2015 12:01
 Received By: ddp
 Date Printed: 3/6/2015

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?
3308	5.7	16	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.

L23160

CHAIN of CUSTODY

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

Report to:

Name: Miguel Beranza
Company: Tahoe Resources inc.
E-mail: MBeranza@sanrafol.com.gt

Address: Rulerias los pines 18 calle 24-69 Zona 10
Empresarial zona gradea Tercer IV Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc.

E-mail: Cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Beranza
Company: Tahoe Resources inc.
E-mail:

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 intentionally 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 various analysis results. Includes handwritten entries for MW5, MW6, MW7 and GW+TRH.

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 handwritten signatures and dates.

L23160 Chain of Custody

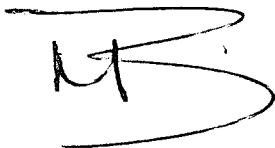
Guatemala March 4th, 2015

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.

March 19, 2015

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: L23161

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 06, 2015. This project has been assigned to ACZ's project number, L23161. 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 L23161. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

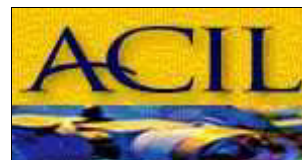
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 18, 2015. 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.

March 19, 2015

Project ID: Escobal

ACZ Project ID: L23161

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on March 6, 2015. 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 L23161. 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 DRO values flagged with an "N1", there were non-hydrocarbon peaks seen in samples. These non-hydrocarbon peaks elute between the C10 and C28 window and are integrated as TPH per the SOP.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW8

ACZ Sample ID: **L23161-01**

Date Sampled: 03/04/15 09:50

Date Received: 03/06/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 11:04	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 12:12	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 16:22	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:52	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:19	mss2

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	03/09/15 22:20	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	03/12/15 19:53	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0002	0.001	03/13/15 12:39	msh
Barium, dissolved	M200.7 ICP	1	0.081			mg/L	0.003	0.02	03/09/15 22:20	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:20	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/10/15 13:57	aeb
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	03/09/15 22:20	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:53	msh
Calcium, dissolved	M200.7 ICP	1	118			mg/L	0.1	0.5	03/09/15 22:20	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:20	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:20	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:20	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:20	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/09/15 22:20	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:53	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	03/09/15 22:20	aeb
Magnesium, dissolved	M200.7 ICP	1	18.8			mg/L	0.2	1	03/09/15 22:20	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:20	aeb
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	03/10/15 12:33	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/09/15 22:20	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:20	aeb
Potassium, dissolved	M200.7 ICP	1	7			mg/L	0.2	1	03/10/15 13:57	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:20	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	03/13/15 12:39	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 19:53	msh
Sodium, dissolved	M200.7 ICP	1	27.1			mg/L	0.2	1	03/09/15 22:20	aeb
Strontium, dissolved	M200.7 ICP	1	0.437			mg/L	0.005	0.03	03/09/15 22:20	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:53	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/09/15 22:20	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:20	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	03/12/15 19:53	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:20	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:20	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW8

ACZ Sample ID: **L23161-01**
 Date Sampled: 03/04/15 09:50
 Date Received: 03/06/15
 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	80.9		*	mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	80.9		*	mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.7			%			03/19/15 10:54	calc
Sum of Anions			9.1			meq/L			03/19/15 10:54	calc
Sum of Cations			8.8			meq/L			03/19/15 10:54	calc
Chloride	SM4500Cl-E	1	22.6		*	mg/L	0.5	2	03/13/15 12:54	bsu
Conductivity @25C	SM2510B	1	856		*	umhos/cm	1	10	03/13/15 0:29	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:03	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:31	mss2
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	03/10/15 13:24	abd
Hardness as CaCO3	SM2340B - Calculation		372			mg/L	0.8	4	03/19/15 10:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.84		*	mg/L	0.06	0.3	03/13/15 23:48	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 12:27	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/12/15 11:49	thf
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	22.3		*	C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	03/19/15 10:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	03/11/15 22:40	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	03/06/15 20:39	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	03/11/15 23:11	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	676		*	mg/L	10	20	03/09/15 13:54	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/10/15 16:44	eea
Residue, Total (TS) @ 105C	SM2540B	1	690		*	mg/L	10	20	03/10/15 14:07	id
Sulfate	D516-02/-07 - Turbidimetric	20	324		*	mg/L	20	100	03/16/15 11:46	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 12:21	eea
TDS (calculated)	Calculation		567			mg/L			03/19/15 10:54	calc
TDS (ratio - measured/calculated)	Calculation		1.19						03/19/15 10:54	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW9

ACZ Sample ID: **L23161-02**

Date Sampled: 03/04/15 09:14

Date Received: 03/06/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 11:13	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 12:21	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 16:34	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 17:00	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:26	mss2

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	03/09/15 22:35	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 19:55	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0016			mg/L	0.0002	0.001	03/13/15 12:42	msh
Barium, dissolved	M200.7 ICP	1	0.058			mg/L	0.003	0.02	03/09/15 22:35	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:35	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/10/15 14:12	aeb
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	03/09/15 22:35	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:55	msh
Calcium, dissolved	M200.7 ICP	1	48.8			mg/L	0.1	0.5	03/09/15 22:35	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:35	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:35	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:35	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:35	aeb
Iron, dissolved	M200.7 ICP	1	10.90			mg/L	0.02	0.05	03/09/15 22:35	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:55	msh
Lithium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.008	0.04	03/09/15 22:35	aeb
Magnesium, dissolved	M200.7 ICP	1	8.5			mg/L	0.2	1	03/09/15 22:35	aeb
Manganese, dissolved	M200.7 ICP	1	0.131			mg/L	0.005	0.03	03/09/15 22:35	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/10/15 12:45	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/09/15 22:35	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:35	aeb
Potassium, dissolved	M200.7 ICP	1	4.2			mg/L	0.2	1	03/10/15 14:12	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:35	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/13/15 12:42	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 19:55	msh
Sodium, dissolved	M200.7 ICP	1	25.7			mg/L	0.2	1	03/09/15 22:35	aeb
Strontium, dissolved	M200.7 ICP	1	0.370			mg/L	0.005	0.03	03/09/15 22:35	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:55	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/09/15 22:35	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:35	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:55	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:35	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:35	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW9

ACZ Sample ID: **L23161-02**
 Date Sampled: 03/04/15 09:14
 Date Received: 03/06/15
 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	124		*	mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	124		*	mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.1			%			03/19/15 10:55	calc
Sum of Anions			4.7			meq/L			03/19/15 10:55	calc
Sum of Cations			5			meq/L			03/19/15 10:55	calc
Chloride	SM4500Cl-E	5	9	B	*	mg/L	3	10	03/13/15 12:54	bsu
Conductivity @25C	SM2510B	1	434		*	umhos/cm	1	10	03/13/15 0:37	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:03	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:32	mss2
Fluoride	SM4500F-C	1	0.57		*	mg/L	0.05	0.3	03/10/15 13:30	abd
Hardness as CaCO3	SM2340B - Calculation		157			mg/L	0.8	4	03/19/15 10:55	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	03/13/15 22:58	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 12:29	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/12/15 11:50	thf
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	22.6		*	C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.40			mg/L	0.03	0.2	03/19/15 10:55	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.13		*	mg/L	0.01	0.05	03/11/15 22:42	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	03/06/15 20:40	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.19		*	mg/L	0.01	0.05	03/11/15 23:12	pjb
Residue, Filterable (TDS) @180C	SM2540C	2	316		*	mg/L	20	40	03/09/15 13:55	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	25.0		*	mg/L	5	20	03/10/15 16:46	eea
Residue, Total (TS) @ 105C	SM2540B	1	356		*	mg/L	10	20	03/10/15 14:08	id
Sulfate	D516-02/-07 - Turbidimetric	5	94.1		*	mg/L	5	25	03/16/15 11:30	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 12:25	eea
TDS (calculated)	Calculation		278			mg/L			03/19/15 10:55	calc
TDS (ratio - measured/calculated)	Calculation		1.14						03/19/15 10:55	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW20

ACZ Sample ID: **L23161-03**

Date Sampled: 03/04/15 12:00

Date Received: 03/06/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 11:23	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 12:30	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 16:46	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 10:12	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:33	mss2

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	03/09/15 22:38	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 19:57	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	03/13/15 12:44	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	03/09/15 22:38	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:38	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/10/15 14:15	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:38	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:57	msh
Calcium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.1	0.5	03/09/15 22:38	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:38	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:38	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:38	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:38	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/09/15 22:38	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:57	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:38	aeb
Magnesium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	03/09/15 22:38	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:38	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/10/15 12:47	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/09/15 22:38	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:38	aeb
Potassium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.2	1	03/10/15 14:15	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:38	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/13/15 12:44	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 19:57	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	03/09/15 22:38	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:38	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:57	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/09/15 22:38	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:38	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 19:57	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:38	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:38	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW20

ACZ Sample ID: **L23161-03**

Date Sampled: 03/04/15 12:00

Date Received: 03/06/15

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	03/13/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			03/19/15 10:55	calc
Sum of Anions			N/A			meq/L			03/19/15 10:55	calc
Sum of Cations				U		meq/L			03/19/15 10:55	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	03/13/15 12:54	bsu
Conductivity @25C	SM2510B	1	1.5	B	*	umhos/cm	1	10	03/13/15 0:44	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:04	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:35	mss2
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	03/10/15 13:34	abd
Hardness as CaCO3	SM2340B - Calculation		1.7	B		mg/L	0.8	4	03/19/15 10:55	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	03/13/15 22:59	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 12:32	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/12/15 11:54	thf
pH (lab)	SM4500H+ B									
pH		1	6.1	H	*	units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	22.4		*	C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	03/19/15 10:55	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	03/18/15 10:55	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	03/06/15 20:41	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/11/15 23:14	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	03/09/15 13:57	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/10/15 16:48	eea
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	03/10/15 14:10	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	03/16/15 11:04	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 12:30	eea
TDS (calculated)	Calculation		0.7			mg/L			03/19/15 10:55	calc
TDS (ratio - measured/calculated)	Calculation		n/a						03/19/15 10:55	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW21

ACZ Sample ID: **L23161-04**
Date Sampled: 03/04/15 10:10
Date Received: 03/06/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/12/15 11:32	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/11/15 12:39	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/11/15 16:57	thf
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/17/15 10:25	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:40	mss2

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	03/09/15 22:41	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/12/15 20:05	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0002	0.001	03/13/15 12:51	msh
Barium, dissolved	M200.7 ICP	1	0.048			mg/L	0.003	0.02	03/09/15 22:41	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:41	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/10/15 14:18	aeb
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	03/09/15 22:41	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:05	msh
Calcium, dissolved	M200.7 ICP	1	149			mg/L	0.1	0.5	03/09/15 22:41	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:41	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:41	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/09/15 22:41	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:41	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/09/15 22:41	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:05	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:41	aeb
Magnesium, dissolved	M200.7 ICP	1	20.4			mg/L	0.2	1	03/09/15 22:41	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:41	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/10/15 12:49	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/09/15 22:41	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/09/15 22:41	aeb
Potassium, dissolved	M200.7 ICP	1	8.4			mg/L	0.2	1	03/10/15 14:18	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/09/15 22:41	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	03/13/15 12:51	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/12/15 20:05	msh
Sodium, dissolved	M200.7 ICP	1	31.7			mg/L	0.2	1	03/09/15 22:41	aeb
Strontium, dissolved	M200.7 ICP	1	0.584			mg/L	0.005	0.03	03/09/15 22:41	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/12/15 20:05	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/09/15 22:41	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:41	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	03/12/15 20:05	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/09/15 22:41	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	03/09/15 22:41	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW21

ACZ Sample ID: **L23161-04**
Date Sampled: 03/04/15 10:10
Date Received: 03/06/15
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	88.2		*	mg/L	2	20	03/13/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/13/15 0:00	abd
Total Alkalinity		1	88.2		*	mg/L	2	20	03/13/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			03/19/15 10:56	calc
Sum of Anions			11			meq/L			03/19/15 10:56	calc
Sum of Cations			11			meq/L			03/19/15 10:56	calc
Chloride	SM4500Cl-E	1	26.6		*	mg/L	0.5	2	03/13/15 12:54	bsu
Conductivity @25C	SM2510B	1	1030		*	umhos/cm	1	10	03/13/15 0:52	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 15:07	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/12/15 14:35	mss2
Fluoride	SM4500F-C	1	0.18	B	*	mg/L	0.05	0.3	03/10/15 13:53	abd
Hardness as CaCO3	SM2340B - Calculation		456			mg/L	0.8	4	03/19/15 10:56	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	7.23		*	mg/L	0.08	0.4	03/13/15 23:49	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/16/15 12:36	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/12/15 11:55	thf
pH (lab)	SM4500H+ B									
pH		1	7.4	H	*	units	0.1	0.1	03/13/15 0:00	abd
pH measured at		1	21.6		*	C	0.1	0.1	03/13/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	03/19/15 10:56	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	03/18/15 10:57	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	03/06/15 20:42	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	03/11/15 23:15	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	812		*	mg/L	10	20	03/09/15 13:58	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	7.0	B	*	mg/L	5	20	03/10/15 16:49	eea
Residue, Total (TS) @ 105C	SM2540B	1	860		*	mg/L	10	20	03/10/15 14:11	id
Sulfate	D516-02/-07 - Turbidimetric	20	408		*	mg/L	20	100	03/16/15 11:46	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/11/15 12:34	eea
TDS (calculated)	Calculation		699			mg/L			03/19/15 10:56	calc
TDS (ratio - measured/calculated)	Calculation		1.16						03/19/15 10:56	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: **L23161**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23161-01	WG380089	Mercury, dissolved	M245.1 CVAA	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG380278	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.
	WG380354	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG380278	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG380300	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).
	WG380295	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).
	WG380105	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).
	WG380278	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380391	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG380421	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
	WG380248	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG380278	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG380238	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).
	WG380022	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).
	WG380242	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG380062	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG380141	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).
	WG380121	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG380428	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.
	WG380177	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).
	WG380278	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23161**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23161-02	WG380278	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG380354		Chloride	SM4500CI-E	DD	Sample required dilution due to matrix color or odor.
			SM4500CI-E	DF	Sample required dilution due to high sediment.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
WG380278		Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
WG380300		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).
WG380295		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).
WG380105		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).
WG380278		Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG380391		Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
WG380421		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).
WG380248		Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
WG380278		pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG380238		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).
WG380022		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).
WG380242		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG380062		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG380141		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).
WG380121		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG380428		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.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
WG380177		Sulfide as S	SM4500S2-D	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).

Tahoe Resources, Inc.

ACZ Project ID: **L23161**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG380278	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23161**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23161-03	WG380278	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380354	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG380278	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG380300	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).
	WG380295	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).
	WG380105	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).
	WG380278	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380391	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG380421	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).
	WG380248	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG380278	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG380547	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).
	WG380022	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).
	WG380242	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG380062	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG380141	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).
	WG380121	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG380428	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.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG380177	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).
			SM4500S2-D	Q6	Sample was received above recommended temperature.
	WG380278	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23161**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23161-04	WG380278	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380354	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG380278	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG380300	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).
	WG380295	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).
	WG380105	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).
	WG380278	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG380391	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG380421	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).
	WG380248	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG380278	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG380547	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).
	WG380022	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).
	WG380242	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).	
WG380062	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG380141	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).	
WG380121	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG380428	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.	
WG380177	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).	

Tahoe Resources, Inc.

ACZ Project ID: **L23161**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG380278	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW8ACZ Sample ID: **L23161-01**
Date Sampled: 03/04/15 9:50
Date Received: 03/06/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380472Analyst: drh
Extract Date: 03/11/15 13:48
Analysis Date: 03/16/15 15:10

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	87.2		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW9ACZ Sample ID: **L23161-02**
Date Sampled: 03/04/15 9:14
Date Received: 03/06/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380472Analyst: drh
Extract Date: 03/11/15 13:50
Analysis Date: 03/16/15 15:36

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.8		1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	90.2		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW20ACZ Sample ID: **L23161-03**
Date Sampled: 03/04/15 12:00
Date Received: 03/06/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380472Analyst: drh
Extract Date: 03/11/15 13:52
Analysis Date: 03/16/15 16:02

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	88.5		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW21ACZ Sample ID: **L23161-04**
Date Sampled: 03/04/15 10:10
Date Received: 03/06/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380472Analyst: drh
Extract Date: 03/11/15 13:54
Analysis Date: 03/16/15 16:28

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	88.3		1	*	%	70	130

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: **L23161**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23161-01	WG380472	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L23161-02	WG380472	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L23161-03	WG380472	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L23161-04	WG380472	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23161**

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: L23161
 Date Received: 03/06/2015 12:00
 Received By: ddp
 Date Printed: 3/6/2015

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?
2518	10.3	16	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.

23161

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: BUNIKI LOS PROCERES 18 calle 24-69 zona 10
Empresarial zona Pradera, Torre IV Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc.

E-mail: cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*Sampler's Signature: [Signature] I attest to the authenticity and validity of this sample. I understand that intentionally 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 ANALYSES REQUESTED. Includes handwritten entries for MW 8, 9, 10, 11 and GW + TPH.

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.

Vertical text: Chain of Custody 23161

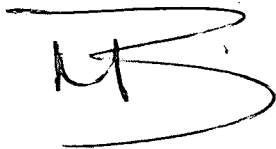
Guatemala March 4th, 2015

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.

March 13, 2015

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: L23117

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 04, 2015. This project has been assigned to ACZ's project number, L23117. 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 L23117. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

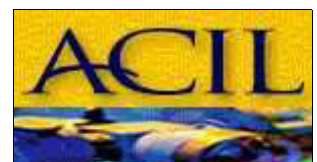
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 12, 2015. 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.

March 13, 2015

Project ID: Escobal

ACZ Project ID: L23117

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 ground water samples from Tahoe Resources, Inc. on March 4, 2015. 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 L23117. 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 the TSS flagged with an "N1", the workgroup was removed from 105 degree oven out of specifications at 106 degrees

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L23117-01**
Date Sampled: 03/02/15 09:00
Date Received: 03/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 14:32	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 13:08	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 14:37	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:12	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 14:16	mss2

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	03/05/15 16:03	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/11/15 21:18	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0002	0.001	03/11/15 21:18	msh
Barium, dissolved	M200.7 ICP	1	0.094			mg/L	0.003	0.02	03/05/15 16:03	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:03	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 16:03	jjc
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	03/06/15 14:54	jjc
Cadmium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	03/11/15 21:18	msh
Calcium, dissolved	M200.7 ICP	1	172			mg/L	0.1	0.5	03/05/15 16:03	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:03	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:03	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:03	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:03	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/05/15 16:03	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:18	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:03	jjc
Magnesium, dissolved	M200.7 ICP	1	33.2			mg/L	0.2	1	03/05/15 16:03	jjc
Manganese, dissolved	M200.7 ICP	1	2.020			mg/L	0.005	0.03	03/05/15 16:03	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:32	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/05/15 16:03	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:03	jjc
Potassium, dissolved	M200.7 ICP	1	13.3			mg/L	0.2	1	03/06/15 14:54	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:03	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/11/15 21:18	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/11/15 21:18	msh
Sodium, dissolved	M200.7 ICP	1	44.5			mg/L	0.2	1	03/05/15 16:03	jjc
Strontium, dissolved	M200.7 ICP	1	1.050			mg/L	0.005	0.03	03/05/15 16:03	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	03/11/15 21:18	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 16:03	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:03	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	03/11/15 21:18	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:03	jjc
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	03/05/15 16:03	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: RW-1

ACZ Sample ID: **L23117-01**
 Date Sampled: 03/02/15 09:00
 Date Received: 03/04/15
 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	03/10/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Total Alkalinity		1	126			mg/L	2	20	03/10/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.4			%			03/13/15 13:53	calc
Sum of Anions			15			meq/L			03/13/15 13:53	calc
Sum of Cations			14			meq/L			03/13/15 13:53	calc
Chloride	SM4500Cl-E	1	50.7			mg/L	0.5	2	03/10/15 16:26	mss2
Conductivity @25C	SM2510B	1	1320			umhos/cm	1	10	03/10/15 1:35	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:08	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:38	thf
Fluoride	SM4500F-C	1	0.06	B	*	mg/L	0.05	0.3	03/09/15 17:23	abd
Hardness as CaCO3	SM2340B - Calculation		566			mg/L	0.8	4	03/13/15 13:53	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.14		*	mg/L	0.02	0.1	03/11/15 23:01	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 13:41	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	03/06/15 14:42	bsu
pH (lab)	SM4500H+ B									
pH		1	7.6	H		units	0.1	0.1	03/10/15 0:00	abd
pH measured at		1	21.9			C	0.1	0.1	03/10/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	03/13/15 13:53	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	03/11/15 22:22	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	03/04/15 23:27	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	03/06/15 22:01	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	976			mg/L	10	20	03/05/15 16:42	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	6.0	B	*	mg/L	5	20	03/05/15 11:31	eea
Residue, Total (TS) @ 105C	SM2540B	1	1050			mg/L	10	20	03/04/15 14:01	id
Sulfate	D516-02/-07 - Turbidimetric	20	511		*	mg/L	20	100	03/10/15 10:35	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/05/15 10:23	enb
TDS (calculated)	Calculation		905			mg/L			03/13/15 13:53	calc
TDS (ratio - measured/calculated)	Calculation		1.08						03/13/15 13:53	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-1

ACZ Sample ID: **L23117-02**
Date Sampled: 03/02/15 11:15
Date Received: 03/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 14:40	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 13:17	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 14:45	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:19	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 14:26	mss2

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	03/05/15 16:07	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/11/15 21:20	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0068			mg/L	0.0002	0.001	03/11/15 21:20	msh
Barium, dissolved	M200.7 ICP	1	0.021			mg/L	0.003	0.02	03/05/15 16:07	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:07	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 16:07	jjc
Boron, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	03/06/15 14:58	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:20	msh
Calcium, dissolved	M200.7 ICP	1	188			mg/L	0.1	0.5	03/05/15 16:07	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:07	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:07	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:07	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:07	jjc
Iron, dissolved	M200.7 ICP	1	1.89			mg/L	0.02	0.05	03/05/15 16:07	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:20	msh
Lithium, dissolved	M200.7 ICP	1	0.086			mg/L	0.008	0.04	03/05/15 16:07	jjc
Magnesium, dissolved	M200.7 ICP	1	34.9			mg/L	0.2	1	03/05/15 16:07	jjc
Manganese, dissolved	M200.7 ICP	1	0.052			mg/L	0.005	0.03	03/05/15 16:07	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:34	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/05/15 16:07	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:07	jjc
Potassium, dissolved	M200.7 ICP	1	4.7			mg/L	0.2	1	03/06/15 14:58	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:07	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/11/15 21:20	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/11/15 21:20	msh
Sodium, dissolved	M200.7 ICP	1	44.8			mg/L	0.2	1	03/05/15 16:07	jjc
Strontium, dissolved	M200.7 ICP	1	1.880			mg/L	0.005	0.03	03/05/15 16:07	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:20	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 16:07	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:07	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	03/11/15 21:20	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:07	jjc
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	03/05/15 16:07	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-1

ACZ Sample ID: **L23117-02**
Date Sampled: 03/02/15 11:15
Date Received: 03/04/15
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	177			mg/L	2	20	03/10/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Total Alkalinity		1	177			mg/L	2	20	03/10/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.2			%			03/13/15 13:53	calc
Sum of Anions			16			meq/L			03/13/15 13:53	calc
Sum of Cations			15			meq/L			03/13/15 13:53	calc
Chloride	SM4500Cl-E	1	41.9			mg/L	0.5	2	03/10/15 16:26	mss2
Conductivity @25C	SM2510B	1	1350			umhos/cm	1	10	03/10/15 1:44	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:09	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:38	thf
Fluoride	SM4500F-C	1	2.45		*	mg/L	0.05	0.3	03/09/15 17:27	abd
Hardness as CaCO3	SM2340B - Calculation		613			mg/L	0.8	4	03/13/15 13:53	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	03/11/15 23:03	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 13:43	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/06/15 15:02	bsu
pH (lab)	SM4500H+ B									
pH		1	8.1	H		units	0.1	0.1	03/10/15 0:00	abd
pH measured at		1	21.7			C	0.1	0.1	03/10/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	03/13/15 13:53	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/11/15 22:24	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	03/04/15 23:28	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/06/15 22:04	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	986		*	mg/L	10	20	03/05/15 16:43	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/05/15 11:32	eea
Residue, Total (TS) @ 105C	SM2540B	1	1030			mg/L	10	20	03/04/15 14:03	id
Sulfate	D516-02/-07 - Turbidimetric	20	531		*	mg/L	20	100	03/10/15 10:35	mss2
Sulfide as S	SM4500S2-D	1	0.15		*	mg/L	0.02	0.1	03/05/15 10:28	enb
TDS (calculated)	Calculation		960			mg/L			03/13/15 13:53	calc
TDS (ratio - measured/calculated)	Calculation		1.03						03/13/15 13:53	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-11

ACZ Sample ID: **L23117-03**

Date Sampled: 03/02/15 11:40

Date Received: 03/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 14:48	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 13:27	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 14:54	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:26	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 14:31	mss2

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	03/05/15 16:10	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/11/15 21:23	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0028			mg/L	0.0002	0.001	03/11/15 21:23	msh
Barium, dissolved	M200.7 ICP	1	0.030			mg/L	0.003	0.02	03/05/15 16:10	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:10	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 16:10	jjc
Boron, dissolved	M200.7 ICP	1	0.20			mg/L	0.01	0.05	03/06/15 15:01	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:23	msh
Calcium, dissolved	M200.7 ICP	1	241			mg/L	0.1	0.5	03/05/15 16:10	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:10	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:10	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:10	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:10	jjc
Iron, dissolved	M200.7 ICP	1	1.54			mg/L	0.02	0.05	03/05/15 16:10	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	03/11/15 21:23	msh
Lithium, dissolved	M200.7 ICP	1	0.078			mg/L	0.008	0.04	03/05/15 16:10	jjc
Magnesium, dissolved	M200.7 ICP	1	37.8			mg/L	0.2	1	03/05/15 16:10	jjc
Manganese, dissolved	M200.7 ICP	1	0.026	B		mg/L	0.005	0.03	03/05/15 16:10	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:36	mfm
Molybdenum, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	03/05/15 16:10	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:10	jjc
Potassium, dissolved	M200.7 ICP	1	4.5			mg/L	0.2	1	03/06/15 15:01	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:10	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	03/11/15 21:23	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/11/15 21:23	msh
Sodium, dissolved	M200.7 ICP	1	70.2			mg/L	0.2	1	03/05/15 16:10	jjc
Strontium, dissolved	M200.7 ICP	1	2.380			mg/L	0.005	0.03	03/05/15 16:10	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:23	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 16:10	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:10	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	03/11/15 21:23	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:10	jjc
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	03/05/15 16:10	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-11

ACZ Sample ID: **L23117-03**
Date Sampled: 03/02/15 11:40
Date Received: 03/04/15
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	136			mg/L	2	20	03/10/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Total Alkalinity		1	136			mg/L	2	20	03/10/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.6			%			03/13/15 13:53	calc
Sum of Anions			20			meq/L			03/13/15 13:53	calc
Sum of Cations			19			meq/L			03/13/15 13:53	calc
Chloride	SM4500Cl-E	1	63.8			mg/L	0.5	2	03/10/15 16:26	mss2
Conductivity @25C	SM2510B	1	1620			umhos/cm	1	10	03/10/15 1:53	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:12	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:39	thf
Fluoride	SM4500F-C	1	2.54		*	mg/L	0.05	0.3	03/09/15 17:30	abd
Hardness as CaCO3	SM2340B - Calculation		757			mg/L	0.8	4	03/13/15 13:53	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	03/11/15 23:04	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 13:48	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/06/15 14:45	bsu
pH (lab)	SM4500H+ B									
pH		1	8.0	H		units	0.1	0.1	03/10/15 0:00	abd
pH measured at		1	22.0			C	0.1	0.1	03/10/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	03/13/15 13:53	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/11/15 22:25	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	03/04/15 23:29	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/06/15 22:05	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1250		*	mg/L	10	20	03/05/15 16:45	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	03/05/15 11:34	eea
Residue, Total (TS) @ 105C	SM2540B	1	1280			mg/L	10	20	03/04/15 14:04	id
Sulfate	D516-02/-07 - Turbidimetric	20	733		*	mg/L	20	100	03/10/15 10:35	mss2
Sulfide as S	SM4500S2-D	1	0.06	B	*	mg/L	0.02	0.1	03/05/15 10:32	enb
TDS (calculated)	Calculation		1240			mg/L			03/13/15 13:53	calc
TDS (ratio - measured/calculated)	Calculation		1.01						03/13/15 13:53	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: **L23117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23117-01	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380239	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).
	WG380037	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).
	WG379998	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).
	WG380238	Phosphorus, dissolved	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.
	WG379911	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379936	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380100	Sulfate	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).
	WG379925	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.

ACZ Project ID: **L23117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23117-02	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380239	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).
	WG380037	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).
	WG379998	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).
	WG380238	Phosphorus, dissolved	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.
	WG379911	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).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379957	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).
	WG379936	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380100	Sulfate	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).
	WG379925	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.

ACZ Project ID: **L23117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23117-03	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380239	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).
	WG380037	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).
	WG379998	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).
	WG380238	Phosphorus, dissolved	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.
	WG379911	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).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379957	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).
	WG379936	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380100	Sulfate	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).
	WG379925	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: RW-1ACZ Sample ID: **L23117-01**
Date Sampled: 03/02/15 9:00
Date Received: 03/04/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380000Analyst: drh
Extract Date: 03/04/15 16:41
Analysis Date: 03/05/15 21:45

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: PSA-1ACZ Sample ID: **L23117-02**
Date Sampled: 03/02/15 11:15
Date Received: 03/04/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380000Analyst: drh
Extract Date: 03/04/15 16:43
Analysis Date: 03/05/15 22:11

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83		1.01	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-11

ACZ Sample ID: **L23117-03**
Date Sampled: 03/02/15 11:40
Date Received: 03/04/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG380000

Analyst: drh
Extract Date: 03/04/15 16:46
Analysis Date: 03/05/15 22:38

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	78.9		1.01	*	%	70	130

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: **L23117**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23117-01	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.
L23117-02	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.
L23117-03	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23117**

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: L23117
 Date Received: 03/04/2015 09:53
 Received By: ddp
 Date Printed: 3/4/2015

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? L23117-01 : A Orange container not received and the associated analysis could not be run. L23117-02 : A Orange container not received and the associated analysis could not be run. L23117-03 : A Orange container not received and the associated analysis could not be run.		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?
3777	6	14	N/A

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L23117
Date Received: 03/04/2015 09:53
Received By: ddp
Date Printed: 3/4/2015

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. **L23117**

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: Pileta Las Proceras Calle 24-69 Zona 10
Company: Tahoe Resources Inc.	Empresarial Zona Pileta Torre IV Oficina 1406
E-mail: MBerganza@samrafael.com.gt	Telephone: (502) 5951-5248

Copy of Report to:

Name: Charles Muerhoff	E-mail: cmuerhoff@tahoreresourcesinc.com
Company: Tahoe Resources Inc.	Telephone:

Invoice to:

Name: Miguel Berganza	Address:
Company: Tahoe Resources Inc.	
E-mail: MBerganza@samrafael.com.gt	Telephone:

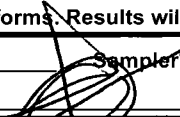
If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES NO

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: IE 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 intentionally 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)

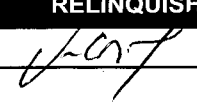
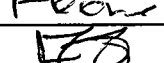
Quote #: <u>Water Quality</u>	# of Containers	GW+TPH	Total												
PO#: <u>Escobal</u>															
Reporting state for compliance testing:															
Check box if samples include NRC licensed material?															
SAMPLE IDENTIFICATION	DATE:TIME	Matrix													
1. + RW-1	02/03/15 09:00	GW	8	✓											
2. + PSA-1	02/03/15 11:15	GW	8	✓											
3. + MW-11	02/03/15 11:40	GW	8	✓											
Pileta 1	01/03/15 07:50	SW	1	✓											
Pileta 2	01/03/15 07:40	SW	1	✓											
Pileta de Proceso	01/03/15 08:10	WW	1	✓											
Pozo PP	01/03/15 08:00	SW	1	✓											
Agua de Proceso	01/03/15 08:50	WW	1	✓											
WWA	27/04/15 08:40	WW	1	✓											
WWA	01/03/15 08:39	WW	1	✓											

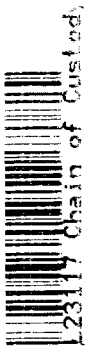
Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

1 present results of RW-1, PSA-1 and MW-11 in a different report.

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
	02-03-2015 15:25	Fernando 	23. 15:59 3-4-15 9:53



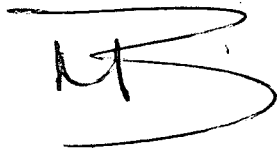
Guatemala March 2nd, 2015

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.

April 08, 2015

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: L23466

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 25, 2015. This project has been assigned to ACZ's project number, L23466. Please reference this number in all future inquiries.

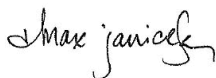
All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L23466. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

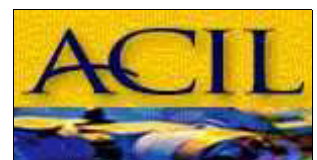
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 08, 2015. 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.



Max Janicek has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-SR

ACZ Sample ID: **L23466-02**

Date Sampled: 03/19/15 09:30

Date Received: 03/25/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/30/15 11:04	mss2
Cyanide, WAD	SM4500-CN I- distillation								03/26/15 14:00	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								04/01/15 10:30	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/30/15 16:43	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/02/15 11:07	mss2

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	03/26/15 17:50	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	04/02/15 21:01	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0124			mg/L	0.0002	0.001	04/02/15 21:01	msh
Barium, dissolved	M200.7 ICP	1	0.092			mg/L	0.003	0.02	03/26/15 17:50	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:50	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/26/15 17:50	aeb
Boron, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	03/26/15 17:50	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0001	0.0005	04/02/15 21:01	msh
Calcium, dissolved	M200.7 ICP	1	99.6		*	mg/L	0.1	0.5	03/26/15 17:50	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:50	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:50	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:50	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 17:50	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/26/15 17:50	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 21:01	msh
Lithium, dissolved	M200.7 ICP	1	0.138			mg/L	0.008	0.04	03/26/15 17:50	aeb
Magnesium, dissolved	M200.7 ICP	1	6.5			mg/L	0.2	1	03/26/15 17:50	aeb
Manganese, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	03/26/15 17:50	aeb
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	03/30/15 12:20	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/26/15 17:50	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/26/15 17:50	aeb
Potassium, dissolved	M200.7 ICP	1	2.3			mg/L	0.2	1	03/26/15 17:50	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/26/15 17:50	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	04/02/15 21:01	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	04/03/15 20:09	msh
Sodium, dissolved	M200.7 ICP	1	78.4			mg/L	0.2	1	03/26/15 17:50	aeb
Strontium, dissolved	M200.7 ICP	1	4.340		*	mg/L	0.005	0.03	03/26/15 17:50	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	04/02/15 21:01	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/26/15 17:50	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/26/15 17:50	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	04/02/15 21:01	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/26/15 17:50	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/26/15 17:50	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-SR

ACZ Sample ID: **L23466-02**
 Date Sampled: 03/19/15 09:30
 Date Received: 03/25/15
 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	178		*	mg/L	2	20	03/30/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	03/30/15 0:00	abd
Total Alkalinity		1	178		*	mg/L	2	20	03/30/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.7			%			04/07/15 16:06	calc
Sum of Anions			9.6			meq/L			04/07/15 16:06	calc
Sum of Cations			9.1			meq/L			04/07/15 16:06	calc
Chloride	SM4500Cl-E	1	4.1		*	mg/L	0.5	2	04/02/15 11:05	bsu
Conductivity @25C	SM2510B	1	888		*	umhos/cm	1	10	03/30/15 21:07	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/31/15 16:39	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/26/15 16:10	mss2
Fluoride	SM4500F-C	1	0.85		*	mg/L	0.05	0.3	03/31/15 15:38	abd
Hardness as CaCO3	SM2340B - Calculation		275			mg/L	0.8	4	04/07/15 16:06	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.06	B	*	mg/L	0.02	0.1	04/02/15 22:28	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	04/01/15 12:52	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	04/01/15 23:53	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	03/30/15 0:00	abd
pH measured at		1	22.9		*	C	0.1	0.1	03/30/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	04/07/15 16:06	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	04/01/15 0:39	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	03/25/15 20:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	04/02/15 22:55	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	612		*	mg/L	10	20	03/25/15 15:12	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/25/15 13:48	enb
Residue, Total (TS) @ 105C	SM2540B	1	636		*	mg/L	10	20	03/25/15 15:02	id
Sulfate	D516-02/-07 - Turbidimetric	20	279		*	mg/L	20	100	04/01/15 15:38	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/26/15 11:51	eea
TDS (calculated)	Calculation		584			mg/L			04/07/15 16:06	calc
TDS (ratio - measured/calculated)	Calculation		1.05						04/07/15 16:06	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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L23466**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23466-02	WG381400	Cadmium, dissolved	M200.8 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.
	WG381014	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.
	WG381098	Mercury, dissolved	M245.1 CVAA	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG381471	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
	WG381014	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.
	WG381165	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381371	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG381165	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG381228	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).
	WG381036	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).
	WG381198	Fluoride	SM4500F-C	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG381165	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG381412	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG381283	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).
	WG381347	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).
	WG381165	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG381247	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).
	WG380972	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).
	WG381415	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG380953	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG380949	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6	Sample was received above recommended temperature.
	WG380955	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG381323	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.
	WG381003	Sulfide as S	D516-02/-07 - Turbidimetric SM4500S2-D SM4500S2-D	Q6	Sample was received above recommended temperature.
	WG381165	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
L23466-03	WG381239	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
				Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L23466-04	WG381239	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
				Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L23466-05	WG381239	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
				Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L23466-06	WG381239	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
				Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L23466-07	WG381239	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
				Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-SR

ACZ Sample ID: **L23466-02**
Date Sampled: 03/19/15 9:30
Date Received: 03/25/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG381145

Analyst: drh
Extract Date: 03/25/15 13:19
Analysis Date: 03/28/15 22:12

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.3		1.01	*	%	70	130

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 unless omitted or equal to the PQL (see comment #4) 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. Synonymous with the EPA term "minimum level".
<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: **L23466**

Diesel Range Organics (C10-C28)

M8015D GC/FID

WG381145

MS	Sample ID: L23414-01MS		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 13:55			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5	.2	2.16	mg/L	78.0	70	130			
OTP (surr)				%	96.1	70	130			

DUP	Sample ID: L23441-01DUP		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 20:53			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28		.2	.16	mg/L		70	130	22	20	RA
OTP (surr)				%	81.3	70	130			RA

LCSW	Sample ID: WG380930LCSW		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 11:44			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.25	mg/L	90.0	70	130			
OTP (surr)				%	94.6	70	130			

LCSWD	Sample ID: WG380930LCSWD		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 12:10			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.18	mg/L	87.0	70	130	3	20	
OTP (surr)				%	94.4	70	130			

PBW	Sample ID: WG380930PBW		PCN/SCN: TPH150211-1				Analyzed: 03/28/15 11:18			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28			U	mg/L		-5	.5			
OTP (surr)				%	88.7	70	130			

WG381192

MS	Sample ID: L23473-01MS		PCN/SCN: TPH150211-1				Analyzed: 03/31/15 5:51			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5	U	2.23	mg/L	87.0	70	130			
OTP (surr)				%	96.4	70	130			

DUP	Sample ID: L23504-01DUP		PCN/SCN: TPH150211-1				Analyzed: 03/31/15 6:43			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28		U	U	mg/L		70	130	0	20	RA
OTP (surr)				%	89.9	70	130			

LCSW	Sample ID: WG381099LCSW		PCN/SCN: TPH150211-1				Analyzed: 03/30/15 23:19			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.14	mg/L	86.0	70	130			
OTP (surr)				%	96.0	70	130			

LCSWD	Sample ID: WG381099LCSWD		PCN/SCN: TPH150211-1				Analyzed: 03/30/15 23:45			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500.5		2.07	mg/L	83.0	70	130	3	20	
OTP (surr)				%	93.9	70	130			

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

PBW		Sample ID: WG381099PBW						Analyzed: 03/30/15 22:53			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
TPH C10 TO C28			U	mg/L		-5	.5				
OTP (surr)				%	90.4	70	130				

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

Oil & Grease, Total Recoverable

1664A - Gravimetric

WG381255

MS		Sample ID: L23451-01MS			PCN/SCN: OP150304-2			Analyzed: 04/01/15 12:31			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE	40	U	35.4	mg/L	89.0	78	114			Q5	

LCSW		Sample ID: WG381255LCSW			PCN/SCN: OP150304-2			Analyzed: 04/01/15 14:33			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE	40		32.8	mg/L	82.0	78	114				

LCSWD		Sample ID: WG381255LCSWD			PCN/SCN: OP150304-2			Analyzed: 04/01/15 14:44			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE	40		32.4	mg/L	81.0	78	114	1	18		

PBW		Sample ID: WG381255PBW			PCN/SCN: OP150304-2			Analyzed: 04/01/15 10:30			
Compound	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual	
OIL AND GREASE			U	mg/L							

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23466-01	WG381192	*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).
	WG381255	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L23466-02	WG381145	*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).

Tahoe Resources, Inc.

ACZ Project ID: **L23466**

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: L23466
 Date Received: 03/25/2015 10:24
 Received By: ddp
 Date Printed: 3/25/2015

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 sample 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? L23466-02 : A Orange container not received and the associated analysis could not be run.		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?
2647	8	15	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.

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L23466
Date Received: 03/25/2015 10:24
Received By: ddp
Date Printed: 3/25/2015

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



Laboratories, Inc.

L23466

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 PROCESOS 12 CALLE 24-69 ZONA 10
Empresarial, zona Procesa, Torre 11 Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc

E-mail:
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 intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATICS:

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, GW+FPH, TOTAL CN. Rows include SW11-E, PSA-SR, Pileta 1, Pileta 2, Agua de Proceso, Pozo PP, WW9.

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

REMARKS

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

Table with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME. Includes signatures and dates like 23-03-2015 and 23.3.15 17:50.



L23466 Chain of Custody

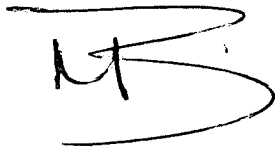
Guatemala March 23rd, 2015

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).

Yours sincerely,

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: 10 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: 040315
 Fecha de ingreso de muestras: 040315
 Fecha de análisis: 040315-170315
 Fecha de informe: 170315

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)
416	MW-2	3365	162	N.D.	< 2
417	MW-3	< 1	< 1	N.D.	< 2
418	MW-4	< 1	< 1	N.D.	4.5
419	MW-5	< 1	< 1	N.D.	< 2
420	MW-6	< 1	< 1	N.D.	4.5
421	MW-7	< 1	< 1	N.D.	23
422	MW-8	< 1	< 1	N.D.	< 2
423	MW-9	61	< 1	N.D.	< 2
424	MW-20	< 1	< 1	N.D.	< 2
425	MW-21	< 1	< 1	N.D.	23

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: 8 muestras de agua
 Análisis solicitado por: Ing. Miguel Berganza
 Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
 Procedencia de la muestra: Proyecto Escobal
 Fecha de muestreo: 020315
 Fecha de ingreso de muestras: 020315
 Fecha de análisis: 020315-120315
 Fecha de informe: 120315

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)
387	GW1-A	179	< 1	N.D.	23
388	GW-2	99	7	N.D.	49
389	GW-3	< 1	< 1	N.D.	< 2
393	GW-10	< 1	< 1	N.D.	< 2
394	GW-11	< 1	< 1	N.D.	< 2
395	RW-1	< 1	< 1	N.D.	< 2
396	PSA-1	254	< 1	N.D.	< 2
397	MW-11	131	< 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

REG 016 Resultados de Análisis

Muestras: 1 muestra de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 190315
Fecha de ingreso de muestras: 190315
Fecha de análisis: 190315-310315
Fecha de informe: 310315

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)
538	PSA-SR	< 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. Silvia Argueta
Gerente de Calidad

March 16, 2015

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: L23121

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 04, 2015. This project has been assigned to ACZ's project number, L23121. 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 L23121. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

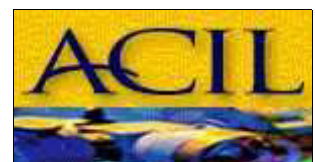
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 15, 2015. 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.

March 16, 2015

Project ID: Escobal

ACZ Project ID: L23121

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on March 4, 2015. 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 L23121. 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.
2. For TSS values flagged with an "N1", the workgroup was removed from the 105 degree oven out of specifications at 106 degrees.

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L23121-01**

Date Sampled: 03/02/15 05:30

Date Received: 03/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 15:51	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 13:56	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 15:03	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 15:55	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 14:45	mss2

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	03/05/15 16:25	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/11/15 21:35	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	03/11/15 21:35	msh
Barium, dissolved	M200.7 ICP	1	0.046			mg/L	0.003	0.02	03/05/15 16:25	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:25	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 16:25	jjc
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	03/06/15 15:16	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:35	msh
Calcium, dissolved	M200.7 ICP	1	10			mg/L	0.1	0.5	03/05/15 16:25	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:25	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:25	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:25	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:25	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/05/15 16:25	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:35	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:25	jjc
Magnesium, dissolved	M200.7 ICP	1	2.9			mg/L	0.2	1	03/05/15 16:25	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:25	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:51	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/05/15 16:25	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:25	jjc
Potassium, dissolved	M200.7 ICP	1	6			mg/L	0.2	1	03/06/15 15:16	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:25	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/11/15 21:35	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/11/15 21:35	msh
Sodium, dissolved	M200.7 ICP	1	14.1			mg/L	0.2	1	03/05/15 16:25	jjc
Strontium, dissolved	M200.7 ICP	1	0.078			mg/L	0.005	0.03	03/05/15 16:25	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:35	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 16:25	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:25	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:35	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:25	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:25	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L23121-01**
 Date Sampled: 03/02/15 05:30
 Date Received: 03/04/15
 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	59.0			mg/L	2	20	03/12/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Total Alkalinity		1	59.0			mg/L	2	20	03/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			03/16/15 8:07	calc
Sum of Anions			1.5			meq/L			03/16/15 8:07	calc
Sum of Cations			1.5			meq/L			03/16/15 8:07	calc
Chloride	SM4500Cl-E	1	9.7		*	mg/L	0.5	2	03/10/15 17:42	mss2
Conductivity @25C	SM2510B	1	160			umhos/cm	1	10	03/12/15 19:26	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:19	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:42	thf
Fluoride	SM4500F-C	1	0.11	B	*	mg/L	0.05	0.3	03/09/15 18:06	abd
Hardness as CaCO3	SM2340B - Calculation		37			mg/L	0.8	4	03/16/15 8:07	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.99		*	mg/L	0.02	0.1	03/11/15 23:08	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 13:51	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.7		*	mg/L	0.1	0.5	03/06/15 14:46	bsu
pH (lab)	SM4500H+ B									
pH		1	7.9	H		units	0.1	0.1	03/12/15 0:00	abd
pH measured at		1	21.0			C	0.1	0.1	03/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	03/16/15 8:07	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/11/15 22:29	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	03/04/15 23:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	03/06/15 22:10	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	178		*	mg/L	10	20	03/05/15 16:46	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	03/05/15 11:38	eea
Residue, Total (TS) @ 105C	SM2540B	1	182			mg/L	10	20	03/04/15 14:10	id
Sulfate	D516-02/-07 - Turbidimetric	1	3.1	B	*	mg/L	1	5	03/13/15 14:39	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/05/15 11:02	enb
TDS (calculated)	Calculation		82			mg/L			03/16/15 8:07	calc
TDS (ratio - measured/calculated)	Calculation		2.17						03/16/15 8:07	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L23121-02**
Date Sampled: 03/02/15 08:12
Date Received: 03/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 15:58	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 14:06	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 15:12	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:09	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 14:50	mss2

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	03/05/15 16:28	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	03/11/15 21:37	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0068			mg/L	0.0002	0.001	03/11/15 21:37	msh
Barium, dissolved	M200.7 ICP	1	0.068			mg/L	0.003	0.02	03/05/15 16:28	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:28	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 16:28	jjc
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	03/06/15 15:19	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:37	msh
Calcium, dissolved	M200.7 ICP	1	10.8			mg/L	0.1	0.5	03/05/15 16:28	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:28	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:28	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:28	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:28	jjc
Iron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	03/05/15 16:28	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:37	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:28	jjc
Magnesium, dissolved	M200.7 ICP	1	2.2			mg/L	0.2	1	03/05/15 16:28	jjc
Manganese, dissolved	M200.7 ICP	1	0.031			mg/L	0.005	0.03	03/05/15 16:28	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:53	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/05/15 16:28	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:28	jjc
Potassium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	03/06/15 15:19	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:28	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/11/15 21:37	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/11/15 21:37	msh
Sodium, dissolved	M200.7 ICP	1	7.3			mg/L	0.2	1	03/05/15 16:28	jjc
Strontium, dissolved	M200.7 ICP	1	0.086			mg/L	0.005	0.03	03/05/15 16:28	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:37	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 16:28	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:28	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:37	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:28	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:28	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L23121-02**
Date Sampled: 03/02/15 08:12
Date Received: 03/04/15
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	47.5			mg/L	2	20	03/12/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Total Alkalinity		1	47.5			mg/L	2	20	03/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-4.3			%			03/16/15 8:07	calc
Sum of Anions			1.2			meq/L			03/16/15 8:07	calc
Sum of Cations			1.1			meq/L			03/16/15 8:07	calc
Chloride	SM4500Cl-E	1	1.5	B	*	mg/L	0.5	2	03/10/15 17:42	mss2
Conductivity @25C	SM2510B	1	113			umhos/cm	1	10	03/12/15 19:35	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:20	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:43	thf
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	03/09/15 18:12	abd
Hardness as CaCO3	SM2340B - Calculation		36			mg/L	0.8	4	03/16/15 8:07	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	03/11/15 23:09	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 13:52	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	03/06/15 14:47	bsu
pH (lab)	SM4500H+ B									
pH		1	7.6	H		units	0.1	0.1	03/12/15 0:00	abd
pH measured at		1	20.4			C	0.1	0.1	03/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	03/16/15 8:07	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	03/11/15 22:31	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	03/04/15 23:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	03/06/15 22:12	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	148		*	mg/L	10	20	03/05/15 16:47	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/05/15 11:41	eea
Residue, Total (TS) @ 105C	SM2540B	1	148		*	mg/L	10	20	03/04/15 14:14	id
Sulfate	D516-02/-07 - Turbidimetric	1	8.6		*	mg/L	1	5	03/13/15 14:39	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/05/15 11:07	enb
TDS (calculated)	Calculation		62.1			mg/L			03/16/15 8:07	calc
TDS (ratio - measured/calculated)	Calculation		2.38						03/16/15 8:07	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-3

ACZ Sample ID: **L23121-03**
Date Sampled: 03/04/15 10:30
Date Received: 03/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 16:06	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 14:15	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 15:21	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:16	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 14:55	mss2

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	03/05/15 16:38	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	03/11/15 21:39	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0021			mg/L	0.0002	0.001	03/11/15 21:39	msh
Barium, dissolved	M200.7 ICP	1	0.140			mg/L	0.003	0.02	03/05/15 16:38	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:38	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 16:38	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	03/06/15 15:28	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:39	msh
Calcium, dissolved	M200.7 ICP	1	69.8			mg/L	0.1	0.5	03/05/15 16:38	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:38	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:38	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:38	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:38	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/05/15 16:38	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:39	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:38	jjc
Magnesium, dissolved	M200.7 ICP	1	16.1			mg/L	0.2	1	03/05/15 16:38	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:38	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:55	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/05/15 16:38	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:38	jjc
Potassium, dissolved	M200.7 ICP	1	9.1			mg/L	0.2	1	03/06/15 15:28	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:38	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	03/11/15 21:39	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/11/15 21:39	msh
Sodium, dissolved	M200.7 ICP	1	21.4			mg/L	0.2	1	03/05/15 16:38	jjc
Strontium, dissolved	M200.7 ICP	1	0.397			mg/L	0.005	0.03	03/05/15 16:38	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:39	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 16:38	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:38	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:39	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	03/05/15 16:38	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:38	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-3

ACZ Sample ID: **L23121-03**
 Date Sampled: 03/04/15 10:30
 Date Received: 03/04/15
 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	68.8			mg/L	2	20	03/12/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Total Alkalinity		1	68.8			mg/L	2	20	03/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.7			%			03/16/15 8:08	calc
Sum of Anions			5.8			meq/L			03/16/15 8:08	calc
Sum of Cations			6			meq/L			03/16/15 8:08	calc
Chloride	SM4500Cl-E	1	9.8		*	mg/L	0.5	2	03/10/15 17:42	mss2
Conductivity @25C	SM2510B	1	615			umhos/cm	1	10	03/12/15 19:43	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:22	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:44	thf
Fluoride	SM4500F-C	1	0.18	B	*	mg/L	0.05	0.3	03/09/15 18:17	abd
Hardness as CaCO3	SM2340B - Calculation		241			mg/L	0.8	4	03/16/15 8:08	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.06		*	mg/L	0.02	0.1	03/11/15 23:10	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 13:53	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/06/15 14:48	bsu
pH (lab)	SM4500H+ B									
pH		1	7.4	H		units	0.1	0.1	03/12/15 0:00	abd
pH measured at		1	21.4			C	0.1	0.1	03/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	03/16/15 8:08	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	03/11/15 22:33	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	B	*	mg/L	0.01	0.05	03/04/15 23:38	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	03/06/15 22:13	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	490		*	mg/L	10	20	03/05/15 16:49	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/10/15 16:32	eea
Residue, Total (TS) @ 105C	SM2540B	1	510		*	mg/L	10	20	03/04/15 14:16	id
Sulfate	D516-02/-07 - Turbidimetric	20	197		*	mg/L	20	100	03/13/15 15:01	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/05/15 11:11	enb
TDS (calculated)	Calculation		366			mg/L			03/16/15 8:08	calc
TDS (ratio - measured/calculated)	Calculation		1.34						03/16/15 8:08	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-1D

ACZ Sample ID: **L23121-04**
Date Sampled: 03/02/15 12:00
Date Received: 03/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 16:22	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 14:35	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 15:30	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 16:24	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 15:00	mss2

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	03/05/15 16:41	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	03/11/15 21:42	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	03/11/15 21:42	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	03/05/15 16:41	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:41	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 16:41	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/06/15 15:32	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:42	msh
Calcium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.1	0.5	03/05/15 16:41	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:41	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:41	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:41	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:41	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/05/15 16:41	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:42	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:41	jjc
Magnesium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	03/05/15 16:41	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:41	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:57	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/05/15 16:41	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 16:41	jjc
Potassium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	03/06/15 15:32	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 16:41	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	03/11/15 21:42	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/11/15 21:42	msh
Sodium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	03/05/15 16:41	jjc
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:41	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:42	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 16:41	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:41	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:42	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 16:41	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 16:41	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1D

ACZ Sample ID: **L23121-04**
 Date Sampled: 03/02/15 12:00
 Date Received: 03/04/15
 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	03/12/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/12/15 0:00	abd
Total Alkalinity		1		U		mg/L	2	20	03/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			03/16/15 8:08	calc
Sum of Anions			N/A			meq/L			03/16/15 8:08	calc
Sum of Cations				U		meq/L			03/16/15 8:08	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	03/10/15 17:42	mss2
Conductivity @25C	SM2510B	1	1.2	B		umhos/cm	1	10	03/12/15 20:22	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:24	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:47	thf
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	03/09/15 18:25	abd
Hardness as CaCO3	SM2340B - Calculation		1.7	B		mg/L	0.8	4	03/16/15 8:08	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	03/11/15 23:11	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 13:54	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/06/15 14:49	bsu
pH (lab)	SM4500H+ B									
pH		1	6.2	H		units	0.1	0.1	03/12/15 0:00	abd
pH measured at		1	21.2			C	0.1	0.1	03/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	03/16/15 8:08	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/11/15 22:36	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	03/04/15 23:40	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	03/06/15 22:14	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	03/05/15 16:50	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/05/15 11:43	eea
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	03/04/15 14:18	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	03/13/15 14:39	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/05/15 11:15	enb
TDS (calculated)	Calculation		1.1			mg/L			03/16/15 8:08	calc
TDS (ratio - measured/calculated)	Calculation		n/a						03/16/15 8:08	calc



Report Header Explanations

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

QC Sample Types

Table with 4 columns: Code, Description, Code, Description. Lists various QC sample types such as AS, ASD, CCB, CCV, DUP, ICB, ICV, ICSAB, LCSS, LCSSD, and LCSW.

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L23121**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23121-01	WG380143	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380239	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).
	WG380037	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).
	WG379998	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).
	WG380238	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379911	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379957	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).
	WG379936	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380363	Sulfate	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).
	WG379925	Sulfide as S	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: **L23121**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23121-02	WG380143	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380239	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).
	WG380037	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).
	WG379998	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).
	WG380238	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379911	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379957	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).
	WG379936	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
	WG379875	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).
	WG380363	Sulfate	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).
	WG379925	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.

ACZ Project ID: **L23121**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23121-03	WG380143	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380239	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).
	WG380037	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).
	WG379998	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).
	WG380238	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379911	Phosphorus, ortho dissolved	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).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379957	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).
	WG380141	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).
	WG379875	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).
	WG380363	Sulfate	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).
	WG379925	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.

ACZ Project ID: **L23121**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23121-04	WG380143	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380239	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).
	WG380037	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).
	WG379998	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).
	WG380238	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379911	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).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379957	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).
	WG379936	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
	WG379875	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).
	WG380363	Sulfate	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).
	WG379925	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: GW-1A

ACZ Sample ID: **L23121-01**
Date Sampled: 03/02/15 5:30
Date Received: 03/04/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG380000

Analyst: drh
Extract Date: 03/04/15 16:53
Analysis Date: 03/06/15 0:22

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	74.6		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-2

ACZ Sample ID: **L23121-02**

Date Sampled: 03/02/15 8:12

Date Received: 03/04/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG380000

Analyst: drh

Extract Date: 03/04/15 16:55

Analysis Date: 03/06/15 0:48

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		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-3ACZ Sample ID: **L23121-03**
Date Sampled: 03/04/15 10:30
Date Received: 03/04/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380000Analyst: drh
Extract Date: 03/04/15 16:57
Analysis Date: 03/06/15 1:14

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.5		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-1DACZ Sample ID: **L23121-04**
Date Sampled: 03/02/15 12:00
Date Received: 03/04/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380000Analyst: drh
Extract Date: 03/04/15 16:59
Analysis Date: 03/06/15 1:40

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	83.6		1	*	%	70	130

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: **L23121**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23121-01	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.
L23121-02	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.
L23121-03	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.
L23121-04	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23121**

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: L23121
 Date Received: 03/04/2015 09:55
 Received By: ddp
 Date Printed: 3/4/2015

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 sample identification 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? L23121-01 : A Orange container not received and the associated analysis could not be run. L23121-02 : A Orange container not received and the associated analysis could not be run. L23121-03 : A Orange container not received and the associated analysis could not be run. L23121-04 : A Orange container not received and the associated analysis could not be run.		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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L23121
Date Received: 03/04/2015 09:55
Received By: ddp
Date Printed: 3/4/2015

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4281	5.8	14	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.

L23121

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@sonrafael.com.gt

Address: Boulevard Los Proceres 18 Calle 24-69 Zona 10
Empresarial, Zona Pradera, Torre IV Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
Company:

E-mail: Cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc
E-mail: M.Berganza@sonrafael.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 intentionally 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. Includes entries for GW-1A, GW-2, GW-3, and GW-10.

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 Miguel Berganza and Charlie Muerhoff.



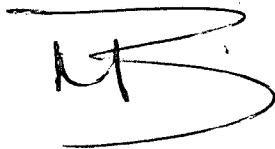
Guatemala March 2nd, 2015

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.

March 13, 2015

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: L23115

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 04, 2015. This project has been assigned to ACZ's project number, L23115. 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 L23115. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

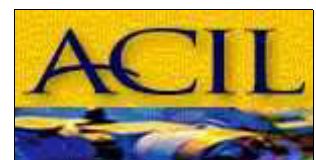
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after April 12, 2015. 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.

March 13, 2015

Project ID: Escobal

ACZ Project ID: L23115

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 1 ground water sample from Tahoe Resources, Inc. on March 4, 2015. 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 L23115. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times.

Sample Analysis

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 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 the TSS flagged with an "N1", the workgroup was removed from 105 degree oven out of specifications at 106 degrees.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-11

ACZ Sample ID: **L23115-01**

Date Sampled: 03/02/15 10:30

Date Received: 03/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								03/09/15 13:45	thf
Cyanide, WAD	SM4500-CN I- distillation								03/09/15 12:29	thf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								03/05/15 13:26	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								03/11/15 14:43	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								03/06/15 13:52	mss2

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	03/05/15 15:45	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	03/10/15 17:09	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	03/10/15 17:09	msh
Barium, dissolved	M200.7 ICP	1	0.138			mg/L	0.003	0.02	03/05/15 15:45	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 15:45	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	03/05/15 15:45	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	03/06/15 14:36	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/11/15 21:15	msh
Calcium, dissolved	M200.7 ICP	1	68.8			mg/L	0.1	0.5	03/05/15 15:45	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 15:45	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 15:45	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	03/05/15 15:45	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 15:45	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	03/05/15 15:45	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/10/15 17:09	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 15:45	jjc
Magnesium, dissolved	M200.7 ICP	1	15.6			mg/L	0.2	1	03/05/15 15:45	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 15:45	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	03/09/15 13:24	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	03/05/15 15:45	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	03/05/15 15:45	jjc
Potassium, dissolved	M200.7 ICP	1	9.1			mg/L	0.2	1	03/06/15 14:36	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	03/05/15 15:45	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	03/10/15 17:09	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	03/10/15 17:09	msh
Sodium, dissolved	M200.7 ICP	1	20.6			mg/L	0.2	1	03/05/15 15:45	jjc
Strontium, dissolved	M200.7 ICP	1	0.388			mg/L	0.005	0.03	03/05/15 15:45	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/10/15 17:09	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	03/05/15 15:45	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 15:45	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	03/10/15 17:09	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	03/05/15 15:45	jjc
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	03/05/15 15:45	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-11

ACZ Sample ID: **L23115-01**
 Date Sampled: 03/02/15 10:30
 Date Received: 03/04/15
 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	69.9			mg/L	2	20	03/10/15 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	03/10/15 0:00	abd
Total Alkalinity		1	69.9			mg/L	2	20	03/10/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.7			%			03/13/15 13:04	calc
Sum of Anions			6.1			meq/L			03/13/15 13:04	calc
Sum of Cations			5.9			meq/L			03/13/15 13:04	calc
Chloride	SM4500Cl-E	1	10			mg/L	0.5	2	03/10/15 16:25	mss2
Conductivity @25C	SM2510B	1	632			umhos/cm	1	10	03/10/15 0:54	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 15:03	thf
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	03/10/15 14:32	thf
Fluoride	SM4500F-C	1	0.16	B	*	mg/L	0.05	0.3	03/09/15 17:00	abd
Hardness as CaCO3	SM2340B - Calculation		236			mg/L	0.8	4	03/13/15 13:04	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.95		*	mg/L	0.02	0.1	03/11/15 16:32	bsu
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	03/09/15 14:14	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	03/06/15 14:31	bsu
pH (lab)	SM4500H+ B									
pH		1	7.5	H		units	0.1	0.1	03/10/15 0:00	abd
pH measured at		1	22.1			C	0.1	0.1	03/10/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	03/13/15 13:04	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	03/11/15 22:16	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	03/04/15 23:20	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	03/06/15 21:56	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	498			mg/L	10	20	03/05/15 16:40	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	03/05/15 11:25	eea
Residue, Total (TS) @ 105C	SM2540B	1	516			mg/L	10	20	03/04/15 13:53	id
Sulfate	D516-02/-07 - Turbidimetric	10	210		*	mg/L	10	50	03/10/15 10:35	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	03/04/15 13:17	abd
TDS (calculated)	Calculation		377			mg/L			03/13/15 13:04	calc
TDS (ratio - measured/calculated)	Calculation		1.32						03/13/15 13:04	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: **L23115**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23115-01	WG380129	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).
	WG380125	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).
	WG380050	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380208	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).
	WG380037	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).
	WG379998	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.
	WG380238	Phosphorus, dissolved	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.
	WG379911	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).
	WG380023	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG379936	Residue, Non-Filterable (TSS) @105C	SM2540D	N1	See Case Narrative.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG380100	Sulfate	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).
	WG379856	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: GW-11ACZ Sample ID: **L23115-01**
Date Sampled: 03/02/15 10:30
Date Received: 03/04/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG380000Analyst: drh
Extract Date: 03/04/15 16:39
Analysis Date: 03/05/15 21:19

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.3		1	*	%	70	130



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: **L23115**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23115-01	WG380000	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG379884		M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23115**

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: L23115
 Date Received: 03/04/2015 09:51
 Received By: ddp
 Date Printed: 3/4/2015

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? L23115-01 : A Orange container not received and the associated analysis could not be run.		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?
3992	3.5	16	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: L23115
Date Received: 03/04/2015 09:51
Received By: ddp
Date Printed: 3/4/2015



Laboratories, Inc. L23115

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 proceres 18 calle 24-69 zona 10
Empresarial, Zona Pradera, Torre IV Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc.

E-mail: CMuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*Sampler's Signature: [Signature] I attest to the authenticity and validity of this sample. I understand that intentionally 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, GW+TPH, GW, and multiple empty columns for analyses.

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

REMARKS

Present results of GW 6, 7 and 8 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.



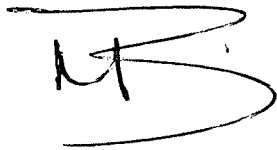
Guatemala March 2nd, 2015

To whom it may concern:

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

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

Best regards,

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

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

REG 016 Resultados de Análisis

Muestras: 8 muestras de agua
 Análisis solicitado por: Ing. Miguel Berganza
 Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
 Procedencia de la muestra: Proyecto Escobal
 Fecha de muestreo: 020315
 Fecha de ingreso de muestras: 020315
 Fecha de análisis: 020315-120315
 Fecha de informe: 120315

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)
387	GW1-A	179	< 1	N.D.	23
388	GW-2	99	7	N.D.	49
389	GW-3	< 1	< 1	N.D.	< 2
393	GW-10	< 1	< 1	N.D.	< 2
394	GW-11	< 1	< 1	N.D.	< 2
395	RW-1	< 1	< 1	N.D.	< 2
396	PSA-1	254	< 1	N.D.	< 2
397	MW-11	131	< 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

11.6 Informes originales de los Resultados Analíticos obtenidos del muestreo de sedimentos, Junio 2015.

May 01, 2015

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: L23659

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 06, 2015. This project has been assigned to ACZ's project number, L23659. 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 L23659. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

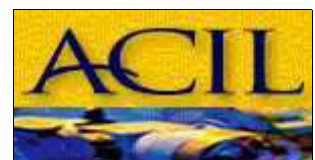
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 31, 2015. 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.

May 01, 2015

Project ID: Escobal

ACZ Project ID: L23659

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 19 sediment samples from Tahoe Resources, Inc. on April 6, 2015. 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 L23659. 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" or an "H1", received after the hold time had expired.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-1

ACZ Sample ID: **L23659-01**
Date Sampled: 03/09/15 10:40
Date Received: 04/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 12:26	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 10:38	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20200	11200		*	mg/Kg	20	100	04/29/15 22:23	pmc
Antimony, total (3050)	M6020 ICP-MS	505	0.8	B	*	mg/Kg	0.2	1	04/23/15 4:55	pmc
Arsenic, total (3050)	M6020 ICP-MS	505	13			mg/Kg	0.1	0.5	04/23/15 4:55	pmc
Barium, total (3050)	M6020 ICP-MS	20200	300		*	mg/Kg	10	50	04/29/15 22:23	pmc
Boron, total (3050)	M6010B ICP	101	3	B		mg/Kg	1	5	04/20/15 15:18	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.37			mg/Kg	0.05	0.3	04/23/15 4:55	pmc
Calcium, total (3050)	M6010B ICP	101	3800			mg/Kg	10	50	04/20/15 15:18	jjc
Chromium, total (3050)	M6020 ICP-MS	505	3.1			mg/Kg	0.3	1	04/23/15 4:55	pmc
Copper, total (3050)	M6020 ICP-MS	505	11.2			mg/Kg	0.3	1	04/23/15 4:55	pmc
Iron, total (3050)	M6010B ICP	101	13900		*	mg/Kg	2	5	04/20/15 15:18	jjc
Lead, total (3050)	M6020 ICP-MS	505	14.40		*	mg/Kg	0.05	0.3	04/23/15 4:55	pmc
Magnesium, total (3050)	M6010B ICP	101	1290			mg/Kg	20	100	04/20/15 15:18	jjc
Manganese, total (3050)	M6020 ICP-MS	20200	490		*	mg/Kg	10	50	04/29/15 22:23	pmc
Mercury, total	M7471A CVAA	242		UH	*	mg/Kg	0.05	0.2	04/09/15 10:03	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	04/20/15 15:18	jjc
Nickel, total (3050)	M6020 ICP-MS	505	5			mg/Kg	0.3	2	04/23/15 4:55	pmc
Potassium, total (3050)	M6010B ICP	101	1970			mg/Kg	20	100	04/20/15 15:18	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.16		*	mg/Kg	0.05	0.1	04/23/15 4:55	pmc
Silver, total (3050)	M6020 ICP-MS	505	0.18		*	mg/Kg	0.03	0.1	04/23/15 4:55	pmc
Zinc, total (3050)	M6020 ICP-MS	505	39		*	mg/Kg	1	3	04/23/15 4:55	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	77.7		*	%	0.1	0.5	04/09/15 14:25	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:00	spl
Digestion - Hot Plate	M3050B ICP								04/17/15 17:27	mns
Digestion - Hot Plate	M3050B ICP-MS								04/17/15 17:27	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 9:00	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-1

ACZ Sample ID: **L23659-01**

Date Sampled: 03/09/15 10:40

Date Received: 04/06/15

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	04/10/15 12:28	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	165	0.0422	H	*	%	0.00165	0.00825	04/15/15 14:00	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2

ACZ Sample ID: **L23659-02**
Date Sampled: 03/09/15 09:50
Date Received: 04/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 12:52	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 10:58	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20000	12300		*	mg/Kg	20	100	04/29/15 22:27	pmc
Antimony, total (3050)	M6020 ICP-MS	20000	13	B	*	mg/Kg	8	40	04/29/15 22:27	pmc
Arsenic, total (3050)	M6020 ICP-MS	500	52.9			mg/Kg	0.1	0.5	04/23/15 4:58	pmc
Barium, total (3050)	M6020 ICP-MS	500	156		*	mg/Kg	0.3	1	04/23/15 4:58	pmc
Boron, total (3050)	M6010B ICP	100	5			mg/Kg	1	5	04/20/15 15:24	jjc
Cadmium, total (3050)	M6020 ICP-MS	500	21.60			mg/Kg	0.05	0.3	04/23/15 4:58	pmc
Calcium, total (3050)	M6010B ICP	100	41100			mg/Kg	10	50	04/20/15 15:24	jjc
Chromium, total (3050)	M6020 ICP-MS	500	9.2			mg/Kg	0.3	1	04/23/15 4:58	pmc
Copper, total (3050)	M6020 ICP-MS	500	59.6			mg/Kg	0.3	1	04/23/15 4:58	pmc
Iron, total (3050)	M6010B ICP	100	15400		*	mg/Kg	2	5	04/20/15 15:24	jjc
Lead, total (3050)	M6020 ICP-MS	20000	861		*	mg/Kg	2	10	04/29/15 22:27	pmc
Magnesium, total (3050)	M6010B ICP	100	4910			mg/Kg	20	100	04/20/15 15:24	jjc
Manganese, total (3050)	M6020 ICP-MS	20000	2900		*	mg/Kg	10	50	04/29/15 22:27	pmc
Mercury, total	M7471A CVAA	321	0.20	BH	*	mg/Kg	0.06	0.3	04/09/15 10:10	mfm
Molybdenum, total (3050)	M6010B ICP	100	2	B		mg/Kg	2	10	04/20/15 15:24	jjc
Nickel, total (3050)	M6020 ICP-MS	500	7.8			mg/Kg	0.3	2	04/23/15 4:58	pmc
Potassium, total (3050)	M6010B ICP	100	1960			mg/Kg	20	100	04/20/15 15:24	jjc
Selenium, total (3050)	M6020 ICP-MS	500	0.31		*	mg/Kg	0.05	0.1	04/23/15 4:58	pmc
Silver, total (3050)	M6020 ICP-MS	20000	77		*	mg/Kg	1	5	04/29/15 22:27	pmc
Zinc, total (3050)	M6020 ICP-MS	20000	1750		*	mg/Kg	40	100	04/29/15 22:27	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	57.9		*	%	0.1	0.5	04/09/15 15:36	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:02	spl
Digestion - Hot Plate	M3050B ICP								04/17/15 20:24	mns
Digestion - Hot Plate	M3050B ICP-MS								04/17/15 20:24	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 9:20	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2

ACZ Sample ID: **L23659-02**

Date Sampled: 03/09/15 09:50

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	34.4		UH	*	mg/Kg	0.2	0.7	04/10/15 12:29	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	164	0.0339	H	*	%	0.00164	0.0082	04/15/15 14:02	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-3

ACZ Sample ID: **L23659-03**
Date Sampled: 03/23/15 11:30
Date Received: 04/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 13:18	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 11:08	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	5290		*	mg/Kg	10	50	04/29/15 22:30	pmc
Antimony, total (3050)	M6020 ICP-MS	500	0.6	B	*	mg/Kg	0.2	1	04/23/15 5:01	pmc
Arsenic, total (3050)	M6020 ICP-MS	500	13.6			mg/Kg	0.1	0.5	04/23/15 5:01	pmc
Barium, total (3050)	M6020 ICP-MS	500	204		*	mg/Kg	0.3	1	04/23/15 5:01	pmc
Boron, total (3050)	M6010B ICP	100	2	B		mg/Kg	1	5	04/20/15 15:27	jjc
Cadmium, total (3050)	M6020 ICP-MS	500	0.17	B		mg/Kg	0.05	0.3	04/23/15 5:01	pmc
Calcium, total (3050)	M6010B ICP	100	1990			mg/Kg	10	50	04/20/15 15:27	jjc
Chromium, total (3050)	M6020 ICP-MS	500	1.8			mg/Kg	0.3	1	04/23/15 5:01	pmc
Copper, total (3050)	M6020 ICP-MS	500	3.3			mg/Kg	0.3	1	04/23/15 5:01	pmc
Iron, total (3050)	M6010B ICP	100	9080		*	mg/Kg	2	5	04/20/15 15:27	jjc
Lead, total (3050)	M6020 ICP-MS	500	7.12		*	mg/Kg	0.05	0.3	04/23/15 5:01	pmc
Magnesium, total (3050)	M6010B ICP	100	580			mg/Kg	20	100	04/20/15 15:27	jjc
Manganese, total (3050)	M6020 ICP-MS	10000	627		*	mg/Kg	5	30	04/29/15 22:30	pmc
Mercury, total	M7471A CVAA	234	0.08	B	*	mg/Kg	0.05	0.2	04/09/15 10:12	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	04/20/15 15:27	jjc
Nickel, total (3050)	M6020 ICP-MS	500	1.5	B		mg/Kg	0.3	2	04/23/15 5:01	pmc
Potassium, total (3050)	M6010B ICP	100	1590			mg/Kg	20	100	04/20/15 15:27	jjc
Selenium, total (3050)	M6020 ICP-MS	500	0.06	B	*	mg/Kg	0.05	0.1	04/23/15 5:01	pmc
Silver, total (3050)	M6020 ICP-MS	500	0.04	B	*	mg/Kg	0.03	0.1	04/23/15 5:01	pmc
Zinc, total (3050)	M6020 ICP-MS	500	25		*	mg/Kg	1	3	04/23/15 5:01	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	78.3		*	%	0.1	0.5	04/09/15 16:47	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:04	spl
Digestion - Hot Plate	M3050B ICP-MS								04/17/15 23:22	mns
Digestion - Hot Plate	M3050B ICP								04/17/15 23:22	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 9:40	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-3

ACZ Sample ID: **L23659-03**

Date Sampled: 03/23/15 11:30

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	32.4		UH	*	mg/Kg	0.2	0.6	04/10/15 12:31	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	114	0.0134		*	%	0.00114	0.0057	04/15/15 14:03	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4

ACZ Sample ID: **L23659-04**
Date Sampled: 03/09/15 08:30
Date Received: 04/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 13:32	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 11:17	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	7400		*	mg/Kg	10	50	04/29/15 22:36	pmc
Antimony, total (3050)	M6020 ICP-MS	500	2.6		*	mg/Kg	0.2	1	04/23/15 5:08	pmc
Arsenic, total (3050)	M6020 ICP-MS	500	13.3			mg/Kg	0.1	0.5	04/23/15 5:08	pmc
Barium, total (3050)	M6020 ICP-MS	500	220		*	mg/Kg	0.3	1	04/23/15 5:08	pmc
Boron, total (3050)	M6010B ICP	100	3	B		mg/Kg	1	5	04/20/15 15:30	jjc
Cadmium, total (3050)	M6020 ICP-MS	500	0.31			mg/Kg	0.05	0.3	04/23/15 5:08	pmc
Calcium, total (3050)	M6010B ICP	100	2480			mg/Kg	10	50	04/20/15 15:30	jjc
Chromium, total (3050)	M6020 ICP-MS	500	6			mg/Kg	0.3	1	04/23/15 5:08	pmc
Copper, total (3050)	M6020 ICP-MS	500	8			mg/Kg	0.3	1	04/23/15 5:08	pmc
Iron, total (3050)	M6010B ICP	100	8670		*	mg/Kg	2	5	04/20/15 15:30	jjc
Lead, total (3050)	M6020 ICP-MS	500	11.40		*	mg/Kg	0.05	0.3	04/23/15 5:08	pmc
Magnesium, total (3050)	M6010B ICP	100	1100			mg/Kg	20	100	04/20/15 15:30	jjc
Manganese, total (3050)	M6020 ICP-MS	10000	176		*	mg/Kg	5	30	04/29/15 22:36	pmc
Mercury, total	M7471A CVAA	215	0.08	BH	*	mg/Kg	0.04	0.2	04/09/15 10:14	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	04/20/15 15:30	jjc
Nickel, total (3050)	M6020 ICP-MS	500	3.2			mg/Kg	0.3	2	04/23/15 5:08	pmc
Potassium, total (3050)	M6010B ICP	100	1780			mg/Kg	20	100	04/20/15 15:30	jjc
Selenium, total (3050)	M6020 ICP-MS	500	0.17		*	mg/Kg	0.05	0.1	04/23/15 5:08	pmc
Silver, total (3050)	M6020 ICP-MS	500	0.31		*	mg/Kg	0.03	0.1	04/23/15 5:08	pmc
Zinc, total (3050)	M6020 ICP-MS	500	39		*	mg/Kg	1	3	04/23/15 5:08	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	78.5		*	%	0.1	0.5	04/09/15 17:58	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:07	spl
Digestion - Hot Plate	M3050B ICP								04/18/15 2:19	mns
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 2:19	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 10:00	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4

ACZ Sample ID: **L23659-04**

Date Sampled: 03/09/15 08:30

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	30		UH	*	mg/Kg	0.2	0.6	04/10/15 12:32	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	182	0.0467	H	*	%	0.00182	0.0091	04/15/15 14:45	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-5

ACZ Sample ID: **L23659-05**
Date Sampled: 03/23/15 07:40
Date Received: 04/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 13:45	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 11:27	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	5560		*	mg/Kg	10	50	04/29/15 22:39	pmc
Antimony, total (3050)	M6020 ICP-MS	500	0.9	B	*	mg/Kg	0.2	1	04/23/15 5:11	pmc
Arsenic, total (3050)	M6020 ICP-MS	500	17.3			mg/Kg	0.1	0.5	04/23/15 5:11	pmc
Barium, total (3050)	M6020 ICP-MS	500	77.3		*	mg/Kg	0.3	1	04/23/15 5:11	pmc
Boron, total (3050)	M6010B ICP	100	3	B		mg/Kg	1	5	04/20/15 15:33	jjc
Cadmium, total (3050)	M6020 ICP-MS	500	0.15	B		mg/Kg	0.05	0.3	04/23/15 5:11	pmc
Calcium, total (3050)	M6010B ICP	100	820			mg/Kg	10	50	04/20/15 15:33	jjc
Chromium, total (3050)	M6020 ICP-MS	500	1			mg/Kg	0.3	1	04/23/15 5:11	pmc
Copper, total (3050)	M6020 ICP-MS	500	3.4			mg/Kg	0.3	1	04/23/15 5:11	pmc
Iron, total (3050)	M6010B ICP	100	10400		*	mg/Kg	2	5	04/20/15 15:33	jjc
Lead, total (3050)	M6020 ICP-MS	500	9.28		*	mg/Kg	0.05	0.3	04/23/15 5:11	pmc
Magnesium, total (3050)	M6010B ICP	100	330			mg/Kg	20	100	04/20/15 15:33	jjc
Manganese, total (3050)	M6020 ICP-MS	10000	323		*	mg/Kg	5	30	04/29/15 22:39	pmc
Mercury, total	M7471A CVAA	227	0.09	B	*	mg/Kg	0.05	0.2	04/09/15 10:16	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	04/20/15 15:33	jjc
Nickel, total (3050)	M6020 ICP-MS	500	0.7	B		mg/Kg	0.3	2	04/23/15 5:11	pmc
Potassium, total (3050)	M6010B ICP	100	1830			mg/Kg	20	100	04/20/15 15:33	jjc
Selenium, total (3050)	M6020 ICP-MS	500	0.07	B	*	mg/Kg	0.05	0.1	04/23/15 5:11	pmc
Silver, total (3050)	M6020 ICP-MS	500	0.05	B	*	mg/Kg	0.03	0.1	04/23/15 5:11	pmc
Zinc, total (3050)	M6020 ICP-MS	500	15		*	mg/Kg	1	3	04/23/15 5:11	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	79.8		*	%	0.1	0.5	04/09/15 19:08	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:09	spl
Digestion - Hot Plate	M3050B ICP								04/18/15 5:16	mns
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 5:16	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 10:20	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-5

ACZ Sample ID: **L23659-05**

Date Sampled: 03/23/15 07:40

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	32.2		UH	*	mg/Kg	0.2	0.6	04/10/15 12:33	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	109	0.00338	B	*	%	0.00109	0.00545	04/15/15 14:06	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-6

ACZ Sample ID: **L23659-06**
Date Sampled: 03/23/15 08:05
Date Received: 04/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 13:58	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 11:37	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	5140		*	mg/Kg	10	50	04/29/15 22:42	pmc
Antimony, total (3050)	M6020 ICP-MS	500	0.7	B	*	mg/Kg	0.2	1	04/23/15 5:14	pmc
Arsenic, total (3050)	M6020 ICP-MS	500	12.5			mg/Kg	0.1	0.5	04/23/15 5:14	pmc
Barium, total (3050)	M6020 ICP-MS	500	77.9		*	mg/Kg	0.3	1	04/23/15 5:14	pmc
Boron, total (3050)	M6010B ICP	100	6			mg/Kg	1	5	04/20/15 15:37	jjc
Cadmium, total (3050)	M6020 ICP-MS	500	0.13	B		mg/Kg	0.05	0.3	04/23/15 5:14	pmc
Calcium, total (3050)	M6010B ICP	100	1530			mg/Kg	10	50	04/20/15 15:37	jjc
Chromium, total (3050)	M6020 ICP-MS	500	8.2			mg/Kg	0.3	1	04/23/15 5:14	pmc
Copper, total (3050)	M6020 ICP-MS	500	8.1			mg/Kg	0.3	1	04/23/15 5:14	pmc
Iron, total (3050)	M6010B ICP	100	17600		*	mg/Kg	2	5	04/20/15 15:37	jjc
Lead, total (3050)	M6020 ICP-MS	500	5.84		*	mg/Kg	0.05	0.3	04/23/15 5:14	pmc
Magnesium, total (3050)	M6010B ICP	100	1090			mg/Kg	20	100	04/20/15 15:37	jjc
Manganese, total (3050)	M6020 ICP-MS	10000	214		*	mg/Kg	5	30	04/29/15 22:42	pmc
Mercury, total	M7471A CVAA	235	0.08	B	*	mg/Kg	0.05	0.2	04/09/15 10:22	mfm
Molybdenum, total (3050)	M6010B ICP	100	3	B		mg/Kg	2	10	04/20/15 15:37	jjc
Nickel, total (3050)	M6020 ICP-MS	500	2.9			mg/Kg	0.3	2	04/23/15 5:14	pmc
Potassium, total (3050)	M6010B ICP	100	1290			mg/Kg	20	100	04/20/15 15:37	jjc
Selenium, total (3050)	M6020 ICP-MS	500	0.09	B	*	mg/Kg	0.05	0.1	04/23/15 5:14	pmc
Silver, total (3050)	M6020 ICP-MS	500	0.04	B	*	mg/Kg	0.03	0.1	04/23/15 5:14	pmc
Zinc, total (3050)	M6020 ICP-MS	500	23		*	mg/Kg	1	3	04/23/15 5:14	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	83.3		*	%	0.1	0.5	04/09/15 20:19	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:11	spl
Digestion - Hot Plate	M3050B ICP								04/18/15 8:14	mns
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 8:14	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 10:40	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-6

ACZ Sample ID: **L23659-06**

Date Sampled: 03/23/15 08:05

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	25.8		UH	*	mg/Kg	0.2	0.5	04/10/15 12:34	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	80.5	0.0120		*	%	0.00081	0.00403	04/15/15 14:09	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-8

ACZ Sample ID: **L23659-07**
Date Sampled: 03/23/15 10:15
Date Received: 04/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 14:11	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 11:47	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20200	8560		*	mg/Kg	20	100	04/29/15 22:52	pmc
Antimony, total (3050)	M6020 ICP-MS	505	1		*	mg/Kg	0.2	1	04/23/15 5:23	pmc
Arsenic, total (3050)	M6020 ICP-MS	505	7.3			mg/Kg	0.1	0.5	04/23/15 5:23	pmc
Barium, total (3050)	M6020 ICP-MS	505	128		*	mg/Kg	0.3	1	04/23/15 5:23	pmc
Boron, total (3050)	M6010B ICP	101	2	B		mg/Kg	1	5	04/20/15 15:46	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.57			mg/Kg	0.05	0.3	04/23/15 5:23	pmc
Calcium, total (3050)	M6010B ICP	101	2280			mg/Kg	10	50	04/20/15 15:46	jjc
Chromium, total (3050)	M6020 ICP-MS	505	3			mg/Kg	0.3	1	04/23/15 5:23	pmc
Copper, total (3050)	M6020 ICP-MS	505	10.7			mg/Kg	0.3	1	04/23/15 5:23	pmc
Iron, total (3050)	M6010B ICP	101	9120		*	mg/Kg	2	5	04/20/15 15:46	jjc
Lead, total (3050)	M6020 ICP-MS	505	11.50		*	mg/Kg	0.05	0.3	04/23/15 5:23	pmc
Magnesium, total (3050)	M6010B ICP	101	950			mg/Kg	20	100	04/20/15 15:46	jjc
Manganese, total (3050)	M6020 ICP-MS	20200	680		*	mg/Kg	10	50	04/29/15 22:52	pmc
Mercury, total	M7471A CVAA	292	0.09	B	*	mg/Kg	0.06	0.3	04/09/15 10:24	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	04/20/15 15:46	jjc
Nickel, total (3050)	M6020 ICP-MS	505	2			mg/Kg	0.3	2	04/23/15 5:23	pmc
Potassium, total (3050)	M6010B ICP	101	1350			mg/Kg	20	100	04/20/15 15:46	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.13		*	mg/Kg	0.05	0.1	04/23/15 5:23	pmc
Silver, total (3050)	M6020 ICP-MS	505	0.25		*	mg/Kg	0.03	0.1	04/23/15 5:23	pmc
Zinc, total (3050)	M6020 ICP-MS	505	51		*	mg/Kg	1	3	04/23/15 5:23	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	62.5		*	%	0.1	0.5	04/09/15 21:30	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:14	spl
Digestion - Hot Plate	M3050B ICP								04/18/15 11:11	mns
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 11:11	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 11:00	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-8

ACZ Sample ID: **L23659-07**

Date Sampled: 03/23/15 10:15

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	39.4		UH	*	mg/Kg	0.2	0.8	04/10/15 12:36	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	86.9	0.0411		*	%	0.00087	0.00435	04/15/15 14:10	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-9

ACZ Sample ID: **L23659-08**

Date Sampled: 03/23/15 09:00

Date Received: 04/06/15

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 14:24	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 11:56	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20200	9970		*	mg/Kg	20	100	04/29/15 22:55	pmc
Antimony, total (3050)	M6020 ICP-MS	505	0.9	B	*	mg/Kg	0.2	1	04/23/15 5:27	pmc
Arsenic, total (3050)	M6020 ICP-MS	505	9.5			mg/Kg	0.1	0.5	04/23/15 5:27	pmc
Barium, total (3050)	M6020 ICP-MS	505	142		*	mg/Kg	0.3	1	04/23/15 5:27	pmc
Boron, total (3050)	M6010B ICP	101	2	B		mg/Kg	1	5	04/20/15 15:49	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.36			mg/Kg	0.05	0.3	04/23/15 5:27	pmc
Calcium, total (3050)	M6010B ICP	101	8020			mg/Kg	10	50	04/20/15 15:49	jjc
Chromium, total (3050)	M6020 ICP-MS	505	3.3			mg/Kg	0.3	1	04/23/15 5:27	pmc
Copper, total (3050)	M6020 ICP-MS	505	8.7			mg/Kg	0.3	1	04/23/15 5:27	pmc
Iron, total (3050)	M6010B ICP	101	11000		*	mg/Kg	2	5	04/20/15 15:49	jjc
Lead, total (3050)	M6020 ICP-MS	505	19.60		*	mg/Kg	0.05	0.3	04/23/15 5:27	pmc
Magnesium, total (3050)	M6010B ICP	101	1870			mg/Kg	20	100	04/20/15 15:49	jjc
Manganese, total (3050)	M6020 ICP-MS	20200	820		*	mg/Kg	10	50	04/29/15 22:55	pmc
Mercury, total	M7471A CVAA	400	0.10	B	*	mg/Kg	0.08	0.4	04/09/15 10:26	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	04/20/15 15:49	jjc
Nickel, total (3050)	M6020 ICP-MS	505	2.2			mg/Kg	0.3	2	04/23/15 5:27	pmc
Potassium, total (3050)	M6010B ICP	101	1500			mg/Kg	20	100	04/20/15 15:49	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.15		*	mg/Kg	0.05	0.1	04/23/15 5:27	pmc
Silver, total (3050)	M6020 ICP-MS	505	0.16		*	mg/Kg	0.03	0.1	04/23/15 5:27	pmc
Zinc, total (3050)	M6020 ICP-MS	505	41		*	mg/Kg	1	3	04/23/15 5:27	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	45.7		*	%	0.1	0.5	04/09/15 22:41	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:16	spl
Digestion - Hot Plate	M3050B ICP								04/18/15 14:09	mns
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 14:09	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 11:20	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-9

ACZ Sample ID: **L23659-08**

Date Sampled: 03/23/15 09:00

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	49.5		UH	*	mg/Kg	0.3	1	04/10/15 12:37	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	103	0.0259		*	%	0.00103	0.00515	04/15/15 14:11	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2A

ACZ Sample ID: **L23659-09**
Date Sampled: 03/23/15 13:40
Date Received: 04/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 14:37	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 12:06	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20200	13800		*	mg/Kg	20	100	04/29/15 22:58	pmc
Antimony, total (3050)	M6020 ICP-MS	505	6.6		*	mg/Kg	0.2	1	04/23/15 5:30	pmc
Arsenic, total (3050)	M6020 ICP-MS	505	49.8			mg/Kg	0.1	0.5	04/23/15 5:30	pmc
Barium, total (3050)	M6020 ICP-MS	505	191		*	mg/Kg	0.3	1	04/23/15 5:30	pmc
Boron, total (3050)	M6010B ICP	101	9			mg/Kg	1	5	04/20/15 15:52	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	8.82			mg/Kg	0.05	0.3	04/23/15 5:30	pmc
Calcium, total (3050)	M6010B ICP	101	26600			mg/Kg	10	50	04/20/15 15:52	jjc
Chromium, total (3050)	M6020 ICP-MS	505	12.5			mg/Kg	0.3	1	04/23/15 5:30	pmc
Copper, total (3050)	M6020 ICP-MS	505	33			mg/Kg	0.3	1	04/23/15 5:30	pmc
Iron, total (3050)	M6010B ICP	101	15200		*	mg/Kg	2	5	04/20/15 15:52	jjc
Lead, total (3050)	M6020 ICP-MS	20200	460		*	mg/Kg	2	10	04/29/15 22:58	pmc
Magnesium, total (3050)	M6010B ICP	101	6170			mg/Kg	20	100	04/20/15 15:52	jjc
Manganese, total (3050)	M6020 ICP-MS	20200	2620		*	mg/Kg	10	50	04/29/15 22:58	pmc
Mercury, total	M7471A CVAA	814	0.2	B	*	mg/Kg	0.2	0.8	04/09/15 10:28	mfm
Molybdenum, total (3050)	M6010B ICP	101	6	B		mg/Kg	2	10	04/20/15 15:52	jjc
Nickel, total (3050)	M6020 ICP-MS	505	10.4			mg/Kg	0.3	2	04/23/15 5:30	pmc
Potassium, total (3050)	M6010B ICP	101	3090			mg/Kg	20	100	04/20/15 15:52	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.47		*	mg/Kg	0.05	0.1	04/23/15 5:30	pmc
Silver, total (3050)	M6020 ICP-MS	20200	29		*	mg/Kg	1	5	04/29/15 22:58	pmc
Zinc, total (3050)	M6020 ICP-MS	20200	760		*	mg/Kg	40	100	04/29/15 22:58	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	20.6		*	%	0.1	0.5	04/09/15 23:51	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:18	spl
Digestion - Hot Plate	M3050B ICP								04/18/15 17:06	mns
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 17:06	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 11:40	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2A

ACZ Sample ID: **L23659-09**

Date Sampled: 03/23/15 13:40

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	80.1		UH	*	mg/Kg	0.5	2	04/10/15 12:38	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	99.4	0.0272		*	%	0.00099	0.00497	04/15/15 14:12	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2B

ACZ Sample ID: **L23659-10**
Date Sampled: 03/09/15 09:05
Date Received: 04/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 14:50	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 12:16	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	24500		*	mg/Kg	50	300	04/29/15 23:01	pmc
Antimony, total (3050)	M6020 ICP-MS	505	1.4		*	mg/Kg	0.2	1	04/23/15 5:33	pmc
Arsenic, total (3050)	M6020 ICP-MS	505	16			mg/Kg	0.1	0.5	04/23/15 5:33	pmc
Barium, total (3050)	M6020 ICP-MS	50500	410		*	mg/Kg	30	100	04/29/15 23:01	pmc
Boron, total (3050)	M6010B ICP	101	3	B		mg/Kg	1	5	04/20/15 15:55	jjc
Cadmium, total (3050)	M6020 ICP-MS	505	0.97			mg/Kg	0.05	0.3	04/23/15 5:33	pmc
Calcium, total (3050)	M6010B ICP	101	4500			mg/Kg	10	50	04/20/15 15:55	jjc
Chromium, total (3050)	M6020 ICP-MS	505	4.1			mg/Kg	0.3	1	04/23/15 5:33	pmc
Copper, total (3050)	M6020 ICP-MS	505	14.7			mg/Kg	0.3	1	04/23/15 5:33	pmc
Iron, total (3050)	M6010B ICP	101	17900		*	mg/Kg	2	5	04/20/15 15:55	jjc
Lead, total (3050)	M6020 ICP-MS	505	21.80		*	mg/Kg	0.05	0.3	04/23/15 5:33	pmc
Magnesium, total (3050)	M6010B ICP	101	1090			mg/Kg	20	100	04/20/15 15:55	jjc
Manganese, total (3050)	M6020 ICP-MS	50500	1960		*	mg/Kg	30	100	04/29/15 23:01	pmc
Mercury, total	M7471A CVAA	274	0.09	BH	*	mg/Kg	0.05	0.3	04/09/15 10:31	mfm
Molybdenum, total (3050)	M6010B ICP	101	2	B		mg/Kg	2	10	04/20/15 15:55	jjc
Nickel, total (3050)	M6020 ICP-MS	505	3.4			mg/Kg	0.3	2	04/23/15 5:33	pmc
Potassium, total (3050)	M6010B ICP	101	1550			mg/Kg	20	100	04/20/15 15:55	jjc
Selenium, total (3050)	M6020 ICP-MS	505	0.21		*	mg/Kg	0.05	0.1	04/23/15 5:33	pmc
Silver, total (3050)	M6020 ICP-MS	505	0.74		*	mg/Kg	0.03	0.1	04/23/15 5:33	pmc
Zinc, total (3050)	M6020 ICP-MS	505	59		*	mg/Kg	1	3	04/23/15 5:33	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	68.1		*	%	0.1	0.5	04/10/15 1:02	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:21	spl
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 20:03	mns
Digestion - Hot Plate	M3050B ICP								04/18/15 20:03	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 12:00	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2B

ACZ Sample ID: **L23659-10**

Date Sampled: 03/09/15 09:05

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.2		UH	*	mg/Kg	0.2	0.6	04/10/15 12:39	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	58	0.0179	H	*	%	0.00058	0.0029	04/15/15 14:13	tcd

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4A

ACZ Sample ID: **L23659-11**
Date Sampled: 03/23/15 13:05
Date Received: 04/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								04/08/15 15:04	tcd
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								04/08/15 12:26	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	51000	19800		*	mg/Kg	50	300	04/29/15 23:04	pmc
Antimony, total (3050)	M6020 ICP-MS	510	5.1		*	mg/Kg	0.2	1	04/23/15 5:36	pmc
Arsenic, total (3050)	M6020 ICP-MS	510	39.7			mg/Kg	0.1	0.5	04/23/15 5:36	pmc
Barium, total (3050)	M6020 ICP-MS	51000	280		*	mg/Kg	30	100	04/29/15 23:04	pmc
Boron, total (3050)	M6010B ICP	102	7			mg/Kg	1	5	04/20/15 15:58	jjc
Cadmium, total (3050)	M6020 ICP-MS	510	1.77			mg/Kg	0.05	0.3	04/23/15 5:36	pmc
Calcium, total (3050)	M6010B ICP	102	9660			mg/Kg	10	50	04/20/15 15:58	jjc
Chromium, total (3050)	M6020 ICP-MS	510	22.8			mg/Kg	0.3	1	04/23/15 5:36	pmc
Copper, total (3050)	M6020 ICP-MS	510	33.7			mg/Kg	0.3	1	04/23/15 5:36	pmc
Iron, total (3050)	M6010B ICP	102	20600		*	mg/Kg	2	5	04/20/15 15:58	jjc
Lead, total (3050)	M6020 ICP-MS	510	73.80		*	mg/Kg	0.05	0.3	04/23/15 5:36	pmc
Magnesium, total (3050)	M6010B ICP	102	2340			mg/Kg	20	100	04/20/15 15:58	jjc
Manganese, total (3050)	M6020 ICP-MS	51000	4340		*	mg/Kg	30	100	04/29/15 23:04	pmc
Mercury, total	M7471A CVAA	781	0.2	B	*	mg/Kg	0.2	0.8	04/09/15 10:33	mfm
Molybdenum, total (3050)	M6010B ICP	102	2	B		mg/Kg	2	10	04/20/15 15:58	jjc
Nickel, total (3050)	M6020 ICP-MS	510	7.2			mg/Kg	0.3	2	04/23/15 5:36	pmc
Potassium, total (3050)	M6010B ICP	102	2890			mg/Kg	20	100	04/20/15 15:58	jjc
Selenium, total (3050)	M6020 ICP-MS	510	0.84		*	mg/Kg	0.05	0.1	04/23/15 5:36	pmc
Silver, total (3050)	M6020 ICP-MS	510	3.58		*	mg/Kg	0.03	0.1	04/23/15 5:36	pmc
Zinc, total (3050)	M6020 ICP-MS	510	176		*	mg/Kg	1	3	04/23/15 5:36	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	23.2		*	%	0.1	0.5	04/10/15 2:13	spl

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								04/09/15 12:23	spl
Digestion - Hot Plate	M3050B ICP								04/18/15 23:01	mns
Digestion - Hot Plate	M3050B ICP-MS								04/18/15 23:01	mns
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								04/16/15 12:20	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4A

ACZ Sample ID: **L23659-11**

Date Sampled: 03/23/15 13:05

Date Received: 04/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	109		UH	*	mg/Kg	0.7	2	04/10/15 12:40	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	335	0.102		*	%	0.00335	0.0168	04/15/15 14:46	tcd

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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-01	WG382446	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.
	WG382361	Antimony, 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.
	WG382446	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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			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).
WG381982	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H1	Sample prep or analysis performed past holding time. See case narrative.	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	

Tahoe Resources, Inc.

ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-02	WG382446	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.
		Antimony, total (3050)	M6020 ICP-MS	M4	The spiked sample required a dilution such that the spike recovery calculation does not provide useful information. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382361	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.
	WG382175	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.
	WG382446	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG381601	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	Silver, 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.
			Zinc, total (3050)	M6020 ICP-MS	M3
				M6020 ICP-MS	ZB
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			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).	
WG381982	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H1	Sample prep or analysis performed past holding time. See case narrative.	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	

Tahoe Resources, Inc.

ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-03	WG382446	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.
	WG382361	Antimony, 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.
		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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric M9012B - Automated Colorimetric	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).
	WG381982	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.

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-04	WG382446	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.
	WG382361	Antimony, 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.
		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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			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).
WG381982	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H1	Sample prep or analysis performed past holding time. See case narrative.	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-05	WG382446	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.
	WG382361	Antimony, 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.
		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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			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).
WG381982	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.	

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-06	WG382446	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.
	WG382361	Antimony, 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.
		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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			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).
	WG381982	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.

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-07	WG382446	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.
	WG382361	Antimony, 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.
		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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			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).
WG381982	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.	

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-08	WG382446	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.
	WG382361	Antimony, 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.
		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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			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).
	WG381982	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.

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-09	WG382446	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.
	WG382361	Antimony, 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.
		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.
	WG382175	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.
	WG382446	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG381601	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	Silver, 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.
		Zinc, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			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).
WG381982	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.	

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-10	WG382446	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.
	WG382361	Antimony, 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.
	WG382446	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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			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).	
WG381982	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H1	Sample prep or analysis performed past holding time. See case narrative.	

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ACZ Project ID: **L23659**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23659-11	WG382446	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.
	WG382361	Antimony, 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.
	WG382446	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.
	WG382175	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.
	WG382361	Lead, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG382446	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.
	WG381601	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG382361	Selenium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Silver, 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.
		Zinc, 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.
	WG381790	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			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).

Tahoe Resources, Inc.

ACZ Project ID: **L23659**

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)
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L23659
 Date Received: 04/06/2015 10:12
 Received By: ddp
 Date Printed: 4/6/2015

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 5+8 and ID Line 8 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?
NA21557	14.7	14	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: L23659
Date Received: 04/06/2015 10:12
Received By: ddp
Date Printed: 4/6/2015

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



Laboratories, Inc. 23659

CHAIN of CUSTODY

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

Report to:

Name: Migue Berganza
Company: Tahoe Resources inc.
E-mail: M.Berganza@scnr

Address: Boulevard Los Proceres 18 Calle 24-69 zona 10
Empresarial zona Proceres Torre IV Oficina 1406
Telephone: (502) 5951 5242

Copy of Report to:

Name: Charlie Muechoff
Company: Tahoe Resources inc.

E-mail: Cmuechoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: M.Berganza@santafael.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 intentionally 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 columns. Includes handwritten entries for 'water Quality', 'Escobal', and 'SED'.

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

REMARKS

COC 1/4 report results per chain of custody.

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 handwritten signature and date 4-6-15 1030.





Laboratories, Inc. *023659*

CHAIN of CUSTODY

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

Report to:

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

Address: *BULEVAR LOS PROCEROS 18 calle 24-b9 zona 10*
Empresarial, Zona Prodera, Torre IV oficina 1406
Telephone: *(502) 5951 5248*

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@samrafael.com.gt*

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*Sampler's Signature: *[Signature]* I attest to the authenticity and validity of this sample. I understand that intentionally 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)

SAMPLE IDENTIFICATION				DATE:TIME	Matrix	# of Containers									
Quote #: <i>Water Quality</i>															
PO#: <i>Escobal</i>															
Reporting state for compliance testing:															
Check box if samples include NRC licensed material?															
Sed-4A				<i>23-03-15</i>	<i>13:05</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
Sed-ww14				<i>26-02-15</i>	<i>07:25</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
Sed-ww9				<i>18-03-15</i>	<i>15:50</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
Sed-ww14				<i>26-03-15</i>	<i>10:20</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
Sed-Pileta 1-TW				<i>31-12-14</i>	<i>15:40</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
Sed-Pileta 3-TW				<i>31-12-14</i>	<i>15:30</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
Lodos planta de tratamiento (ww9)				<i>18-03-15</i>	<i>09:20</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
Lodos clarificadores				<i>26-03-15</i>	<i>08:10</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
TDS-1				<i>25-02-15</i>	<i>08:48</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							
TDS-2				<i>25-02-15</i>	<i>08:39</i>	<i>SO</i>	<i>1</i>	<i>SED</i>							

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

REMARKS

*COC 2/4 Report results of SED-4A with samples in
COC 1/4.
Report results of "Lodos planta de tratamiento (ww9)"
in a different report.*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
		<i>HPL</i>	<i>4-6-15 1000</i>

Guatemala April 1st, 2015

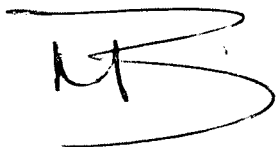
QUARANTINE STATEMENT

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).

Sincerely yours,

A handwritten signature in black ink, appearing to be the initials 'MB' with a large, sweeping flourish underneath.

Miguel Berganza
Environment Department
Proyecto Escobal, S. A.

INSTRUCTIONS TO DHS CBP INSPECTORS FOR IMPORTED SOIL SHIPMENTS ROUTED TO RECEIVING FACILITY:

For hand carry of soil, an official of CBP Agricultural Programs and Trade Liaison (APTL) would have been notified to document and facilitate the entry of the soil (See hand carry conditions below if stipulated). Otherwise:

1. Validate the permit in ePermits using the CBP search feature by logging on to: <https://epermits.aphis.usda.gov/epermits>
2. Confirm that the shipment is being routed directly to a USDA APHIS PPQ Inspected Facility authorized to receive soil by logging on to: <https://web01.aphis.usda.gov/PPQ/AuthSoilLabs.nsf/web?openform>
3. Confirm that the imported shipment has a valid USDA PPQ Form 550 Black/White label.
4. Confirm that the carrier of the shipment imported under this USDA PPQ 525 permit is commercially bonded.
5. For questions or concerns, contact the USDA APHIS PPQ Permit Unit in Riverdale, MD, at 866-524-5421 and ask to speak with a compliance officer.

PERMIT GUIDANCE

Receipt or use of foreign isolates or samples from countries under sanctions requires specific permission from the U.S. Department of Treasury (see <http://www.ustreas.gov/offices/enforcement/ofac/sanctions> for current country/regional listings) for current country listings.

This permit does not authorize importation, interstate movement, possession, and/or use of strains of genetically engineered regulated organisms (created by the use of recombinant DNA technology).

If an animal pathogen is identified in your shipment, to ensure appropriate safeguarding, please refer to http://www.aphis.usda.gov/import_export/animals/animal_import/animal_imports_anproducts.sh

tml.

If a human pathogen is identified, please see the CDC Etiologic Agent Import Permit Program at <http://www.cdc.gov/od/eaipp/>

This permit does not fulfill the requirements of other federal or state regulatory authorities. As appropriate, please contact the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S. Food and Drug Administration, the Centers for Disease Control and Prevention, the APHIS Veterinary Services unit, or your State's Department of Agriculture to ensure proper permitting.

If you are considering renewal of this permit, an application should be submitted at least 90 days prior to the expiration date of this permit to ensure continued coverage. Permits requiring containment facilities may take a longer period of time to process.

Approved Sterilization Methods:
All soil residues must be dry-heated, incinerated, hydroclaved or autoclaved.

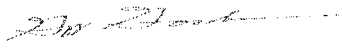
DRY HEAT Treatment: use one of the following schedules:

- 110- 120.5 degrees C (230-249 F) for 16 hours
- 121-154 degrees C (250-309 F) for 2 hours
- 154.4 - 192.5 degrees C (310-379 F) for 30 minutes
- 193-220 degrees C (380-429 F) for 4 minutes
- 221-232 degrees C (430-450) for 2 minutes

Time starts when the entire sample reaches the required temperature, and a suitable temperature probe must be used for verification.

INCINERATION: With the exception of metal and glass containers, all regulated and associated material must be reduced completely to ash at the end of the incineration cycle.

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.</p>  <p>Gregg Goodman</p>	<p>DATE</p> <p>08/13/2013</p>
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WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

AUTOCLAVE soil and other material using the following conditions:

- a. Soil must be autoclaved at 121 degrees Centigrade (250 degrees Fahrenheit) for a minimum of 30 minutes at 15 psi.
- b. Autoclave tape or other indicators must be placed on each bag or sharps container prior to treatment. The autoclave tape or other indicator on each container must be checked to verify color change before disposal.
- c. The autoclave log must be completed by each user for each autoclave cycle. All parameters must be noted as listed on the log for each autoclave load.
- d. If the autoclave does not attain the minimum time and/or temperature or the autoclave tape does not change color, a notation must be made in the comment section of the autoclave log. The load must then be re-autoclaved after placing new tape on the material. If minimum time and temperature is not attained on the second cycle, users must contact the person responsible for maintaining the unit to initiate repairs. Waste must then be treated at an alternate autoclave facility that is approved by USDA.
- e. Thermometers on the autoclave must be calibrated annually, and a written record must be maintained. This must be done by an authorized autoclave service company during routine servicing.
- f. Every 6 months, you should use a commercially available test indicator kit that uses bacterial spores *Bacillus stearothermophilus* that are rendered unviable at 250 degrees F or 121 degrees C. For the test, ampules of *B. stearothermophilus* are autoclaved along with a load of waste. Upon completion of the cycle, the ampules are incubated for 48 hours and then observed for any sign of growth, which indicates insufficient sterilization.

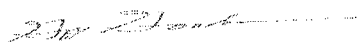
HYDROCLAVE: Soil must be hydroclaved at 121oC/250oF for a minimum of 30 minutes or 132oC for 15 minutes.

PERMIT CONDITIONS

This permit authorizes the importation of soil from all foreign sources (except countries with sanctions or embargoes by U.S. State Department), and interstate/ domestic movement of soil from Hawaii, the contiguous U.S., the continental U.S., and all U.S. territories only for chemical/ physical analysis in a controlled laboratory environment at the named facility on the permit. It is not authorized for use in field research or release into the environment. This permit also authorizes the hand carry of soil subject to hand carry conditions stipulated below.

1. This permit is issued only for the named permit holder at the address(s) identified on this permit. This permit cannot be transferred or assigned.
2. The permit holder verifies United States residency by initialing and accepting these permit conditions. If you are not a United States resident, it is unlawful for you to initial or accept these permit conditions because a USDA 525 soil Permit can only be issued to United States residents.
3. The permit holder is solely responsible for ensuring compliance with all statutory requirements and specifically listed permit conditions. Failure to comply with the terms and conditions of this permit is cause for the following: (a) cancellation of this permit, (b) cancellation of other permits issued to the permit holder, (c) seizure and/or destruction of regulated organisms, (d) denial of future permit applications by this permit holder, (e) liability for civil penalties, and (f) criminal prosecution under provisions in the Plant Protection Act.
4. Any alteration, forgery, unauthorized use of this permit and/or associated Federal Forms are subject to civil and criminal penalties including fines and imprisonment.
5. This permit must not be used for the movement or use of plant pathogens listed in the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. If any organism listed as a Select Agent is identified from materials associated with this research, the permit holder is required to notify APHIS, Agricultural Select Agent Program (ASAP) within one business day by phone at 301-851-3300, and within seven (7) days submit APHIS/CDC Form 4 (Report of Identification of a Select Agent or Toxin in a Clinical or Diagnostic Laboratory) to APHIS, ASAP; 4700 River Rd, Unit 2, Riverdale, MD 20737 (see instructions at: http://www.aphis.usda.gov/programs/ag_selectagent/index.shtml). Failure to comply with this requirement is a violation of the Agricultural Bioterrorism Protection Act of 2002.

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.</p>  <p>Gregg Goodman</p>	<p>DATE</p> <p>08/13/2013</p>
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WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years or both (18 U.S.C.s 1001)

6. If a regulated organism is received in this shipment, the permit holder must take all prudent measures to contain the organism(s) and notify the permit unit within one business day by calling 866-524-5421 or by e-mail to pest.permits@aphis.usda.gov. The permit holder must immediately notify the permit unit of the destruction of regulated organisms received under this permit, as above. Similarly, the permit holder must immediately notify the permit unit if facilities are destroyed or decommissioned for any reason.
7. You as the permit holder are responsible for maintaining a valid permit for as long as the soil is in your possession. APHIS does not issue extensions or renewals of existing permits; the permit holder must submit a new permit application at least three months prior to the expiration of this permit, and obtain a new permit to continue uninterrupted authorization for the soil approved under this permit.
8. If an accidental release into the environment occurs, notification must be made within one business day to APHIS, PPQ, 4700 River Rd., unit 133, Riverdale, MD 20737; 866-524-5421. A written report of the incident must be submitted identifying: (a) the name of the permit holder (responsible person), (b) the permit number, (c) the country or State of origin of the soil, (d) the nature of the release, and (e) measures already taken to contain, reduce or limit the effects of the accidentally released soil. Any plans prepared to contain, reduce or limit the effects of the accidentally released soil may be submitted as developed.
9. Without prior notice and during reasonable hours, authorized PPQ and/or State regulatory officials shall be allowed to inspect the conditions associated with the regulated soil authorized under this permit.
10. The permit holder must maintain an official permanent work assignment at the address identified on this permit. If the permit holder ceases assignment/affiliation at the address identified on this permit, or personnel circumstances change in any way, then a compliance officer must be notified at the PPQ permit unit immediately (that is, within one business day) by either (a) email to pest.permits@aphis.usda.gov, (b) fax to 301-734-4300 or 8700/5392, or (c) conventional mail to USDA PPQ Permit Unit, 4700 River Road, Riverdale, MD 20737. Should the permit holder depart from the organization/facility, the permit holder must either (a) request cancellation of this permit and comply with all permit-specific termination conditions, (b) apply for and receive a permit to move the soil to a new facility, or (c) relinquish control of the regulated soil to a qualified individual who obtained a permit for the continued use of this regulated soil prior to this permit holder's departure.
11. A copy of this permit must accompany all shipments authorized under this permit.
12. CBP-AI and PPQ have the authority to order and approve treatment, re-exportation or destruction of a shipment, a portion of a shipment or any other material associated with the shipment (i.e. pallets, packaging, and means of conveyance). If an official of CBP-AI or PPQ determines that the shipment requires treatment as a condition of entry, is contaminated with a quarantine plant pest or pests, is commingled with prohibited plant material or the required documentation is incomplete or missing, then that official may order and approve treatment, re-exportation or destruction of a shipment, a portion of a shipment or any other material associated with the shipment (i.e. pallets, packaging, means of conveyance).
13. All solid wood packing material (SWPM) accompanying the shipment must be in compliance with ISPM 15 treatment regulations and IPPC stamp requirements and enforcement. Noncompliant shipments will be treated, re-exported or destroyed at the consignee's expense.
14. All costs and arrangements for safeguarding and transportation of the cargo are the responsibility of the importer, broker or other parties associated with the shipment.
15. All operations must be consistent with information submitted in association with the above listed APHIS-PPQ inspected facility and subject to the conditions below.
16. Soil must be shipped in a securely closed, watertight container (primary container, test tube, vial, etc.) which must be enclosed in a second, durable watertight container (secondary container).
17. The shipment must be free from foreign matter or debris, plants and plant parts including noxious weeds and infestations by other macroorganisms such as insects, Cyst nematode nematodes, mollusks and acari. Authorized material found to be commingled with unauthorized material will be subject to the same action (i.e. re-export, destruction) as unauthorized material.
18. The imported article can be released without treatment at the port of entry to the permittee's address listed on the permit or label or to an authorized user only if the final destination is an approved facility listed at <https://web01.aphis.usda.gov/PPQ/AuthSoilLabs.nsf/web?openform>.

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.</p>	<p>DATE</p>
<p><i>Gregg Goodman</i></p> <p>Gregg Goodman</p>	<p>08/13/2013</p>

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

19. The soil must not be used in field research or release into the environment before sterilization.

The soil must not be used for isolation or culture of organisms, or for extracting and concentrating organisms from the soil.

The soil must not be used as a growing medium.

20. Further distribution of soil is not allowed without prior approval from Federal officials [State Plant Health Director or designee] (or from Federal officials with State concurrence): Access the website at <http://www.aphis.usda.gov/ppq/sphd/> for a list of State Plant Health Offices. Access the website at <http://nationalplantboard.org/member/index.html> for a list of State Plant Regulatory Officials.

21. While in storage, all soil must be kept locked (e.g. in freezer, cabinet) in the approved lab with access limited to authorized personnel or they will be in a restricted access building that requires a key card entry and access is restricted to authorized personnel only, or it must be in locked room restricted to authorized personnel only.

22. The soil must be handled as quarantined material until sterilized. This will include keeping the soil enclosed in containers when not in use and labeling all containers and/or storage areas: "Quarantine Soil- Sterilize Before Disposal"

23. All packing material, media, substrate, and shipping containers must be sterilized or destroyed as approved and prescribed by the permit conditions after removing the soil.

24. All unconsumed soil, containers and effluent must be autoclaved, incinerated or properly sterilized by the permittee at the conclusion of the project as approved and prescribed by the permit conditions.

25. Any water residues (effluent) from the processing of soil samples must be treated by an approved sterilization procedure such as hydroclave or autoclave.

26. All soil residues must be dry-heated, incinerated, hydroclaved or autoclaved.

Dry Heat Treatment: use one of the following schedules:

- 110- 120.5 degrees C (230-249 F) for 16 hours
- 121-154 degrees C (250-309 F) for 2 hours
- 154.4 - 192.5 degrees C (310-379 F) for 30 minutes
- 193-220 degrees C (380-429 F) for 4 minutes
- 221-232 degrees C (430-450) for 2 minutes

Time starts when the entire sample reaches the required temperature, and a suitable temperature probe must be used for verification.

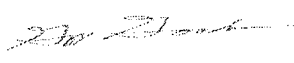
27. Incineration: With the exception of metal and glass containers, all regulated and associated material must be reduced completely to ash at the end of the incineration cycle.

28. Equipment and supplies used to conduct operations or that have contacted the soil must be decontaminated using one of the following methods:

- (a) Material can be soaked in a fresh bleach solution of 10 percent (1:10) for at least 30 minutes. (1:10 is a convention that means 1 in 10 or 1 part 9 parts = 10 parts total, which is a 10 percent solution)
- (b) Material can be soaked in 70 percent ethanol
- (c) Flamed with ethanol
- (d) Treated with quaternary ammonium compounds.

Note also that autoclaving, hydroclave, incineration, and dry heat sterilization are also acceptable sterilization/decontamination methods.

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.</p>  <p>Gregg Goodman</p>	<p>DATE</p> <p>08/13/2013</p>
--	-------------------------------

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

29. You must attach a PPQ Form 550 Black/White label to the exterior of each shipment being imported under this permit. If you are e-authenticated, you are instructed to request labels using the My shipment/my label option within ePermits at least 7 days in advance. Labels also may be requested by email at: BlackWhiteGreenYellow.labelrequest@aphis.usda.gov. All email requests must come from the permit holder or their authorized contact, if requested by an authorized contact the permit holder must be copied on all requests. You must specify PPQ Form 550 Black/White labels, the specific port(s) of entry and number of labels for each port when requesting labels. The requested labels will be sent to you through a bonded carrier.

30. Underlying packaging/wrapping must carry the address, billing, and any other information required to direct the shipment to its final destination (i.e., the permit holder's address; Please note: USDA APHIS does not defray any additional shipping costs incurred for transiting the shipment through an inspection station as the initial US destination).

31. The following conditions apply to all authorized soil hand carry events:

1. Twenty days prior to each hand carry event, the permit holder or designee must notify the PPQ Permit Compliance Officer or designee by email (BlackWhiteGreenYellow.labelrequest@aphis.usda.gov) to provide specific information such as:

- hand carrier's identity
- anticipated first port of arrival into the United States
- actual date of arrival the time
- detailed description of transport method; if border crossing, license plate number; or if travel by airline, the flight number.

An official notification to CBP Agricultural Programs and Trade Liaison (APTL) to document and facilitate the entry of the soil will be sent from the permit unit.

2. The hand carrier must indicate that soil is being imported under a USDA permit on the Customs Declaration form if such form is required at the port of entry.

3. At the port of entry, individuals carrying permitted soil must also present to CBP officers the following articles:

- U.S. Passport or permanent resident alien card
- Valid hand carry PPQ Form 550 Black/White label corresponding to the permit.

4. All hand carried articles must be securely packaged in compliance with permit conditions. Non-compliance will result in any of the following actions enforced by US CBP:

- seizure of the package for processing,
- clearance or destruction, or
- require its movement to the nearest PPQ Inspection Station.

The permit holder is responsible for all costs incidental to such actions.

5. Hand carried soil must be transported directly to the containment facility authorized in the permit.

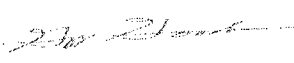
6. The permit unit must be notified of the arrival of the soil by an independent third party (e.g. containment facility director, departmental chair, campus biosafety officer, etc.) within 24 hours of the first business day via fax (301-734-5392) or email (BlackWhiteGreenYellow.labelrequest@aphis.usda.gov). The notification must include the permit number, label number, date of arrival, the origin of the soil, and quantity. Failure to notify the permit unit may result in loss of hand carry privileges. A PPQ inspector may also visit the facility to confirm the arrival of the package and its contents.

7. Person whose name is listed within the issued permit conditions who is authorized to hand-carry:

William Michael Kaage, Environmental Specialist, AATA International, Inc., 1400 Wewatta, Ste. 310, Denver, CO 80202, PH. (720) 583-2081.

8. Permit holder must request within the e-permits mylabel/myshipment feature or request using the email address

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.</p>  <p>Gregg Goodman</p>	<p>DATE</p> <p>08/13/2013</p>
--	-------------------------------

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1101)

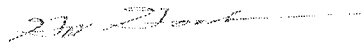
(BlackWhiteGreenYellow.labelrequest@aphis.usda.gov) to receive new PPQ Form 550 Black/White labels for each hand carry event, once the required information is submitted. The black and white labels for prepared for bonded carriers cannot be interchanged with hand carry labels. Illegal use of 550 Black/White labels may cause seizure by the Department of Homeland Security and destruction.

Further guidance on Hand Carry can be obtained from:
http://www.aphis.usda.gov/plant_health/permits/organism/soil/handcarry.shtml

END OF PERMIT CONDITIONS

Permit Number P330-13-00153

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.



Gregg Goodman

DATE

08/13/2013

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control numbers for this information collection are 0579-0054, 0088, 0129, 0198, 0235, 0257, 0305, 0310. The time required to complete this information collection is estimated to average 1.25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

FORM APPROVED
OMB NUMBER 0579-0054/0088/0129/0198/0235/0257/0305/0310

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

COMPLIANCE AGREEMENT

1. NAME AND MAILING ADDRESS OF PERSON OR FIRM Audrey J. Stover ACZ Laboratories 2773 Downhill Drive Steamboat Springs, CO 80487 Ph: 970-879-6590 Ext. 515 Fax: 815-301-3857 Email: audreys@acz.com	2. LOCATION Same
---	-------------------------

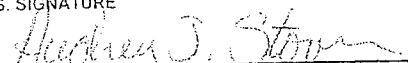
3. REGULATED ARTICLE(S)
Non-sterilized Foreign soil; or Foreign & Regulated Domestic soil; or Domestic soil (HI and/or U.S. territories) - ANALYSIS

4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS
7 CFR Part 330 and 7 CFR 301

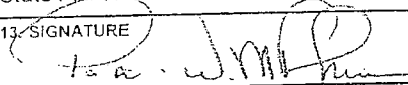
5. I/WE AGREE TO THE FOLLOWING:

I. Transfer and Noncompliance
 A. This agreement may be immediately cancelled or revoked for noncompliance.
 B. This compliance agreement is non-transferable.
 C. Any person who knowingly violates the Plant Protection Act (PPA) (7 U.S.C. 7701 et seq.) and/or the Animal Health Protection Act (AHPA) (7 U.S.C. 8301 et seq.) may be criminally prosecuted and found guilty of a misdemeanor which can result in penalties, a one-year prison term or both. Additionally, any person violating the PPA and/or the AHPA may be assessed civil penalties of up to \$250,000 per violation or twice the gross gain or gross loss for any violation that results in the person deriving pecuniary gain or causing pecuniary loss to another, whichever is greater.

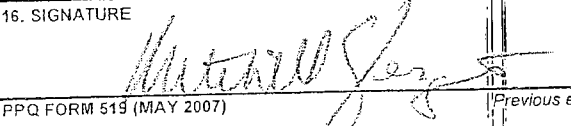
II. Procedures, protocols and limitations established in 'General Stipulations' (attached).

6. SIGNATURE 	7. TITLE President/CEO	8. DATE SIGNED 4-30-13
The affixing of the signatures below will validate this agreement which shall remain in effect until cancelled, but may be revised as necessary or revoked for noncompliance.		9. AGREEMENT NO. SP-13 169 10. DATE OF AGREEMENT

11. PPQ/CBP OFFICIAL (NAME AND TITLE) Patrick McPherran State Plant Health Director	12. ADDRESS USDA APHIS PPQ 3950 N. Lewiston St. Suite 104 Aurora, CO 80011
---	---

13. SIGNATURE


14. U.S. GOVERNMENT/STATE AGENCY OFFICIAL (NAME AND TITLE) Mitch Yergert Director, Division of Plant Industry	15. ADDRESS Colorado Department of Agriculture 700 Kipling Suite 4000 Lakewood, CO 80215
---	---

16. SIGNATURE


11.7 Informes originales de los Resultados Analíticos obtenidos del Efluente en los meses de Mayo a Julio 2015.

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 23:00 horas (090215)

Alicuota 2: 02:00 horas (100215)

Alicuota 3: 05:00 horas (100215)

Alicuota 4: 08:00 horas (100215)

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: 090215-100215

Fecha de ingreso de muestras: 100215

Fecha de análisis: 100215-230215

Fecha de informe: 230215

Identificación de la muestra: WW9

Correlativo Ecosistemas: 275

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	7.42	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	10	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	0.010	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) 2437 7224 - 2437 4455

17 avenida 2-39 zona 4 de Mixco

Ofibodegas Zaragoza 2, Bodega No. 2, Guatemala.

laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	0.05	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	16	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	4.5	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: 100215
 Fecha de ingreso de muestras: 100215
 Fecha de análisis: 100215-230215
 Fecha de informe: 230215

Identificación de la muestra: WW10

Correlativo Ecosistemas: 276

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	7.37	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	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	N.D.	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	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.

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** 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

February 23, 2015

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:

Account Payable DON?T USE

Tahoe Resources, Inc.

5310 Kietzke Lane

Suite 200

Reno, NV 89511

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L22849

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on February 12, 2015. This project has been assigned to ACZ's project number, L22849. 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 L22849. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

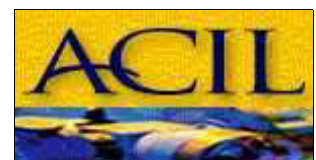
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after March 25, 2015. 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: **L22849-01**
 Date Sampled: 02/10/15 08:00
 Date Received: 02/12/15
 Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								02/19/15 13:01	tcd

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	02/21/15 0:08	thf

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW10

ACZ Sample ID: **L22849-02**

Date Sampled: 02/10/15 08:00

Date Received: 02/12/15

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								02/19/15 13:01	tcd

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	02/21/15 0:09	thf



Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L22849**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22849-01	WG379265	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).
L22849-02	WG379265	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).

Tahoe Resources, Inc.

ACZ Project ID: **L22849**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L22849
 Date Received: 02/12/2015 09:51
 Received By: ddp
 Date Printed: 2/12/2015

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?
3874	7.3	16	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.

L22849

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc. com
E-mail: m.Berganza@sanofad.com.gt

Address: Bulvar los Pinos 13501 24-692009 10
Empresarial Zona Pradera Torre IV oficina 1406
Telephone: (507) 5951 5248

Copy of Report to:

Name: Charlie Merrhoff
Company: Tahoe Resources inc.

E-mail: cmerrhoff@Tahoe Resources inc. com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: m.Berganza@sanofad.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 intentionally 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#: Escoba
Reporting state for compliance testing:
Check box if samples include NRC licensed material?

Table with columns: # of Containers, Matrix, and analysis results. Includes handwritten 'SW', 'Total 3', and a large 'COPY' watermark.

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix. Contains handwritten entries for WW9, WW10, WW9, WW10.

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

REMARKS

Please present cyanide results in a different report.

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

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

Handwritten signatures and dates for Relinquished and Received by.



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: 300315

Fecha de ingreso de muestras: 300315

Fecha de análisis: 300315-170415

Fecha de informe: 170415

Identificación de la muestra: WW9

Correlativo Ecosistemas: 701

Límites Máximos Permisibles Entes
Generadores Nuevos
Acuerdo 236-2006

Acuerdo Gubernativo 236-2006 (excepto cianuros)

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.84	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	10	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	0.011	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) 2437 7224 - 2437 4455

17 avenida 2-39 zona 4 de Mixco

Ofibodegas Zaragoza 2, Bodega No. 2, Guatemala.

laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

					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	30	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	1.6 x 10 ³	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

teléfonos: (502) 2437 7224 - 2437 4455

17 avenida 2-39 zona 4 de Mixco

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laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

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: 300315
 Fecha de ingreso de muestras: 300315
 Fecha de análisis: 300315-170415
 Fecha de informe: 170415

Identificación de la muestra: WW10

Correlativo Ecosistemas: 702

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	6.28	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	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	N.D.	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

teléfonos: (502) 2437 7224 - 2437 4455

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laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

Comparación de descarga según información del cliente.


Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUÍMICO
COLEGIADO No. 876

April 22, 2015

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: L23657

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 06, 2015. This project has been assigned to ACZ's project number, L23657. 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 L23657. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

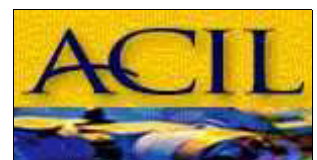
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after May 22, 2015. 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.

April 22, 2015

Project ID: Escobal

ACZ Project ID: L23657

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 20 ground water samples from Tahoe Resources, Inc. on April 6, 2015. 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 L23657. 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 sample L23657-01, the dissolved and total selenium values were verified by re-digestion and re-analysis with no significant change.

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L23657-16**

Date Sampled: 03/30/15 12:00

Date Received: 04/06/15

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								04/08/15 12:54	tcd

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	04/10/15 10:45	mss2

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW10

ACZ Sample ID: **L23657-17**
 Date Sampled: 03/30/15 12:00
 Date Received: 04/06/15
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								04/08/15 13:04	tcd

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	04/10/15 10:46	mss2



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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L23657**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23657-09	WG381609	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).
L23657-10	WG381609	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).
L23657-11	WG381609	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).
L23657-12	WG381776	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, 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).
L23657-13	WG381776	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, 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).
L23657-14	WG381776	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, 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).
L23657-15	WG381609	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).
L23657-16	WG381776	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, 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).
L23657-17	WG381776	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, 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).

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 unless omitted or equal to the PQL (see comment #4) 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. Synonymous with the EPA term "minimum level".
<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: **L23657**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L23657-01	WG381812	*All Compounds*	M8015D GC/FID	H3	Sample was received and analyzed past holding time.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG381765	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
	WG381536	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L23657-02	WG381812	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG381765	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
	WG381536	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L23657**

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: L23657
 Date Received: 04/06/2015 10:10
 Received By: ddp
 Date Printed: 4/6/2015

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 Report to: and Invoice to: on COC 1 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

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4545	12.8	13	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: L23657
Date Received: 04/06/2015 10:10
Received By: ddp
Date Printed: 4/6/2015



Laboratories, Inc. *(2365)*

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 12 calle 24-69 zona 10*
Empresarial zona Pradera Torre IV oficina 1406
Telephone: *(502) 5951 5242*

Copy of Report to:

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

E-mail: *cmuerhoff@tahorerresourcesinc.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 intentionally 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	Total <i>12</i>															
PO#: <i>Escobal</i>																			
Reporting state for compliance testing:																			
Check box if samples include NRC licensed material?																			
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																	
<i>Pozo PP</i>	<i>29/03/15 08:12</i>	<i>GW</i>	<i>1</i>	<i>✓</i>															
<i>Pileta de Proceso</i>	<i>29/03/15 08:23</i>	<i>WW</i>	<i>1</i>	<i>✓</i>															
<i>Agua de proceso</i>	<i>29/03/15 08:57</i>	<i>WW</i>	<i>1</i>	<i>✓</i>															
<i>WW9</i>	<i>29/03/15 09:15</i>	<i>WW</i>	<i>1</i>	<i>✓</i>															
<i>DWPO</i>	<i>29/03/15 14:20</i>	<i>GW</i>	<i>1</i>	<i>✓</i>															
<i>WW9</i>	<i>30/03/15 03:00-12:00</i>	<i>WW</i>	<i>1</i>	<i>✓</i>															
<i>WW10</i>	<i>30/03/15 12:00</i>	<i>SW</i>	<i>1</i>	<i>✓</i>															
<i>WW14</i>	<i>31/03/15 06:30-15:30</i>	<i>WW</i>	<i>1</i>	<i>✓</i>															
<i>SW3A</i>	<i>31/03/15 14:00</i>	<i>SW</i>	<i>1</i>	<i>✓</i>															
<i>SW2B</i>	<i>31/03/15 14:40</i>	<i>SW</i>	<i>1</i>	<i>✓</i>															

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
<i>J. Cortez</i>	<i>01-04-2015 10:45</i>	<i>Cortez</i>	<i>1-4-15 10:45</i>
		<i>WPL</i>	<i>1-6-15 10:10</i>

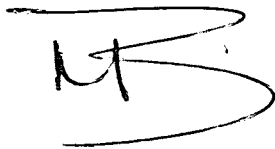
Guatemala April 1st, 2015

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

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 22:00 horas / 270415

Alicuota 2: 01:00 horas / 280415

Alicuota 3: 04:00 horas / 280415

Alicuota 4: 07:00 horas / 280415

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: 270415-280415

Fecha de ingreso de muestras: 280415

Fecha de análisis: 280415-110515

Fecha de informe: 110515

Identificación de la muestra: WW9

Correlativo Ecosistemas: 1118

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	7.49	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	10	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	0.009	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) 2437 7224 - 2437 4455

17 avenida 2-39 zona 4 de Mixco

Ofibodegas Zaragoza 2, Bodega No. 2, Guatemala.

laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	2.4×10^3	NMP	$< 1 \times 10^4$

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).


Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

Comparación de descarga según información del cliente.


Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 270415
Fecha de ingreso de muestras: 280415
Fecha de análisis: 280415-110515
Fecha de informe: 110515

Identificación de la muestra: WW10
Correlativo Ecosistemas: 1119

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	6.54	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	Oxítop-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 Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	10	N.D	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	N.D	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D	SMWW 3111B	2

					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

*** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**** Análisis referido.**

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

May 11, 2015

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: L24072

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 30, 2015. This project has been assigned to ACZ's project number, L24072. 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 L24072. 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.

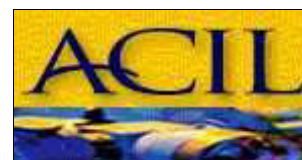
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after June 10, 2015. 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: **L24072-01**
 Date Sampled: 04/28/15 09:00
 Date Received: 04/30/15
 Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								05/05/15 13:45	bsu

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	05/08/15 12:07	mss2

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW10

ACZ Sample ID: **L24072-02**

Date Sampled: 04/27/15 12:00

Date Received: 04/30/15

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								05/05/15 13:54	bsu

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	05/08/15 12:10	mss2

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 unless omitted or equal to the PQL (see comment #5). 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. Synonymous with the EPA term "minimum level".
<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: **L24072**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24072-01	WG383195	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
L24072-02	WG383195	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24072**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
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ACZ Project ID: L24072
 Date Received: 04/30/2015 09:55
 Received By: ddp
 Date Printed: 4/30/2015

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? ¹			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?
3511	12.5	13	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.
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ACZ Project ID: L24072
Date Received: 04/30/2015 09:55
Received By: ddp
Date Printed: 4/30/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

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

L24072

CHAIN of CUSTODY

Report to:

Name: Miguel Berganza
Company: Tahoe Resources Inc
E-mail: M.Berganza@safafuel.com.gt

Address: Boulevard 105 Progreso 18 calle 24-69 zona 10
Empresarial Zona Progreso Torre IV of. 5.00 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlene Maerhof
Company: Tahoe Resources Inc

E-mail: emmaerhof@TahoeResources.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc
E-mail: M.Berganza@safafuel.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 intentionally 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#: ESC091
Reporting state for compliance testing:
Check box if samples include NRC licensed material?

Table with columns for Matrix, # of Containers, and analysis results. Includes handwritten entries for SW and WW matrices.

SAMPLE IDENTIFICATION DATE:TIME Matrix

Table with columns for Matrix, DATE:TIME, and Matrix. Includes handwritten entries for WW9, WW10, WWA, and CW4A.

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

REMARKS

Present results of WW9 and WW10 of cyanide in a different report.

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

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

Handwritten signatures and dates for Relinquished and Received by fields.



COPY