

Proyecto Minero Escobal
San Rafael Las Flores, Santa Rosa

Informe de Monitoreo Ambiental



Preparado para:



Ministerio de Ambiente y Recursos Naturales (MARN)

Informe Trimestral de Monitoreo Ambiental

Preparado por:



Departamento de Ambiente

San Rafael Las Flores, Santa Rosa, Guatemala

NOVIEMBRE 2015 - ENERO 2016

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1 Introducción

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

- A. Resultados obtenidos durante los monitoreos ambientales referente a la calidad del aire (material particulado, gases de combustión y niveles de presión sonora), calidad de agua, vibraciones, salud y seguridad ocupacional y geoquímica de roca llevados a cabo durante los meses de Noviembre 2015 a Enero 2016.

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

- Vibraciones: Se instalaron tres medidores de vibraciones, los cuales registraron la velocidad de partícula durante cada una de las voladuras. En total se registraron 736 voladuras durante los meses de Noviembre de 2015 a Enero 2016.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 15 muestras de material extraído de los túneles.
- Mediciones de Seguridad y Salud Ocupacional: Se analizaron seis estaciones de monitoreo de presión sonora, tres estaciones de material particulado y se presenta un extracto de las mediciones rutinarias de gases para determinar ácido sulfhídrico (H₂S).
- Copia de registro documentado del caudal bombeado de los pozos del agua bombeada desde los túneles hacia las piletas. En el anexo 11.1 se presenta copia de las lecturas diarias de flujómetros y los cálculos realizados para determinar los caudales bombeados del portal Este y el portal Oeste, durante los meses de Noviembre 2015 a Enero 2016.
- Copia de registro documentado del análisis In Situ y kit de Cianuro de efluentes. En el anexo 11.2 se presenta copia de las lecturas diarias de parámetros *In Situ* (pH, temperatura, conductividad y turbidez), así como los resultados obtenidos con el Kit de Cianuro (método colorimétrico) y resultados de muestras enviadas al laboratorio ACZ para la verificación del método colorimétrico, durante los meses de Noviembre 2015 a Enero 2016.

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 Noviembre 2015 a Enero 2016.

Cuadro 2-1: Condiciones meteorológicas, Proyecto Minero Escobal

Temperatura (°C)			Velocidad del viento (km/h)			Ráfagas (km/h)	Humedad relativa (%)			Precipitación (mm)
Max	Min	Media	Max	Min	Media	Max	Max	Min	Media	Total
Noviembre 2015										
28.33	12.3	20.07	39.17	0.31	5.88	160.92	100	0.31	80.61	56.17
Diciembre 2015										
28.43	11.42	20.38	39.01	0.31	7.45	160.92	100	33.92	74.39	1.01
Enero 2016										
29.7	7.6	18.62	37.75	0.31	8.66	48.13	100	28.84	73.44	0

°C = grados centígrados. Km/h = kilómetros por hora. % = porcentaje. mm = milímetros. Max = valor máximo. Min = valor mínimo. Fuente: MSR, 2016.

Durante el trimestre se registró una temperatura promedio de entre los 18.62° a los 20.38°C y en el mes de Noviembre se registró la mayor precipitación (56.17 mm). El mes que mayor humedad relativa promedio presentó fue Noviembre con 80.61% y el mes que en promedio presentó la mayor velocidad de vientos fue Enero con 8.66 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.



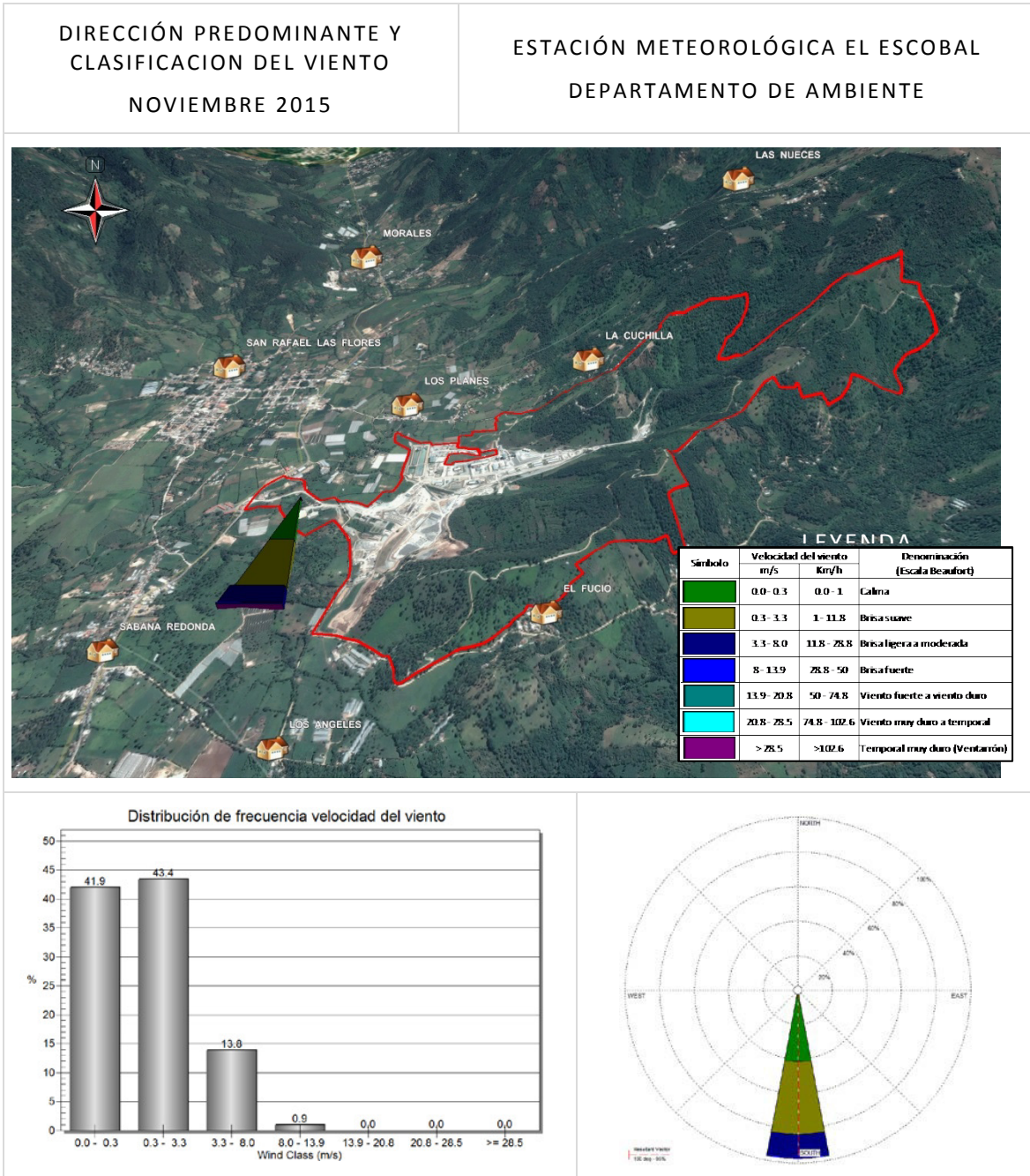
Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa

Fuente: MSR, 2016.

Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 la predominancia de los vientos durante Noviembre de 2015 y Enero de 2016 fue de norte a sur y el 74% de los registros están clasificados como brisa suave a brisa ligera moderada.

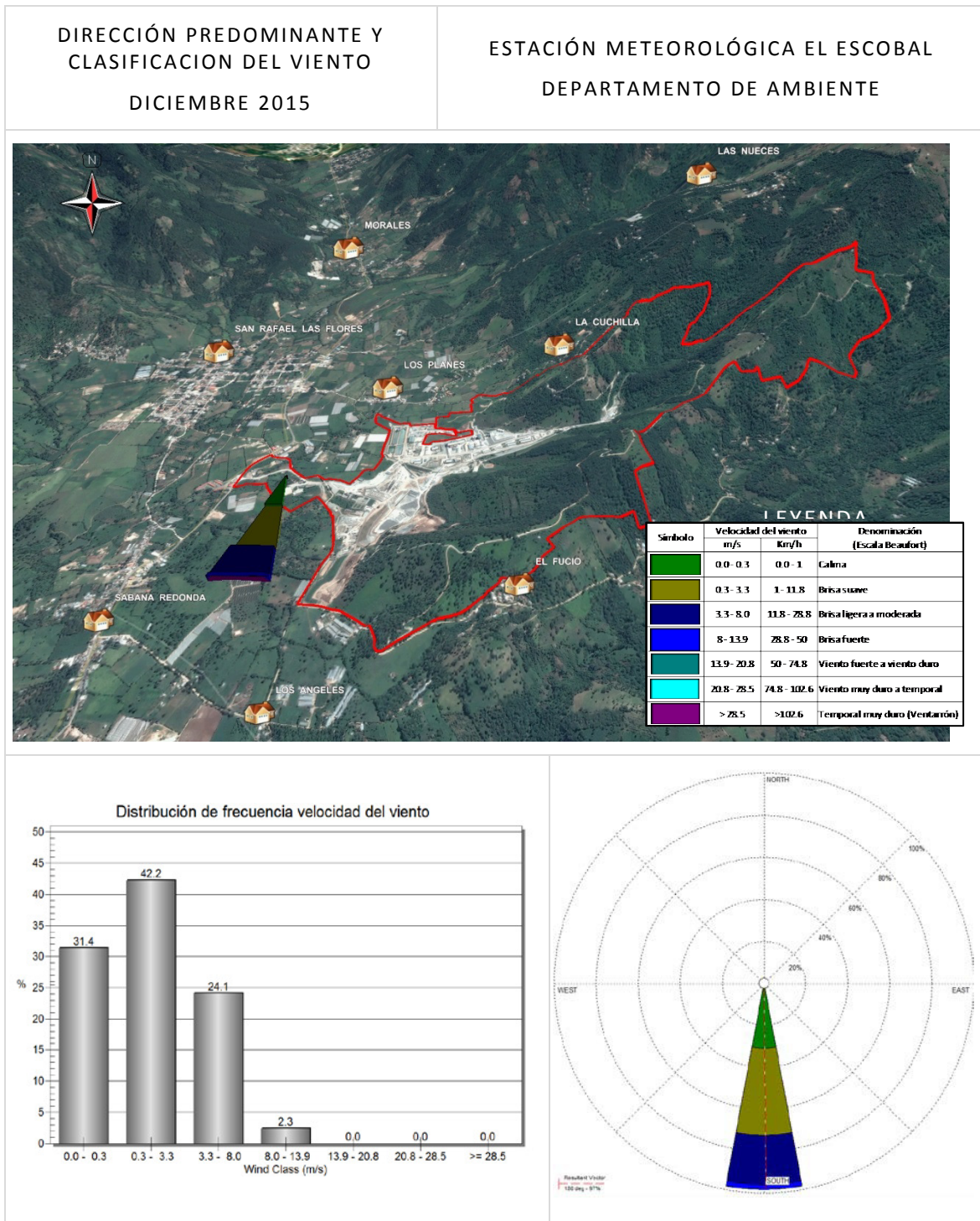
Figura 2-1: Dirección del viento Noviembre 2015, Proyecto Minero Escobal

6



Fuente: MSR, 2016.

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

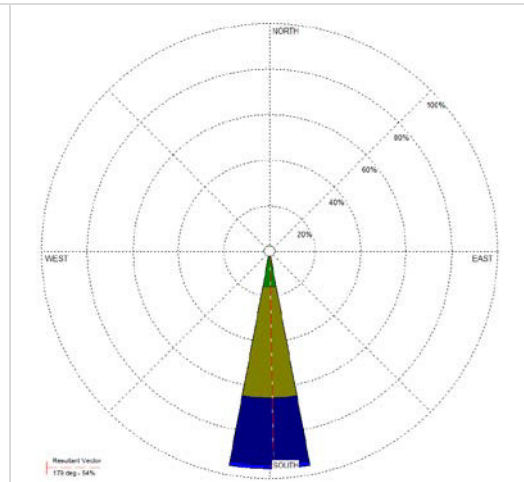
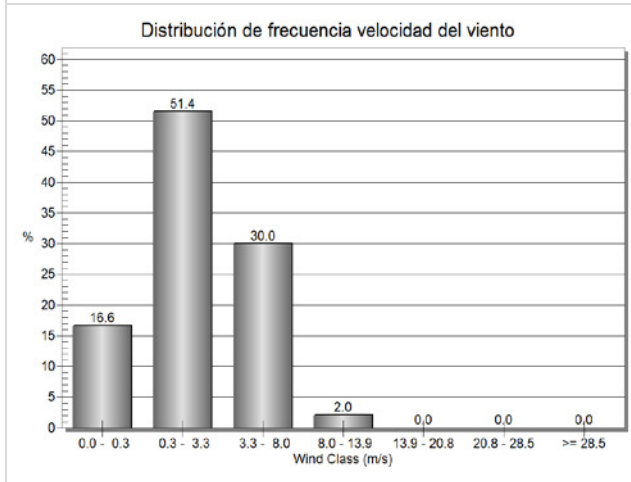
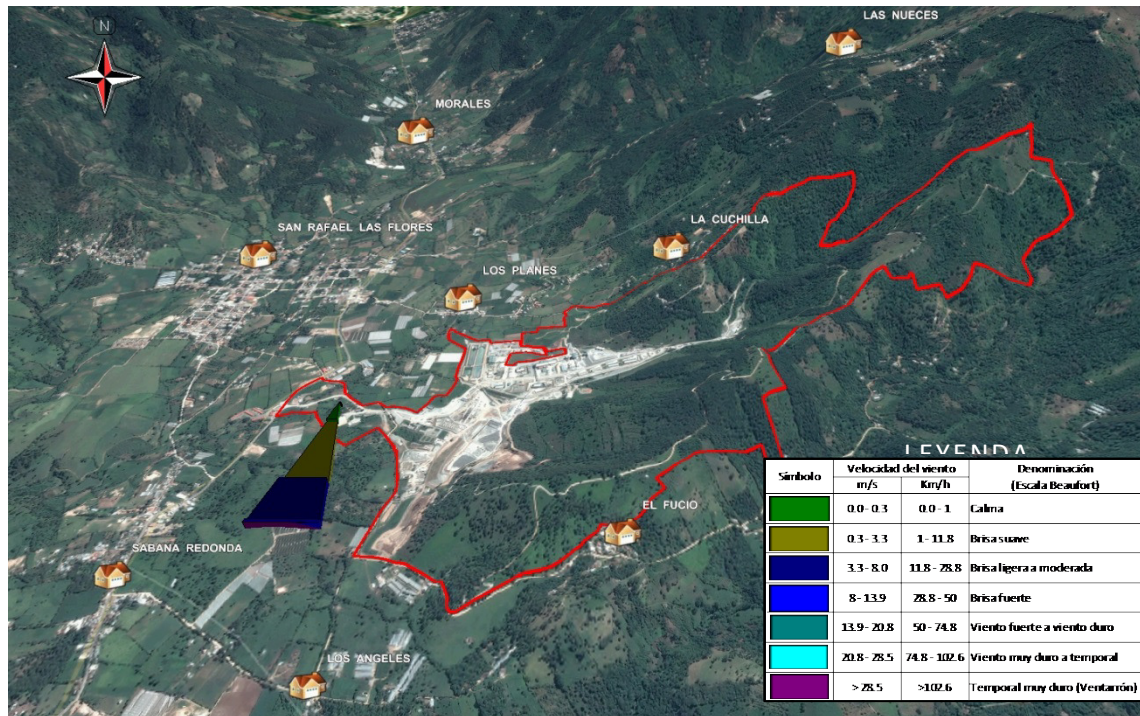


Fuente: MSR, 2016.

Figura 2-3: Dirección del viento Enero 2016, Proyecto Minero Escobal

<p>DIRECCIÓN PREDOMINANTE Y CLASIFICACION DEL VIENTO ENERO 2016</p>	<p>ESTACIÓN METEOROLÓGICA EL ESCOBAL DEPARTAMENTO DE AMBIENTE</p>
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8



Fuente: MSR, 2016.

3 Calidad de Aire

3.1 Material Particulado

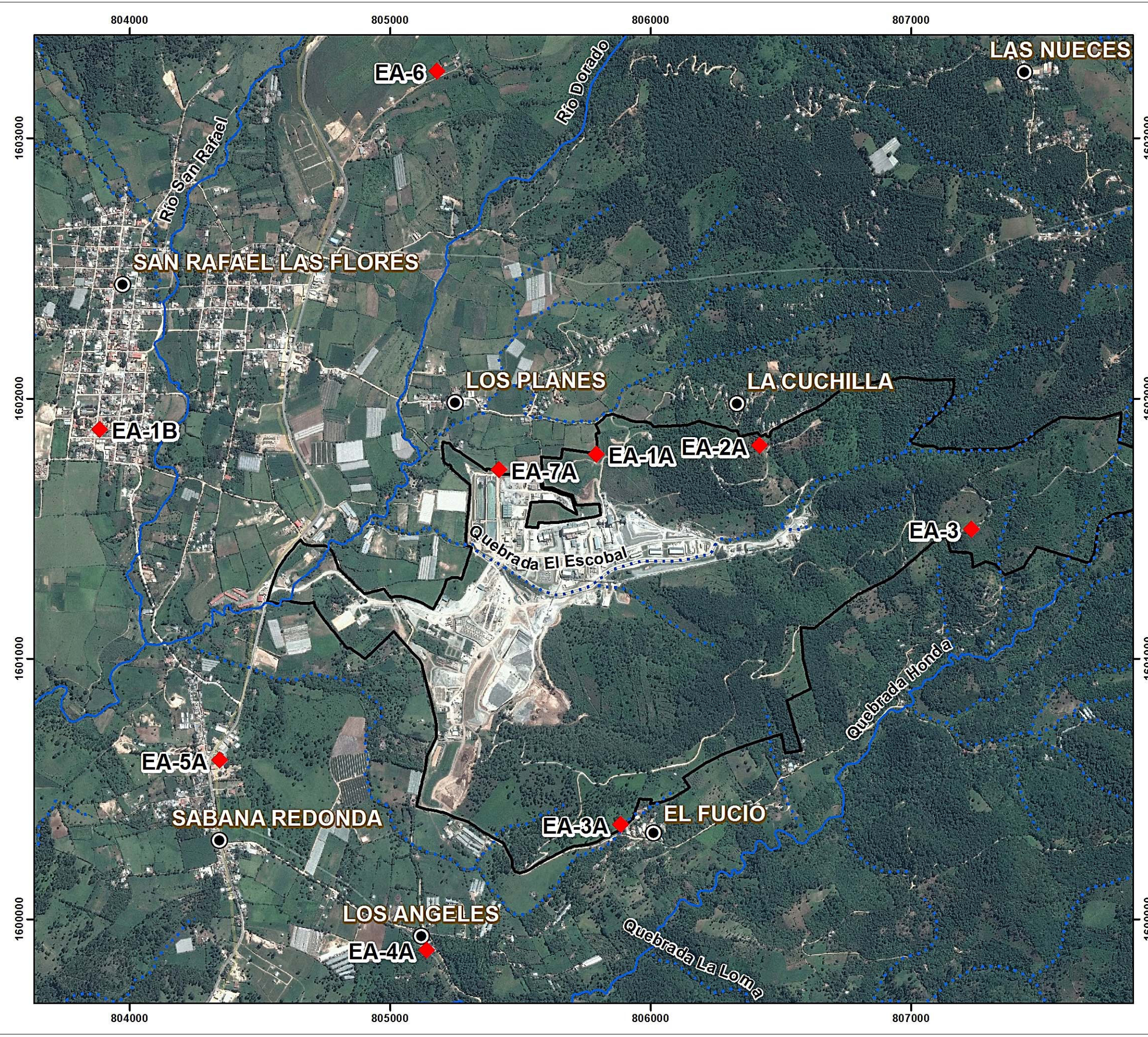
3.1.1 Sitios de Monitoreo

En el Cuadro 3-1 se enlistan las estaciones de monitoreo de material particulado (**PM₁₀**) menor o igual a 10 micrómetros, localizadas dentro de los terrenos de la mina y en la jurisdicción de los centros poblados ubicados en el área de influencia (**AI**) del Proyecto: Los Planes, La Cuchilla, El Fucío, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. La ubicación de las estaciones de monitoreo de **PM₁₀** se presenta en la Figura 3-1.

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

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

*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
MATERIAL PARTICULADO (PM10)

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

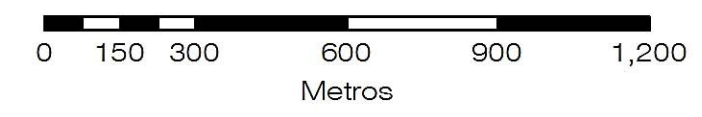
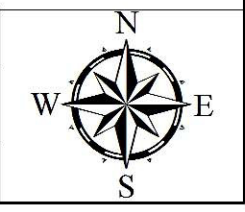
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO (PM10)

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

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

Fecha de Elaboración: Enero de 2016
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, 2016.

3.1.3 Resultados

En el Cuadro 3-3 se presentan los resultados de PM₁₀ durante los meses de Noviembre de 2015 a Enero de 2016 y los resultados de laboratorio del análisis gravimétrico de filtros y los cálculos realizados para determinar el PM₁₀ se presentan en el anexo 11.3.1

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

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

Estación	Norma*	Guías*		Línea Base			Resultados		
	USEPA ¹	Banco Mundial ²	OMS ³	Promedio	Máximo	Mínimo	Nov-15	Dic-15	Ene-16
				(µg/m ³)					
EA-1A	150	150**	50	24.36	89.95	3.67	3.36	39.52	14.98
EA-1B				NR	NR	NR	18.25	NA	NA
EA-2A				21.40	76.20	2.74	8.35	15.56	44.68
EA-3				25.68	78.85	1.25	4.46	18.40	17.16
EA-3A				NR	NR	NR	14.96	NA	NA
EA-4A				103.55	120.40	86.70	36.15	NA	NA
EA-5A				50.73 [¥]	104.80 [¥]	11.80 [¥]	20.41	NA	NA
EA-6				23.05	57.90	1.70	15.45	NA	NA
EA-7A				46.48 [¥]	115.90 [¥]	13.40 [¥]	12.45	44.51	11.23

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, 2016.

Los resultados obtenidos durante los meses de Noviembre de 2015 a Enero de 2016 se encontraron entre los 3.36 a 44.68 µg/m³. En Noviembre se registró el menor valor de PM₁₀ en la estación EA-1A (3.36 µg/m³), mientras que en Junio y Julio se registró en la estación EA-2A y EA-7A (15.56 y 11.23 µg/m³ respectivamente). Los valores más altos de PM₁₀ se registraron en la estaciones EA-4A durante Noviembre con 47.05 µg/m³, mientras que los valores más altos en Diciembre y Enero se registraron en las estaciones EA-7A y EA-2A con 44.51 y 44.68 µg/m³ respectivamente.

Todos los valores de PM₁₀ registrados durante el monitoreo trimestral, se encuentran por debajo de los límites máximos establecidos durante el levantamiento de línea base. Todos los valores de PM₁₀ se encuentran por debajo de los valores establecidos por las guías de la OMS (50 µg/m³).

3.2 Metales en Material Particulado

3.2.1 Sitios de Monitoreo

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

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

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

*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Nota: 1er y 3er trimestre del año se analiza metales totales, 2do y 4to trimestre únicamente mercurio total. El análisis del laboratorio es destructivo, por tanto es imposible analizar metales y mercurio en un mismo filtro. Fuente: MSR, 2016.

3.2.2 Metodología

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

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

Parámetros utilizados	
Metales en PM_{10}	Al, Sb, As, S, Ba, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Sn, Sr, P, Fe, Mg, Mn, Mo, Ni, Ag, Pb, K, Se, Si, Na, Tl, Ti, V, Zn, Zr
Procedimiento	
Los mismos filtros empleados para determinar el PM_{10} del muestreo trimestral, son enviados al laboratorio para determinar la cantidad de metales por el método analítico EPA 6010Bmod y EPA 6020mod, los resultados se dan en μg por filtro. Este peso se divide por el volumen de aire muestreado para obtener la concentración en $\mu\text{g}/\text{m}^3$. El	

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

Laboratorio

Nombre	Laboratorio Ambiental S.A. (parte de CTA). Laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados (análisis gravimétrico de filtros) cuentan con validez internacional según OGA-LE 050-12.
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Fuente: MSR, 2016.

3.2.3 Resultados

En el Cuadro 3-6 se presentan los resultados de concentración de mercurio en PM₁₀ durante el mes de Noviembre 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. La concentración de mercurio registrada durante Noviembre de 2015 estuvieron por debajo de los valores registrados durante Noviembre de 2014 en todas las estaciones de monitoreo, a excepción de la estación EA-2A.

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

Parámetro	EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A
	2233-1119	2271-0223	2273-0440	2230-0808	2229-0717	2234-1212	2272-0303
	Noviembre 2014 (µg/m³)						
Mercurio	N.D.	N.D.	0.0080	0.0080	N.D.	0.0010	N.D.
	Noviembre 2015(µg/m³)						
Mercurio	N.D.	0.00008	N.D.	N.D.	N.D.	N.D.	N.D.

ND: no detectado. LD: límite de detección. µg/m³ = microgramos por metro cúbico. Fuente: MSR, 2016.

3.3 Partículas Sedimentables Totales (PST)

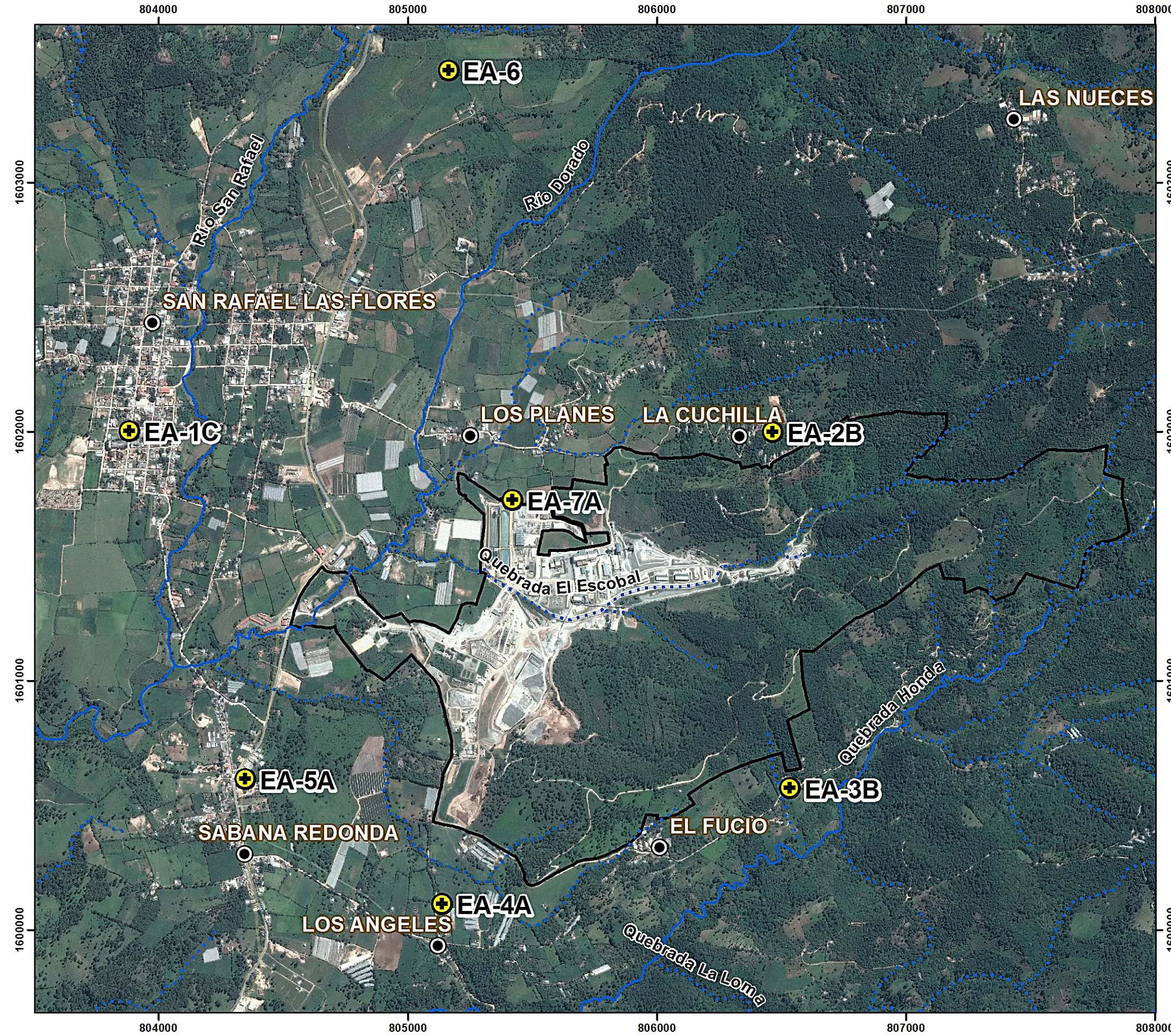
3.3.1 Sitios de Monitoreo

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 Mataquesuintla	
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, 2016.



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE PARTICULAS SEDIMENTABLES
TOTALES

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

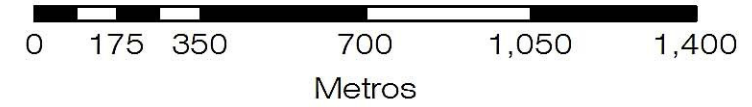
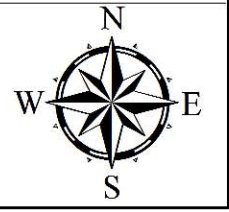
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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

Fecha de Elaboración: Enero de 2016

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, 2016.

3.3.3 Resultados

En el Cuadro 3-9 se presentan los resultados de Partículas Sedimentables Totales (PST) realizado durante Diciembre 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	Dic-15	Dic-15	Dic-15	Línea Base			Muestreo	Línea Base			Muestreo	Dic-15	Dic-15
						Promedio	Mínimo	Máximo	Dic-15	Promedio	Mínimo	Máximo	Dic-15		
	g/(m² x 30 días)														
Sólidos insolubles	ND	ND	11.78	5.48	16.74	6.27	2.60	10.80	33.32	6.50	0.80	16.00	6.95	1.56	3.59
Sólidos solubles			0.81	1.25	0.88	2.12	0.90	2.90	1.66	11.26	2.00	37.00	0.57	0.37	0.36
Sólidos totales			12.59	6.73	17.62	8.37	4.60	13.00	34.98	17.58	3.20	50.00	7.52	1.94	3.95

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, 2016.

Los valores de PST se encuentran entre 1.94 a 34.98 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 (34.98 g/(m² x 30 días)) se encuentra por 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 se han reportado en concentraciones similares durante los registros de Diciembre. 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)

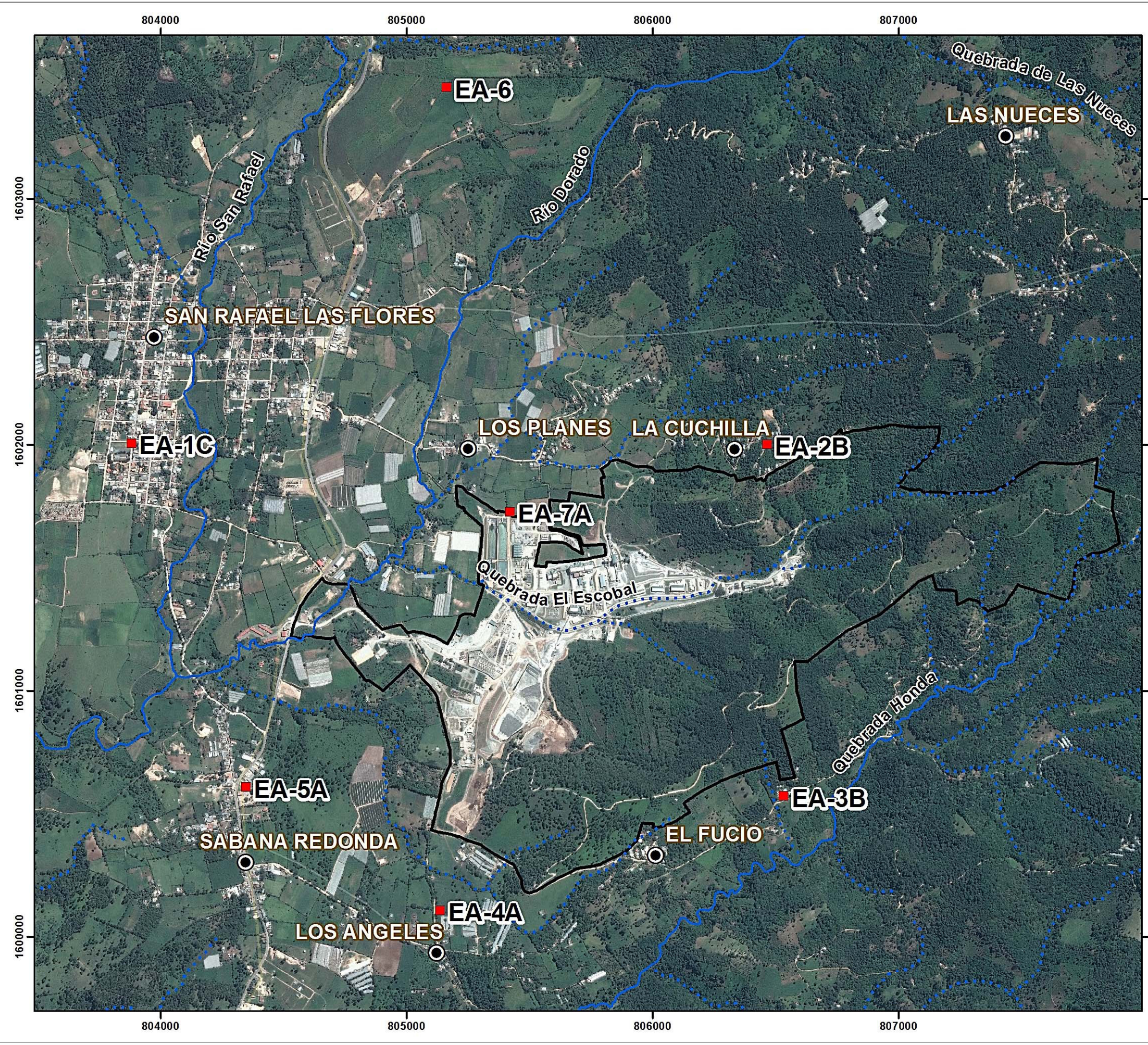
3.4.1 Sitios de Monitoreo

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 gases de combustión, 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, 2016.



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE GASES DE COMBUSTIÓN

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

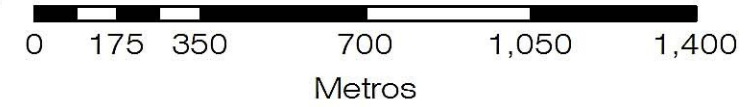
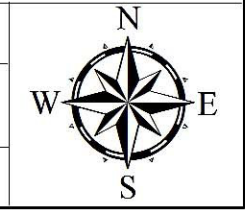
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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

Fecha de Elaboración: Enero de 2016

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 gases de combustión, 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, 2016.

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). Concentraciones de NO₂ únicamente fueron registradas en la estación EA-4A con 9 µg/m³, ligeramente por arriba del límite de detección del método. Todos los valores registrados de SO₂ y de NO₂ son menores a los valores guías establecidos por el Banco Mundial, la OMS, British Columbia y los valores norma establecidos por la USEPA. Lo que indica que las actividades realizadas durante el presente período, no han originado variaciones significativas en los parámetros reportados anteriormente.

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

Parámetro	Norma*				Guías*				EA-5A				EA-6	EA-7A			
	USEPA ¹	Banco Mundial ²	OMS ³	British Columbia ⁴	EA-1C Dic-15	EA-2B Dic-15	EA-3B Dic-15	EA-4A Dic-15	Línea base**			Muestreo Dic-15	EA-6 Dic-15	Línea base**			Muestreo Dic-15
									Promedio	Mínimo	Máximo			Promedio	Mínimo	Máximo	
(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	<9	<9	<9	10	<9	<9	<9	<9	<9	<9	<9	<9	<9

µg/m³ = microgramos por metro cúbico; SO₂= dióxido de azufre, NO₂= dióxido de nitrógeno. ¹Guía USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). ²Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. ³Guía de Calidad del Aire, OMS 2005. ⁴Guías para la calidad del aire ambiental. *Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. **Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente. ¥ Este valor corresponde a la concentración promedio anual. Fuente: MSR, 2016.

3.5 Niveles de Presión Sonora

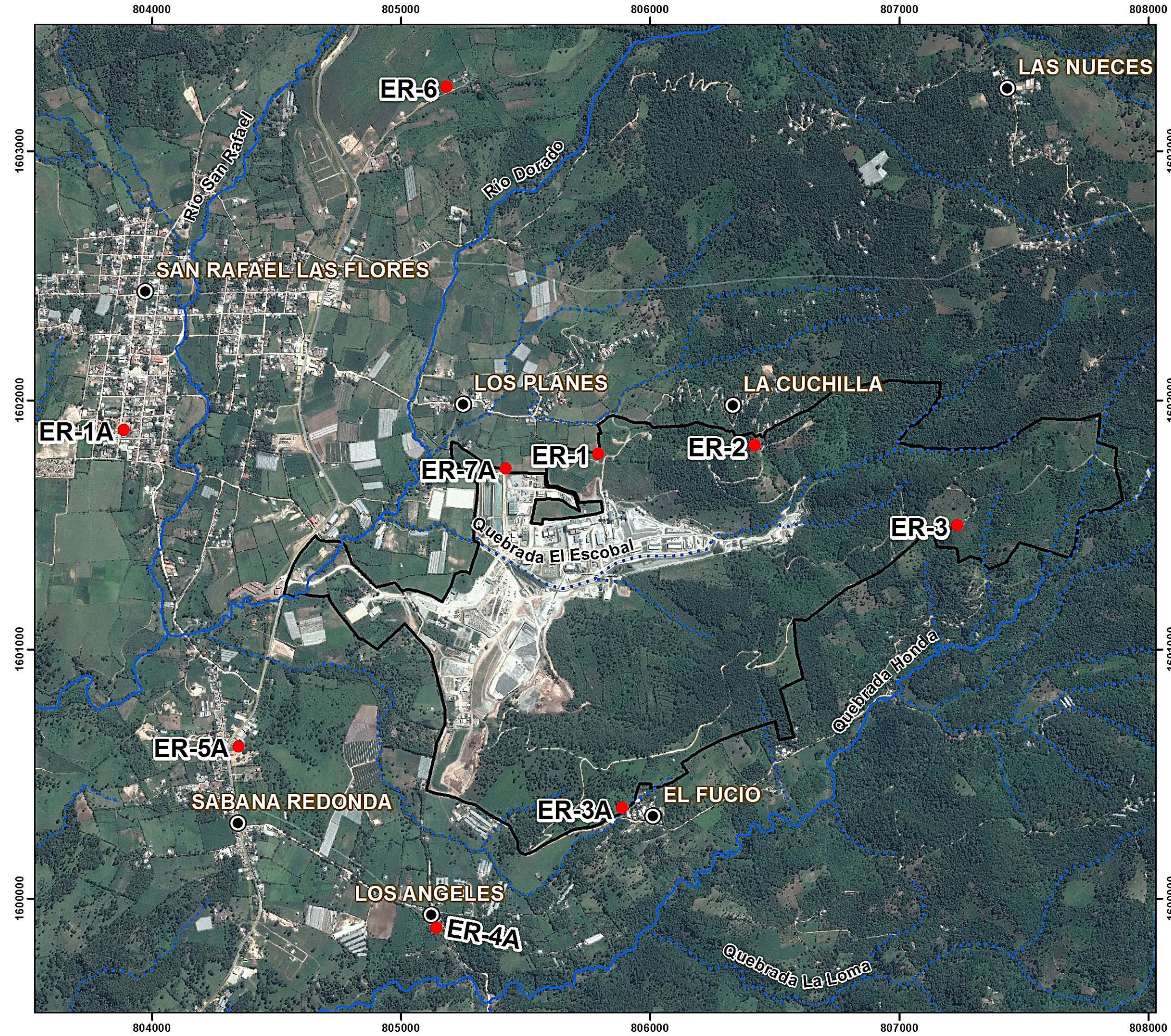
3.5.1 Sitios de Monitoreo

En el Cuadro 3-13 se enlistan las estaciones de monitoreo de presión sonora ubicados en el área de influencia (AI) del Proyecto, localizadas en la jurisdicción de los centros poblados: Los Planes, La Cuchilla, El Fucío, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. La ubicación de las estaciones de monitoreo de presión sonora se presenta en la Figura 3-4.

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

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

Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO NIVELES DE PRESIÓN SONORA

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

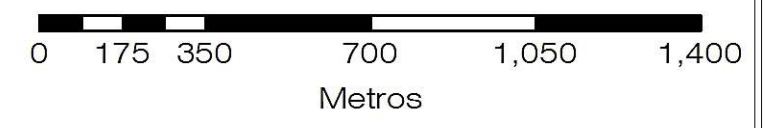
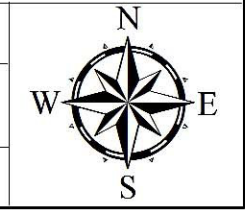
Símbolo	Estación	X	Y
	ER-1	805791	1601785
	ER-1A	803885	1601881
	ER-2	806419	1601819
	ER-3	807232	1601498
	ER-3A	805886	1600364
	ER-4A	805140	1599883
	ER-5A	804346	1600611
	ER-6	805181	1603257
	ER-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas catográficas año 2010 Mataquesuintla (2159-1) y Laguna de Ayarza (2159-II) del IGN, Ortofotos año 2008 del MAGA y Fotografía aérea del proyecto el Escobal año 2014, datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2016

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, 2016.

3.5.3 Resultados

En el Cuadro 3-15 y en el Cuadro 3-16 se presentan los valores registrados de los niveles de presión sonora (**NPS**) durante los meses de Noviembre de 2015 a Enero de 2016. 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 45 dBa y 57.2 dBa, los cuales corresponden a las estaciones ER-3 y ER-4A respectivamente.

La estación ER-3 se presentó el menor promedio diurno (45.4 dBa) y el menor promedio nocturno (39.5 dBa) de todas las mediciones efectuadas durante el monitoreo; mientras que la estación ER-4A presentó el mayor promedio diurno (55.6 dBa) y el mayor promedio nocturno (57.6 dBa) respectivamente.

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

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Los promedios diurnos registrados durante los meses de Noviembre de 2015 a Enero de 2016 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-4A durante la medición de Noviembre. Sin embargo el valor registrado se encontró ligeramente por arriba de los valores guía y norma. Los promedios nocturnos registrados estuvieron por debajo de la norma establecida por la USEPA (55 dBa), a excepción de los registros reportados en Enero en ER-2 y ER-4A.

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

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

Parámetro	Norma*		Guías*		ER-1						ER-2									
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Nov-15	Dic-15	Ene-16	Línea Base			Nov-15	Dic-15	Ene-16				
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo							
			dBA																	
Lmax	NL	NL	NL	NL	89.3	99.5	64.6	71.9	85.9	96.9	86.7	97.8	64.9	90.8	90.3	105.9				
Lmin					32.5	37.7	27.0	44.4	33.1	36	35.2	42.8	26.5	40.3	40.8	38.4				
Leq					49.9	57.1	41.2	48.9	47.7	51.1	49.4	58.7	39.7	48.5	49.5	55.3				
PD					55	55	55	70	50.5	59.1	39.7	49.3	47.6	51.3	48.8	57.1	39.8	48.8	49.5	54.4
PN					55	50	45	70	47.6	55.7	39.3	48.5	47.9	50.9	46.6	54.5	37.9	48.1	49.5	56.6

Parámetro	Norma*		Guías*		ER-3						ER-7A									
	USEPA ¹	OMS ²	Banco Mundial		Línea Base			Nov-15	Dic-15	Ene-16	Línea Base**			Nov-15	Dic-15	Ene-16				
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo							
			dBA																	
Lmax	NL	NL	NL	NL	87.4	100.7	67.2	82.3	93.4	85.2	87.5	89.0	82.1	81.4	94.9	97.5				
Lmin					49.4	56.2	26.9	34.1	29.4	31.4	NR	NR	NR	37.3	38.2	39.7				
Leq					56.8	63.2	39.7	45.4	45	49.4	52.8	54.5	50.9	49	51.4	52.6				
PD					55	55	55	70	56.5	63.1	41.0	45.4	46.6	49.5	52.1	53.5	50.4	50.5	52	52.8
PN					55	50	45	70	57.2	64.0	34.1	45.6	39.5	49.4	49.7	50.9	48.8	47.9	50.4	52.4

*Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. ¹Guía USEPA, 2006. Normas nacionales de niveles de presión sonora. ²Guías sobre ruido comunitario, OMS 1999. ³Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. dBA = decibeles en escala A. PD = promedio diurno (de 07:00 a 22:00) - PN = promedio nocturno (de 22:00 a 7:00). Lmax = lectura máxima registrada de dBA. Lmin= lectura mínima registrada de dBA. NL = no hay límite establecido para este parámetro. NR = cálculo No Realizado por falta de datos de línea base. ** Los valores de línea base corresponden a la estación ER-7. Fuente: MSR, 2016.

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

Parámetro	Norma*		Guías*		ER-1A				ER-3A				ER-4A				
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Nov-15	Línea Base			Nov-15	Línea Base			Nov-15	
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
			dBA														
Lmax								93.7					76.2	80.6	78.2	82.1	92.8
Lmin	NL	NL	NL	NL				39.4					32.5	NR	NR	NR	41.1
Leq					NR	NR	NR	52.5	NR	NR	NR		46.5	50.2	49.3	50.9	57.2
PD	55	55	55	70				53.4					46.8	49.5	48.4	50.4	55.6
PN	55	50	45	70				50.5					46.3	48.6	48.2	48.9	57.6

Parámetro	Norma*		Guías*		ER-5A				ER-6				
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Nov-15	Línea Base			Nov-15	
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
			dBA										
Lmax					91.6	85.1	92.2	91					76
Lmin	NL	NL	NL	NL	NR	NR	NR	34.3					33.3
Leq					65.8	51.6	67.6	47.9	NR	NR	NR		50.9
PD	55	55	55	70	61.2	50.2	63.8	48.5					51.4
PN	55	50	45	70	62.8	45.9	65.0	46.8					50.2

*Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. ¹Guía USEPA, 2006. Normas nacionales de niveles de presión sonora. ²Guías sobre ruido comunitario, OMS 1999. ³Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. dBA = decibeles en escala A. PD = promedio diurno (de 07:00 a 22:00) - PN = promedio nocturno (de 22:00 a 7:00). Lmax = lectura máxima registrada de dBA. Lmin= lectura mínima registrada de dBA. NL = no hay límite establecido para este parámetro. NR = cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.

4 Calidad del Agua

4.1 Sitios de Monitoreo

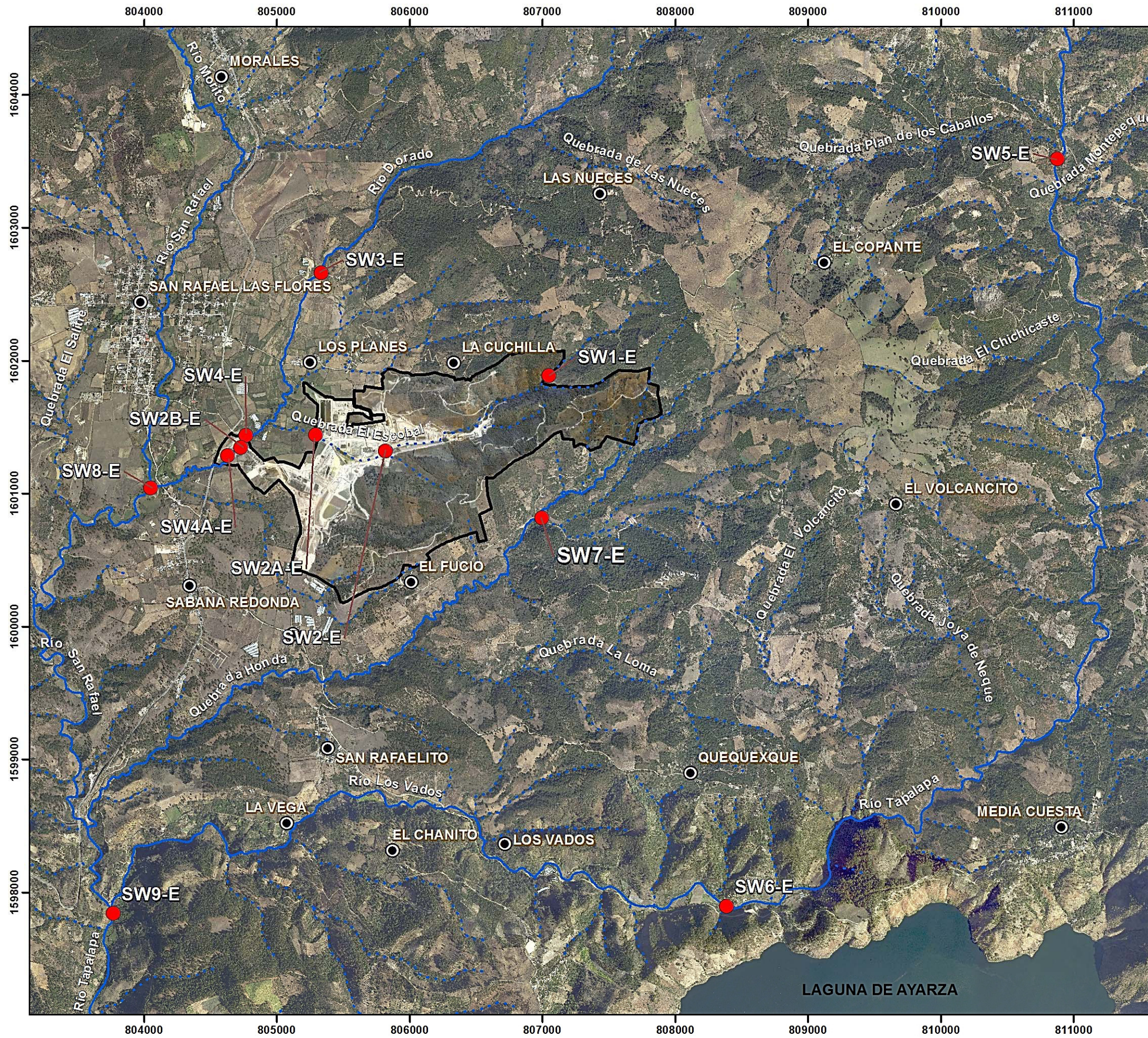
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua 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, 2016.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO AGUA SUPERFICIAL

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

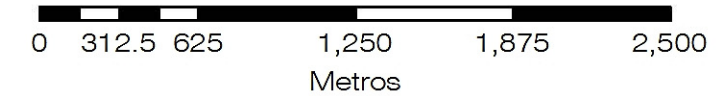
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW6-E	808385	1597892
	SW7-E	806995	1600815
	SW8-E	804048	1601037
	SW9-E	803766	1597838

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.

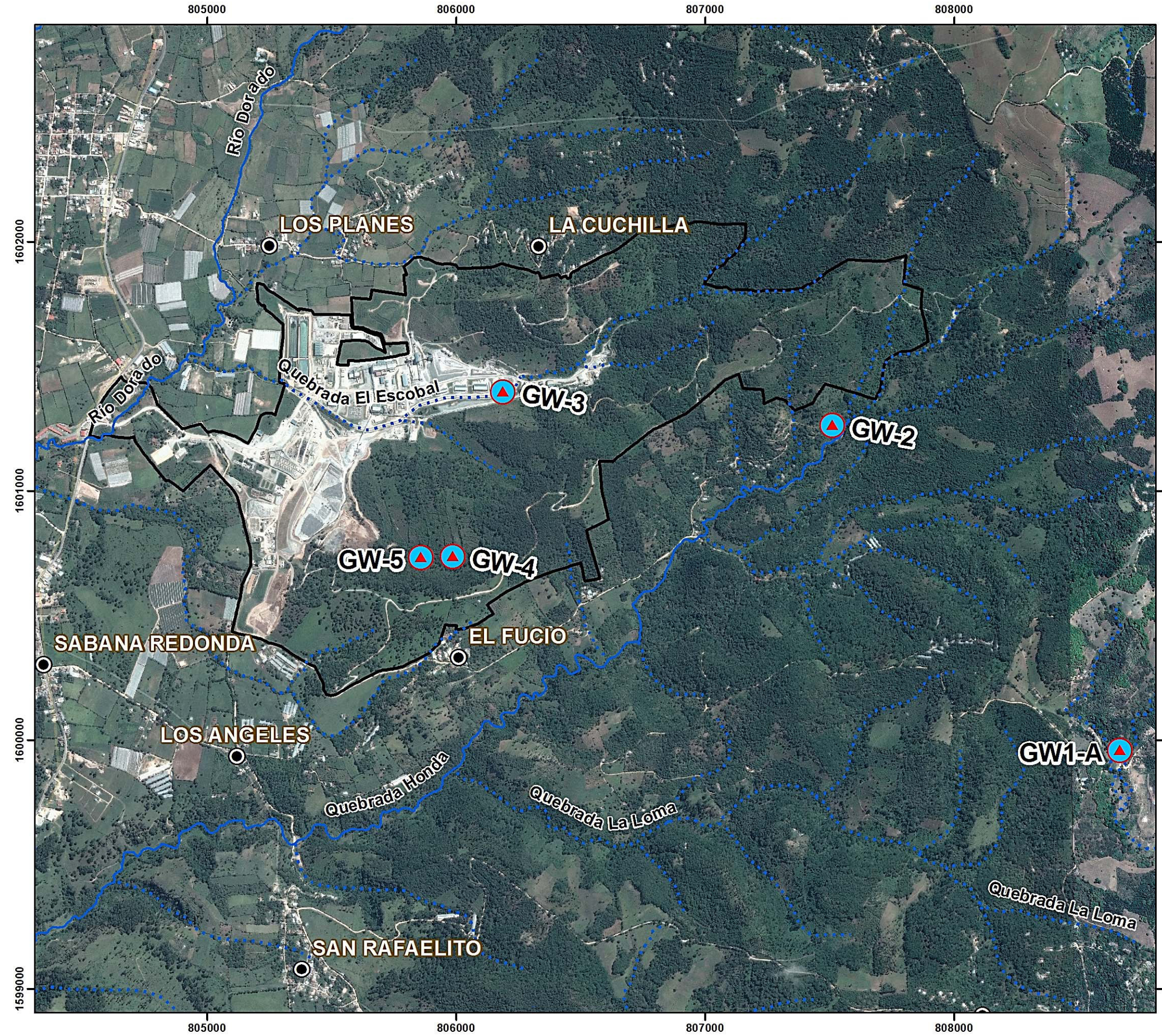
Fecha de Elaboración: Enero de 2016

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



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

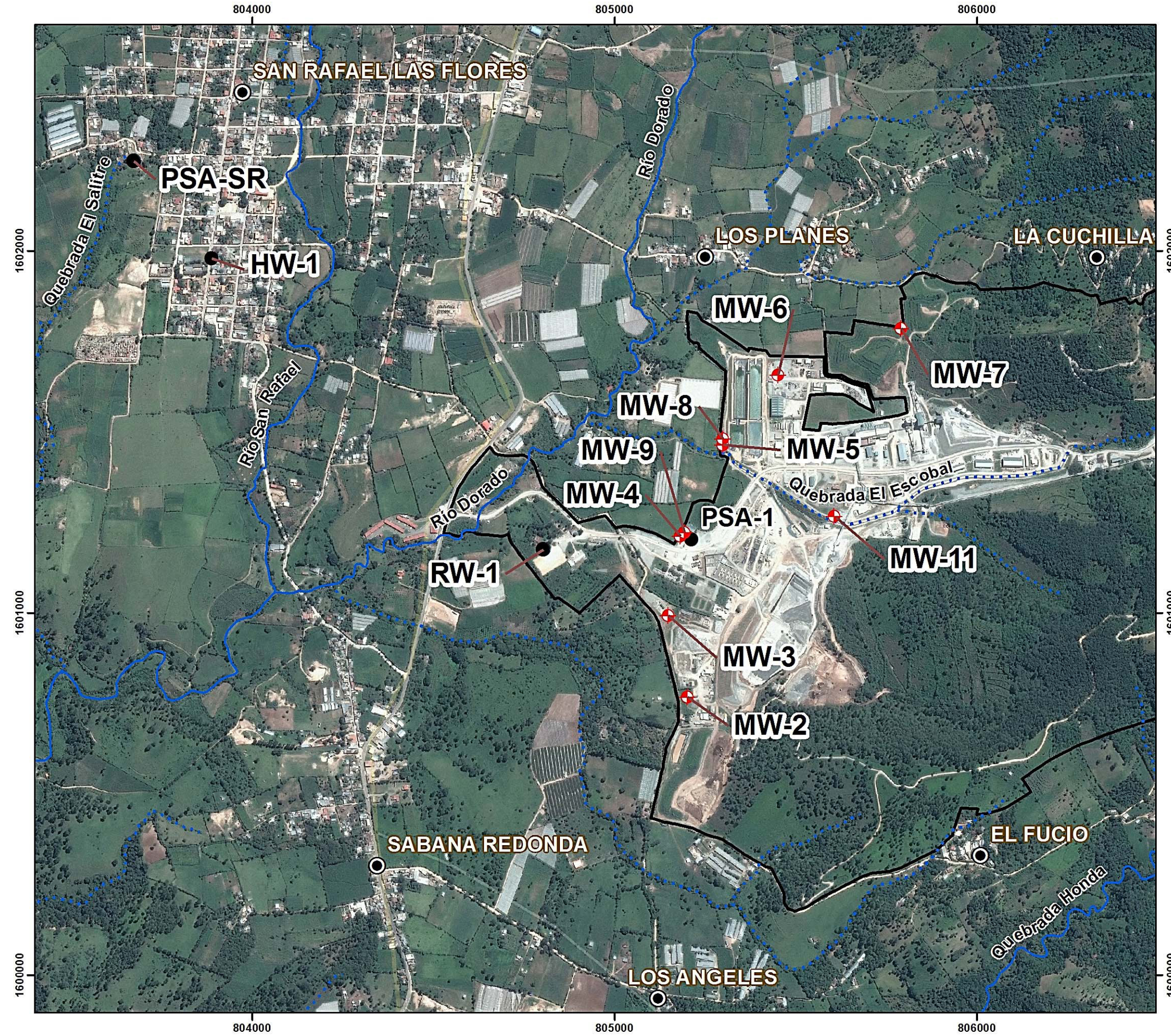
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquescuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2008 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2016

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



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)

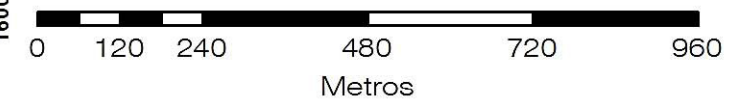
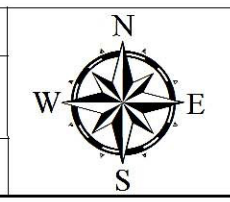
Símbolo	Estación	X	Y	
	MW-2	805201	1600768	
	MW-3	805148	1600993	
	MW-4	805181	1601212	
	MW-5	805299	1601463	
	MW-6	805452	1601657	
	MW-7	805791	1601785	
	MW-8	805298	1601480	
	MW-9	805192	1601222	
	MW-11	805607	1601267	
		RW-1	804803	1601175
		PSA-SR	803672	1602247
HW-1		803888	1601977	
PSA-1		805212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

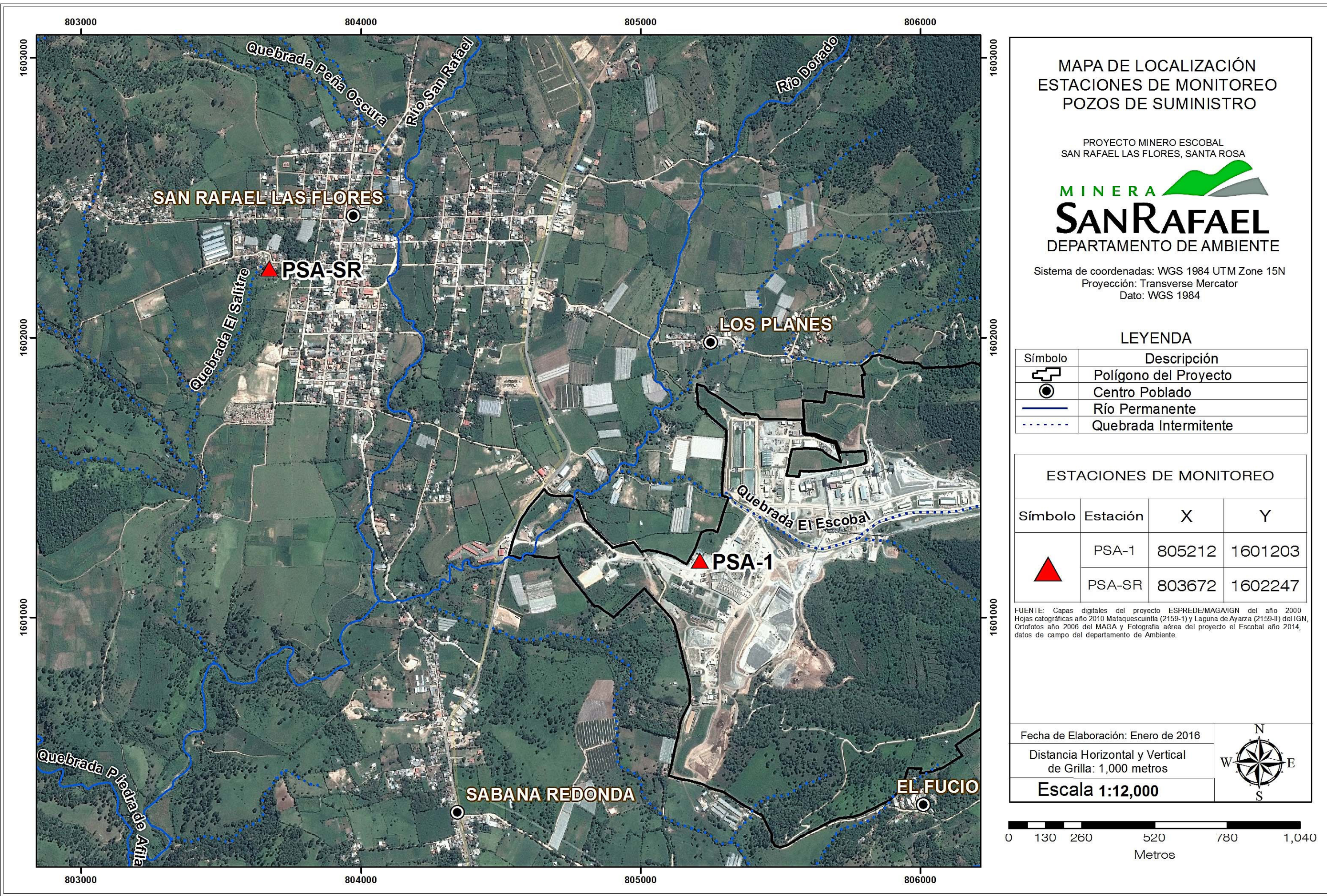
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas cartográficas año 2010 Mataquesuinta (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Enero de 2016

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



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

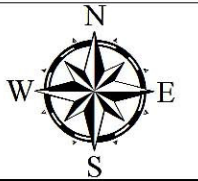
Símbolo	Estación	X	Y
	PSA-1	805212	1601203
	PSA-SR	803672	1602247

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

Fecha de Elaboración: Enero de 2016

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:12,000



4.2 Metodología

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

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

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

Fuente: MSR, 2016.

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

4.3 Resultados

4.3.1 Control de Calidad

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

En las tres muestras del control de calidad de los blancos de campo, se detectaron concentraciones mínimas de bario disuelto (GW10 y MW20), boro disuelto (SW10, GW10 y MW20), calcio disuelto (SW10, GW10 y MW20), calcio total (SW10), plomo total (SW10), magnesio disuelto (SW10), magnesio total (SW10, GW10 y MW20), zinc disuelto (SW10), cloruros (SW10), sólidos disueltos totales (GW10) y sulfatos (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	240	540	<2	<2	<2	<2
Color Aparente	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	26	44
Color Real	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Aluminio Total		<0.03	NA	NA	0.07	0.07	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0219	0.0225	0.0005	0.0004	<0.0004	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0197	0.0201	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.0085	0.0084	0.0022	0.0023	0.0017	0.0017
Arsénico Total		<0.0002	NA	NA	0.0087	0.0085	NA			
Bario Disuelto		<0.003	0.004	0.003	0.07	0.072	0.083	0.083	0.06	0.060
Bario Total		<0.003	NA	NA	0.072	0.07	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		0.02	0.01	<0.01	0.08	0.09	0.02	0.02	0.03	0.03
Boro Total		<0.01	NA	NA	0.1	0.09	NA			
Cadmio Disuelto		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		<0.0001	NA	NA	<0.0001	<0.0001	NA			
Calcio Disuelto		0.2	0.1	0.1	297	309	49.2	48.7	47.9	47.8
Calcio Total		0.1	NA	NA	317	303	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	8.91	8.88
Hierro Total		<0.02	NA	NA	<0.02	<0.02	NA			
Plomo Disuelto		<0.0001	<0.0001	<0.0001	0.0003	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Plomo Total		0.0001	NA	NA	0.0007	0.0007	NA			
Litio Disuelto		<0.008	<0.008	<0.008	0.083	0.063	<0.008	<0.008	0.016	0.016

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Litio Total	mg/L	<0.008	NA	NA	0.08	0.087	NA			
Magnesio Disuelto		0.3	0.3	<0.2	14.9	15.1	10.6	10.6	8.1	8
Magnesio Total		0.2	NA	NA	15.8	15.2	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.025	0.026	<0.005	<0.005	0.111	0.110
Manganeso Total		<0.005	NA	NA	0.036	0.031	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	0.06	0.06	<0.02	<0.02	<0.02	<0.02
Molibdeno Total		<0.02	NA	NA	0.08	0.05	NA			
Níquel Disuelto		<0.008	<0.008	<0.008	<0.008	<0.008	0.008	<0,008	<0,008	<0.008
Níquel Total		<0.008	NA	NA	<0.008	<0.008	NA			
Potasio Disuelto		<0.2	<0.2	<0.2	14	14.1	8	7.7	4.1	4.1
Potasio Total		<0.2	NA	NA	14.4	13.5	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		<0.0001	<0.0001	<0.0001	0.0022	0.0022	0.0003	0.0003	<0.0001	<0,001
Selenio Total		<0.0001	NA	NA	0.0021	0.002	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	<0.00005	NA			
Sodio Disuelto		<0.2	<0.2	<0.2	67	66.9	19.6	19.9	25.9	25.9
Sodio Total		<0.2	NA	NA	68.9	66.9	NA			
Estroncio Disuelto		<0.005	<0.005	<0.005	3.22	3.22	0.269	0.267	0.343	0.344
Estroncio Total		<0.005	NA	NA	3.26	3.19	NA			
Talio Disuelto		<0.0001	<0.0001	<0.0001	0.0003	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Talio Total		<0.0001	NA	NA	0.0003	0.0003	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	0.012	0.005	0.006	0.006	<0.005	0.005
Titanio Total		<0.005	NA	NA	0.012	0.015	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Uranio Total		<0.0001	NA	NA	0.0002	0.0002	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadio Total		<0.005	NA	NA	0.014	0.011	NA			
Zinc Disuelto		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0,01	<0,01
Zinc Total		<0.01	NA		<0.01	<0.01	NA			
Grasas y Aceites		<2	NA		2.3	<2	NA			
DQO		<10	NA		<10	<10	NA			
Cloruros		0.5	<0.5	<0.5	59.7	61	9.7	9.4	7.7	7
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	1.16	1.11	0.19	0.19	0.52	0.53
Nitratos/Nitritos como N	<0.02	<0.02	<0.02	3.53	3.52	3.32	3.27	<0.02	<0.02	
Amonio	<0.05	<0.05	<0.05	0.08	0.05	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)	<0.1	<.0.1	<0.1	0.1	0.3	0.1	0.1	<0.1	<0.1	
Fosfatos	<0.06	<0.06	<0.06	<0.06	<0.06	0.06	<0.06	0.43	0.43	
Fósforo Disuelto (Orto)	<0.02	<0.01	<0.01	0.02	0.02	0.05	0.05	0.06	0.06	
Fósforo Total	<0.02	<0.01	<0.01	0.02	0.02	0.02	0.02	0.15	0.15	
STD (TDS)	<10	10	<10	1390	1390	360	354	312	314	
SST (TSS)	<5	<5	<5	<5	<5	<5	<5	8.0	5.0	
ST (TS)	<10	<10	<10	1450	1440	368	376	332	342	
Sulfatos	1.0	<1	<1	840	792	118	117	74.4	77.6	

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
Alcalinidad Total		<2	<2	<2	39.6	39.5	68.9	69.3	124	122
Hidrocarburos totales (TPH)	mg/L	<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, 2016.

4.3.2 Agua Superficial

En el Cuadro 4-4 se presentan los resultados de la calidad del agua superficial para el mes de Diciembre 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 (6.47 a 8.2 u.e.). En ninguna de las estaciones se detectaron valores de grasas y aceites 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, a excepción de la estación SW6-E en donde se registró ligeramente por encima del límite de detección del método. La Demanda Química de Oxígeno (**DQO**) se detectó en las estaciones SW1-E, SW2-E, SW4-E, SW4A-E y SW8-E en concentraciones entre 10-32 mg/L, y no sobrepasaron el valor guía establecido por el Banco Mundial (125 mg/L). En ninguna estación se detectó concentración alguna de Demanda Bioquímica de Oxígeno (**DBO**).

Las estaciones muestreadas presentaron concentraciones por debajo de la directriz de la USEPA para la salud humana de Cloruros (250 mg/L), Fluoruros (4 mg/L) y concentraciones muy por debajo de los valores establecidos por el Acuerdo (10 mg/L) y el Banco Mundial (2 mg/L) para Fósforo total.

En cuatro de las once estaciones se detectó sólidos suspendidos totales encontrándose por debajo de los valores establecidos por el Acuerdo (100 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 la línea base. El Antimonio fue detectado en siete estaciones, excepto en SW5-E, SW6-E, SW3-E y SW1-E y se detectó en un rango de concentración de 0.0007 – 0.0201 mg/L, por debajo de los límites máximos establecidos durante la línea base.

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

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, Proyecto Minero Escobal (1/4)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E			
					Quebrada Escobal-aguas arriba				Quebrada Escobal-en medio del Proyecto				Quebrada Escobal- salida del Proyecto			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	7.87	7.42	6.56	7.87	8.2				7.71
Temperatura (campo)	°C				17.4	13	19.8	16.5	22.4	20.3	25.6	25.4				23.8
Conductividad (campo)	µS/cm				277.9	66.3	566.6	198.1	807.3	177.3	1965	1855				1687
Oxígeno disuelto (campo)					3.6	0.1	6.4	8.08	4.76	3.5	5.8	7.36				7.14
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							3.1 x 10 ²				23				540
Color Aparente	U Pt/Co				NR	NR	NR	31	NR	NR	NR	<1				<1
Color Real								<1				<1				<1
Turbidez	NTU							8.79				1.77				6.84
Aluminio Disuelto					0.035	<0.03	0.09	<0.03	0.043	<0.03	0.12	<0.03				<0.03
Aluminio Total		0.2			5.02	<0.03	35.1	0.59	2.35	0.06	8.77	0.16				0.07
Antimonio Disuelto					<0.0004	<0.0004	0.0006	<0.0004	<0.0004	<0.0004	<0.0004	0.0153				0.0225
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	<0.0004	<0.0004	<0.0004	0.0005	0.015				0.0201
Arsénico Disuelto					0.00216	0.0005	0.0034	0.0019	0.00184	0.0013	0.0024	0.0112				0.0084
Arsénico Total		0.01		0.1	0.00339	0.0015	0.0094	0.0019	0.00266	0.0012	0.0054	0.0114				0.0085
Bario Disuelto					0.1361	0.086	0.207	0.087	0.109	0.088	0.133	0.046				0.072
Bario Total		1			0.186	0.1	0.434	0.091	0.131	0.096	0.186	0.045				0.07
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	0.12				0.09
Boro Total					<0.01	<0.01	0.02	0.01	0.11	<0.01	0.28	0.12				0.09
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	22.8	144.9	20.7	333	342				309
Calcio Total					45.5	20.9	70.5	24.2	144.6	20.5	331	348				303
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	0.25	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	0.0005				0.0003
Plomo Total		0.015		0.4	0.0025	<0.0001	0.0191	0.0002	0.00088	<0.0001	0.0038	0.0062				0.0007
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.086				0.063
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.088				0.087
Magnesio Disuelto					3.9	2.6	5.3	3	15.9	3.2	37.3	21.7				15.1
Magnesio Total					4.2	2.8	5.2	3.1	15.1	3.6	32.2	22.6				15.2
Manganeso Disuelto					0.0051	<0.005	0.02	<0.005	0.0195	<0.005	0.07	0.058				0.026
Manganeso Total		0.4			0.1041	<0.005	0.721	0.014	0.0602	0.007	0.174	0.074				0.031
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	0.04				0.06

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E				
					Quebrada Escobal-aguas arriba				Quebrada Escobal-en medio del Proyecto				Quebrada Escobal- salida del Proyecto				
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	0.05				0.05	
Níquel Disuelto					<0.01	<0.01	0.03	<0.008	0.013	<0.01	0.04	<0.008				<0.008	
Níquel Total		0.61		2	<0.01	<0.01	0.04	<0.008	0.022	<0.01	0.04	<0.008				<0.008	
Potasio Disuelto					4.4	3.5	5.1	3.9	6.1	4.9	7.6	9.2				14.1	
Potasio Total					5.3	3.5	13	4.2	6.3	5.2	7.4	9.7				13.5	
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	0.0002	0.00045	<0.0001	0.0002	0.0012				0.0022	
Selenio Total		0.17			0.0001	<0.0001	0.0003	<0.0001	0.00011	<0.0001	0.0002	0.0013				0.002	
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	0.0001				<0.00005	
Sodio Disuelto					9.81	8.3	11.6	7.9	40.1	9.4	87.8	67.4				66.9	
Sodio Total					9.46	7.8	11.8	8	39.8	9.4	85.2	69.7				66.9	
Estroncio Disuelto					0.17	0.09	0.26	0.115	1.23	0.1	2.99	3.74				3.22	
Estroncio Total					0.18	0.1	0.25	0.115	1.23	0.11	2.91	3.75				3.19	
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	0.0003				0.0003	
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	0.013				0.005	
Titanio Total					0.092	<0.005	0.591	0.021	0.2715	<0.005	0.171	0.015				0.015	
Uranio Disuelto					0.00013	<0.0001	0.0003	<0.0001	0.00028	<0.0001	0.0006	0.0005		NR	NR	NR	0.0002
Uranio Total					0.00038	<0.0001	0.0011	<0.0001	0.00024	<0.0001	0.0005	0.0005				0.0002	
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	0.0065	<0.005	0.015	0.009				<0.005	
Vanadio Total					0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	0.012				0.011	
Zinc Disuelto					0.053	<0.01	0.1	<0.01	0.046	<0.02	0.1	<0.01				<0.01	
Zinc Total		7.4		10	0.064	<0.01	0.12	<0.01	0.041	<0.01	0.06	0.02				<0.01	
Grasas y Aceites			10	10	<2.062	<2.062	<2.248	<2.1	<2.04	<2.04	<2.04	<2				<2	
DQO			125		15.7	<10	40	11	<2.04	<2.04	<2.04	32				<10	
Cloruros		250			5	4	7	7	<2.04	<2.04	<2.04	64.5				61	
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	0.13	0.6	0.1	1.2	1.23				1.11	
Nitratos/Nitritos como N					1.61	0.08	4.87	2.1	2.46	0.03	4.9	2.33				3.52	
Amonio					<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	0.11				0.05	
Nitrógeno Kjeldahl (TKN)					3.53	<0.1	25.9	0.3	0.32	<0.1	0.8	0.4				0.3	
Fosfatos					0.185	0.1	0.3	0.16	0.19	0.1	0.4	<0.06				<0.06	
Fósforo Disuelto (Orto)					0.06	0.03	0.1	<0.02	0.06	0.02	0.13	0.07				0.02	
Fósforo Total			2	10	0.37	0.04	2.51	0.05	0.08	0.03	0.19	0.02				0.02	
STD (TDS)		500			225	170	280	170	754	170	1620	1500				1390	
SST (TSS)			50	100	163.6	<5	780	<5	67	<5	320	<5				<5	
ST (TS)					346.3	200	1080	182	850	230	1660	1580				1440	
Sulfatos		250			26.3	10	42	20.6	472.6	14	1600	882.0				792	
Alcalinidad Total					104	38	161	58.6	80	44	119	87.6				39.5	
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; **NR** = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, Proyecto Minero Escobal (2/4)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E			
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	7.46	7.4	6.56	7.94	7.43				7.58
Temperatura (campo)	°C				19.8	17	24	18.9	21	17.2	24	20.4				22.1
Conductividad (campo)	µS/cm				219.7	80	374.5	212.7	308.9	120	612	680.1				775.4
Oxígeno disuelto (campo)					3.8	0.1	6.8	7.75	4.2	0.1	7.5	6.87				7.05
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							9.2 x 10 ³				1.6 x 10 ⁴				5.4 x 10 ³
Color Aparente	U Pt/Co				NR	NR	NR	48	NR	NR	NR	165				46
Color Real								<1				<1				<1
Turbidez	NTU							9.24				70.7				17.7
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	1.02	5.72	0.1	36	2.6				0.61
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0027				0.0047
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.0012	0.0005	0.0037	0.0025				0.0047
Arsénico Disuelto					0.00797	0.0041	0.0139	0.0095	0.00541	0.0039	0.0072	0.0043				0.0054
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0098	0.00873	0.0043	0.0326	0.0071				0.0066
Bario Disuelto					0.0915	0.051	0.118	0.089	0.1645	0.08	0.234	0.166				0.147
Bario Total		1			0.12445455	0.098	0.253	0.096	0.2356	0.144	0.567	0.19				0.158
Berilio Disuelto					<0.002	<0.0002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01				<0.01
Berilio Total		0.004			<0.002	<0.0002	<0.01	<0.01	0.002	<0.002	0.003	<0.01				<0.01
Bismuto Disuelto					<0.01	<0.01	<0.04	<0.04	0.04	<0.04	0.1	<0.04				<0.04
Bismuto Total					<0.01	<0.01	<0.04	<0.04	0.04	<0.04	0.04	<0.04				<0.04
Boro Disuelto					<0.01	<0.01	0.02	<0.01	0.008	<0.01	0.02	0.04				0.03
Boro Total					<0.01	<0.01	0.02	<0.01	0.012	<0.01	0.02	0.03				0.04
Cadmio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001
Cadmio Total		0.003		0.1	<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0005	0.0002				<0.0001
Calcio Disuelto					27.8	11.7	39.9	27.1	37.4	18.5	61.7	95.2				115
Calcio Total					27.9272727	12.3	38.7	27.9	38.3	17.2	58.9	99.5				122
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cromo Total		0.1		0.1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01				<0.01
Cobalto Disuelto					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobalto Total					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobre Disuelto					<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Total		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Hierro Disuelto					0.033	<0.02	0.06	0.02	0.032	<0.02	0.15	0.04				0.02
Hierro Total		0.3			1.9	0.06	10.2	0.43	3.8	0.09	26.5	1.93				0.55
Plomo Disuelto					<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	0.0002	0.0002				<0.0001
Plomo Total		0.015		0.4	0.0013	<0.0001	0.0072	0.0004	0.003	<0.0001	0.0198	0.0072				0.0029
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.014				<0.008
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.016				0.025
Magnesio Disuelto					2.6	1.3	3.5	2.5	4.2	2.4	7.3	8.4				9.1
Magnesio Total					2.7	1.6	3.5	2.5	4.6	2.5	7.3	8.8				9.7
Manganeso Disuelto					0.07418182	0.01	0.381	0.044	0.116	0.011	0.26	0.175				0.131
Manganeso Total		0.4			0.14745455	0.025	0.403	0.052	0.2844	0.101	1.23	0.305				0.175
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02				<0.02

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E						
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo						
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	<0.02			
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.02	0.008				<0.008			
Níquel Total					<0.01	<0.01	0.05	<0.008	0.01	<0.01	0.06	<0.008				<0.008			
Potasio Disuelto					4.2	3.5	5.5	3.8	5.8	4.2	8.7	7.5				8.8			
Potasio Total					4.5	3.6	7	3.8	6.5	4.4	11.7	8				9.2			
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1			
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1			
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0003				0.0004			
Selenio Total					<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0004				0.0005			
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005			
Plata Total					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	0.0002				0.0001			
Sodio Disuelto					12.65	7.7	16.6	10	12.44	9	15.6	23.7				27.1			
Sodio Total					12.17	7.5	15.4	10.4	12.13	8.6	15.2	23.2				28.6			
Estroncio Disuelto					0.19	0.06	0.3	0.183	0.22	0.09	0.36	0.783				0.998			
Estroncio Total					0.18818182	0.08	0.3	0.183	0.228	0.11	0.33	0.784				1.04			
Talio Disuelto					<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	<0.0001				<0.0001			
Talio Total					0.002	<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007				<0.0001			
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04			
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04			
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01				<0.005			
Titanio Total					0.071	<0.005	0.307	0.025	0.127	0.005	0.534	0.097				0.029			
Uranio Disuelto					<0.0001	<0.0001	0.0002	0.0001	0.00012	<0.0001	0.0004	0.0002				0.0002			
Uranio Total					0.00019	<0.0001	0.0005	0.0001	0.00027	<0.0001	0.0009	0.0004				0.0002			
Vanadio Disuelto					<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	0.006				<0.005			
Vanadio Total					0.0051	<0.005	0.019	<0.005	0.0085	<0.005	0.04	0.009				0.006			
Zinc Disuelto					0.068	<0.01	0.14	<0.01	0.061	0.05	0.14	<0.01				<0.01			
Zinc Total					7.4	<0.01	1.01	<0.01	0.065	0.01	0.17	0.02				<0.01			
Grasas y Aceites						10	10	<2.062	<2.04	<2.326	<2.2	<2.062				<2.02	<2.084	<2.2	<2.1
DQO						125		10.9	<10	40	<10	16.8				<10	60	14	11
Cloruros					250			2.7	2	3	3.8	8.5				4	16	22.6	27.5
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	0.32	0.41							
Nitratos/Nitritos como N				0.59	<0.02	1.51	0.50	4.49	1.96	10.1	5.6	5.83							
Amonio				0.05	<0.05	0.21	<0.05	0.059	<0.05	0.15	0.16	0.21							
Nitrógeno Kjeldahl (TKN)				0.35	<0.1	0.6	0.2	0.58	0.1	1.3	1.4	0.8							
Fosfatos				0.12	0.1	0.4	0.06	0.36	0.1	1.2	0.25	0.47							
Fósforo Disuelto (Orto)				0.04	0.02	0.12	0.05	0.12	0.03	0.39	0.16	0.17							
Fósforo Total		2	10	0.05	0.02	0.14	0.03	0.17	0.04	0.39	0.25	0.23							
STD (TDS)	500			183.636364	140	220	184	233.6	150	350	496	610							
SST (TSS)		50	100	48	5	340	<5	115	<5	880	95.0	20.0							
ST (TS)				231.8	140	500	188	378.2	260	1180	624	648							
Sulfatos	250			16.9	4	25	17.9	27.5	10	57	197.0	254							
Alcalinidad Total				83	38	118	84.0	80	45	102	86.1	86.0							
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; **NR** = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, Proyecto Minero Escobal (3/4)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW5-E				SW6-E				SW7-E			
					Río Tapalapa – Aguas arriba				Río Los Vados				Quebrada La Honda			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	7.36	7.4	7.1	7.8	7.06	7.5	6.9	8	7.05
Temperatura (campo)	°C				17.4	14.5	21.5	15.8	19.4	12.2	27.3	16.4	18.7	15	21.3	16.7
Conductividad (campo)	µS/cm				72.1	0.1	160.2	72.24	259	60	948	106.1	216	120	416.2	137.3
Oxígeno disuelto (campo)	mg/L				4	0	8	8.23	4	0	8.3	8.44	3.9	0.1	7.5	7.45
Cr VI								<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml				NR	NR	NR	1.6 x 10 ³	NR	NR	NR	2.2 x 10 ³	NR	NR	NR	9.4 10 ²
Color Aparente	U Pt/Co							21				40				96
Color Real								<1				<1				<1
Turbidez	NTU							9.26				8.18				16.6
Aluminio Disuelto	mg/L				0.055	<0.03	0.14	<0.03	0.031	<0.03	0.08	0.04	0.033	<0.03	0.13	<0.03
Aluminio Total		0.2			1.09	<0.03	3.7	0.56	1.89	<0.03	8.1	0.75	3.05	0.1	16.4	2.28
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	0.0007
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0005	<0.0004	0.0007	0.0007
Arsénico Disuelto					0.00139	0.0005	0.0024	0.0015	0.0032	0.0007	0.0076	0.0016	0.00382	0.0022	0.0054	0.0033
Arsénico Total		0.01	0.1		0.00177	0.0013	0.0028	0.0018	0.00387	0.0025	0.0074	0.002	0.00446	0.003	0.0061	0.0036
Bario Disuelto					0.0447	0.023	0.072	0.04	0.0618	0.027	0.136	0.041	0.0946	0.052	0.143	0.064
Bario Total		1			0.0556	0.039	0.069	0.044	0.0806	0.055	0.136	0.048	0.2142	0.088	0.99	0.079
Berilio Disuelto					<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01
Berilio Total		0.004			0.002	<0.002	<0.01	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.1	<0.04	<0.04	<0.04	0.04	<0.04
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					0.01	<0.01	0.01	0.01	0.361	<0.01	1.8	0.04	<0.01	<0.01	0.01	0.01
Boro Total					0.01	<0.01	0.02	<0.01	0.379	<0.01	1.93	0.05	0.013	<0.01	0.02	<0.01
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		0.003	0.1		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0003	<0.0001
Calcio Disuelto					7.9	3.4	13.7	6	15.1	5.4	38.9	8.4	23.1	11.2	38.1	12.5
Calcio Total					7.73	3.4	13.1	6.2	14.81	5.9	37.5	8.6	23.04	11.5	36.7	13.4
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	0.03	0.097	<0.02	0.28	0.04	0.022	<0.02	0.07	<0.02
Hierro Total		0.3			0.7	0.16	1.8	0.37	1.3	0.33	4.8	0.41	1.8	0.08	9.5	0.77
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	0.0003	0.0007	<0.0001	0.0028	0.0004	0.0015	<0.0001	0.0083	0.0008
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	0.13	<0.02	0.67	0.015	<0.02	<0.02	<0.02	<0.008
Litio Total					<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.02	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					1.5	0.8	2.5	1.4	3	1.4	7.4	1.8	4.1	2.2	6.4	2.5
Magnesio Total					1.5	0.9	2.5	1.4	3.1	1.8	7.5	2	4.3	2.6	6.5	2.6
Manganeso Disuelto					0.025	0.006	0.047	0.008	0.114	<0.005	0.551	0.006	0.032	0.014	0.074	<0.005
Manganeso Total		0.4			0.0406	0.014	0.062	0.016	0.1482	0.04	0.543	0.019	0.0981	0.019	0.342	0.019
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total		0.002	0.01		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW5-E				SW6-E				SW7-E			
					Río Tapalapa – Aguas arriba				Río Los Vados				Quebrada La Honda			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto					<0.01	<0.01	0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Níquel Total		0.61		2	0.013	<0.01	0.03	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.04	<0.008
Potasio Disuelto					3	2.5	3.7	2.4	4.1	3.2	7.1	2.8	4.1	3.6	5.4	3.2
Potasio Total					3	2.2	4.1	2.6	4.2	3.1	7.5	3	4.5	3.6	7	3.4
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto					<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Selenio Total		0.17			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00006	<0.00005
Sodio Disuelto					6.34	3.7	10.8	4.4	32.16	6	135	8	11.69	8.7	15.4	7.3
Sodio Total					5.99	3.4	9.4	4.3	31.11	5.3	124	8.1	11.45	8.3	15.5	7.2
Estroncio Disuelto					0.06	0.02	0.09	0.05	0.12	0.03	0.33	0.063	0.17	0.07	0.29	0.09
Estroncio Total					0.057	0.02	0.08	0.048	0.122	0.04	0.35	0.062	0.174	0.09	0.28	0.092
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	0.014	0.05	<0.005	0.22	0.02	0.069	<0.005	0.325	0.054
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	0.007
Zinc Disuelto					0.04	<0.01	0.1	<0.01	<0.1	<0.1	0.4	<0.01	0.131	<0.01	0.81	<0.01
Zinc Total		7.4		10	0.197	<0.01	1.6	<0.01	<0.1	<0.1	0.22	<0.01	0.339	<0.01	1.87	<0.01
Grasas y Aceites			10	10	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	2.9	<2.062	<2.02	<2.084	NA
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	6.8	3	5	3	3.9
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	0.07	0.11	<0.1	0.3	0.09	<0.1	0.2	0.1	0.14
Nitratos/Nitritos como N					0.13	0.03	0.42	0.17	0.3	<0.02	1.22	0.31	<0.1	3.53	0.19	0.83
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	0.1	0.2	0.1	0.5	<0.1	<0.1	0.7	0.4	0.3
Fosfatos					0.04	<0.03	0.2	<0.06	0.08	<0.03	0.3	<0.06	0.1	0.2	0.09	0.12
Fósforo Disuelto (Orto)					0.15	<0.01	0.06	0.10	0.03	<0.01	0.09	0.03	0.03	0.08	0.03	0.02
Fósforo Total			2	10	0.02	<0.01	0.05	<0.02	0.04	0.02	0.08	0.02	0.03	0.19	0.19	0.05
STD (TDS)		500			84	60	110	74	187	90	540	100	140	240	100	134
SST (TSS)			50	100	9	<5	32	<5	21	<5	105	<5	<5	330	6	<5
ST (TS)					97	70	130	80	221	120	550	120	150	610	140	162
Sulfatos		250			16.5	<10	47	10.1	14	<10	23	10.3	9	38	19.4	11.3
Alcalinidad Total					25	13	43	22.1	48	22	108	29.9	30	101	54	45.1
Hidrocarburos totales (TPH)					<0.1	<0.09	<0.09	<0.1	11.54375	<0.1	92	<0.1	<0.09	<0.1	<0.1	<0.1

Dónde: **u.e.**: unidades exponenciales; **mg/L**: miligramos por litro; **µS/cm**: micro siemens por centímetro; **°C**: grados centígrados; **NMP/100ml**: número más probable en 100ml; **u Pt/Co**: unidades platino cobalto; **NR** = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.

Cuadro 4-4: Resultados de la Calidad del Agua Superficial, Proyecto Minero Escobal (4/4)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW8-E				SW9-E			
					Aguas debajo de la confluencia del Río San Rafael Y el Río El Dorado				Río Tapalapa, aguas debajo de la confluencia del Río San Rafael Río Los Vados y Quebrada La Honda			
					Línea Base			Dic-15	Línea Base			Dic-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	7.02	7.86	7.5	10.7	6.47
Temperatura (campo)	°C				22.1	18.9	25.1	21.3	21.8	19.1	24.2	19.3
Conductividad (campo)	µS/cm				363.7	186.8	807.6	482.6	267.4	121.8	518	291.2
Oxígeno disuelto (campo)					5.14	0.28	7.48	7.64	6.2	0.8	8.5	8.08
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	5.4 x 10 ⁴	9x10 ⁴	1x10 ²	2x10 ⁵	3.5 x 10 ³
Color Aparente	U Pt/Co				172	19	351	54	342	29	824	37
Color Real					20	22	36	<1	43	10	60	<1
Turbidez	NTU				14.15	6.09	22.2	8.35	25.72	4.93	46.5	8.35
Aluminio Disuelto	mg/L				0.033	<0.03	0.06	<0.03	0.087	<0.03	0.22	<0.03
Aluminio Total		0.2			2.39	0.04	7.35	0.17	2.96	0.4	8.6	0.39
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0018	0.0006	<0.0004	0.0013	0.0008
Antimonio Total		0.006			0.001	<0.0004	0.0027	0.0015	0.0007	<0.0004	0.0012	0.0007
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0039	0.004	0.0023	0.0057	0.003
Arsénico Total		0.01		0.1	0.006	0.0041	0.0096	0.0043	0.0042	0.002	0.006	0.0034
Bario Disuelto					0.107	0.074	0.143	0.119	0.094	0.056	0.135	0.072
Bario Total		1			0.136	0.102	0.185	0.132	0.121	0.09	0.154	0.075
Berilio Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total		0.004			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					0.022	<0.01	0.05	0.02	0.043	<0.01	0.09	0.05
Boro Total					0.023	<0.01	0.06	0.03	0.041	<0.01	0.1	0.07
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		0.003		0.1	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0002	<0.0001
Calcio Disuelto					50.4	17.5	156	56.6	35.7	18.2	78.3	32.2
Calcio Total					52.1	18.6	156	58.9	36.2	18.5	79.7	30.4
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	0.17	0.09	<0.02	0.17	<0.02
Hierro Total		0.3			1.53	0.05	4.36	0.52	1	0.25	2.2	0.34
Plomo Disuelto				0.0001	<0.0001	0.0003	0.0002	0.0002	<0.0001	0.0005	<0.0001	
Plomo Total	0.015		0.4	0.003	<0.0001	0.0089	0.0012	0.0022	0.0002	0.008	0.0005	
Litio Disuelto				<0.02	<0.02	0.04	0.013	<0.02	<0.02	0.04	0.019	
Litio Total				<0.02	<0.02	0.04	0.016	<0.02	<0.02	0.04	0.025	
Magnesio Disuelto				6.3	3.2	14.7	6.1	6	3.3	9.7	4.9	
Magnesio Total				6.6	3.3	14.8	6.3	6.2	3.4	10.1	4.7	
Manganeso Disuelto				0.095	0.009	0.118	0.133	0.057	0.023	0.148	0.011	
Manganeso Total	0.4			0.1808	0.047	0.349	0.187	0.115	0.043	0.187	0.035	
Mercurio Disuelto				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Mercurio Total	0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW8-E				SW9-E			
					Aguas debajo de la confluencia del Río San Rafael Y el Río El Dorado				Río Tapalapa, aguas debajo de la confluencia del Río San Rafael Río Los Vados y Quebrada La Honda			
					Línea Base			Dic-15	Línea Base			Dic-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	8.3	6	4.5	8.1	5.4
Potasio Total					6.8	6.4	7.8	8.8	6.1	4.8	8.5	5.4
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	0.0002	<0.0001	<0.0001	0.0001	0.0001
Selenio Total		0.17			0.00011	<0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0001
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total					<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	0.00007	<0.0001
Sodio Disuelto					18.8	12.3	33.7	24.5	17.6	10.7	26.9	16.9
Sodio Total					18.4	12.9	34.3	25.2	17.4	11	28.5	16.5
Estroncio Disuelto					0.44	0.16	1.5	0.563	0.29	0.14	0.71	0.279
Estroncio Total					0.44	0.16	1.48	0.573	0.295	0.14	0.73	0.255
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	0.012	0.084	0.015	0.237	0.016
Uranio Disuelto					0.00014	<0.0001	0.0003	0.0001	0.00014	<0.0001	0.0002	<0.0001
Uranio Total					0.00022	0.0001	0.0003	0.0001	0.00022	0.0002	0.0003	0.0001
Vanadio Disuelto					<0.005	<0.005	0.006	<0.005	<0.005	<0.005	0.006	<0.005
Vanadio Total					<0.005	<0.005	0.01	0.006	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	0.03	<0.01	<0.01	0.03	<0.01
Grasas y Aceites			10	10	<2.04	<2.02	<2.062	<2.2	<2.02	<2.02	<5	<2.1
DQO			125		20	<10	40	27	17.8	<10	35	<10
Cloruros		250			10	7	19	17.2	12	6	20	14.3
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	0.25	0.006	<0.003	0.013	0.20
Nitratos/Nitritos como N					3.07	2.01	5.23	2.90	1.97	1.14	3.85	0.03
Amonio					0.24	<0.05	0.58	1.27	0.129	<0.05	0.22	0.11
Nitrógeno Kjeldahl (TKN)					0.74	<0.1	1.6	2.1	0.57	0.3	0.9	0.1
Fosfatos					0.55	0.3	1	0.78	0.49	0.22	1.3	0.25
Fósforo Disuelto (Orto)					0.18	0.08	0.33	0.23	0.18	0.09	0.49	0.10
Fósforo Total			2	10	0.27	0.12	0.51	0.35	0.25	0.09	0.58	0.09
STD (TDS)		500			312	160	750	328	255	160	440	230
SST (TSS)			50	100	34	<5	102	5.0	73	<5	340	5.0
ST (TS)					362	180	750	364	310	200	450	242
Sulfatos		250			91	22	360	118	60	25	169	57.0
Alcalinidad Total					79	50	110	84.6	70	45	90	57.8
Hidrocarburos totales (TPH)					<0.01	<0.01	<0.01	<0.1	70	45	90	<0.1

Dónde: u.e.: unidades exponenciales; mg/L: miligramos por litro; µS/cm: micro siemens por centímetro; °C: grados centígrados; NMP/100ml: número más probable en 100ml; u Pt/Co: unidades platino cobalto; Fuente: MSR, 2016.

4.3.3 Agua Subterránea

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

La temperatura de las estaciones muestreadas se encontró entre 17.4 y 22.4 °C. La lectura menor de pH se obtuvo en la estación GW-4 (5.24 u.e.) y la mayor en la estación GW-1A (6.25 u.e.). Los Sólidos Suspendidos Totales (**SST**) se registraron únicamente en la estación GW-2 (31 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. Los sólidos disueltos totales (**TDS**) están por debajo de las directrices de la USEPA (500mg/L) en la mayoría de las estaciones a excepción de GW4; se dará seguimiento a este parámetro en la presente estación en futuros muestreos para comprobar o descartar que dicho aumento se deba a las actividades realizadas dentro del Proyecto. De corroborarse que el aumento se deba a las actividades generadas dentro del proyecto, se procederá a tomar las medidas necesarias para su corrección.

El Cadmio, Cianuro, Berilio, Bismuto, Boro, Cobalto, Cobre, Cromo, Galio, Litio, Cromo hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Talio, Estaño, Plata y Zinc no fueron detectados en ninguna de las estaciones. El Selenio fue detectado en las estaciones GW1-A (0.0001 mg/L) y GW3 (0.0003 mg/L) por debajo de la guía de la USEPA (0.17mg/L). El Antimonio fue detectado en la estación GW3 en concentraciones por debajo de la guía dada por la USEPA (0.01 mg/L). El Plomo se registró en GW2 y GW4 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			Dic-15	Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	6.25	6.54	6.01	7.16	6.05	6.54	6.21	7.13	6.07	6.13	6.13	6.13	5.24
Temperatura de campo	°C				15.2	14.8	15.6	18	21.4	19	23.7	17.4	19.4	18.5	21	22.4	18.1	18.1	18.1	19.6
Conductividad de campo	µS/cm				229.8	223	236.5	180.2	323.4	111.3	500.5	115.1	315.3	236.7	501.1	447.2	147.3	147.3	147.3	112.1
Oxígeno Disuelto de campo	mg/L				0.1	0.03	0.17	6.8	1.18	0.13	2.35	7.34	0.68	0.03	1.26	3.31	0.14	0.14	0.14	2.35
Turbidez	NTU							7.50								1.54				145
Materia Flotante				Ausente				Ausente								Ausente				Presente
Color Aparente	u Pt/Co			500	NR	NR	NR	21	NR	NR	NR	739	NR	NR	NR	<1	NR	NR	NR	1200
Color Real	u Pt/Co							<1				22				<1				687
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				23				94				<2				4.5
Aluminio Disuelto		0.2			<0.03	<0.03	<0.03	<0.03	0.075	<0.03	0.24	0.1	<0.03	<0.03	0.04	<0.03	1.42	1.42	1.42	0.61
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	0.00078	<0.0004	0.0011	<0.0004	0.0004	<0.0004	0.001	0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01		0.1	0.001	0.0008	0.0011	0.0009	0.0156	0.0043	0.0299	0.0031	0.0059	0.0037	0.0115	0.0023	0.0008	0.0008	0.0008	0.0006
Bario Disuelto		1			0.025	0.022	0.028	0.058	0.24	0.125	0.451	0.07	0.186	0.12	0.328	0.083	0.127	0.127	0.127	0.144
Berilio Disuelto		0.004			<0.01	<0.002	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcio Disuelto					5.7	5.1	6.2	6.2	33.5	9.6	65.3	11.9	31.6	25.7	43.4	48.7	4.4	4.4	4.4	4.8
Cromo Disuelto		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
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	0.03	<0.02	0.103	0.03	0.17	0.04	0.103	<0.02	0.33	<0.02	0.74	0.74	0.74	0.6
Plomo Disuelto		0.015		0.4	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0009	0.0009	0.0009	0.0008
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					3.1	2.9	3.3	2.4	5.9	1.8	12	2.2	4.9	3.3	8.3	10.6	2.6	2.6	2.6	3.1
Manganeso Disuelto	mg/L	0.05			<0.005	<0.005	<0.005	<0.005	0.123	0.02	0.356	0.013	0.057	<0.005	0.133	<0.005	0.069	0.069	0.069	0.1
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Potasio Disuelto					7.3	5.9	8.6	4.6	2.9	1.3	4.3	2.2	3.8	2.5	5	7.7	4.6	4.6	4.6	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	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto		0.17			0.0002	<0.0001	0.0003	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Sodio Disuelto					17.6	16.9	18.2	7.4	13.5	7.2	22	7.4	11.5	9.3	16.4	19.9	10.3	10.3	10.3	10.2
Estroncio Disuelto					0.03	0.03	0.03	0.057	0.26	0.08	0.56	0.101	0.2	0.12	0.37	0.267	0.03	0.03	0.03	0.054
Talio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.1	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.042	0.042	0.042	0.045
Uranio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	0.0002
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	0.009
Zinc Disuelto		7.4		10	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	0.1	<0.01	0.94	<0.01	3.47	<0.01	0.1	0.1	0.1	<0.01
Cloruros		250			15	14	16	4.7	4	2	7	2	5	3	6	9.4	4	4	4	2.3

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			Dic-15	Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	<0.003
Fluoruros					<0.1	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	0.13	0.15	0.1	0.2	0.19	<0.1	<0.1	<0.1	0.09
Nitratos/Nitritos como N					2.19	1.9	2.48	2.26	0.74	0.14	1.1	0.44	1.19	0.05	3.16	3.27	0.07	0.07	0.07	<0.02
Amonio					<0.05	<0.05	0.07	<0.05	0.059	<0.05	0.16	<0.05	0.065	<0.05	0.14	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)					0.7	0.3	1.1	<0.1	0.63	0.2	0.9	0.4	0.46	<0.05	1.2	0.1	0.3	0.3	0.3	0.2
Fosfatos					0.2	0.1	0.2	0.12	0.4	0.1	0.7	0.09	0.3	0.1	0.5	<0.06	0.09	0.09	0.09	<0.06
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	0.02	0.03	0.03	0.03	0.02
STD (TDS)		500			190	190	190	158	223	130	350	184	213	190	260	354	170	170	170	554
SST (TSS)			50	100	6.5	6	7	<5	7.7	6	9	31	39	5	105	<5	206	206	206	<5
ST (TS)					200	180	220	166	237.5	140	380	244	217.5	170	270	376	360	360	360	572
Sulfatos		250			12.5	11	14	4.4	43	7	90	9.1	30	16	71	117	7	7	7	14.1
Alcalinidad Total					31	31	31	30.6	0.18	0.09	0.27	46.4	83	71	97	69.3	35	35	35	39.9

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. NR = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.

Cuadro 4-6: Resultados de la medición de calidad de agua subterránea (Pozos de Monitoreo, Producción y Artesanal), Proyecto Minero Escobal (1/3)

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5				
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	6.56	6.37	6.77	NA	6.44	6.34	6.49	6.73	6.32	6.23	6.41	6.48	6.19	6.04	6.34	6.32	
Temperatura de campo	°C				24.4	23.4	25.1	NA	24.1	23.7	24.5	23.3	23.3	22.2	24.4	25.2	23.4	23	24.6	25	
Conductividad de campo	µS/cm				427.5	211.9	1001.3	NA	803.9	741.6	829.1	611.2	916.9	872.1	944.8	554.6	469.7	401.4	494.1	1084	
Oxígeno Disuelto de campo	mg/L				0.75	0.3	1.21	NA	0.65	0.11	1.44	6.41	0.97	0.48	1.93	4.78	0.82	0.19	1.77	4.05	
Turbidez	NTU							NA				1.00				1.01				0.34	
Materia flotante	Visual			Ausente				NA				Ausente				Ausente				Ausente	
Color Aparente	u Pt/Co			500	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Color Real																					
Cr (VI)	mg/L			0.1				NA				<0.05				<0.05				<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴				NA				<2				<2				<2	
Aluminio Disuelto	mg/L	0.2			0.038	<0.03	0.07	NA	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	NA	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0005	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01		0.1	0.0011	0.0008	0.0014	NA	0.0023	0.0021	0.0027	0.0022	0.0023	0.0021	0.0028	0.0024	0.0013	0.001	0.0016	0.0009	
Bario Disuelto		1			0.03	0.024	0.039	NA	0.036	0.032	0.041	0.034	0.042	0.038	0.047	0.023	0.162	0.157	0.166	0.04	
Berilio Disuelto		0.004			<0.002	<0.002	0.003	NA	<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	NA	<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	NA	0.06	0.05	0.07	0.06	0.078	0.06	0.09	0.06	0.015	<0.01	0.03	0.05	
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	NA	<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	NA	80.3	76.4	83.3	79.7	100	93	107	76.8	40.8	39.2	42.2	172	
Cromo Disuelto		0.1		0.1	<0.01	<0.01	<0.01	NA	<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	NA	<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	NA	<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	NA	<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	NA	<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	NA	<0.02	<0.02	0.02	0.016	<0.02	<0.02	0.02	0.016	<0.02	<0.02	<0.02	0.009	
Magnesio Disuelto					3.5	2.4	6.1	NA	10.3	10.1	10.7	9.4	11.3	10.9	11.6	8.3	7.3	6.8	7.6	21.6	
Manganeso Disuelto		0.05			0.108	0.03	0.308	NA	<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	NA	<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	NA	<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	NA	<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	NA	4.2	3.9	4.6	4.1	4.7	4.5	5.2	4.1	6	5.5	6.5	8.9	
Escandio Disuelto					<0.1	<0.1	<0.1	NA	<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	NA	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	NA	<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	NA	29.5	28.2	30.9	27.5	32.3	30.4	35.8	26.3	16.9	15.6	19.1	35.3	
Estroncio Disuelto					0.18	0.07	0.46	NA	0.74	0.71	0.77	0.747	0.89	0.84	0.98	0.698	0.27	0.26	0.29	0.611	
Talio Disuelto					<0.0001	<0.0001	<0.0001	NA	<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	NA	<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	NA	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	0.009	
Uranio Disuelto					0.00016	<0.0001	0.0005	NA	0.0002	0.0002	0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0001	0.00033	0.0001	0.001	0.0005	
Vanadio Disuelto					0.0059	<0.005	0.008	NA	0.0055	<0.005	0.009	0.005	0.006	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc Disuelto		7.4		10	0.031	<0.01	0.11	NA	0.053	<0.01	0.1	0.04	<0.01	<0.01	0.1	0.02	<0.01	<0.01	0.1	0.03	
Cloruros	250			12	3	28	NA	16	16	17	16.9	20	19	21	15.1	9	8	9	31.4		
Cianuro Total	0.14		1	0.0039	<0.003	0.011	NA	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	NA	0.8	0.8	0.8	0.74	0.8	0.8	0.8	0.88	0.18	0.1	0.2	0.20		
Nitratos/Nitritos como N				2.48	2.04	2.93	NA	2.2	2.08	2.26	2.61	2.13	1.98	2.32	2.68	3.32	3	3.57	6.5		

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	0.3	<0.1	<0.1	<0.1	0.3	<0.1
Fosfatos					0.233	0.21	0.27	NA	0.315	0.27	0.37	0.22	0.248	0.24	0.27	0.19	0.203	0.15	0.24	0.09
Fósforo Total			2	10	0.24	0.06	0.44	NA	0.09	0.08	0.1	0.07	0.07	0.06	0.08	0.07	0.06	0.05	0.07	0.03
STD (TDS)		500			253	190	360	NA	470	460	480	436	553	540	560	450	305	290	320	880
SST (TSS)			50	100	345.8	137	584	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ST (TS)					597.5	350	810	NA	487.5	450	510	490	555	520	580	472	325	280	350	912
Sulfatos		250			28.5	4	97	NA	166	162	169	183	212.5	210	220	163	72.3	64	76	435
Alcalinidad Total					64	56	80	NA	84	82	86	81.6	85	83	88	85.4	66	61	68	89.7

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, 2016.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	6.11	6.38	6.14	6.98	6.53	6.16	6.07	6.29	6.5	7.15	6.9	7.4	6.63
Temperatura de campo	°C				22.3	21.6	22.8	24	22.4	22	23.1	23.5	23.3	23.2	23.4	23.8	27.5	25.9	29	28.9
Conductividad de campo	µS/cm				538.2	342.9	752.6	974.4	299.6	285.9	323.8	305.4	426.8	424.6	428.1	990.2	1595	1569	1621	440.7
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	3.26	0.61	0.25	1.19	3.5	0.72	0.16	1.45	3.43	0.38	0.35	0.41	3.24
Turbidez	NTU							0.64				3.04				1.68				1.49
Materia flotante	Visual			Ausente				Ausente				Ausente				Ausente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1
Color Real		<1																		
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				4.5				<2				<2				<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	0.04	<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	0.0006	0.001	0.0009	0.0011	0.0006	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01	0.1		0.0028	0.0024	0.0032	0.0024	0.0034	0.0029	0.0041	0.002	0.0021	0.0019	0.0024	0.0012	0.003	0.0007	0.0052	0.0017
Bario Disuelto		1			0.198	0.134	0.281	0.142	0.156	0.129	0.176	0.378	0.125	0.122	0.129	0.089	0.031	0.028	0.034	0.06
Berilio Disuelto		0.004			<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.01	<0.002	<0.01	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.04	0.09	0.08	0.1	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	144	16.7	13.9	19.6	27.3	34.6	32.5	36.3	147	185.5	170	201	47.8
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	<0.02	<0.02	<0.02	<0.02	<0.02	5.52	1.53	9.51	8.88
Plomo Disuelto		0.015	0.4		<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.0002	0.0004	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.019	0.07	0.07	0.07	0.016
Magnesio Disuelto					7.5	4.9	10.5	18.1	4.8	4.6	5	8.4	6.4	6.3	6.7	22.2	35.8	34.4	37.2	8
Manganeso Disuelto		0.05			<0.005	<0.005	0.006	0.006	0.0065	<0.005	0.012	0.025	0.019	0.012	0.029	<0.005	0.203	0.149	0.257	0.11
Mercurio Disuelto		0.002	0.01		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto		0.61	2		<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Potasio Disuelto					5.7	5	6.5	9.4	6.2	5.4	6.8	8.2	4.8	4.6	5.1	7.5	4.8	4.6	5	4.1
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	0.0003	0.0002	0.0001	0.0002	<0.0001	0.0004	0.0003	0.0006	0.0007	<0.0001	<0.0001	<0.0001	<0.0001
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					14	12.3	17	31.7	19.1	15.4	27.5	17.3	15.2	15	15.6	29.5	45.1	44.7	45.4	25.9
Estroncio Disuelto					0.26	0.18	0.35	0.676	0.1	0.09	0.11	0.191	0.22	0.21	0.23	0.509	1.64	1.58	1.69	0.344
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	0.008	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	0.005
Uranio Disuelto					0.00013	0.0001	0.0002	0.0007	<0.0001	<0.0001	0.0001	<0.0001	0.00017	0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0004	<0.0001
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.005	<0.005	<0.005	<0.005	<0.005
Zinc Disuelto		7.4	10		0.034	<0.01	0.1	0.12	0.034	<0.01	0.1	0.35	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01	<0.01
Cloruros	250			11	6	17	23	11	9	12	11.9	6	6	6	29.6	37	36	37	7	
Cianuro Total	0.14	1		0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.007	<0.003	0.012	<0.003	
Fluoruros				0.18	0.1	0.2	0.12	0.13	0.1	0.2	0.12	0.17	0.1	0.2	0.13	2.55	2.5	2.6	0.53	
Nitratos/Nitritos como N				5.08	4.42	6.15	10.3	4.75	4.08	5.24	2.45	2.76	2.63	2.83	5.14	<0.02	<0.02	<0.02	<0.02	

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Dic-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	0.5	0.09	<0.1	0.2	<0.1	0.23	<0.1	0.4	<0.1
Fosfatos					0.173	0.15	0.21	0.12	0.113	0.09	0.18	0.09	0.23	0.21	0.24	0.12	<0.03	<0.03	<0.03	0.43
Fósforo Total			2	10	0.05	0.04	0.06	0.04	0.04	0.01	0.07	0.04	0.07	0.06	0.08	0.04	<0.01	<0.01	0.02	0.15
STD (TDS)		500			340	260	440	774	233	220	250	256	277	270	290	796	905	890	920	314
SST (TSS)			50	100	<5	<5	<5	<5	19.75	7	45	<5	9	6	14	37.0	27	25	29	5.0
ST (TS)					345	240	450	794	260	230	280	276	300	290	310	870	940	910	970	342
Sulfatos		250			85.3	33	153	340	19.3	17	23	40.4	54.7	54	55	354	440	440	440	77.6
Alcalinidad Total					65	62	68	100.0	48	41	60	77.6	68	66	70	75.4	147	136	157	122

u.e.: unidades exponenciales. mg/L: miligramos por litro. μ S/cm: micro siemens por centímetro. °C: grados centígrados. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. NR = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.

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

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1			
					Línea Base			Dic-15	Línea Base			Dic-15	Línea Base			Ene-16	Línea Base			Dic-15	Línea Base			Dic-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	7.05	7.45	7.45	7.45	6.63				7.02				6.68				7.4
Temperatura de campo	°C				30.4	30.4	30.4	32.2	27.8	27.8	27.8	28.9				27.2				23.2				32.6
Conductividad de campo	µS/cm				2.243	2.243	2.243	1633	663.9	663.9	663.9	883.2				738.2				1378				1318
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	3.54	0.05	0.05	0.05	1.44				8.28				5.41				4.34
Turbidez	NTU							1.22				0.67				0.92				5.04				1.40
Materia flotante	Visual			Ausente				Ausente				NA							Presente				Ausente	
Color Aparente	u Pt/Co			500	NR	NR	NR	129	NR	NR	NR	<1							<1				270	
Color Real	u Pt/Co							<1				<1				NA			<1				<1	
Cr (VI)	mg/L			0.1				<0.05				<0.05							<0.05				<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2							49				<2	
Aluminio Disuelto		0.2			<0.03	<0.03	<0.03	<0.03	0.06	0.06	0.06	<0.03				<0.03			<0.03				<0.03	
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	
Arsénico Disuelto		0.01		0.1	0.0022	0.0022	0.0022	0.0028	0.0136	0.0136	0.0136	0.0135				0.01			0.0005				0.0065	
Bario Disuelto		1			0.033	0.033	0.033	0.032	0.125	0.125	0.125	0.084				0.074			0.138				0.024	
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	
Bismuto Disuelto					<0.08	<0.08	<0.08	<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	0.11				0.08			0.13				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	
Calcio Disuelto					271	271	271	258	47.5	47.5	47.5	101				81.3			205				201	
Cromo Disuelto		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01			<0.01				<0.01	
Cobalto Disuelto					<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	
Galio Disuelto					<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	1.74	0.05	0.05	0.05	<0.02	NR	NR	NR	<0.02	NR	NR	NR	<0.02	NR	NR	NR	2.41
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	
Litio Disuelto					0.06	0.06	0.06	0.096	0.08	0.08	0.08	0.147				0.112			<0.008				0.1	
Magnesio Disuelto					41.3	41.3	41.3	38.4	4.1	4.1	4.1	6.2				5.5			34.2				36.1	
Manganeso Disuelto		0.05			0.044	0.044	0.044	0.03	0.03	0.03	0.03	0.024				<0.005			0.013				0.056	
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	
Molibdeno Disuelto					0.01	0.01	0.01	<0.02	<0.01	<0.01	<0.01	<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	
Potasio Disuelto					5	5	5	4.5	2.5	2.5	2.5	1.9				2.3			13.5				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	
Selenio Disuelto		0.17			0.0006	0.0006	0.0006	0.0001	<0.0001	<0.0001	<0.0001	0.0001				0.0001			<0.0001				<0.0001	
Plata Disuelta					<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	73.7	55.2	55.2	55.2	78.3				66.2			54.2				47.6	
Estroncio Disuelto					2.23	2.23	2.23	2.48	1.33	1.33	1.33	4.65				3.55			1.68				1.96	
Talio Disuelto					0.0002	0.0002	0.0002	<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	
Titanio Disuelto					<0.005	<0.005	<0.005	0.013	<0.005	<0.005	<0.005	0.009				<0.005			0.011				0.011	
Uranio Disuelto					0.0007	0.0007	0.0007	0.0005	0.0002	0.0002	0.0002	0.0003				0.0002			0.0056				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	
Zinc Disuelto		7.4		10	0.04	0.04	0.04	<0.01	0.12	0.12	0.12	<0.01				<0.01			<0.01				0.06	
Cloruros		250			68	68	68	65.5	32	32	32	4.2				4.1			48.9				42.7	
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	
Fluoruros					2.7	2.7	2.7	2.66	0.7	0.7	0.7	0.89				0.66			0.78				2.63	
Nitratos/Nitritos como N					0.19	0.19	0.19	<0.02	<0.02	<0.02	<0.02	0.15				0.57			0.31				<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			Dic-15	Línea Base			Dic-15	Línea Base			Ene-16	Línea Base			Dic-15	Línea Base			Dic-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				<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				<0.1
Fosfatos					0.03	0.03	0.03	<0.06	0.06	0.06	0.06	<0.06				0.25				0.12				<0.06
Fósforo Total			2	10	0.06	0.06	0.06	0.02	0.02	0.02	0.02	<0.02				0.03				0.04				<0.01
STD (TDS)		500			1370	1370	1370	1230	320	320	320	620	NR	NR	NR	538	NR	NR	NR	1050	NR	NR	NR	982
SST (TSS)			50	100	145	145	145	<5	<5	<5	<5	<5				<5				<5				<5
ST (TS)					1000	1000	1000	1270	300	300	300	652				548				1110				1030
Sulfatos			250		700	700	700	697	45	45	45	288				218				556				513
Alcalinidad Total					133	133	133	134	186	186	186	170				145				136				166

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. NA= no analizado. Fuente: MSR, 2016.

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 Diciembre. 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 6.11 a 7.4 u.e. y la temperatura en el rango de 23.2 a 32.4 °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-8, MW-11, 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 y MW9, 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, Cobalto, Cromo, Cromo Hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Plata y Estaño no fueron detectados en ninguno de los pozos monitoreados.

El Antimonio se detectó en los pozos MW-4, MW-7 y MW-8, 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-9, MW-11 y PSA-1. En el pozo MW-9 la concentración se encuentra por debajo de lo establecido durante la línea base El pozo MW-11 presenta una concentración ligeramente por encima de lo establecido por la línea base. El pozo PSA-1 no cuenta con línea base.

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

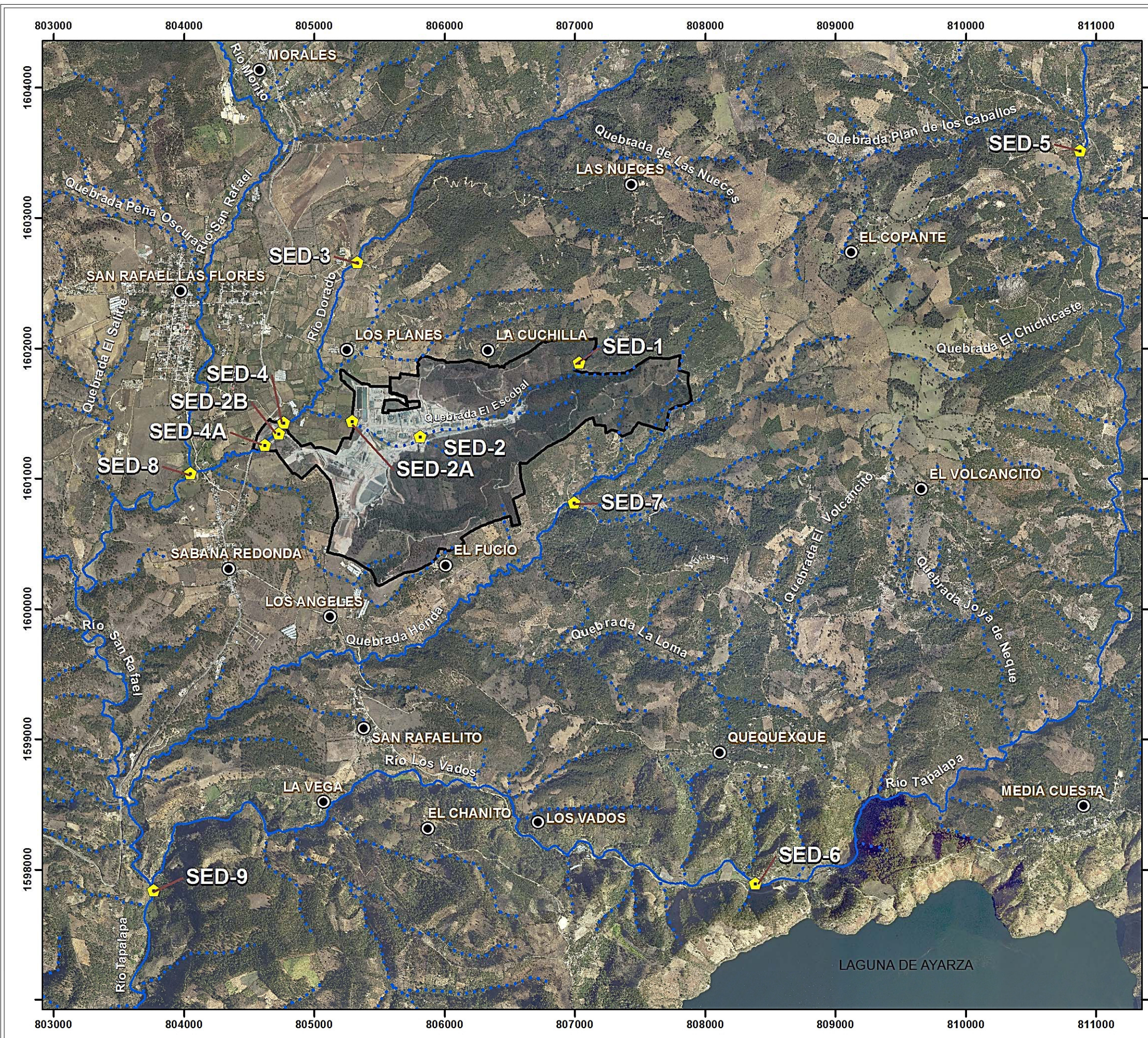
5.1 Sitios de Monitoreo

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, 2016.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO DE SEDIMENTOS





PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA




MINERA
SAN RAFAEL
DEPARTAMENTO DE AMBIENTE

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


LEYENDA

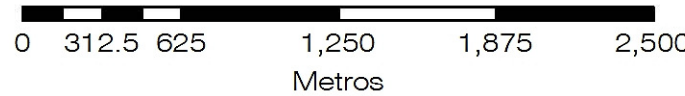
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

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

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

Fecha de Elaboración: Enero de 2016	
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, 2016.

5.3 Resultados

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

El porcentaje de fósforo total se encuentra en el rango de 0.00765% (SED-7) a 0.0365% (SED-2A). No se detectó cianuro en ninguna de las estaciones muestreadas.

El mercurio se detectó en siete de once estaciones, en concentraciones por debajo de lo establecido (25 mg/kg) para la disposición de lodos en el suelo establecidos por el Acuerdo 236-2006. Las concentraciones de Cadmio, Cromo y Plomo registradas están muy por debajo de los valores guía. Todas las estaciones muestreadas registraron concentraciones de Arsénico menor al valor sugerido (50 mg/Kg).

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

Parámetro	Unidades	Acuerdo 236-2006	SED-1	SED-2	SED-2A	SED-3	SED-4	SED-4A
		Aplicación al suelo	Dic-15	Dic-15	Dic-15	Dic-15	Dic-15	Dic-15
Arsénico Total	mg/Kg**	50	8	37.3	29.8	20.4	16.7	34.5
Cadmio Total	mg/Kg**	50	<1	4.72	1.91	0.23	0.16	9.33
Cromo Total	mg/Kg**	1500	<5	5.4	6	3.2	3	5
Plomo Total	mg/Kg**	500	11	239	103	17	9.16	191
Mercurio Total	mg/Kg**	25	<0.04	0.08	<0.5	0.09	<0.05	0.11
Cianuro Total	mg/Kg**		<0.2	<0.1	<0.1	<0.1	<0.1	<0.2
Fósforo Total	%		0.0126	0.0302	0.0265	0.0087	0.0122	0.00818

Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7	SED-8	SED-9
		Aplicación al suelo	Dic-15	Dic-15	Dic-15	Dic-15	Dic-15
Arsénico Total	mg/Kg**	50	10.8	6.5	5.7	10.7	6.8
Cadmio Total	mg/Kg**	50	0.19	0.13	0.16	0.57	0.46
Cromo Total	mg/Kg**	1500	2.5	3.3	3.4	2.9	5.9
Plomo Total	mg/Kg**	500	15	4.93	6.49	13.8	12.3
Mercurio Total	mg/Kg**	25	0.05	0.06	<0.04	0.21	0.05
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.2	<0.2	<0.3
Fósforo Total	%		0.00738	0.00832	0.00765	0.0365	0.0198

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, 2016.

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, 2016.

805000 806000

1602000

1602000



805000 806000

1601000

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

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIÓN DE MONITOREO

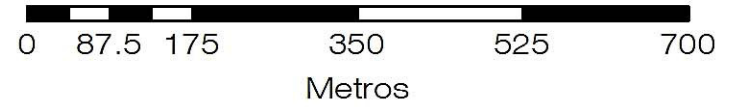
Símbolo	Estación	X	Y
	WW9	805461	1601314

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

Fecha de Elaboración: Enero de 2016

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, 2016.

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

6.3 Resultados

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

Cuadro 6-3: Resultados de control de calidad para muestras de Efluentes de Planta de Tratamiento, Proyecto Minero Escobal

Mes	Unidades	LMP Acuerdo 236-2006	Noviembre	Diciembre	Enero		
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11	WW9
No. Reporte Lab.			2191-15	2266-15	142-16	143-16	141-16
Grasas y Aceites	mg/L		<5	<5	<5	<5	<5
Materia Flotante	NL		ausente	ausente	ausente	ausente	ausente
DBO	mg/L		< 10	< 10	< 10	< 10	< 10
DQO		< 25	< 25	< 25	< 25	< 25	
SST (TSS)		< 10	< 10	< 10	< 10	< 10	
Sólidos Sedimentables		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrógeno Total		<10	<10	<10	<10	<10	
Fósforo Total		<0.05	<0.05	<0.05	<0.05	<0.05	
Arsénico		<0.002	<0.002	<0.002	0.008	0.008	
Cadmio		<0.02	<0.02	<0.05	<0.02	<0.02	
Cobre		<0.03	<0.03	<0.03	<0.03	<0.03	
Cromo Hexavalente		<0.05	<0.05	<0.05	<0.05	<0.05	
Cianuro Total*		<0.003	<0.003	<0.003	<0.003	<0.003	
Mercurio		<0.004	<0.004	<0.004	<0.004	<0.004	
Níquel		<0.05	<0.05	<0.05	<0.05	<0.05	
Plomo		<0.05	<0.05	<0.05	<0.05	<0.05	
Zinc		<0.01	<0.01	<0.01	<0.01	<0.01	
Color Aparente		u Pt/Co		< 1	< 1	< 1	< 1
Color Real	< 1		< 1	< 1	< 1	< 1	
Coliformes Fecales	NMP/100ml		< 2	< 2	< 2	23	23

*análisis realizado por laboratorio AZC. u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. NL = no hay límite establecido para este parámetro. Fuente: MSR, 2016.

Para la preparación de blancos analíticos de los parámetros fisicoquímicos y metales se utilizó agua desmineralizada y para los parámetros microbiológicos se utilizó agua salvavidas embotellada. Todos los parámetros analizados por los dos laboratorios son confiables en manipulación de las muestras y precisión del análisis.

En el Cuadro 6-4 se pueden observar los resultados de la calidad del efluente de la planta de tratamiento del Proyecto Minero Escobal. Los resultados de laboratorio se presentan en el Anexo 0.

Los valores de pH se encontraron en el rango de 7.11 a 7.83 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. Asimismo los parámetros de materia flotante, sólidos sedimentables, nitrógeno y fósforo total, zinc y color real y aparente se encuentran también por debajo de lo establecido por el acuerdo.

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

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

Mes	Unidades	LMP Acuerdo 236-2006	Valores Indicador Banco Mundial Sector Minero	LMP EPA. CFR 440, Subparte J, 440.102, (a)	Noviembre	Diciembre	Enero
Fecha Muestreo					24/11/2015	03/12/2015	25/01/2016
ID Muestra					WW9	WW9	WW9
No. Reporte Lab.					2189-15	2165-15	141-16
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.11	7.44	7.83
Temperatura de campo	°C	+/- 7	+/- 3		26.6	25.9	24.4
Temperatura. Quebrada El Escobal					24.7	22.5	28.2
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	< 10
Sólidos Sedimentables					< 0.1	< 0.1	< 0.1
Nitrógeno Total		20	10		<10	<10	<10
Fósforo Total		10	2		<0.05	<0.05	<0.05
Arsénico		0.1	0.1		0.007	0.007	0.008
Cadmio		0.1	0.05		<0.02	<0.02	<0.02
Cobre		3	0.3	0.3	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	0.1		<0.05	<0.05	<0.05
Cianuro Total*		1	1		<0.003	<0.003	<0.003
Mercurio		0.01	0.002	0.002	<0.004	<0.004	<0.004
Níquel		2	0.5		<0.05	<0.05	<0.05
Plomo		0.4	0.2	0.6	<0.05	<0.05	<0.05
Zinc		10	0.5	1.5	<0.01	<0.01	<0.01
Color Aparente	u Pt/Co	500			7	12	5
Color Real					< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	400		23	49	23

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, 2016.

7 Vibraciones

7.1 Sitios de Monitoreo

La Empresa tiene instalados 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, 2016.



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE VIBRACIONES PERMANENTE

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

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

ESTACIONES DE MONITOREO

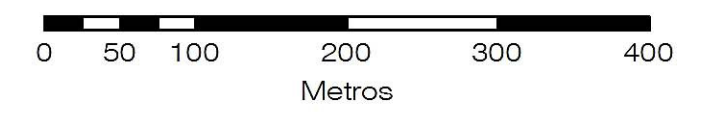
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

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

Fecha de Elaboración: Enero de 2016

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:5,000



7.2 Metodología

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

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

PARAMETROS ANALIZADOS	
Velocidad	Velocidad de partícula
PROCEDIMIENTO	
Se registraron todas las voladuras realizadas en ambos portales durante los meses de noviembre de 2015 a enero de 2016. 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, 2016.

7.3 Resultados

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

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

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Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1190-6440	1	05:30AM	<1.3
	1240-C.F.E.	1	05:35AM	<1.3
	1355-RAMPA	1	05:40AM	<1.3
	1290-6730	1	5:30PM	<1.3
	1315-6770	1	5:35PM	<1.3
	1365-6700	1	5:40PM	<1.3
	1365-6620	1	5:45PM	<1.3
	1430-7420	1	5:50PM	<1.3
	1315-6630	2	05:30AM	<1.3
	1315-6670	2	05:35AM	<1.3
	1290-6640	2	05:40AM	<1.3
	1380-RAMPA	2	05:45AM	<1.3
	1365-6920	2	05:50AM	<1.3
	1365-6820	2	05:55AM	<1.3
	1315-6710	2	5:30PM	<1.3
	1215-SERV.	2	5:35PM	<1.3
	1190-6640	2	5:40PM	<1.3
	1340-6580	2	5:45PM	<1.3
	1365-6500	2	5:50PM	<1.3
	1365-C.F.E.O.	2	5:55PM	<1.3
	1405-RAMPA	2	18:00	<1.3
	1380-RAMPA	4	05:30AM	<1.3
	1355-REMUCK	4	05:35AM	<1.3
	1340-6480	4	05:40AM	<1.3
	1215-6480	4	05:45AM	<1.3
	1365-6420	4	05:50AM	<1.3
1365-6700	4	5:30PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1240-6840	4	5:35PM	<1.3
	1340-pas	4	5:40PM	<1.3
	1290-6420	4	5:45PM	<1.3
	1315-6770	5	05:30AM	<1.3
	1315-6710	5	05:35AM	<1.3
	1340-6760	5	05:40AM	<1.3
	1365-C,F,E,	5	05:45AM	<1.3
	1365-6480	5	05:50AM	<1.3
	1315-6670	5	5:30PM	<1.3
	1290-6810	5	5:35PM	<1.3
	1215-SERV.	5	5:40PM	<1.3
	1365-C,F,E,	5	5:45PM	<1.3
	1365-6960	5	5:50PM	<1.3
	1215-6440	5	5:55PM	<1.3
	1240-C.F.E.	6	05:30AM	<1.3
	1380-RAMPA	6	05:35AM	<1.3
	1315-6670	6	05:40AM	<1.3
	1365-6720	6	05:45AM	<1.3
	1340-BPAS	6	05:50AM	<1.3
	1365-6500	6	05:55AM	<1.3
	1215-6440	6	06:00AM	<1.3
	1315-6630	6	06:05AM	<1.3
	1240-6820	6	5:30PM	<1.3
	1240-6840	6	5:35PM	<1.3
	1365-6920	6	5:40PM	<1.3
	1405-ACC	7	05:30AM	<1.3
1365-6620	7	05:35AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1405-RAMPA	7	05:40AM	<1.3
	1215-SERV.	7	05:45AM	<1.3
	1315-6710	7	05:50AM	<1.3
	1315-6670	7	05:55AM	<1.3
	1290-6730	7	5:30PM	<1.3
	1290-6810	7	5:35PM	<1.3
	1290-6420	7	5:40PM	<1.3
	1365-6700	7	5:45PM	<1.3
	1240-6820	8	05:30AM	<1.3
	1340-6860	8	05:35AM	<1.3
	1380-RAMPA	8	05:40AM	<1.3
	1365-6940	8	05:45AM	<1.3
	1340-BPAS	8	05:50AM	<1.3
	1430-7420	8	5:30PM	<1.3
	1406-RAMPA	8	5:35PM	<1.3
	1315-6630	8	5:40PM	<1.3
	1315-6770	8	5:45PM	<1.3
	1365-6480	8	5:50PM	<1.3
	1365-VENT.	8	5:55PM	<1.3
	1340-6600	8	18:00	<1.3
	1380-RAMPA	9	05:30AM	<1.3
	1365-6700	9	05:35AM	<1.3
	1365-6620	9	05:40AM	<1.3
	1315-6770	9	05:45AM	<1.3
	1240-6800	9	05:50AM	<1.3
	1405-SUB. E.	9	05:55AM	<1.3
	1315-6630	9	5:30PM	<1.3
	1460-RAMPA	10	05:30AM	<1.3
	1365-6480	10	05:35AM	<1.3
	1365-C.F.E.	10	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1290-6810	10	05:45AM	<1.3
	1190-6480	10	05:50AM	<1.3
	1365-6960	10	5:30PM	<1.3
	1290-6730	10	5:35PM	<1.3
	1315-6710	10	5:40PM	<1.3
	1405-RAMPA	10	5:45PM	<1.3
	1455-C.F.O.	10	5:50PM	<1.3
	1355-PORTON	10	5:55PM	<1.3
	1290-6420	10	18:00	<1.3
	1460-RAMPA	11	05:30AM	<1.3
	1365-6480	11	05:35AM	<1.3
	1365-C.F.E.	11	05:40AM	<1.3
	1290-6810	11	05:45AM	<1.3
	1190-6480	11	05:50AM	<1.3
	1365-6960	11	5:30PM	<1.3
	1290-6730	11	5:35PM	<1.3
	1315-6710	11	5:40PM	<1.3
	1405-RAMPA	11	5:45PM	<1.3
	1455-C.F.O.	11	5:50PM	<1.3
	1355-PORTON	11	5:55PM	<1.3
	1290-6420	11	18:00	<1.3
	1315-6710	12	05:30AM	<1.3
	1190-6480	12	05:35AM	<1.3
	1315-6630	12	05:40AM	<1.3
	1365-6940	12	05:45AM	<1.3
	1405-SUB	12	5:30PM	<1.3
	1390-C.F.O.	12	5:35PM	<1.3
	1365-6920	12	5:40PM	<1.3
	1290-6770	12	5:45PM	<1.3
	1315-6670	12	5:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1290-6820	12	5:55PM	<1.3
	1365-6480	13	05:30AM	<1.3
	1365-6500	13	05:35AM	<1.3
	1365-VENT	13	05:40AM	<1.3
	1290-6730	13	05:45AM	<1.3
	1215-SERV	13	05:50AM	<1.3
	1405-SUBEST.	13	05:55AM	<1.3
	1365-C.F.E.	13	5:30PM	<1.3
	1460-RAMPA	13	5:35PM	<1.3
	1315-7770	13	5:40PM	<1.3
	1240-C.F.E	13	5:45PM	<1.3
	1340-6650	13	5:50PM	<1.3
	1440-6820	13	5:55PM	<1.3
	1405-RAMPA	13	18:00	<1.3
	1215-6440	13	6:05PM	<1.3
	1240-6820	14	05:30AM	<1.3
	1340-6640	14	05:35AM	<1.3
	1405-RAMPA	14	05:40AM	<1.3
	1290-6820	14	5:30PM	<1.3
	1315-6770	14	5:35PM	<1.3
	1365-6620	14	5:40PM	<1.3
	1340-6720	14	5:45PM	<1.3
	1365-C.F.E.	14	5:50PM	<1.3
	1365-6600	14	5:55PM	<1.3
	1190-6800	14	18:00	<1.3
	1290-6810	15	05:30AM	<1.3
	1315-6770	15	05:35AM	<1.3
	1340-6860	15	05:40AM	<1.3
1240-6800	15	5:30PM	<1.3	
1240-C.F.E.	15	5:35PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1290-6770	15	5:40PM	<1.3
	1315-6770	15	5:45PM	<1.3
	1355-PORTON	15	5:50PM	<1.3
	1290-6590	15	5:55PM	<1.3
	1365-6600	15	18:00	<1.3
	1240-6800	16	05:30AM	<1.3
	1290-6770	16	05:35AM	<1.3
	1365-6940	16	05:40AM	<1.3
	1365-6500	16	05:45AM	<1.3
	1365-6480	16	05:50AM	<1.3
	1460-RAMPA	16	5:30PM	<1.3
	1405-RAMPA	16	5:35PM	<1.3
	1315-6670	16	5:40PM	<1.3
	1215. SERV.	16	5:45PM	<1.3
	1340-6640	16	5:50PM	<1.3
	1405-RAMPA	17	05:30AM	<1.3
	1240-C,F,E,	17	05:35AM	<1.3
	1315-6630	17	5:30PM	<1.3
	1290-6730	17	5:35PM	<1.3
	1365-C,F,E	17	5:40PM	<1.3
	1615-6610	18	05:30AM	<1.3
	1315-6570	18	05:35AM	<1.3
	1365-C.F.E.	18	05:40AM	<1.3
	1460-RAMPA	18	05:45AM	<1.3
	1405-RAMPA	18	05:50AM	<1.3
	1405-SUB	18	5:30PM	<1.3
	1390-C.F,O.	18	5:35PM	<1.3
	1430-C.F.E.	18	5:40PM	<1.3
	1215-6560	18	5:45PM	<1.3
	1405-RAMPA	19	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1240-6820	19	05:35AM	<1.3
	1240-6800	19	05:40AM	<1.3
	1290-6730	19	05:45AM	<1.3
	1365-6960	19	05:50AM	<1.3
	1290-6590	19	05:55AM	<1.3
	1365-6600	19	06:00AM	<1.3
	1190-6560	19	5:30PM	<1.3
	1290-6810	19	5:35PM	<1.3
	1315-6780	19	5:40PM	<1.3
	1315-6920	19	5:45PM	<1.3
	1340-PASS	19	5:50PM	<1.3
	1290-6770	20	05:30AM	<1.3
	1290-6570	20	05:35AM	<1.3
	1365-6480	20	05:40AM	<1.3
	1355-RAMPA	20	05:45AM	<1.3
	1290-6590	20	05:50AM	<1.3
	1240-C.F.E	20	5:30PM	<1.3
	1315-6570	20	5:35PM	<1.3
	1290-6810	20	5:40PM	<1.3
	1340-6860	20	5:45PM	<1.3
	1380-RAMPA	20	5:50PM	<1.3
	1290-6770	21	05:30AM	<1.3
	1290-6570	21	05:35AM	<1.3
	1365-6480	21	05:40AM	<1.3
	1355-RAMPA	21	05:45AM	<1.3
	1290-6590	21	05:50AM	<1.3
	1240-C.F.E	21	5:30PM	<1.3
	1315-6570	21	5:35PM	<1.3
	1290-6810	21	5:40PM	<1.3
	1340-6860	21	5:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1380-RAMPA	21	5:50PM	<1.3
	134-6650	22	05:30AM	<1.3
	1365-VENT.	22	05:35AM	<1.3
	1380-RAMPA	22	05:40AM	<1.3
	1430-C.F.E	22	05:45AM	<1.3
	1455-C.F.E	22	05:50AM	<1.3
	1315-6770	22	05:55AM	<1.3
	1240-C.F.E	22	06:00AM	<1.3
	1315-6630	22	5:30PM	<1.3
	1290-6730	22	5:35PM	<1.3
	1380-RAMPA	22	5:40PM	<1.3
	1365-C.F.E.	22	5:45PM	<1.3
	1290-6710	22	5:50PM	<1.3
	1340-PAS	23	05:30AM	<1.3
	1290-6590	23	05:35AM	<1.3
	1365-6620	23	05:40AM	<1.3
	1380-RAMPA	23	05:45AM	<1.3
	1215-6560	23	05:50AM	<1.3
	1290-6810	23	05:55AM	<1.3
	1290-6410	23	06:00AM	<1.3
	1365-6940	23	5:30PM	<1.3
	1290-6710	23	5:35PM	<1.3
	1315-6770	23	5:40PM	<1.3
	1380-PAS	23	5:45PM	<1.3
	1455-C.F.E.	23	5:50PM	<1.3
	1380-RAMPA	24	05:30AM	<1.3
	1365-VENT.	24	05:35AM	<1.3
	1365-6480	24	05:40AM	<1.3
	1240-C.F.E.	24	05:45AM	<1.3
	1315-6630	24	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1290-6590	24	05:55AM	<1.3
	1290-6570	24	5:30PM	<1.3
	1240-6860	24	5:35PM	<1.3
	1380-RAMPA	24	5:40PM	<1.3
	1340-PAS	24	5:45PM	<1.3
	1290-6510	25	05:30AM	<1.3
	1290-6570	25	05:35AM	<1.3
	1430-C.F.E.	25	05:40AM	<1.3
	1380-RAMPA	25	05:45AM	<1.3
	1190-6560	25	5:30PM	<1.3
	1315-6570	25	5:35PM	<1.3
	1455-C.F.E.	25	5:40PM	<1.3
	1365-6720	25	5:45PM	<1.3
	1315-6420	25	5:50PM	<1.3
	1340-6540	26	05:30AM	<1.3
	1365-6620	26	05:35AM	<1.3
	1315-6590	26	05:40AM	<1.3
	1380-RAMPA	26	5:30PM	<1.3
	1340-6540	26	5:35PM	<1.3
	1355-RAMPA	26	5:40PM	<1.3
	1315-6670	27	05:30AM	<1.3
	1290-6590	27	05:35AM	<1.3
	1380-RAMPA	27	05:40AM	<1.3
	1315-6590	27	05:45AM	<1.3
	1240-C.F.E.	27	5:30PM	<1.3
	1290-6810	27	5:35PM	<1.3
	1340-6540	27	5:40PM	<1.3
	1315-6670	28	05:30AM	<1.3
1190-6560	28	05:35AM	<1.3	
1215-6560	28	05:40AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Noviembre	1315-6590	28	05:45AM	<1.3
	1340-VYPAS	28	5:30PM	<1.3
	1340-6630	28	5:35PM	<1.3
	1380-RAMPA	28	5:40PM	<1.3
	1430-C.F.E.	28	5:45PM	<1.3
	13810-ACC	29	05:30AM	<1.3
	1380-DESCENDENTE	29	05:35AM	<1.3
	1365-6480	29	05:40AM	<1.3
	1365-VENT	29	05:45AM	<1.3
	1380-ASCENDENTE	29	05:50AM	<1.3
	1290-6810	29	05:55AM	<1.3
	1355-RAMPA	29	5:30PM	<1.3
	1365-6500	29	5:35PM	<1.3
	1240-C.F.E.	29	5:40PM	<1.3
	1290-6410	29	5:45PM	<1.3
	1315-6570	29	5:50PM	<1.3
	1365-6720	29	5:55PM	<1.3
	1265-6670	30	05:30AM	<1.3
	1340-6650	30	05:35AM	<1.3
	1240-C.F.E.	30	05:40AM	<1.3
	1455-C.F.O.	30	05:45AM	<1.3
	1240-6570	30	5:30PM	<1.3
	1315-6670	30	5:35PM	<1.3
	1315-6650	30	5:40PM	<1.3
	1390-C.F.O.	30	5:45PM	<1.3
	1365-6620	30	5:50PM	<1.3
	1365-6580	30	5:55PM	<1.3
	1215-6480	30	18:00	<1.3
	1315-6590	30	6:05PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1460-C.F.O.	1	05:30AM	<1.3
	1365-C.F.E DEL O.	1	05:35AM	<1.3
	10290-64110	1	05:40AM	<1.3
	1290-6730	1	05:45AM	<1.3
	1290-6770	1	5:30PM	<1.3
	1315-6630	1	5:35PM	<1.3
	1380- ASCENDENTE	1	5:40PM	<1.3
	1355-RAMPA	1	5:45PM	<1.3
	1380- DESCENDENTE	1	5:50PM	<1.3
	1215-6440	1	5:55PM	<1.3
	1315-6570	2	05:30AM	<1.3
	1290-6570	2	05:35AM	<1.3
	1340-6540	2	05:40AM	<1.3
	1340-6650	2	05:45AM	<1.3
	1340-PAS	2	05:50AM	<1.3
	1215-6560	2	5:30PM	<1.3
	1365-6480	2	5:35PM	<1.3
	1365-6500	2	5:40PM	<1.3
	1430-c.f.e.	2	5:45PM	<1.3
	1460-RAMPA	2	5:50PM	<1.3
	1290-6530	2	5:55PM	<1.3
	1215-6380	2	18:00	<1.3
	1290-6810	3	05:30AM	<1.3
	1290-6410	3	05:35AM	<1.3
	1380-ASCENDENTE	3	05:40AM	<1.3
	1240-C.F.E.	3	5:30PM	<1.3
	1365-6620	3	5:35PM	<1.3
	1365-VENT.	3	5:40PM	<1.3
	1455-C.F.E.	3	5:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1265-6400	3	5:50PM	<1.3
	1240-C.F.E.	4	05:30AM	<1.3
	1215-6560	4	05:35AM	<1.3
	1380-ASC.	4	05:40AM	<1.3
	1460-RAMPA	4	5:30PM	<1.3
	1380-DES	4	5:35PM	<1.3
	1290-6570	4	5:40PM	<1.3
	1315-6630	4	5:45PM	<1.3
	1380-ASC	4	5:50PM	<1.3
	1215-.SERV	4	5:55PM	<1.3
	1290-65710	5	05:30AM	<1.3
	1380-ASC	5	05:35AM	<1.3
	1365-C.F.E.O.	5	05:40AM	<1.3
	12315-6590	5	5:30PM	<1.3
	1365-6500	5	5:35PM	<1.3
	1290-6880	5	5:40PM	<1.3
	1265-6410	5	5:45PM	<1.3
	1290-65710	6	05:30AM	<1.3
	1380-ASC	6	05:35AM	<1.3
	1365-C.F.E.O.	6	05:40AM	<1.3
	12315-6590	6	5:30PM	<1.3
	1365-6500	6	5:35PM	<1.3
	1290-6880	6	5:40PM	<1.3
	1265-6410	6	5:45PM	<1.3
	1265-6410	7	05:30AM	<1.3
	1215-TALLER	7	05:35AM	<1.3
	1390-C.F.O.	7	05:40AM	<1.3
	1340-PAS	7	05:45AM	<1.3
	1365-6480	7	05:50AM	<1.3
	1315-6420	7	05:55AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1380-ASC.	7	5:30PM	<1.3
	1380-DESC.	7	5:35PM	<1.3
	1240-C.F.E.	7	5:40PM	<1.3
	1240-6880	7	5:45PM	<1.3
	1240-6810	7	5:50PM	<1.3
	1380-ASC.	8	05:30AM	<1.3
	1315-6630	8	05:35AM	<1.3
	1365-6500	8	5:30PM	<1.3
	1365-c.f.o.e.	8	5:35PM	<1.3
	1340-6650	8	5:40PM	<1.3
	1265-6850	8	5:45PM	<1.3
	1315-6810	8	5:50PM	<1.3
	1315-6570	9	05:30AM	<1.3
	1290-6530	9	05:35AM	<1.3
	1380-DESC.	9	05:40AM	<1.3
	1365-6620	9	05:45AM	<1.3
	1240-6860	9	5:30PM	<1.3
	1460-rampa	9	5:35PM	<1.3
	1380-DESC	10	05:30AM	<1.3
	1365-C.F.E.	10	05:35AM	<1.3
	1380-ASC	10	05:40AM	<1.3
	1340-36440	10	05:45AM	<1.3
	1265-6410	10	05:50AM	<1.3
	1290-6570	10	05:55AM	<1.3
	1340-PAS	10	06:00AM	<1.3
	1290-6810	10	5:30PM	<1.3
	1365-6740	10	5:35PM	<1.3
	1380-ASC	10	5:40PM	<1.3
1390-C.F.O.	10	5:45PM	<1.3	
1340-6500	11	05:30AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1415-ACC	11	05:35AM	<1.3
	1365-6500	11	05:40AM	<1.3
	1380-ASC	11	05:45AM	<1.3
	1215-VENT.	11	5:30PM	<1.3
	1365-6480	11	5:35PM	<1.3
	1460-RAMPA	12	05:30AM	<1.3
	1380-ASC	12	05:35AM	<1.3
	1240-6850	12	05:40AM	<1.3
	1240-6860	12	05:45AM	<1.3
	1365-6740	12	5:30PM	<1.3
	1365-6630	12	5:35PM	<1.3
	1265-6410	12	5:40PM	<1.3
	1265-6850	12	5:45PM	<1.3
	1365-C.F.E.	13	05:30AM	<1.3
	1380-DESC	13	05:35AM	<1.3
	1315-6570	13	05:40AM	<1.3
	1190-SERV.	13	5:30PM	<1.3
	1190-SUB EST,	13	5:35PM	<1.3
	1380-ASC.	14	05:30AM	<1.3
	1240-6880	14	05:35AM	<1.3
	1240-C.F.O.	14	05:40AM	<1.3
	1415.ACC	14	05:45AM	<1.3
	1190-SERV.	14	5:30PM	<1.3
	1340-6650	15	05:30AM	<1.3
	1365-6500	15	05:35AM	<1.3
	1290-6850	15	05:40AM	<1.3
	1265-6850	15	05:45AM	<1.3
	1215-vent.	15	5:30PM	<1.3
	1365-6480	15	5:35PM	<1.3
	1215-6480	15	5:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	6650-1340	15	5:45PM	<1.3
	1340-6860	16	05:30AM	<1.3
	1315-6570	16	05:35AM	<1.3
	1190-SERV.	16	05:40AM	<1.3
	1265-6850	16	05:45AM	<1.3
	1380-RAMAPA	16	5:30PM	<1.3
	1240-C.F.O.	16	5:35PM	<1.3
	1365-C.F.O.O.	16	5:40PM	<1.3
	1365-6740	16	5:45PM	<1.3
	1290-6530	16	5:50PM	<1.3
	1265-6410	16	5:55PM	<1.3
	1365-6500	17	5:30PM	<1.3
	1315-6770	17	5:35PM	<1.3
	1415-ACC	17	5:40PM	<1.3
	1340-6650	18	05:30AM	<1.3
	1365-6480	18	05:35AM	<1.3
	1240-VENT.	18	05:40AM	<1.3
	1190-SEV.	18	05:45AM	<1.3
	1365-6500	18	05:50AM	<1.3
	1380-ASC	18	5:30PM	<1.3
	1365-6740	18	5:35PM	<1.3
	1365-C.F.E.	18	5:40PM	<1.3
	1265-6410	18	5:45PM	<1.3
	1265-6850	18	5:50PM	<1.3
	1215-6480	18	5:55PM	<1.3
	1315-6570	19	05:30AM	<1.3
	1365-6740	19	05:35AM	<1.3
	1380-ASC	19	05:40AM	<1.3
	1340-6440	19	05:45AM	<1.3
	1415-ACC	19	5:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1290-6850	19	5:35PM	<1.3
	1215-SERV	19	5:40PM	<1.3
	1380-DESC	19	5:45PM	<1.3
	1380-ASC	19	5:50PM	<1.3
	1215-6560	19	5:55PM	<1.3
	1240-6880	20	05:30AM	<1.3
	1365-6480	20	05:35AM	<1.3
	1240-6860	20	05:40AM	<1.3
	1215-6560	20	05:45AM	<1.3
	1315-6630	20	5:30PM	<1.3
	1460-RAMPA	20	5:35PM	<1.3
	1365-C.F.O.O.	21	05:30AM	<1.3
	1460-RAMPA	21	05:35AM	<1.3
	1380-asc.	21	5:30PM	<1.3
	1290-6850	21	5:35PM	<1.3
	1415-acc.	21	5:40PM	<1.3
	1380-desc.	21	5:45PM	<1.3
	1340-6650	21	5:50PM	<1.3
	1265-6410	22	05:30AM	<1.3
	1265-6850	22	05:35AM	<1.3
	1380-ASC	22	05:40AM	<1.3
	1380-DESC.	22	05:45AM	<1.3
	1365-6500	22	5:30PM	<1.3
	1340-bypas	22	5:35PM	<1.3
	1190-SUBEST.	22	5:40PM	<1.3
	1215-VENT,	22	5:45PM	<1.3
	1215-6480	22	5:50PM	<1.3
	1315-6770	24	05:30AM	<1.3
	1215-VENT. O.	24	05:35AM	<1.3
	1380-ASC.	24	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Diciembre	1415-ACC	24	5:30PM	<1.3
	1380-ACC	24	5:35PM	<1.3
	1190-SUB.EST.E.	24	5:40PM	<1.3
	1380-DESC.	24	5:45PM	<1.3
	1240-6820	25	05:30AM	<1.3
	1265-6410	25	05:35AM	<1.3
	1265-6850	25	05:40AM	<1.3
	1365-6740	25	05:45AM	<1.3
	1380-DESC.	25	05:50AM	<1.3
	1290-6850	25	5:30PM	<1.3
	1390-C,F,O,	25	5:35PM	<1.3
	1480-ACC	25	5:40PM	<1.3
	1480-RAMPA	25	5:45PM	<1.3
	1190-SERV.	25	5:50PM	<1.3
	1340-6650	26	05:30AM	<1.3
	1190-SUB. EST. E.	26	05:35AM	<1.3
	1365-C,F,O,.E.	26	05:40AM	<1.3
	1190-SERV.O.	26	05:45AM	<1.3
	1240-6820	26	05:50AM	<1.3
	1340-VENT.O.	26	5:30PM	<1.3
	1190-SERV.O.	26	5:35PM	<1.3
	1365-6480	26	5:40PM	<1.3
	1380-ACC.	26	5:45PM	<1.3
	1390-C,F,O.	26	5:50PM	<1.3
	1340-6380	27	05:30AM	<1.3
	1415-SUM.	27	05:35AM	<1.3
	1380-DESC	27	05:40AM	<1.3
1290-6850	27	05:45AM	<1.3	
1265-6410	27	5:30PM	<1.3	
1380-ASC.	27	5:35PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)	
Diciembre	1365-6740	27	5:40PM	<1.3	
	1380-ASC.	28	05:30AM	<1.3	
	1265-6410	28	05:35AM	<1.3	
	1380-DESC.	28	05:40AM	<1.3	
	1240-6820	28	05:45AM	<1.3	
	1215-SERV.	28	05:50AM	<1.3	
	1480-RAMPA	28	5:30PM	<1.3	
	1480-ACC.	28	5:35PM	<1.3	
	1265-6850	28	5:40PM	<1.3	
	1240-VENT.O.	28	5:45PM	<1.3	
	1340-6650	28	5:50PM	<1.3	
	1380-acc	29	05:30AM	<1.3	
	1290-6850	29	05:35AM	<1.3	
	1380-asc.	29	05:40AM	<1.3	
	1390-acc.o.	29	05:45AM	<1.3	
	1380-desc.	29	05:50AM	<1.3	
	1265-6850	29	5:30PM	<1.3	
	1365-6740	29	5:35PM	<1.3	
	1240-vent.	29	5:40PM	<1.3	
	1340-6380	29	5:45PM	<1.3	
	Enero	1240-6820	3	05:30AM	<1.3
		1380-descendente	3	05:35AM	<1.3
		1240-6820	5	05:30AM	<1.3
1380-ASCENDENTE		5	5:30PM	<1.3	
1240-6820		5	5:35PM	<1.3	
1365-6500		6	05:30AM	<1.3	
1265-6410		6	5:30PM	<1.3	
1340-6650		6	5:35PM	<1.3	
1380-asc.		6	5:40PM	<1.3	
1240-VENTILACION	7	05:30AM	<1.3		

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1315-6570	7	05:35AM	<1.3
	1365-6740	7	5:30PM	<1.3
	1265-6850	7	5:35PM	<1.3
	1215-6560	7	5:40PM	<1.3
	1380-ASCE.	7	5:45PM	<1.3
	1265-6850	8	05:30AM	<1.3
	1340-6650	8	5:30PM	<1.3
	1265-6410	8	5:35PM	<1.3
	1240-6820	8	5:40PM	<1.3
	1215-6560	8	5:45PM	<1.3
	1290-6850	8	5:50PM	<1.3
	1340-6650	9	05:30AM	<1.3
	1265-6850	9	05:35AM	<1.3
	1265-6670	9	5:30PM	<1.3
	1265-6410	9	5:35PM	<1.3
	1380-ASENDETE	9	5:40PM	<1.3
	1265-6670	10	05:30AM	<1.3
	1290-6730	10	05:35AM	<1.3
	1215-C.F.O.	10	05:40AM	<1.3
	1265-6410	10	5:30PM	<1.3
	1290-6730	10	5:35PM	<1.3
	1380-ASCENDENTE	10	5:40PM	<1.3
	1290-6850	11	05:30AM	<1.3
	1190-sub, est,	11	05:35AM	<1.3
	1240-6820	11	05:40AM	<1.3
	1265-6740	11	5:30PM	<1.3
	1340-6650	11	5:35PM	<1.3
	1290-6670	11	5:40PM	<1.3
	1240-6810	12	05:30AM	<1.3
	1190-SERV.	12	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1365-6500	12	05:40AM	<1.3
	1215-VENTI.	12	05:45AM	<1.3
	1290-6670	12	05:50AM	<1.3
	1190-serv.	12	5:30PM	<1.3
	1265-6850	12	5:35PM	<1.3
	1290-6770	12	5:40PM	<1.3
	1290-6670	12	5:45PM	<1.3
	1365-6580	13	05:30AM	<1.3
	1365-6740	13	05:35AM	<1.3
	1240-6480	13	05:40AM	<1.3
	1290-6410	13	05:45AM	<1.3
	1355-SUB.EST.	13	05:50AM	<1.3
	1290-6530	13	5:30PM	<1.3
	1240-6400	13	5:35PM	<1.3
	1340-6650	13	5:40PM	<1.3
	1480-ACC.	13	5:45PM	<1.3
	1480-ACC	14	05:30AM	<1.3
	1240-6840	14	05:35AM	<1.3
	1290-6530	14	05:40AM	<1.3
	1340-6650	14	05:45AM	<1.3
	1386- DEL OESTE	14	05:50AM	<1.3
	1365-6780	14	5:30PM	<1.3
	1365-6760	14	5:35PM	<1.3
	1240-6440	14	5:40PM	<1.3
	1265-6410	14	5:45PM	<1.3
	1240-6440	15	05:30AM	<1.3
	1365-6760	15	05:35AM	<1.3
	1365-6780	15	05:40AM	<1.3
	1365-OESTE #1	15	05:45AM	<1.3
	1365-OESTE # 2	15	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1290-6710	15	5:30PM	<1.3
	1240-6400	15	5:35PM	<1.3
	1365-6740	15	5:40PM	<1.3
	1365-OESTE	15	5:45PM	<1.3
	1365-6500	15	5:50PM	<1.3
	1290-6670	16	05:30AM	<1.3
	1390-OESTE	16	05:35AM	<1.3
	1240-6400	16	05:40AM	<1.3
	1290-6440	16	05:45AM	<1.3
	1355-RAMPA	16	5:30PM	<1.3
	1290-6410	16	5:35PM	<1.3
	1240-6840	16	5:40PM	<1.3
	1365-OESTE	16	5:45PM	<1.3
	1340-6540	17	05:30AM	<1.3
	1240-6440	17	05:35AM	<1.3
	1365-6560	17	05:40AM	<1.3
	1390-oeste	17	05:45AM	<1.3
	1365-OESTE	17	5:30PM	<1.3
	1365-6760	17	5:35PM	<1.3
	1240-6840	17	5:40PM	<1.3
	1365-6740	17	5:45PM	<1.3
	1365-6780	17	5:50PM	<1.3
	1390-OESTE #1	18	05:30AM	<1.3
	1390-OESTE #2	18	05:35AM	<1.3
	1365-6520	18	05:40AM	<1.3
	1480-ACC.	18	5:30PM	<1.3
	1365-6560	18	5:35PM	<1.3
	1340-6540	18	5:40PM	<1.3
	1390-OESTE	18	5:45PM	<1.3
	1240-6480	19	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1365-6620	19	05:35AM	<1.3
	1365-6500	19	05:40AM	<1.3
	1390-oeste	19	05:45AM	<1.3
	1290-6410	19	05:50AM	<1.3
	1240-6480	19	5:30PM	<1.3
	1340-6440	19	5:35PM	<1.3
	1365-6760	19	5:40PM	<1.3
	1240-6840	19	5:45PM	<1.3
	1240-6840	20	05:30AM	<1.3
	1365-6780	20	05:35AM	<1.3
	1340-6650	20	05:40AM	<1.3
	1240-6480	20	05:45AM	<1.3
	1290-6850	20	5:30PM	<1.3
	1355-DSST	20	5:35PM	<1.3
	1240-6440	20	5:40PM	<1.3
	1290-6710	20	5:45PM	<1.3
	1365-6510	20	5:50PM	<1.3
	1480-ACC	21	05:30AM	<1.3
	1355-DDST	21	05:35AM	<1.3
	1365-6620	21	05:40AM	<1.3
	1340-6620	21	05:45AM	<1.3
	1340-6460	21	05:50AM	<1.3
	1340-6420	21	05:55AM	<1.3
	1365-6580	21	5:30PM	<1.3
	1365-6760	21	5:35PM	<1.3
	1240-6880	21	5:40PM	<1.3
	1240-6400	21	5:45PM	<1.3
	1365-6620	21	5:50PM	<1.3
	1340-6540	22	05:30AM	<1.3
	1340-6920	22	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1240-6710	22	05:40AM	<1.3
	1290-6410	22	05:45AM	<1.3
	1290-6850	22	05:50AM	<1.3
	1365-6760	22	05:55AM	<1.3
	1240-6440	22	5:30PM	<1.3
	1240-6480	22	5:35PM	<1.3
	1365-6760	22	5:40PM	<1.3
	1365-6580	23	05:30AM	<1.3
	1240-6880	23	05:35AM	<1.3
	1240-6400	23	5:30PM	<1.3
	1240-6440	23	5:35PM	<1.3
	1365-6500	23	5:40PM	<1.3
	1290-6710	23	5:45PM	<1.3
	1365-6620	23	5:50PM	<1.3
	1390-oeste	24	05:30AM	<1.3
	1240-6840	24	05:35AM	<1.3
	1455-ddst	24	05:40AM	<1.3
	1240-6480	24	05:45AM	<1.3
	1365-6760	24	05:50AM	<1.3
	1340-6600	24	5:30PM	<1.3
	1340-6650	24	5:35PM	<1.3
	1390-oeste	24	5:40PM	<1.3
	1365-6780	24	5:45PM	<1.3
	1240-6880	25	05:30AM	<1.3
	1480-acc	25	05:35AM	<1.3
	1365-6760	25	05:40AM	<1.3
	1240-6480	25	5:30PM	<1.3
	1240-6860	25	5:35PM	<1.3
	1240-6400	25	5:40PM	<1.3
	1290-6850	25	5:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1290-6410	25	5:50PM	<1.3
	1365-6620	25	5:55PM	<1.3
	1240-6860	26	05:30AM	<1.3
	1365-6780	26	5:30PM	<1.3
	1365-6580	26	5:35PM	<1.3
	1365-6540	26	5:40PM	<1.3
	1365-6560	26	5:45PM	<1.3
	1365-6760	26	5:50PM	<1.3
	1480-ACC.	27	05:30AM	<1.3
	1290-6850	27	05:35AM	<1.3
	1340-6920	27	05:40AM	<1.3
	1240-6880	27	5:30PM	<1.3
	1240-6840	27	5:35PM	<1.3
	1240-6440	27	5:40PM	<1.3
	1390-C.F.E.O.	27	5:45PM	<1.3
	1390-6920	27	5:50PM	<1.3
	1365-6620	27	5:55PM	<1.3
	1390-CAIDO OESTE	28	05:30AM	<1.3
	1240-6860	28	05:35AM	<1.3
	1480-ACC	28	05:40AM	<1.3
	1365-6580	28	05:45AM	<1.3
	1365-6760	28	05:50AM	<1.3
	1240-6400	28	5:30PM	<1.3
	1240-6480	28	5:35PM	<1.3
	1355-DDTS	28	5:40PM	<1.3
	1365-6780	28	5:45PM	<1.3
	1290-6850	29	05:30AM	<1.3
	1240-6880	29	05:35AM	<1.3
	1355-DDST	29	05:40AM	<1.3
	1355-SUM	29	05:45AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1365-6540	29	05:50AM	<1.3
	1240-6440	29	5:30PM	<1.3
	1240-6840	29	5:35PM	<1.3
	1240-6780	29	5:40PM	<1.3
	1455-C.F.E.	29	5:45PM	<1.3
	1365-6780	29	5:50PM	<1.3
	1240-6400	29	5:55PM	<1.3
	1240-6860	30	05:30AM	<1.3
	1240-6480	30	05:35AM	<1.3
	1365-6720	30	05:40AM	<1.3
	1240-6480	30	5:30PM	<1.3
	1240-6440	30	5:35PM	<1.3
	1315-6710	30	5:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Enero	1240-6400	30	5:45PM	<1.3
	1365-6580	30	5:50PM	<1.3
	1290-6850	31	05:30AM	<1.3
	1240-6860	31	05:35AM	<1.3
	1240-6400	31	05:40AM	<1.3
	1340-VENT.	31	05:45AM	<1.3
	1390-CAIDO OESTE	31	5:30PM	<1.3
	1365-6540	31	5:35PM	<1.3
	1355-SBTS	31	5:40PM	<1.3
	1240-6880	31	5:45PM	<1.3
	1365-6780	31	5:50PM	<1.3

Donde mm/s: milímetros por segundo; Fuente: MSR, 2016.

8 Geoquímica de Roca Estéril

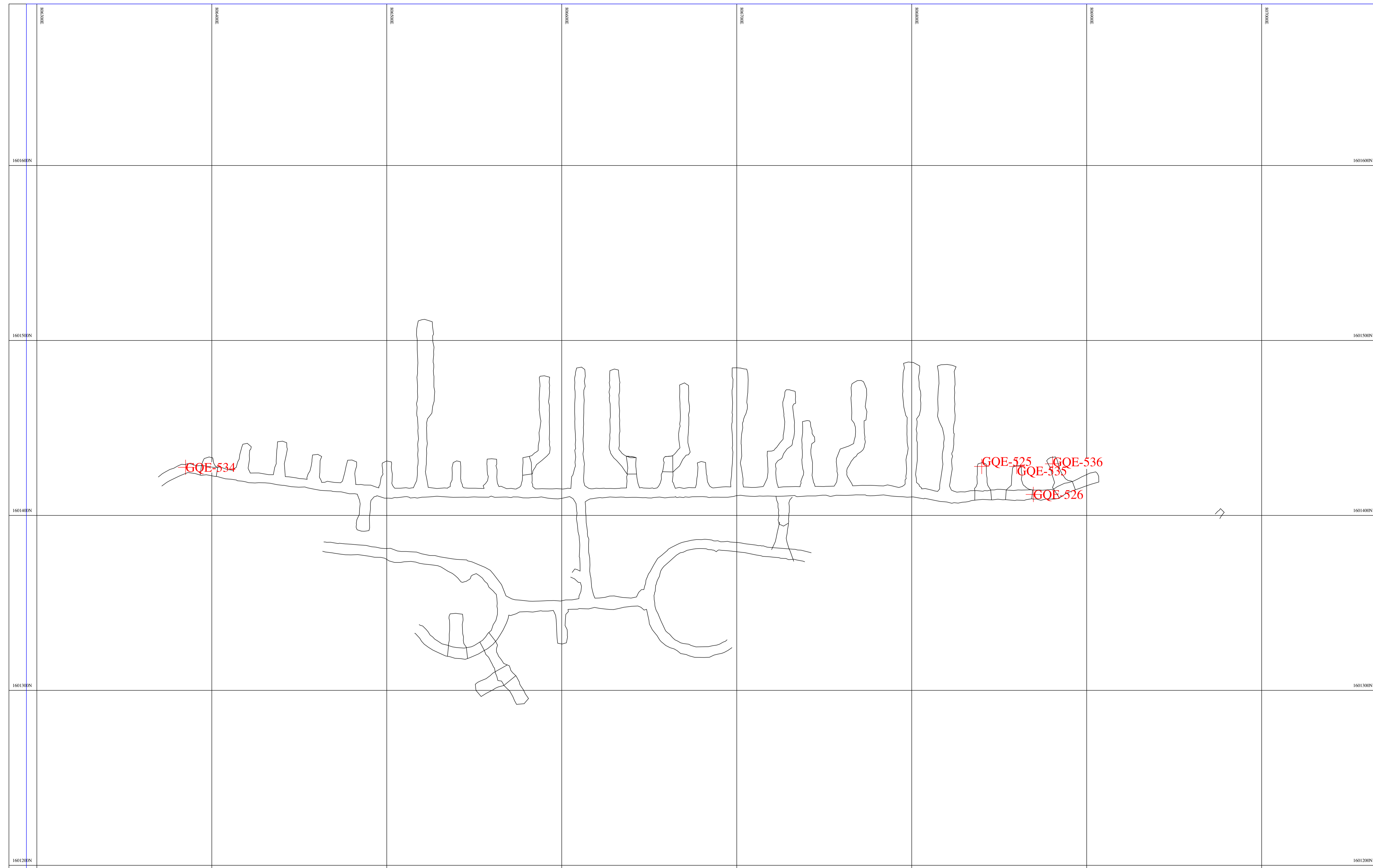
8.1 Sitios de Monitoreo

En el Cuadro 8-1 se enlistan las muestras analizadas de material extraído de los túneles del proyecto, rampa oeste y rampa este, durante los meses de Noviembre de 2015 a Enero de 2016. 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 y Figura 8-7.

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

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-522	1380-RAMP-ZE	807208.5	1601459.25	1355
GQE-523	1365-6480-OC	806480.5	1601404	1367
GQE-524	1365-6960-EC	806959.84	1601403	1370
GQE-525	1240-6480-EC	806840	1601428	1243
GQE-526	1240-CFTE-EC	806869.5	1601412	1244
GQE-527	1365-6500-OC	806500	1601391.5	1367
GQE-528	1405-Acc-ZE	807492.5	1601608	1405
GQE-529	1365-CFTE-OC	806515	1601379.5	1367
GQE-530	1380-RAMP-AS	807335.5	1601477	1363
GQE-531	1380-RAMP-DE	807454	1601516.5	1380
GQE-532	1455-CFTE-ZE	807485.5	1601611.5	1453
GQE-533	1480-RAMP-ZE	807441.5	1601556.5	1478
GQE-534	1240-CFTO	806385	1601427.5	1243
GQE-535	1240-6860	806860	1601428	1245
GQE-536	1240-6880	806880.5	1601429.5	1244

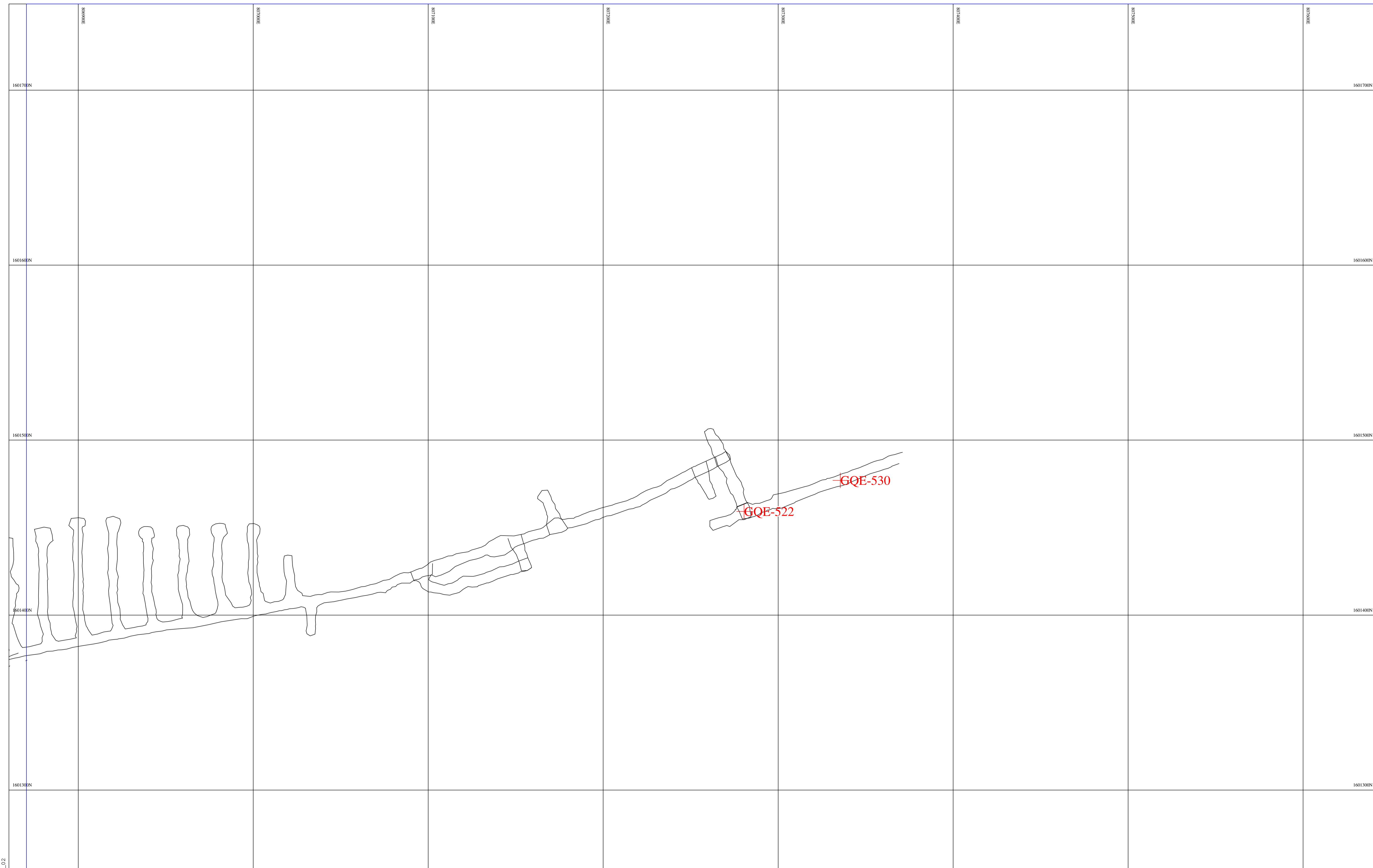
Fuente: MSR, 2016.



Plano ARD Nivel 1240

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2015-Ene 2016	1:1000

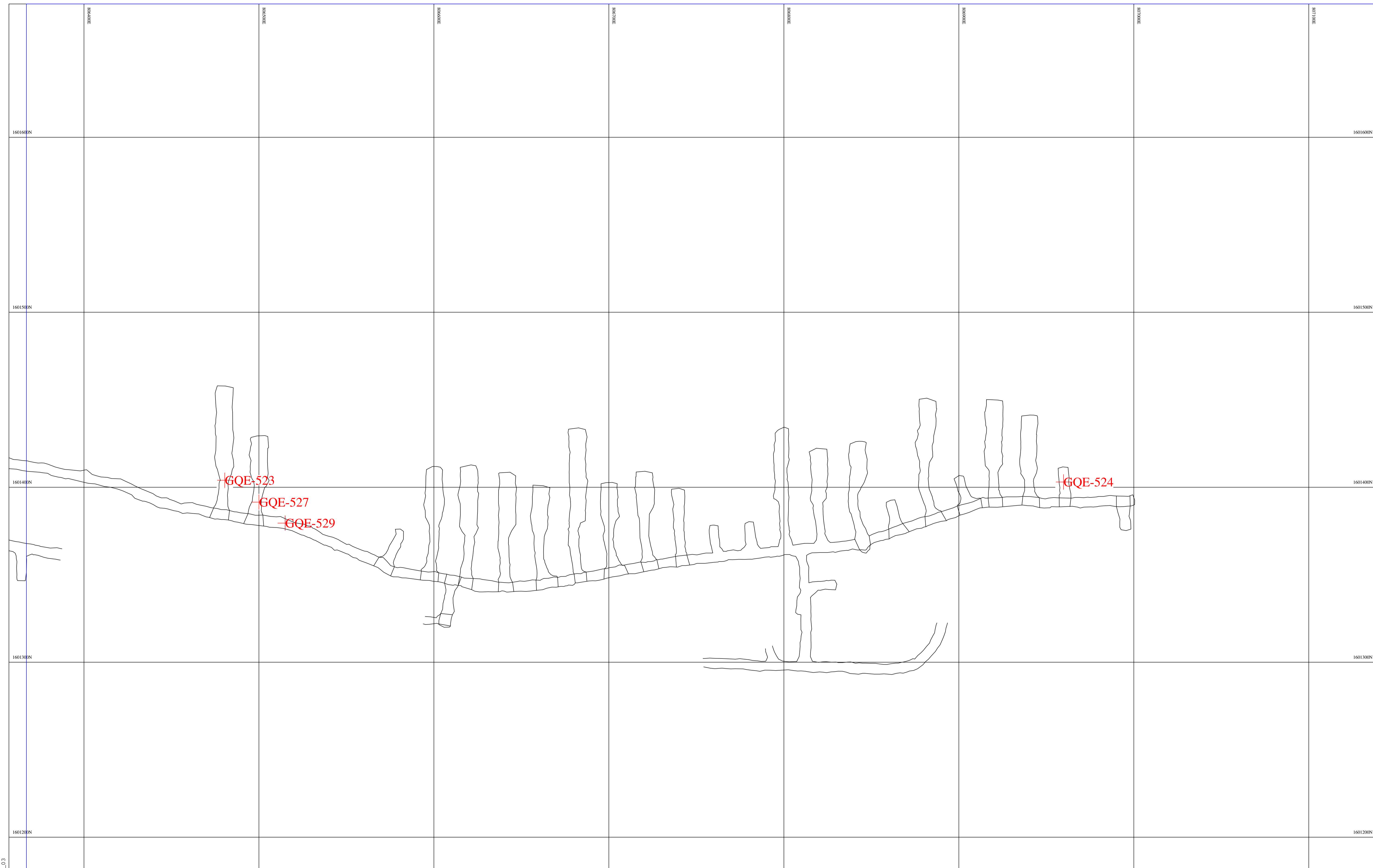
noviembre_2015-enero_2016



Plano ARD Nivel 1355

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HG/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2015-Ene 2016	1:1000

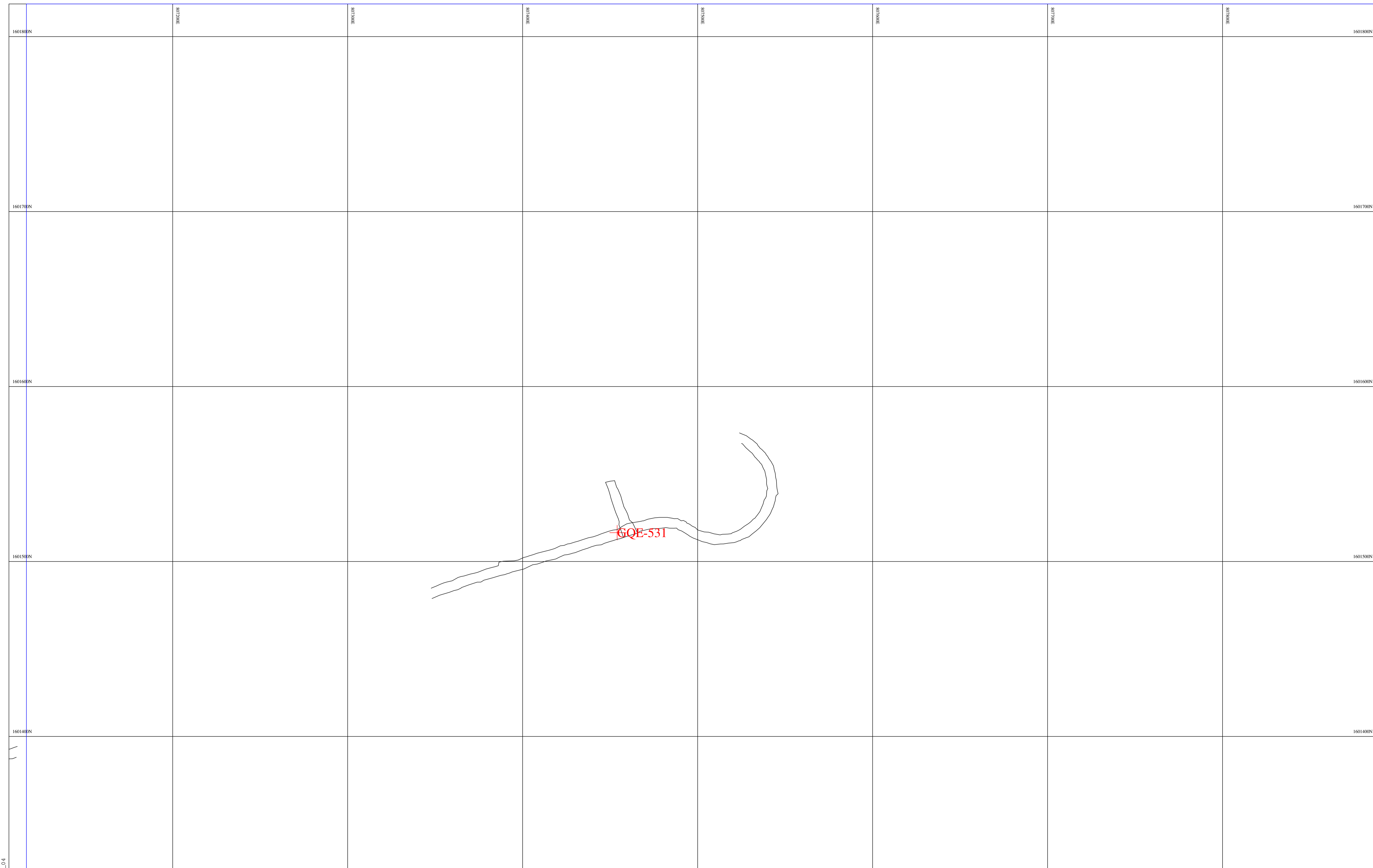
noviembre_2015-enero_2016_02



Plano ARD Nivel 1365

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2015-Ene 2016	1:1000

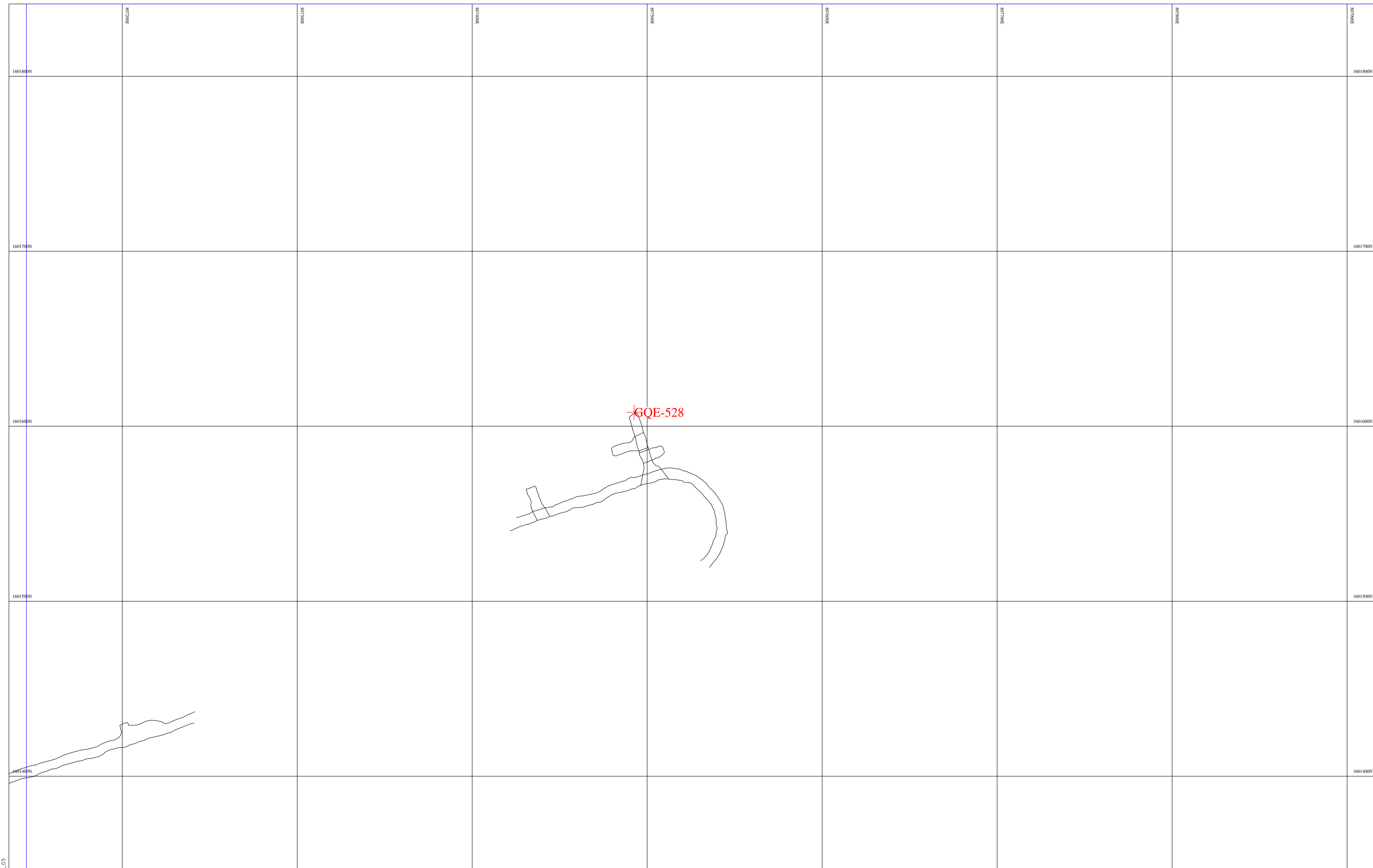
noviembre_2015-enero_2016_03



Plano ARD Nivel 1380

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2015-Ene 2016	1:1000

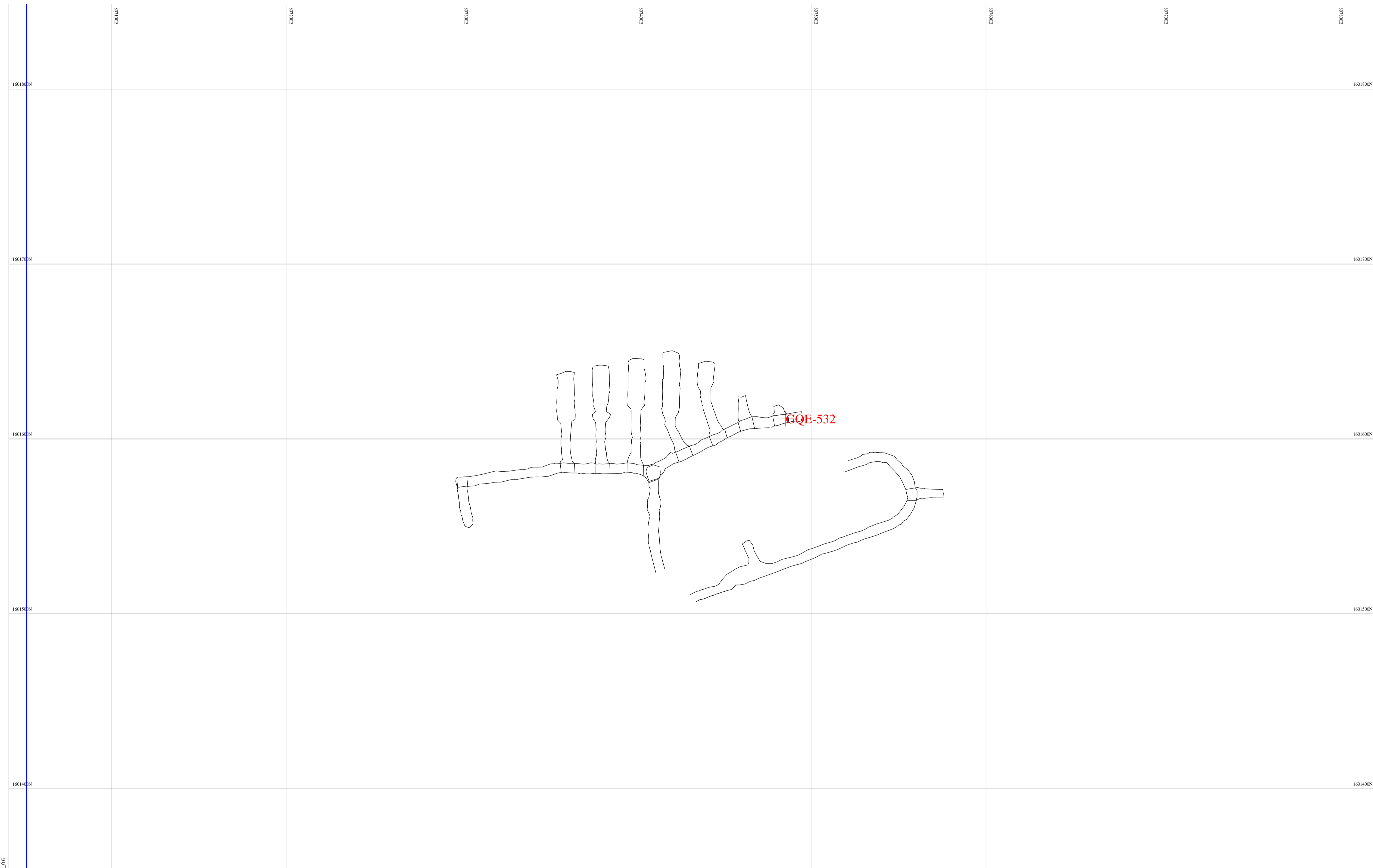
noviembre_2015-enero_2016_04



Plano ARD Nivel 1405

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2015-Ene 2016	1:1000

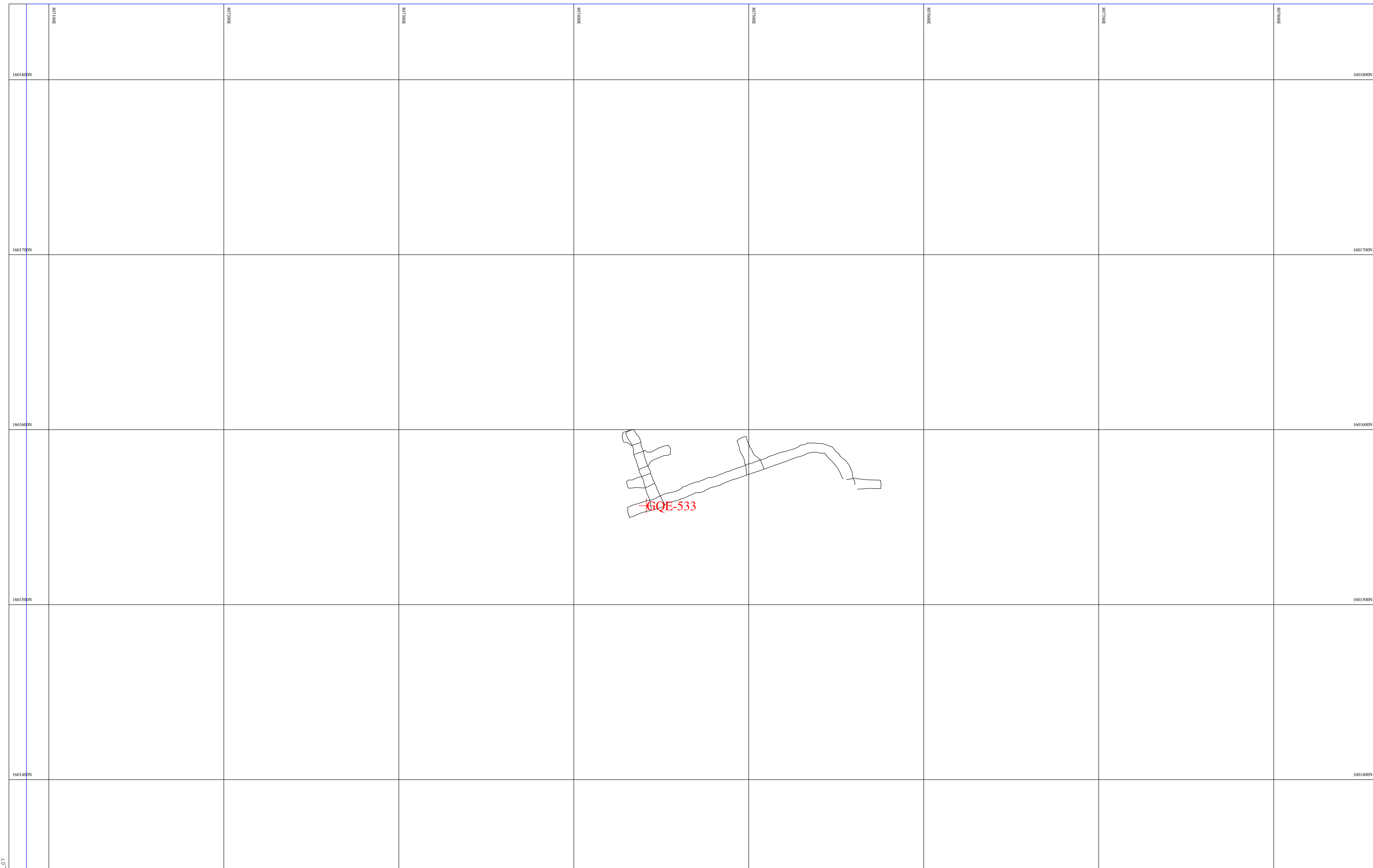
noviembre_2015-enero_2016_05



Plano ARD Nivel 1455

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2015-Ene 2016	1:1000

noviembre_2015-enero_2016_06



Plano ARD Nivel 1480

DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Nov 2015-Ene 2016	1:1000

noviembre_2015-enero_2016_07

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, 2016.

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 8.06 a 9.24 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-522	06/11/2015	08/11/2015	8.57	21.2
GQE-523	06/11/2015	08/11/2015	8.63	21.2
GQE-524	06/11/2015	08/11/2015	9.07	21.1
GQE-525	07/11/2015	08/11/2015	9.19	21.3
GQE-526	14/11/2015	23/11/2015	8.81	25.1
GQE-527	16/11/2015	23/11/2015	9.07	24.9
GQE-528	20/11/2015	23/11/2015	9.06	24.8

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-529	28/11/2015	06/12/2015	8.06	20.5
GQE-530	04/12/2015	06/12/2015	8.27	20.7
GQE-531	05/12/2015	06/12/2015	8.5	20.7
GQE-532	05/12/2015	06/12/2015	8.48	21.1
GQE-533	23/12/2015	25/12/2015	9.24	20.5
GQE-534	20/12/2015	25/12/2015	8.97	20.4
GQE-535	22/12/2015	25/12/2015	8.88	20.2
GQE-536	22/12/2015	25/12/2015	8.85	20.2

Fuente: MSR, 2016.

9 Mediciones de Seguridad Industrial y Salud Ocupacional

9.1 Presión Sonora

La medición de Presión Sonora en el trimestre de Noviembre de 2015 a Enero de 2016 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		2016
Mes		Noviembre	Diciembre	Enero
Fecha		25/11/15	03/12/15	12/01/16
Hora Inicio		7:38	7:04	7:24
Duración		10:04h	10:33h	10:13h
Lmax dBA		123.5	124.8	116.2
Lmin dBA		60.7	60.8	60.6
Prom. Diurno dBA		98.5	101.4	84.5
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*		86	86	86
Duración de Referencia OSHA		12h	12h	12h
Leq (Normal sin uso de EPP)		98.5	101.4	84.5
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		84	86.9	70
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	No Aceptable	Aceptable

Superficie Planta de Proceso - FILTROS		2015		2016
Mes		Noviembre	Diciembre	Enero
Fecha		16/11/15	03/12/15	12/01/16
Hora Inicio		7:05	7:00	7:26
Duración		10h 30 min	10:45h	10:14h
Lmax dBA		113.4	112.7	109.9
Lmin dBA		61.8	60.7	60.7
Prom. Diurno dBA		86	84.4	87.2
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)		86	84.4	87.2
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		71.5	69.9	72.7
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Scoop		2016		2016
Mes		Noviembre	Diciembre	Enero
Fecha		27/11/15	17/12/15	21/01/16
Hora Inicio		6:58	7:07	6:48
Duración		10:39h	10:29h	11:13h
Lmax dBA		136.8	111.9	114.1
Lmin dBA		60.6	60.9	60.5
Prom. Diurno dBA		104.6	96.4	97.8
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*		86	86	86
Duración de Referencia OSHA		12h	12h	12h
Leq (Normal sin uso de EPP)		104.6	96.4	97.8
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		90.1	81.9	83.3
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		No Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - MOLINO		2015		2016
Mes		Noviembre	Diciembre	Enero
Fecha		16/11/15	16/12/15	11/01/16
Hora Inicio		7:07	7:32	7:19
Duración		10h	10:11h	10:27h
Lmax dBA		115.3	112.4	124.5
Lmin dBA		60.8	60.7	60.7
Prom. Diurno dBA		87.2	83.6	92.9
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)		87.2	83.6	92.9
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		72.7	69.1	78.4
Resultado (Leq ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Jumbo		2015		2016
Mes		Noviembre	Diciembre	Enero
Fecha			02/12/15	20/01/16
Hora Inicio			7:04	6:36
Duración			10:33h	11:16h
Lmax dBA			120.6	116.5
Lmin dBA			60.4	60.6
Prom. Diurno dBA			94.7	101.5
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)			94.7	101.5
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)			-14.5	80.2
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)			Aceptable	Aceptable

Puesto de Operador de Boltec		2016		2016
Mes		Noviembre	Diciembre	Enero
Fecha		24/11/16	02/12/15	20/01/16
Hora Inicio		7:24	7:01	6:35
Duración		10:23h	10:38h	11:09h
Lmax dBA		113	115.7	129.1
Lmin dBA		60.8	60.7	60.5
Prom. Diurno dBA		96.7	94	101
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*		86	86	86
Duración de Referencia OSHA		12h	12h	12h
Leq (Normal sin uso de EPP)		96.7	94	101
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)		82.2	79.5	86.5
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	No Aceptable

Fuente: MSR, 2016.

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							2015	2016	
Trimestre							XVI		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MINIMAL CON EPP 99.97%)	NORMA µg/m3	GUIA µg/m3		Noviembre	Diciembre	Enero
Fecha					USEPA ¹	BANCO MUNDIAL ²	09/11/2015	05/12/2015	28/10/2015
Hora Inicio							7:00	7:00	7:00
Duración							11 h	11 h	11 h
OSHA Fracción Respirable PM ₄	mg/m ³	5	16667	150	150	50	0.189	0.005	0.006
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0.657	0.005	0.006

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							2015	2016	
Trimestre							XVI		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MINIMAL CON EPP 99.97%)	NORMA µg/m3	GUIA µg/m3		Noviembre	Diciembre	Enero
Fecha					USEPA ¹	BANCO MUNDIAL ²	09/11/2015	05/12/2015	28/10/2015
Hora Inicio							7:00	7:00	7:00
Duración							11 h	11 h	11 h
OSHA Fracción Respirable PM ₄	mg/m ³	5	16667	150	150	50	0.013	0.004	0.006
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0.023	0.012	0.006

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							2015	2016	
Trimestre							XVI		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MINIMAL CON EPP 99.97%)	NORMA µg/m3	GUIA µg/m3		Noviembre	Diciembre	Enero
Fecha					USEPA ¹	BANCO MUNDIAL ²	09/11/2015	05/12/2015	28/10/2015
Hora Inicio							7:00	7:00	7:00
Duración							11 h	11 h	11 h
OSHA Fracción Respirable PM ₄	mg/m ³	5	16667	150	150	50	0.57	0.062	0.006
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0.18	0.11	0.006

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							2015	2016	
Trimestre							XVI		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MINIMAL CON EPP 99.97%)	NORMA µg/m3	GUIA µg/m3		Noviembre	Diciembre	Enero
Fecha					USEPA ¹	BANCO MUNDIAL ²	26/11/2015	22/12/2015	28/10/2015
Hora Inicio							7:00	7:00	7:00
Duración							11 h	11 h	11 h
OSHA Fracción Respirable PM ₄	mg/m ³	5	16667	150	150	50	0.418	3.57	0.803
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	1.54	6.48	0.904

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 - LANZADO							2015	2016	
Trimestre							XVI		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MINIMAL CON EPP 99.97%)	NORMA µg/m3	GUIA µg/m3		Noviembre	Diciembre	Enero
Fecha					USEPA ¹	BANCO MUNDIAL ²	30/11/2015		21/01/2015
Hora Inicio							7:00		7:00
Duración							11 h		11 h
OSHA Fracción Respirable PM ₄	mg/m ³	5	16667	150	150	50	1.1		0.051
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	2.09		0.074

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, 2016.

9.3 Mediciones de Gas

Las mediciones de Gas, se hacen en forma rutinaria (turno a turno) y debido a que no se ha rebasado los límites permisibles cuando se encuentra maquinaria presente trabajando en las áreas según norma OSHA (Tabla Z1 1910.100 Límites para aires contaminados), es la razón por la que se ha mantenido los sistemas de ventilación de manera normal. Como se puede apreciar en el Cuadro 9-3 se siguió monitoreando la no presencia de Ácido Sulhídrico - Sulfuro de Hidrógeno (H_2S) y se omitirá hasta detectarse la primera vez. De igual forma, para efectos de publicación de informes, se seleccionará la primera etapa del ciclo que aparezca en las mediciones rutinarias, por lo que en los resultados se ha colocado como mínimo 3 turnos de alguno de los meses del trimestre, a fin de tener información sistematizada.

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

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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.			
03-nov-15	1290-6670.EC	Ninguna	Medición posterior a voladura	7	0	07:05	Diurno	Jose Camilo
	1315-6630.EC	Ninguna	Medición posterior a voladura	17	0	07:15		
	1315-6670.EC	Ninguna	Medición posterior a voladura	40	0	07:54		
	1380-RAMP.ZE	Ninguna	Medición posterior a voladura	18	0	08:04		
	1365-6920.EC	Ninguna	Medición posterior a voladura	32	0	09:47		
	1365-6820.EC	Ninguna	Medición posterior a voladura	9	0	09:00		
	1340-6820.EC	Ninguna	Medición posterior a voladura	30	0	08:00		
01-dic-15	1290 6730 EC	Ninguna	Medición posterior a voladura	35	0	07:57	Diurno	Ludyn Lima
	1290 6410 OC	Ninguna	Medición posterior a voladura	30	0	07:35		
	1460 ACC ZE	Ninguna	Medición posterior a voladura	30	0	07:35		
	1365 CFTE OC	Ninguna	Medición posterior a voladura	14	0	07:22		
	1390 CFTO ZE	Ninguna	Medición posterior a voladura	20	0	07:22		
		Ninguna	Medición posterior a voladura	11	0	07:11		
05-ene-16	1240 6820 EC	Ninguna	Medición posterior a voladura	6	0	07:51	Diurno	Ludyn Lima
	1215 6820 EC	Ninguna	Medición posterior a voladura	0	0	07:56		
	1380 RAMP DES ZE	Ninguna	Medición posterior a voladura	18	0	06:59		

Fuente: MSR, 2016.

10 Conclusiones

10.1 Mediciones del aire en el ambiente

- 1) El material particulado (**PM₁₀**), los gases de combustión (**SO₂** y **NO₂**) y los niveles de presión sonora (**NPS**) presentaron valores por debajo de las guías establecidos por la USEPA (**PM₁₀**, **SO₂** y **NO₂**), Banco Mundial (**PM₁₀**, **SO₂**, **NO₂** y **NPS**), OMS (**SO₂** y **NO₂**) y British Columbia (**SO₂** y **NO₂**). Los niveles de **PM₁₀** se encontraron dentro de los valores máximos y mínimos registrados durante el establecimiento de la línea base del Proyecto y el mercurio en **PM₁₀** se detectó únicamente en EA-2A, 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 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 en SW, GW y MW, todos los valores por debajo de lo sugerido por la USEPA (250 mg/L). Se detectó arsénico en todas las categorías de agua (SW, GW y MW) y todos los resultados se encontraron por debajo de los establecido por la USEPA (0.01 mg/L) y dentro del rango registrado durante el establecimiento de la línea base. El plomo se detectó en SW, GW y MW en concentraciones por debajo de lo sugerido por la USEPA y por debajo del rango de lo establecido durante la línea base. Los sólidos disueltos totales y sulfatos totales se detectaron en MW, GW y SW en concentraciones por debajo de lo registrado durante el establecimiento de la línea base.
- 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 Noviembre de 2015 a Enero 2016.

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 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.

Noviembre 2015																														
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
LECTURA FLUJÓMETRO (m³)																														
Portal Este (tubería 6")	43596	43810	44001	44153	44319	45037	45469	45512	45713	46405	47024	47795	48263	48920	49413	49858	50139	50519	50787	51244	51572	51925	52277	52618	52922	53163	53563	54269	55233	55679
Total Este (tubería 8")	54871	55708	55821	56105	56127	56181	56287	56319	56374	56475	56553	56796	56903	57047	57264	58047	58639	59243	59902	60637	61310	62008	62797	63528	64238	SL	65408	65797	66094	66159
Portal Oeste (tubería 6")	280303	281488	282579	283880	285087	286320	287636	288580	289837	290473	291811	293105	294208	295546	296755	297917	299095	300424	301361	302624	303585	304669	305679	306796	307870	308989	309962	311000	312250	312881
Portal Oeste (tubería 8")	234601	236677	239054	240820	242946	245248	247728	249880	252086	254352	256577	259005	260710	262846	282370	290234	290987	292830	306135	307049	308711	310761	311061	311061	311061	311061	313599	314087	314152	314194
Clarificador	3739546	3741100	3744286	37464112	3747341	3748876	3750654	3752462	3754179	3755926	3757779	3759575	3761022	3762704	3764468	3766146	3767666	3769109	3770640	3772299	3773730	3774871	3776397	3777950	3779596	3781287	3782674	3784062	3785429	3786493
VOLUMEN BOMBEO (m³)																														
Portal Este (tubería 6")	42	215	191	153	165	718	432	44	201	692	619	771	468	658	493	445	281	380	268	457	328	354	352	341	304	241	400	706	965	446
Total Este (tubería 8")	32	837	113	285	22	54	107	32	55	102	77	243	106	145	216	783	593	603	659	735	673	698	789	732	709	585	585	388	298	65
Portal Oeste (tubería 6")	1318	1185	1091	1301	1207	1233	1316	944	1257	636	1338	1294	1103	1338	1209	1162	1178	1329	937	1263	961	1084	1010	1117	1074	1119	973	1038	1250	631
Portal Oeste (tubería 8")	1880	2076	2377	1766	2126	2302	2480	2152	2206	2266	2225	2428	1705	2136	19524	7864	753	1843	13305	914	1662	2050	300	0	0	0	2538	488	65	42
Clarificador	1366	1554	3186	1528	1528	1535	1778	1808	1717	1747	1853	1796	1447	1682	1764	1678	1520	1443	1531	1659	1431	1141	1526	1553	1646	1691	1387	1388	1367	1064
CAUDAL PROYECTADO (gpm)																														
Portal Este (tubería 6")	8	39	35	28	30	132	79	8	37	127	113	141	86	121	90	82	51	70	49	84	60	65	64	62	56	44	73	129	177	82
Total Este (tubería 8")	6	153	21	52	4	10	20	6	10	19	14	45	19	27	40	144	109	111	121	135	123	128	145	134	130	107	107	71	55	12
Portal Oeste (tubería 6")	242	217	200	239	221	226	241	173	230	117	245	237	202	245	222	213	216	244	172	232	176	199	185	205	197	205	178	190	229	116
Portal Oeste (tubería 8")	345	381	436	324	390	422	455	395	404	415	408	445	313	392	3579	1442	138	338	2439	168	305	376	55	0	0	0	465	89	12	8
Clarificador	250	285	584	280	280	281	326	331	315	320	340	329	265	308	323	308	279	265	281	304	262	209	280	285	302	310	254	254	251	195

m³: metro cúbico. Gpm: galones por minuto. Amarillo: Flujómetro presentó fallos en medición. Cálculos realizados en base a información del día previo y posterior. Celeste: Flujómetro presentó fallos al registrar el volumen acumulado. Fuente: MSR, 2016.

Diciembre 2015																															
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
LECTURA FLUJÓMETRO (m³)																															
Portal Este (tubería 6")	56820	57702	58708	59684	60924	62004	63264	63799	64868	65349	66098	66829	67443	67621	67750	67821	67869	67955	68044	68162	68301	68541	69067	69544	70344	71058	71928	73043	73638	74196	74911
Total Este (tubería 8")	66159	66159	66159	66160	66160	66160	66504	66716	66901	67043	67373	67781	68281	69343	70458	71723	72844	73898	75091	76357	77693	79004	81034	82882	84576	86486	87561	88598	90086	91350	92239
Portal Oeste (tubería 6")	313983	314941	316076	317376	318547	319890	321636	322579	323864	324763	326065	327293	328522	329522	330826	332353	333740	335241	336784	337985	339330	340675	341129	330251	330722	331128	331620	332094	332611	333626	334623
Portal Oeste (tubería 8")	314194	314194	314194	314194	314194	314194	315442	315884	316578	316728	316728	316728	316728	316728	318029	320104	320104	320104	320104	320104	320104	320447	321114	321139	321562	321610	321610	321610	321610	321610	321610
Clarificador	3787664	3789137	3790515	3792329	3794189	3795393	3797196	3798317	3799681	3801068	3802689	3804158	3805239	3806622	3808101	3809129	3810577	3812057	3813633	3815121	3816452	3817619	3818987	3820665	3822173	3823858	3825172	3826824	3828275	3829423	3829813
VOLUMEN BOMBEO (m³)																															
Portal Este (tubería 6")	1141	882	1006	976	1240	1080	1260	535	1070	481	749	731	614	178	129	71	48	86	89	118	139	240	526	477	800	714	870	1115	595	558	715
Total Este (tubería 8")	0	0	0	0	0	0	344	212	186	141	330	409	500	1062	1114	1266	1120	1055	1193	1266	1336	1311	2031	1848	1695	1910	1075	1037	1488	1264	889
Portal Oeste (tubería 6")	1102	958	1135	1300	1171	1343	1746	943	1285	899	1302	1228	1229	1000	1304	1527	1387	1501	1543	1201	1345	1345	454	-10878	471	406	492	474	517	1015	997
Portal Oeste (tubería 8")	0	0	0	0	0	0	1248	442	694	150	0	0	0	0	1301	2075	0	0	0	0	0	343	667	25	423	48	0	0	0	0	0
Clarificador	1171	1473	1378	1814	1860	1204	1803	1121	1364	1387	1621	1469	1081	1383	1479	1028	1448	1480	1576	1488	1331	1167	1368	1678	1508	1685	1314	1652	1451	1148	390
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	209	162	184	179	227	198	231	98	196	88	137	134	113	33	24	13	9	16	16	22	25	44	96	87	147	131	160	204	109	102	131
Total Este (tubería 8")	0	0	0	0	0	0	63	39	34	26	60	75	92	195	204	232	205	193	219	232	245	240	372	339	311	350	197	190	273	232	163
Portal Oeste (tubería 6")	202	176	208	238	215	246	320	173	236	165	239	225	225	183	239	280	254	275	283	220	247	247	83	-1994	86	74	90	87	95	186	183
Portal Oeste (tubería 8")	0	0	0	0	0	0	229	81	127	28	0	0	0	0	239	380	0	0	0	0	0	63	122	5	78	9	0	0	0	0	0
Clarificador	215	270	253	333	341	221	331	206	250	254	297	269	198	254	271	188	265	271	289	273	244	214	251	308	276	309	241	303	266	210	72

m³: metro cúbico. Gpm: galones por minuto. Celeste: Flujómetro presentó fallos al registrar el volumen acumulado. Fuente: MSR, 2016.

Enero 2016																															
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")	75685	76338	76764	76977	77621	78057	78651	79135	79484	79507	79663	79893	80416	82801	85589	89297	92437	95626	98441	101399	104200	107191	109995	112669	115563	118447	121726	124332	127494	130782	133635
Total Este (tubería 8")	93324	94783	95207	95721	97015	98156	99305	100572	101844	102573	103288	103152	103863	105100	106442	107852	109199	110172	111502	112495	113584	114203	115233	116507	117337	117929	118860	119886	121062	122278	122982
Portal Oeste (tubería 6")	335512	336203	336852	337899	338106	338372	338739	339107	340049	341586	342916	344063	344939	344975	344976	344976	344977	344977	344978	344978	344978	341478	344978	344978	344978	344978	344978	344978	344978	344978	
Portal Oeste (tubería 8")	323208	323887	323887	323887	323887	323887	323887	323887	323887	323887	323887	324623	325829	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	325833	
Clarificador	3830710	3832125	3833669	3835247	3837012	3838231	3838326	3839137	3840398	3841822	3843082	3844137	3845532	3846330	3847265	3848676	3849880	3851299	3852445	3853737	3855002	3856270	3857107	3857897	3859502	3860361	3861299	3861974	3863681	3865087	3866405
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	774	652	426	213	645	436	595	483	349	23	156	230	523	2385	2788	3708	3140	3189	2815	2958	2801	2991	2804	2674	2894	2884	3279	2606	3162	3288	2853
Total Este (tubería 8")	1086	1459	424	513	1295	1141	1149	1267	1272	729	715	-136	711	1237	1342	1410	1347	973	1330	993	1089	619	1030	1274	830	592	931	1026	1176	1216	704
Portal Oeste (tubería 6")	889	691	649	1047	207	266	367	368	942	1537	1330	1147	876	36	1	0	1	0	1	0	0	-3500	3500	0	0	0	0	0	0	0	
Portal Oeste (tubería 8")	1598	679	0	0	0	0	0	0	0	0	0	736	1206	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	897	1415	1544	1578	1765	1219	95	811	1261	1424	1260	1055	1395	798	935	1411	1204	1419	1146	1292	1265	1268	837	790	1605	859	938	675	1707	1406	1318
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	142	120	78	39	118	80	109	89	64	4	29	42	96	437	511	680	576	585	516	542	514	548	514	490	531	529	601	478	580	603	523
Total Este (tubería 8")	199	267	78	94	237	209	211	232	233	134	131	-25	130	227	246	259	247	178	244	182	200	113	189	234	152	109	171	188	216	223	129
Portal Oeste (tubería 6")	163	127	119	192	38	49	67	67	173	282	244	210	161	7	0	0	0	0	0	0	0	-642	642	0	0	0	0	0	0	0	
Portal Oeste (tubería 8")	293	124	0	0	0	0	0	0	0	0	0	135	221	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	164	259	283	289	324	223	17	149	231	261	231	193	256	146	171	259	221	260	210	237	232	232	153	145	294	157	172	124	313	258	242

m³: metro cúbico. Gpm: galones por minuto. Celeste: Flujómetro presentó fallos al registrar el volumen acumulado. Fuente: MSR, 2016.

11.2 Análisis In Situ y kit de cianuro (CN) en efluentes

Noviembre 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.	6.63	7.15	6.66	7.17	6.91	6.66	7.64	6.80	7.56	7.54	7.50	7.90	7.49	7.38	7.31	7.61	7.37	7.37	7.67	7.15	6.99	7.60	7.43	7.11	6.75	7.55	Sin descarga	6.91	6.07	Sin descarga
Temperatura	°C	26.80	27.10	26.00	25.40	27.30	28.70	27.60	27.50	26.70	27.20	26.10	26.60	25.90	26.70	27.00	26.50	27.40	26.40	23.10	26.60	26.40	26.90	24.90	26.60	25.70	27.80		25.40	25.30	
Conductividad	µS/cm	2028	1872	2015	1989	2190	1763	1977	2021	1804	2226	2062	2016	2011	1938	1924	1882	1850	1958	1866	1851	1838	1850.00	2322	1793	1920	1856		1959	2001	
Turbidez	NTU	3.32	5.69	3.58	3.21	4.98	6.89	11.00	2.75	5.06	1.86	2.72	8.68	8.38	5.20	7.00	11.90	5.64	3.84	6.50	5.73	4.82	4.15	3.44	10.20	3.30	6.20		4.64	5.97	
kit CN	mg/L	0.007	0.008	0.003	0.004	0.005	0.009	0.003	0.006	0.009	0.004	0.006	0.008	0.007	0.007	0.008	0.007	0.003	0.001	0.002	0.009	0.002	0.00	0.009	0.003	0.002	0.000		0.004	0.004	
CN Total		0.006	NA	NA	NA	<0.003	NA	NA	NA	0.006	NA	0.004	0.003	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	NA		
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																															
pH	u.e.	8.31	8.17	8.15	8.57	8.30	8.55	8.53	8.60	8.70	8.80	8.87	8.87	8.86	8.84	8.65	8.94	8.88	8.97	8.94	8.81	8.82	8.81	8.76	8.68	7.71	6.13	7.63	6.94	6.75	6.63
Temperatura	°C	24.8	25.3	23.7	22.9	23.4	23.0	23.7	23.3	23.0	23.4	22.4	22.8	21.9	22.3	21.1	23.3	21.9	22.8	22.5	22.5	22.5	23.2	21.80	21.20	21.90	25.80	21.00	20.1	19.2	25.4
Conductividad	µS/cm	797	799	806	804	807	842	850	849	1083	823	1165	852	819	803	806	779	797	795	796	805	790	782	802.30	798.00	803.50	814.70	836.70	891	919	915
Turbidez	NTU	3.7	2.8	2.7	2.9	2.9	5.3	7.8	5.9	8.6	5.2	5.7	19.0	8.3	5.3	4.8	5.0	4.7	4.3	6.3	6.5	5.4	5.4	6.90	4.94	5.81	6.60	4.77	5.7	6.8	6.5
Kit CN	mg/L	0.004	0.000	0.008	0.002	0.000	0.003	0.000	0.004	0.000	0.005	0.000	0.001	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.01	0.00	0.00	0.00	0.001	0.002	0.001
CN Total		NA	0.012	NA	NA	NA	0.004	NA	<0.003	NA	NA	NA	0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.004

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, 2016.

Diciembre 2015																																
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Efluente Planta de Tratamiento Agua de Túneles (WW9)																																
pH	u.e.	6.70	7.38	7.44	7.09	6.63	6.96	7.59	7.26	7.57	Sin descarga	7.08	7.22	7.44	6.95	7.57	7.25	7.05	7.18	7.21	7.33	7.23	7.37	7.35	7.14	7.25	7.35	7.30	7.30	8.10	7.38	7.49
Temperatura	°C	25.5	26.8	25.9	24.6	24.9	24.2	25.2	20.30	24.5		26.0	24.5	22.9	26.7	26.4	26.2	27.9	25.5	25.1	27.1	25.4	26.0	23.0	25.4	25.2	25.3	24.8	25.7	26.3	26.1	25.6
Conductividad	µS/cm	1987	2113	1824	1995	1901	1928	1729	1842.00	1948		2043	1980	1976	1990	1777	1821	1890	1944	1875	1875	1828	1877	1907	1801	1826	1865	1793	1869	1817	1553	1827
Turbidez	NTU	11.70	5.98	5.34	7.60	3.67	4.83	13.10	0.60	9.35		2.83	4.52	0.96	4.97	4.40	4.20	7.37	9.25	2.26	10.00	2.56	8.64	2.21	4.50	7.14	14.30	3.21	5.14	3.75	6.64	4.68
kit CN	mg/L	0.000	0.003	0.001	0.000	0.002	0.000	0.003	0.00	0.001		0.007	0.002	0.005	0.003	0.004	0.003	0.000	0.005	0.006	0.009	0.001	0.002	0.006	0.008	0.008	0.002	0.004	0.001	0.003	0.003	0.002
CN Total		NA	NA	NA	0.009	NA	<0.003	NA	NA	NA		NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	0.004	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	0.008
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	7.8	8.21	7.81	6.3	6.28	7.49	8.52	7.39	8.05	7.47	7.86	7.02	7.64	7.82	7.27	8.4	8.39	7.89	8.08	7.64	7.87	8.28	8.17	8.47	7.13	7.78	7.23	7.55	8.3	7.96	8.11
Temperatura	°C	18.7	20.1	20	19.6	19.2	18.6	19.2	19.3	19.3	20.6	20.9	20.3	21.9	23.1	23.4	23.4	23.5	22.8	20.3	21.2	19.4	19.7	20.8	21.5	24.7	20.6	21.1	22.5	21	20.6	20.5
Conductividad	µS/cm	918.2	913.3	927.1	932.5	942.3	948.1	949	951.9	962.3	976.6	975.4	987.4	991.2	995.9	1003	1010	1009	1005	1018	1012	1024	1040	1054	1048	1042	1051	1057	1053	1070	1075	1064
Turbidez	NTU	5.6	4.68	5.03	4.67	5.27	6.05	5.39	6.98	9.39	5.6	4.5	3.32	3.23	3.4	5.19	3.92	4.35	4.7	5.95	3.93	4.1	3.7	3.21	3.99	3.53	3.7	3.27	5.04	4.1	3.57	2.63
Kit CN	mg/L	0.000	0.000	0.000	0.003	0.000	0.000	0.004	0.000	0.000	0.000	0.003	0.003	0.004	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.004	0.003	0.000	0.000	0.000	0.001	0.001	0.003	0.000	0.001	0.003
CN Total		NA	NA	0.007	NA	NA	0.007	NA	NA	NA	0.007	NA	NA	NA	0.009	NA	NA	NA	0.006	NA	0.006	NA	NA	NA	0.003	NA	NA	0.004	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. NA: no analizado. Fuente: MSR, 2016.

Enero 2016																																
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.	7.37	7.49	7.34	Sin descarga	7.55	Sin descarga	7.19	Sin descarga	7.37	7.58	7.73	Sin descarga	6.95	Sin descarga	7.72	7.53	7.56	7.65	7.73	7.75	7.77	7.66	7.83	Sin descarga	7.62	7.70	7.65	7.62	7.68		
Temperatura	°C	25.3	24.5	25.4		25.5		25.2		25.1	25.6	23.7		26.5		24.3	24.0	23.9	24.7	24.6	23.1	23.1	22.3	24.8								
Conductividad	µS/cm	1985	1934	1949		1981		1845		1889	1884	1748		2381		1865	1860	1891	2071	1990	1964	1906	2055	2011								
Turbidez	NTU	3.41	7.08	3.17		7.74		16.90		6.96	6.10	8.80		6.48		6.59	9.97	3.68	2.50	20.30	2.53	12.80	6.13	22.60								
kit CN	mg/L	0.006	0.003	0.004		0.005		0.001		0.003	0.000	0.005		0.000		0.001	0.006	0.000	0.004	0.000	0.005	0.000	0.001	0.001								
CN Total		NA	NA	NA		0.021		<0.003		NA	<0.003	NA		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA						
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	7.43	8.36	7.93	7.66	7.6	7.39	8.18	8.42	6.42	7.23	7.55	7.24	7.91	8.8	8.89	8.84	8.44	8.59	8.48	6.87	8.6	8.8	8.56	8.27	8.25	8.49	8.62	8.79	8.64	8.69	8.74
Temperatura	°C	21	19.3	19.6	18	19.1	19.6	19.3	20.6	20.8	22.1	20.1	19.8	20.4	21.3	21.7	22.4	22.6	17.9	17.1	18.2	19.6	20	16.2	14.9	17.2	17.9	20.7	22.8	17.2	18	21.9
Conductividad	µS/cm	1077	1085	1096	1098	1083	1089	1101	1103	1108	1103	1114	1106	1131	1227	1261	1348	1676	1196	1242	1461	1199	1260	1251	1338	1293	1295	1333	1289	1292	1280	1259
Turbidez	NTU	2.47	3.38	2.29	3.99	6.43	2.79	2.34	5.2	3.03	3.45	3.54	3.3	0.94	4.59	3.89	5.39	4.68	3.54	4.7	3.34	3.61	4.59	10.3	8.77	7.43	5.33	4.39	5.99	8.52	6.39	5.3
kit CN	mg/L	0.001	0.002	0.000	0.002	0.006	0.005	0.003	0.003	0.003	0.001	0.007	0.002	0.002	0.003	0.001	0.002	0.002	0.003	0.000	0.002	0.002	0.002	0.000	0.000	0.004	0.002	0.004	0.000	0.003	0.002	0.002
CN Total		NA	NA	NA	0.003	NA	NA	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NTU: unidades naftalométricas de turbidez. NA: no analizado. Fuente: MSR, 2016.

Con el objetivo de verificar si los resultados obtenidos con el método colorimétrico empleado para la determinación rápida de Cianuro (kit de CN), desde el mes de Octubre 2013 se enviaron varias muestras duplicado al laboratorio ACZ para realizar análisis de Cianuro Total.

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

11.3 Resultados crudos de calidad de aire

11.3.1 Material Particulado (PM₁₀)

BGI PQ200 Air Sampling System

Downloaded November 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	651	646	649	mmHg
TA	25.8	17.9	20.6	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	24-Nov-15	17:20:00
Stop:	25-Nov-15	17:20:00

Mass Concentration Data:

Filter ID:	2806-0404
Final Wt:	146.720 mg
Initial Wt:	146.650 mg
Delta Wt:	0.070 mg
Total Vol:	20.86 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 3.36 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded November 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	651	649	649	mmHg
TA	28.1	20.5	23.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	19-Nov-15	16:08:00
Stop:	20-Nov-15	16:08:00

Mass Concentration Data:

Filter ID:	2808-0606
Final Wt:	149.240 mg
Initial Wt:	148.863 mg
Delta Wt:	0.377 mg
Total Vol:	20.66 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 18.25 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded November 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	632	630	631	mmHg
TA	27.6	16.8	19.2	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Nov-15	11:57:00
Stop:	13-Nov-15	11:57:00

Mass Concentration Data:

Filter ID:	2773-1111
Final Wt:	151.220 mg
Initial Wt:	151.050 mg
Delta Wt:	0.170 mg
Total Vol:	20.36 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 8.35 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 November 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	627	622	625	mmHg
TA	26.5	15.0	18.8	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	3-Nov-15	15:10:00
Stop:	4-Nov-15	15:10:00

Mass Concentration Data:

Filter ID:	2787-0808
Final Wt:	145.230 mg
Initial Wt:	145.140 mg
Delta Wt:	0.090 mg
Total Vol:	20.20 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 4.46 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded November 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	646	642	644	mmHg
TA	29.2	17.0	20.3	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Nov-15	16:27:00
Stop:	11-Nov-15	16:27:00

Mass Concentration Data:

Filter ID:	2803-0101
Final Wt:	151.950 mg
Initial Wt:	151.640 mg
Delta Wt:	0.310 mg
Total Vol:	20.72 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 14.96 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded November 2015

Job Details:

Job Name: EA-4A
Version: PQ200
Serial No: 3.00
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	649	643	647	mmHg
TA	30.2	15.8	21.2	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	17-Nov-15	15:03:00
Stop:	18-Nov-15	15:03:00

Mass Concentration Data:

Filter ID:	2809-0707
Final Wt:	147.980 mg
Initial Wt:	147.230 mg
Delta Wt:	0.750 mg
Total Vol:	20.75 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 36.15 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 November 2015

Job Details:

Job Name: EA-5A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	653	650	652	mmHg
TA	27.2	14.6	19.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	27-Nov-15	12:33:00
Stop:	28-Nov-15	12:33:00

Mass Concentration Data:

Filter ID:	2807-0505
Final Wt:	152.960 mg
Initial Wt:	152.530 mg
Delta Wt:	0.430 mg
Total Vol:	21.07 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 20.41 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded November 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	644	640	642	mmHg
TA	24.6	14.9	19.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	27-Nov-15	11:10:00
Stop:	28-Nov-15	11:10:00

Mass Concentration Data:

Filter ID:	2711-1111
Final Wt:	150.750 mg
Initial Wt:	150.430 mg
Delta Wt:	0.320 mg
Total Vol:	20.72 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 15.45 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded November 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	652	648	650	mmHg
TA	25.0	17.8	20.6	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	24-Nov-15	16:55:00
Stop:	25-Nov-15	16:55:00

Mass Concentration Data:

Filter ID:	2805-0303
Final Wt:	149.840 mg
Initial Wt:	149.580 mg
Delta Wt:	0.260 mg
Total Vol:	20.89 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 12.45 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Cliente: Minera San Rafael

Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV

Proyecto: 178-079 (El Escobal)

Análisis de muestras: Diciembre, 11 al 14 de 2015

Emisión de reporte: Diciembre, 15 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**

Cuadro 1: resultados de filtros peso final

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	2806-0404	0.14665	0.14672
2	EA-1B	2808-0606	0.14886	0.14924
3	EA-2A	2773-1111	0.15105	0.15122
4	EA-3	2787-0808	0.14514	0.14523
5	EA-3A	2803-0101	0.15164	0.15195
6	EA-4A	2809-0707	0.14723	0.14798
7	EA-5A	2807-0505	0.15253	0.15296
8	EA-6	2711-1111	0.15043	0.15075
9	EA-7A	2805-0303	0.14958	0.14984
10	EA-10	2823-0606	0.14997	0.14998

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reportes analíticos RA-15-11425 y RA-15-11432

Anexos:

Anexo 1. Cadena de Custodia R-02-000721.

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
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
J.J.	Dic., 15/15	D.S.	Dic., 15/15	E.M.	Dic., 15/15	01

BGI PQ200 Air Sampling System

Downloaded December 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	650	644	648	mmHg
TA	30.6	14.6	21.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	15-Dec-15	15:32:00
Stop:	16-Dec-15	15:32:00

Mass Concentration Data:

Filter ID:	2814-1414
Final Wt:	148.950 mg
Initial Wt:	148.000 mg
Delta Wt:	0.950 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 39.52 µg/m³

Notes 1: Depósito de Suelos, Proyecto El Escobal

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded December 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	27.7	16.1	20.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	17-Dec-15	11:41:00
Stop:	18-Dec-15	11:41:00

Mass Concentration Data:

Filter ID:	2821-0404
Final Wt:	148.690 mg
Initial Wt:	148.380 mg
Delta Wt:	0.310 mg
Total Vol:	19.92 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 15.56 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded December 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	622	625	mmHg
TA	26.9	15.1	20.1	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	17-Dec-15	16:00:00
Stop:	18-Dec-15	16:00:00

Mass Concentration Data:

Filter ID:	2832-1515
Final Wt:	149.040 mg
Initial Wt:	148.670 mg
Delta Wt:	0.370 mg
Total Vol:	20.11 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 18.40 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded December 2015

Job Details:

Job Name: EA-7A
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

Job Code: EA-7A
Site Name: Los Planes
Station Code:
Operators: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	652	646	649	mmHg
TA	29.6	15.1	21.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	15-Dec-15	15:45:00
Stop:	16-Dec-15	15:45:00

Mass Concentration Data:

Filter ID:	2812-1111
Final Wt:	151.190 mg
Initial Wt:	150.120 mg
Delta Wt:	1.070 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 44.51 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Cliente: Minera San Rafael

Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV

Proyecto: 178-079 (El Escobal)

Análisis de muestras: Enero, 15 al 18 de 2016

Emisión de reporte: Enero, 18 de 2016

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**

Cuadro 1: resultados de filtros peso final

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	2814-1414	0.14800	0.14895
2	EA-2A	2821-0404	0.14838	0.14869
3	EA-3	2832-1515	0.14867	0.14904
4	EA-7A	2812-1111	0.15012	0.15119
5	EA-8	2815-1515	0.15000	0.15183
6	EA-10	2833-1696	0.15133	0.15133

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reportes analíticos RA-15-11435 y RA-15-11437

Anexos:

Anexo 1. Cadena de Custodia R-02-000723.

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
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Enero, 18/16	L.D.	Enero, 18/16	E.M.	Enero, 18/16	01

BGI PQ200 Air Sampling System

Downloaded January 2016

Job Details:

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

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

	Max	Min	Avg	Units
BP	652	649	650	mmHg
TA	28.0	14.8	20.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Jan-16	11:30:00
Stop:	13-Jan-16	11:30:00

Mass Concentration Data:

Filter ID:	2888-0707
Final Wt:	146.190 mg
Initial Wt:	145.830 mg
Delta Wt:	0.360 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 14.98 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded January 2016

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	630	632	mmHg
TA	31.0	16.2	20.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	27-Jan-16	12:05:00
Stop:	28-Jan-16	12:05:00

Mass Concentration Data:

Filter ID:	2891-1111
Final Wt:	148.290 mg
Initial Wt:	147.400 mg
Delta Wt:	0.890 mg
Total Vol:	19.92 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 44.68 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded January 2016

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	629	625	627	mmHg
TA	27.1	11.7	16.9	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	19-Jan-16	12:20:00
Stop:	20-Jan-16	12:20:00

Mass Concentration Data:

Filter ID:	2890-1010
Final Wt:	146.310 mg
Initial Wt:	145.960 mg
Delta Wt:	0.350 mg
Total Vol:	20.39 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 17.16 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 January 2016

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	650	652	mmHg
TA	27.5	16.5	20.5	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Jan-16	11:06:00
Stop:	13-Jan-16	11:06:00

Mass Concentration Data:

Filter ID:	2887-0606
Final Wt:	145.570 mg
Initial Wt:	145.300 mg
Delta Wt:	0.270 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 11.23 µg/m³

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

Cliete: Minera San Rafael, S.A.
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-079 (El Escobal)
Análisis de muestras: Febrero, 12 al 15 de 2016
Emisión de reporte: Febrero, 18 de 2016

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**

Cuadro 1: resultados de filtros peso final

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	2888-0707	0.14583	0.14619
2	EA-2A	2891-1111	0.14740	0.14829
3	EA-3	2890-1010	0.14596	0.14631
4	EA-7A	2887-0606	0.14530	0.14557

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reportes analíticos RA-16-11449

Anexos:

Anexo 1. Cadena de Custodia R-02-000725

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
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Febrero, 18/16	E.M.	Febrero, 18/16	E.M.	Febrero, 18/16	02

11.3.2 Informe de Metales en PM₁₀

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-080
Análisis de muestras: Diciembre, 30 de 2015
Emisión del reporte: Enero, 04 de 2015

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

Análisis: Mercurio en filtros por ICP de Masas.

Método analítico: ICP Masas. EPA 7470 Mercury by CV/AA

*Parámetros	LDM (µg)	Estación							
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A	EA-10
Código de filtro		2808-0606	2773-1111	2803-0101	2809-0707	2807-0505	2711-1111	2805-0303	2823-0606
Mercurio (Hg)	0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

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

Anexos:

- Anexo 1. Cadena de Custodia R-02-000721
- Anexo 2. Reporte de Laboratorio Subcontratado

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.	Enero, 04/15	L.D.	Enero, 04/15	A.G.J.	Enero, 04/15	01

Your P.O. #: 5602
 Your Project #: 178-080
 Site Location: MSR
 Your C.O.C. #: na

Attention: Ana Gabriela Juarez

CTA Consultoría y Tecnología Ambiental México, S.A. de C.V.
 Av. Insurgentes Sur 1763
 Piso 5 Col. Guadalupe INN C.P.
 Del. Alvaro Obregon D.F. Mexico CP., --
 Mexico 01020

Report Date: 2015/12/30
 Report #: R3836554
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5Q1675
Received: 2015/12/18, 14:20

Sample Matrix: Filter
 # Samples Received: 8

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Mercury	8	2015/12/29	2015/12/30	BRL SOP-00104	EPA 7470 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
 * RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
 Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
 Email: CJohnson@maxxam.ca
 Phone# (905)817-5769

=====
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ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Maxxam ID		BOE217	BOE218	BOE219	BOE220	BOE221	BOE222	BOE223		
Sampling Date		2015/11/19	2015/11/12	2015/11/10	2015/11/17	2015/11/27	2015/11/27	2015/11/24		
COC Number		na	na	na	na	na	na	na		
	UNITS	2808-0606	2773-1111	2803-0101	2809-0707	2807-0505	2711-1111	2805-0303	RDL	QC Batch

Metals										
Acid Extractable Mercury (Hg)	ug	ND	0.002	ND	ND	ND	ND	ND	0.002	4328907

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		BOE224		
Sampling Date		2015/11/30		
COC Number		na		
	UNITS	2823-0606	RDL	QC Batch

Metals				
Acid Extractable Mercury (Hg)	ug	ND	0.002	4328907

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

TEST SUMMARY

Maxxam ID: BOE217
Sample ID: 2808-0606
Matrix: Filter

Collected: 2015/11/19
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

Maxxam ID: BOE218
Sample ID: 2773-1111
Matrix: Filter

Collected: 2015/11/12
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

Maxxam ID: BOE219
Sample ID: 2803-0101
Matrix: Filter

Collected: 2015/11/10
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

Maxxam ID: BOE220
Sample ID: 2809-0707
Matrix: Filter

Collected: 2015/11/17
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

Maxxam ID: BOE221
Sample ID: 2807-0505
Matrix: Filter

Collected: 2015/11/27
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

Maxxam ID: BOE222
Sample ID: 2711-1111
Matrix: Filter

Collected: 2015/11/27
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

Maxxam ID: BOE223
Sample ID: 2805-0303
Matrix: Filter

Collected: 2015/11/24
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

Maxxam Job #: B5Q1675
Report Date: 2015/12/30

CTA Consultoría y Tecnología Ambiental México, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 5602
Sampler Initials: MSR

TEST SUMMARY

Maxxam ID: BOE224
Sample ID: 2823-0606
Matrix: Filter

Collected: 2015/11/30
Shipped:
Received: 2015/12/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	4328907	2015/12/29	2015/12/30	Ron Morrison

GENERAL COMMENTS

Samples have been corrected for desorption efficiencies if average percent recoveries are less than 80% (does not apply to gravimetric and inorganic analysis).

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

CTA Consultoría y Tecnología Ambiental México, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 5602
Sampler Initials: MSR

QC Batch	Parameter	Date	SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4328907	Acid Extractable Mercury (Hg)	2015/12/30	104	90 - 110	ND, RDL=0.002	ug	1.2	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Ralph Siebert, Operations Manager - Inorganic Analyses

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

11.3.3 Informe sobre PST y Gases de Combustión.



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

Diciembre 2015

San Rafael Las Flores, Santa Rosa, Guatemala

Enero de 2016

Este resumen presenta los resultados del monitoreo de calidad del aire realizado para el proyecto minero El Escobal (**el Proyecto**). El monitoreo fue realizado por Consultoría y Tecnología Ambiental, S.A. (**CTA**) del 7 al 10 de Diciembre de 2015 para gases de combustión y del 7 de Diciembre del 2015 al 7 de Enero del 2016 para PST, en San Rafael Las Flores, Santa Rosa, donde se ubica el Proyecto. El propósito del monitoreo fue determinar la calidad de aire ambiental en comunidades aledañas mediante la medición de la concentración de:

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

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

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

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

Coordenadas en metros (**m**).Datum: NAD27 UTM zona 16 N.Fuente: CTA, 2015.

Cuadro 2: Metodologías utilizadas para SO₂ y NO₂ y PST

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

Fuente: CTA, 2015

Los resultados obtenidos para los gases de combustión se compararon con los valores guía reportados en: Calidad de Aire Ambiental: Guías del Banco Mundial (**el Banco**)¹ para SO₂ y NO₂, tomadas de International Finance Corporation (**IFC**) Industry Sector Guidelines for Mining, December 10, 2007 y General Environment Health and Safety Guidelines, December 19/2008.

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

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en Diciembre de 2015; y en el Cuadro 4 se presentan los resultados de la medición de PST (realizada del 07 de Diciembre de 2015 al 07 de Enero de 2016).

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

Estaciones de Muestreo	LDM ¹	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7 ^a	Guías del Banco
SO₂	13.0	<13	<13	<13	<13	<13	<13	<13	20 µg/m ³
NO₂	9.0	<9	<9	<9	10	<9	<9	<9	*40µg/m ³

SO₂: dióxido de azufre. NO₂: dióxido de nitrógeno. *: Promedio anual.¹: LDM: Límite de detección del método. µg/m³: microgramos sobre metros cúbicos. Fuente: Laboratorio Ambiental, S. A., 2015.

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

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

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

Estaciones de Muestreo	Unidad	LDM	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía
Sólidos Insolubles	g/(m ² x 30 días)	0.0019	11.78	5.48	16.74	33.32	6.95	1.56	3.59	
Sólidos Solubles	g/(m ² x 30 días)	0.017	0.81	1.25	0.88	1.66	0.57	0.37	0.36	
Sólidos Totales	g/(m ² x 30 días)	0.019	12.59	6.73	17.62	34.98	7.52	1.94	3.95	
Sólidos Totales	(mg/dm² X día)	0.0063	4.20	2.24	5.87	11.66	2.51	0.65	1.32	2.9

g: gramos. m²: metro cuadrado. mg: miligramos. dm²: decímetro cuadrado. ¹: valor referido para un período promedio de un mes. El valor pendiente de reportar, se debe a robo del equipo en punto de muestreo. Fuente: Laboratorio Ambiental, S. A., 2015.

Gases de Combustión

SO₂:

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

NO₂:

- En todas las estaciones de muestreo se obtuvieron resultados detectables, pero ninguna supera el valor establecido por El Banco (**40 µg/m³**). La estación EA-4A, presenta la concentración más altas (siendo estas 10µg/m³), mientras que las demás estaciones se encuentran por debajo del límite de detección (9µg/m³).

Partículas Sedimentables Totales

- Las estaciones EA-4A y EA-3B presentan la mayor cantidad de sólidos totales, con concentraciones de 11.66 y 5.87 (mg/(dm² x día)) respectivamente. La estación EA-6 presentó la menor cantidad de sólidos totales obteniéndose un valor de 0.65 mg / (dm² x día). Todas las estaciones excepto EA-1C, EA-3B y EA-4A se encuentran por debajo del valor de la guía utilizada de **2.9 mg/dm²X día**.



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: 178-082 (CTA)
Fecha de muestreo: Diciembre, 07 al 10 de 2015
Fecha de análisis: Diciembre, 15 al 16 de 2015
Emisión del reporte: Diciembre, 17 de 2015

Tipo de muestras: Soluciones absorbentes para análisis de 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 foot ball de tierra frente a la casa.
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.

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-3B	Aldea El Fucío	E (m): 806,538 N (m): 1,600,367		Camino de terracería cercano al terreno, tráfico vehicular moderado.
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.
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.
EA-6	Norte del proyecto, ruta a Mataquesuintla	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).
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.

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
Fecha de muestreo (Dic, 2015)			07 a 08	08 a 09	07 al 08	07 a 08	08 a 09	08 a 09	09 a 10
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	< 9	< 9	< 9	< 9	10	< 9	< 9
	ppm	0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<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-7A	DEA-4A	Unidades	Teórica	Real
SO ₂	µg/m ³	NA	< 13	µg	15.05	15.12
	ppm	NA	< 0.005			
NO ₂	µg/m ³	< 9	NA	µg/mL	1.000	1.008
	ppm	<0.005	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-02-000717.
- Anexo 2. Cadena de custodia R-02-000718
- Anexo 3. Cadena de custodia R-02-000719.

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:
L.D.	Dic., 17/15	J.J	Dic., 17/15	E.M.	Dic., 17/15	01

Cliente: Minera San Rafael
Dirección: San Rafael, Las Flores, Santa Rosa, Guatemala
Proyecto: 178-082 (CTA)
Fecha de muestreo: Diciembre 07 de 2015 a Enero 07 de 2016
Fecha de análisis: Enero, 12 de 2016
Emisión del reporte: Enero, 15 de 2016

Tipo de muestras: Partículas sedimentables en aire durante un período de 30 días.
Muestreo y determinación de material particulado total sedimentable en el aire (tasa de sedimentación).
Análisis:
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	Coordenadas	Fotografía	Factores ambientales
EA-1C	Frente a Escuela San Rafael	N: 1,601,801 E: 803,887		Casa dentro del pueblo, caminos pavimentados, vientos fuertes. Campo de foot ball de tierra frente a la casa..
EA-2B	Aldea La Cuchilla	N: 1,601,796 E: 806,470		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	Coordenadas	Fotografía	Factores ambientales
EA-3B	Aldea El Fucío	N: 1,600,367 E: 806,538		Camino de terracería cercano al terreno, tráfico vehicular moderado.
	Aldea La Puerta de Los Ángeles	N: 1,599,903 E: 805,142		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	N: 1,600,404 E: 804,352		El terreno está cerca de la carretera principal (asfaltada), está en campo abierto y cercano a una fábrica de block.
EA-6	Norte del proyecto, ruta a Mataquescuintla	N: 1,603,247 E: 805,168		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno..
	Perímetro del Proyecto colindante con aldea Los Planes	N: 1,601,523 E: 805,425		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino.

Coordenadas en metros (m). Datum: NAD83 UTM zona 15 N 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	11.78	0.81	12.59	4.20
2	EA-2B	5.48	1.25	6.73	2.24
3	EA-3B	16.74	0.88	17.62	5.87
4	EA-4A	33.32	1.66	34.98	11.66
5	EA-5A	6.95	0.57	7.52	2.51
6	EA-6	1.56	0.37	1.94	0.65
7	EA-7A	3.59	0.36	3.95	1.32

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

Anexos:

Anexo 1. Cadena de Custodia R-02-000735

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



Lic. Eddy Mendoza
Director de Laboratorio
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
J.J.	Ene., 15/16	D.S.	Ene., 15/16	E.M.	Ene., 19/16	01

11.3.4 Presión Sonora

ER-1

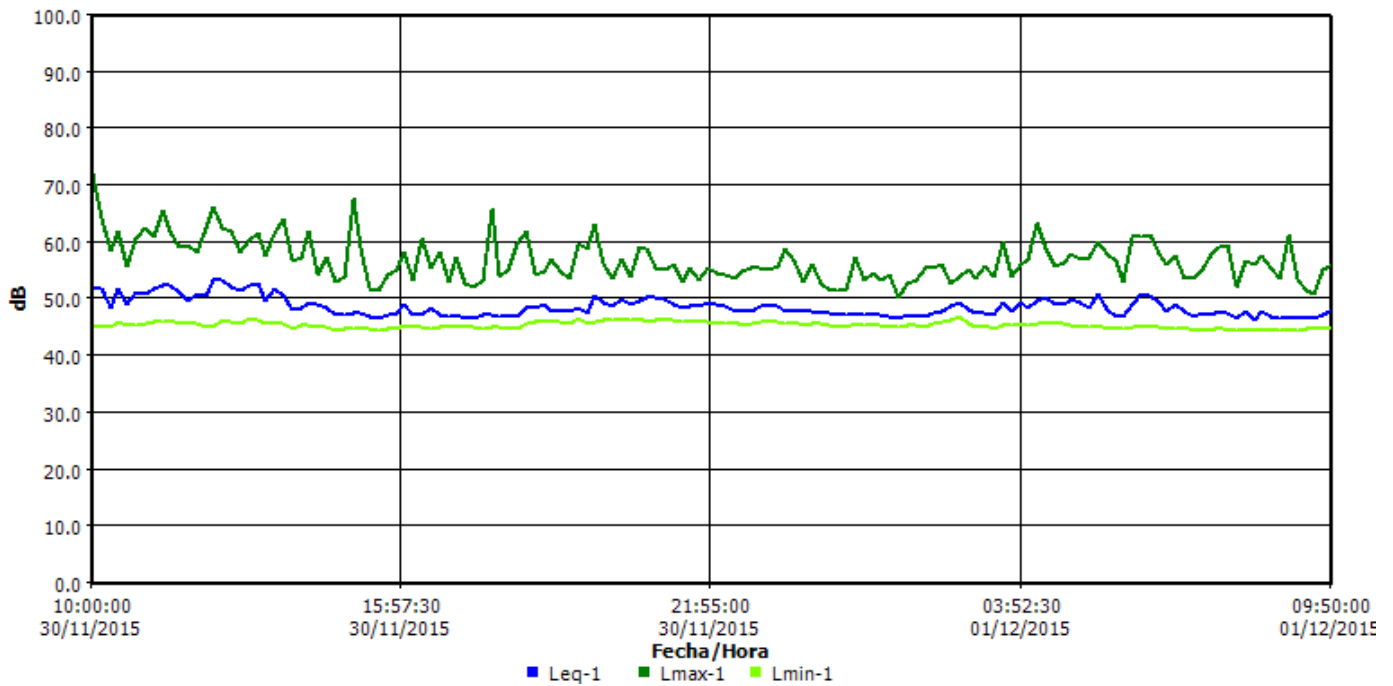
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S014
Hora de inicio Lunes, 30 de Noviembre de 2015 09:50:00
Hora de paro Martes, 01 de Diciembre de 2015 09:50:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	44.4 dB	Lmax	1	71.9 dB
Lpk	1	95.6 dB	Leq	1	48.9 dB

Gráfica de datos de registro



ER-1A

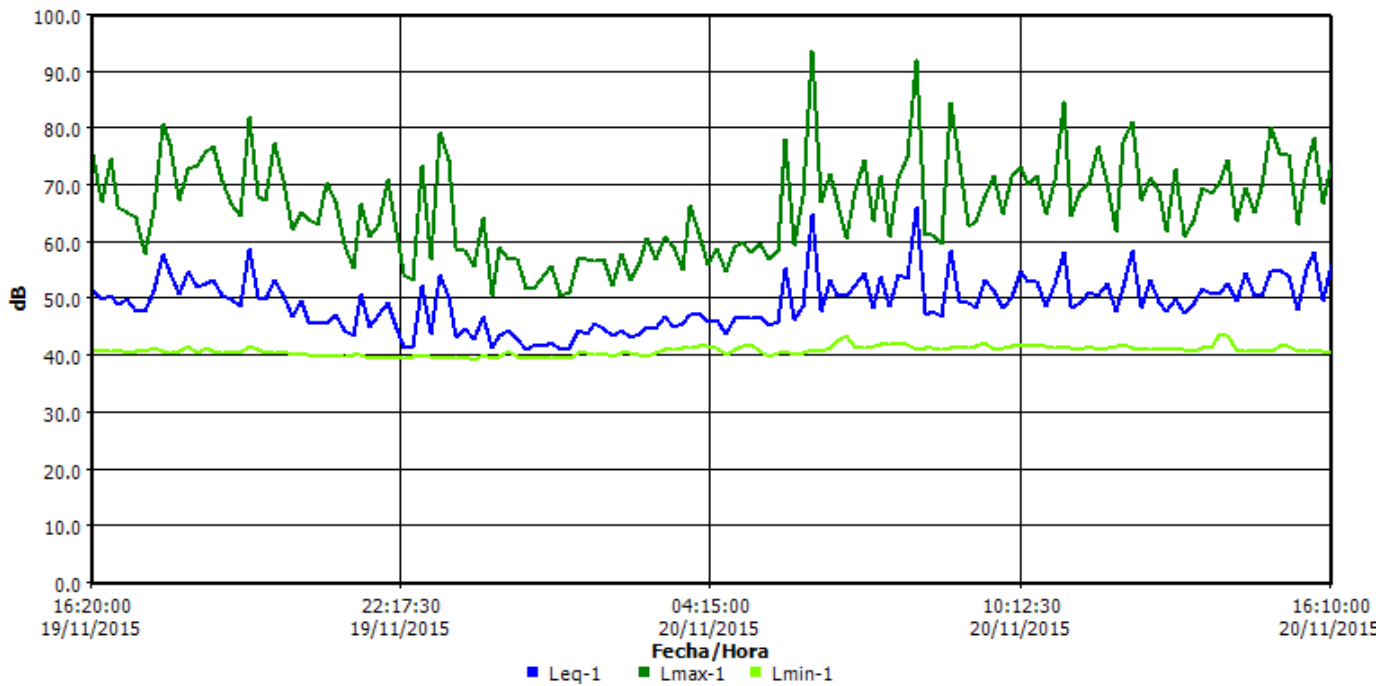
Panel de información

Ubicación San Rafael Las Flores
Nombre ER-1A
Sesión padre S114
Hora de inicio Jueves, 19 de Noviembre de 2015 16:10:00
Hora de paro Viernes, 20 de Noviembre de 2015 16:10:00
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	39.4 dB	Lmax	1	93.7 dB
Lpk	1	105.2 dB	Leq	1	52.5 dB

Gráfica de datos de registro



ER-2

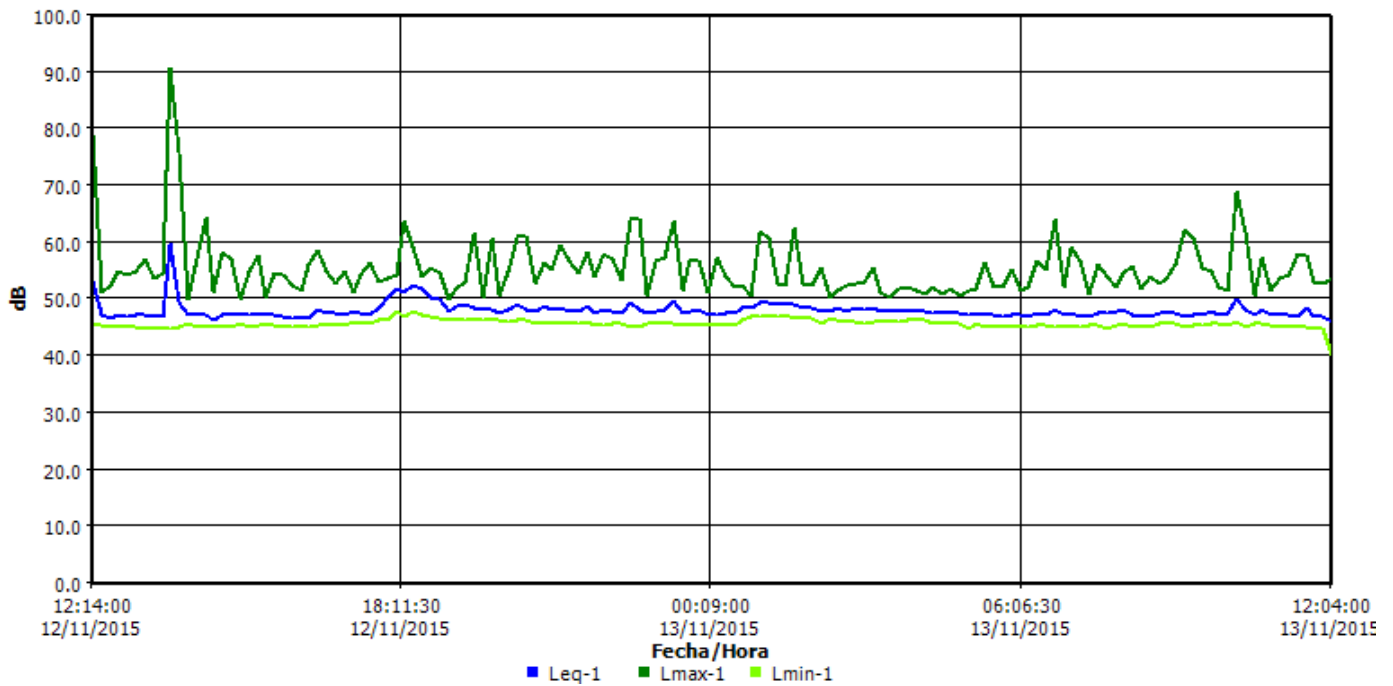
Panel de información

Ubicación Aldea La Cuchilla.
Nombre ER-2
Sesión padre S211
Hora de inicio Jueves, 12 de Noviembre de 2015 12:04:00
Hora de paro Viernes, 13 de Noviembre de 2015 12:04:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	40.3 dB	Lmax	1	90.8 dB
Lpk	1	99.7 dB	Leq	1	48.5 dB

Gráfica de datos de registro



ER-3

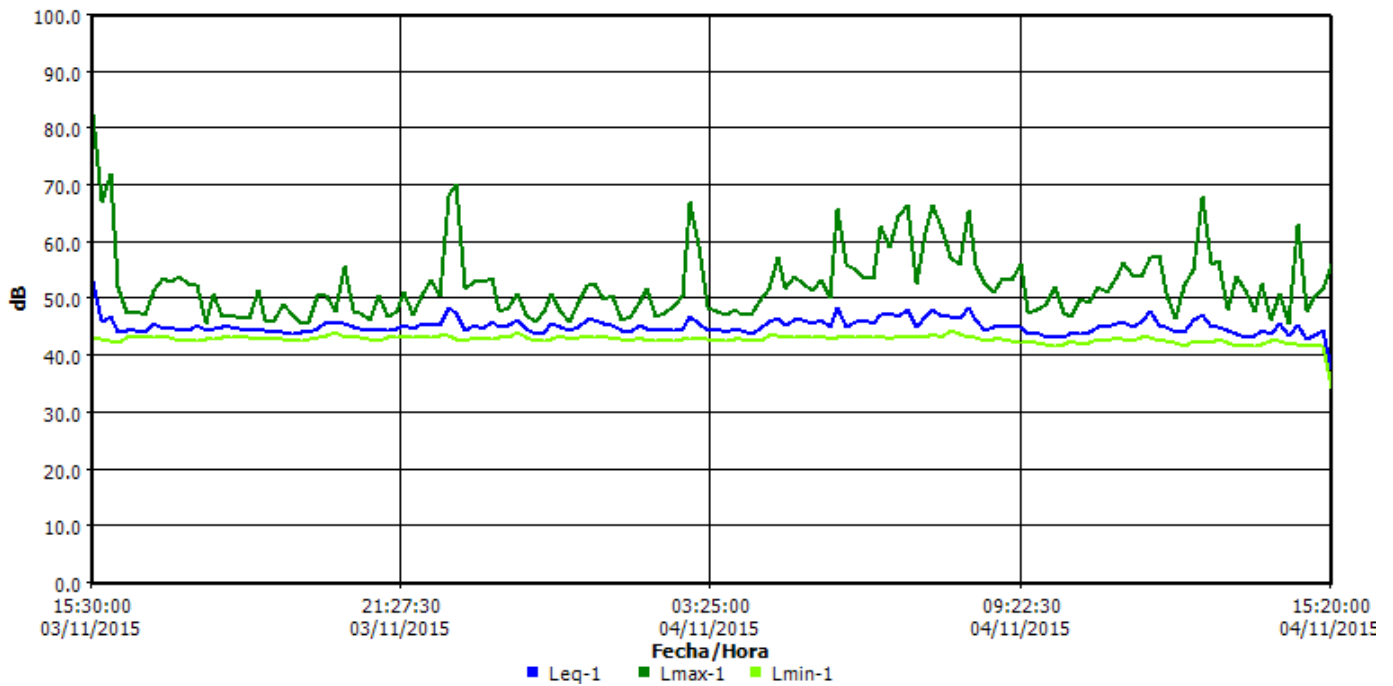
Panel de información

Ubicación Aledaño a Aldea El Fucío.
Nombre ER-3
Sesión padre S112
Hora de inicio Martes, 03 de Noviembre de 2015 15:20:00
Hora de paro Miércoles, 04 de Noviembre de 2015 15:20:00
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	34.1 dB	Lmax	1	82.3 dB
Lpk	1	107.7 dB	Leq	1	45.4 dB

Gráfica de datos de registro



ER-3A

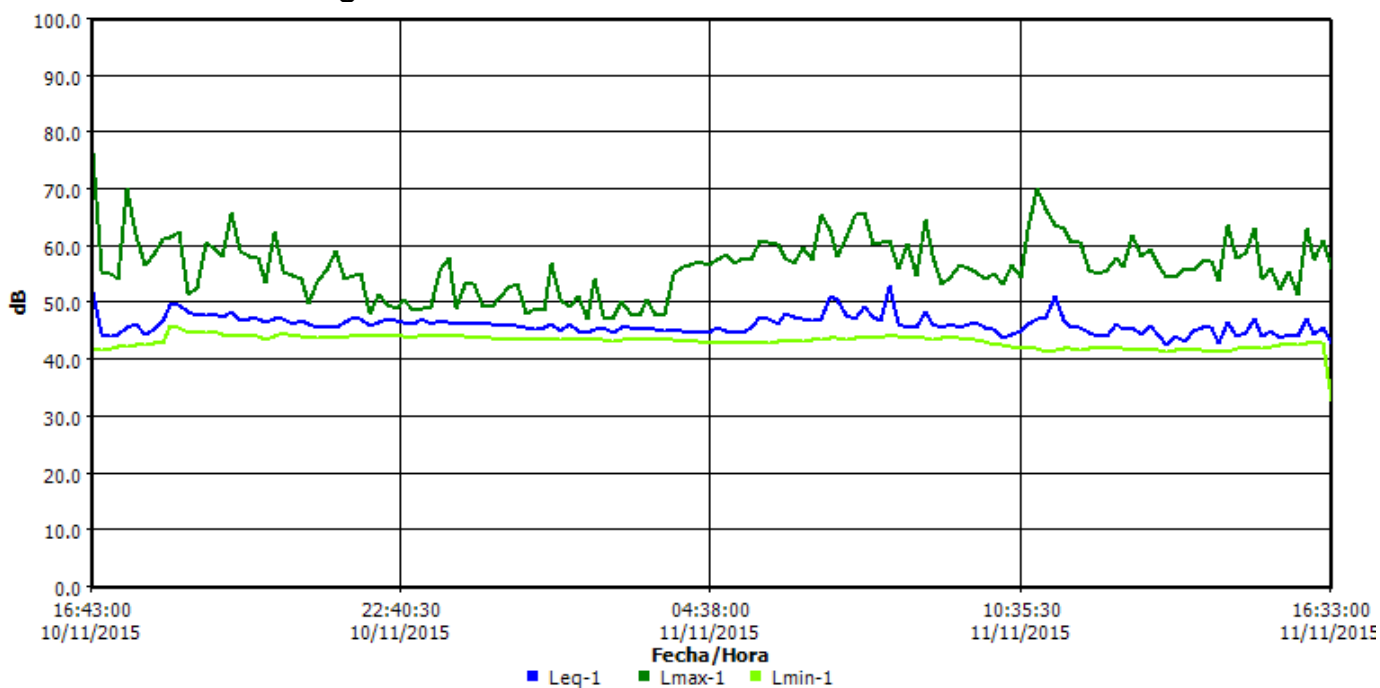
Panel de información

Ubicación Aldea Sabana Redonda.
Nombre ER-3A
Sesión padre S210
Hora de inicio Martes, 10 de Noviembre de 2015 16:33:00
Hora de paro Miércoles, 11 de Noviembre de 2015 16:33:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	32.5 dB	Lmax	1	76.2 dB
Lpk	1	98.3 dB	Leq	1	46.5 dB

Gráfica de datos de registro



ER-4A

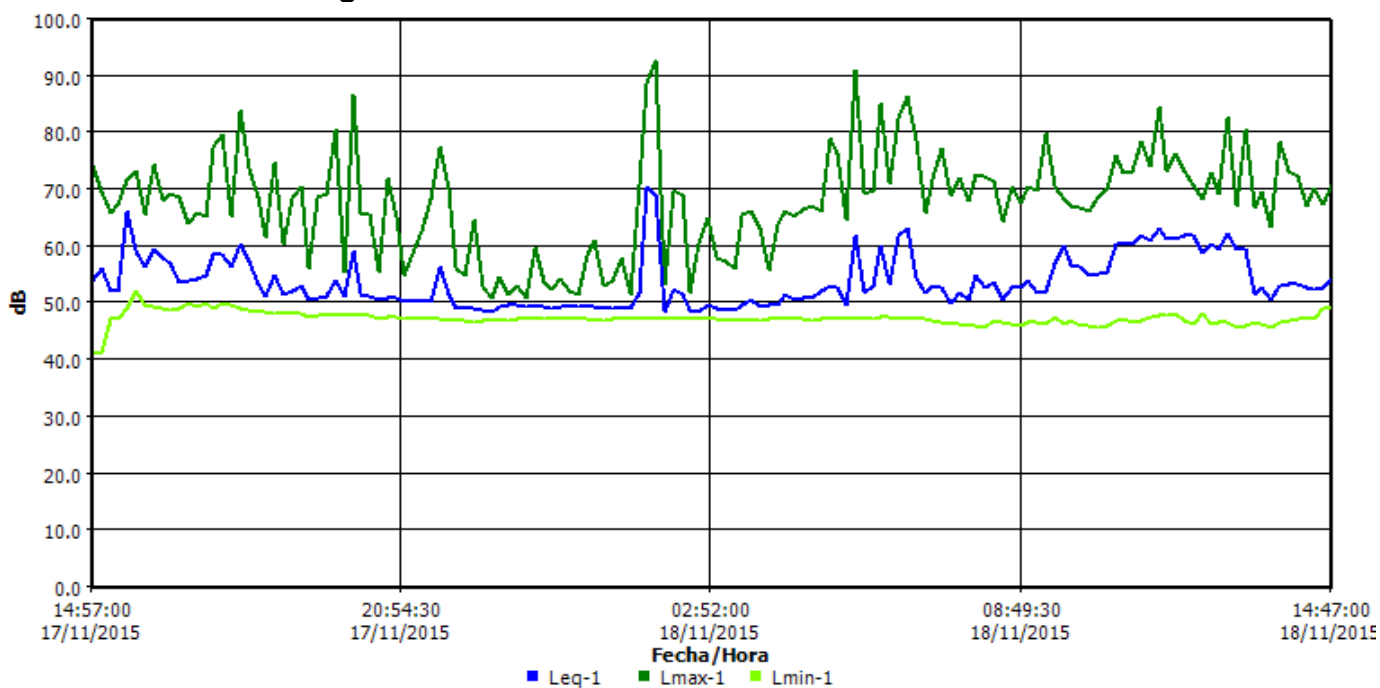
Panel de información

Ubicación Caserío El Portón de los Ángeles
Nombre ER-4A
Sesión padre S113
Hora de inicio Martes, 17 de Noviembre de 2015 14:47:00
Hora de paro Miércoles, 18 de Noviembre de 2015 14:47:00
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	41.1 dB	Lmax	1	92.8 dB
Lpk	1	108.9 dB	Leq	1	57.2 dB

Gráfica de datos de registro



ER-5A

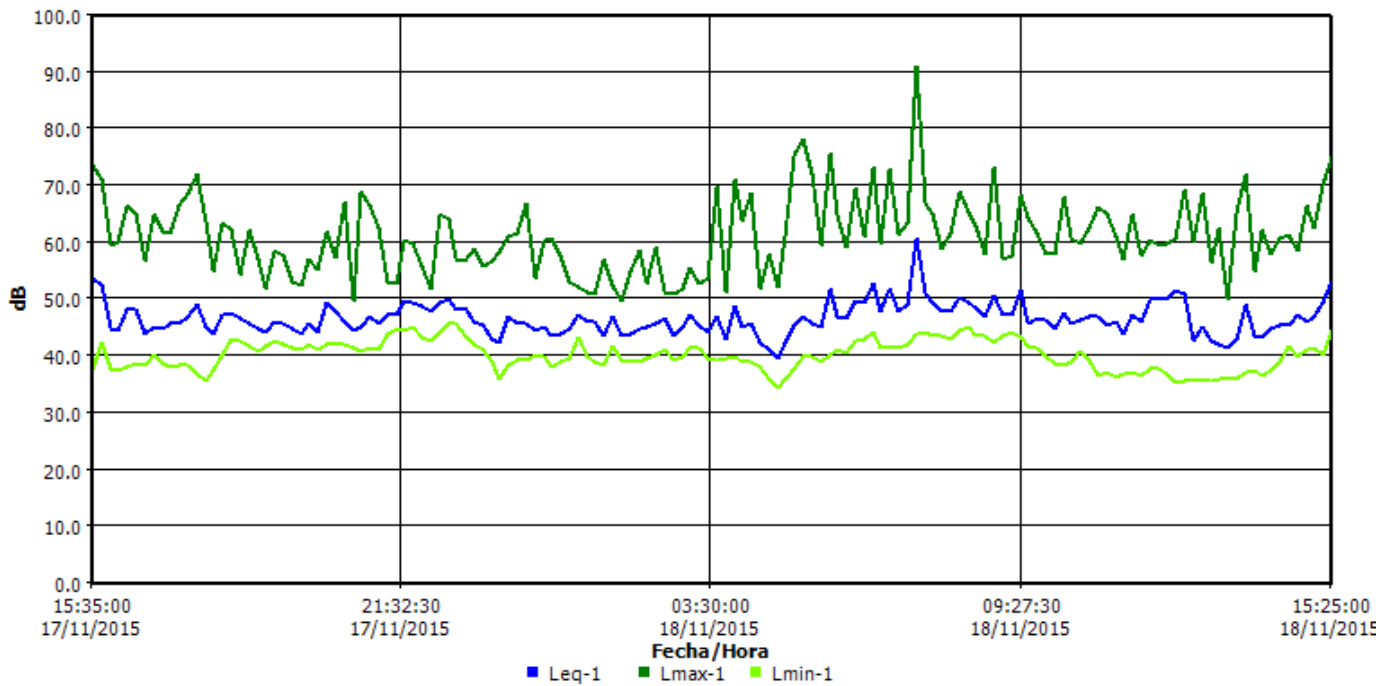
Panel de información

Ubicación Aldea Sabana Redonda.
Nombre ER-5A
Sesión padre S212
Hora de inicio Martes, 17 de Noviembre de 2015 15:25:00
Hora de paro Miércoles, 18 de Noviembre de 2015 15:25:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	34.3 dB	Lmax	1	91 dB
Lpk	1	100.1 dB	Leq	1	47.9 dB

Gráfica de datos de registro



ER-6

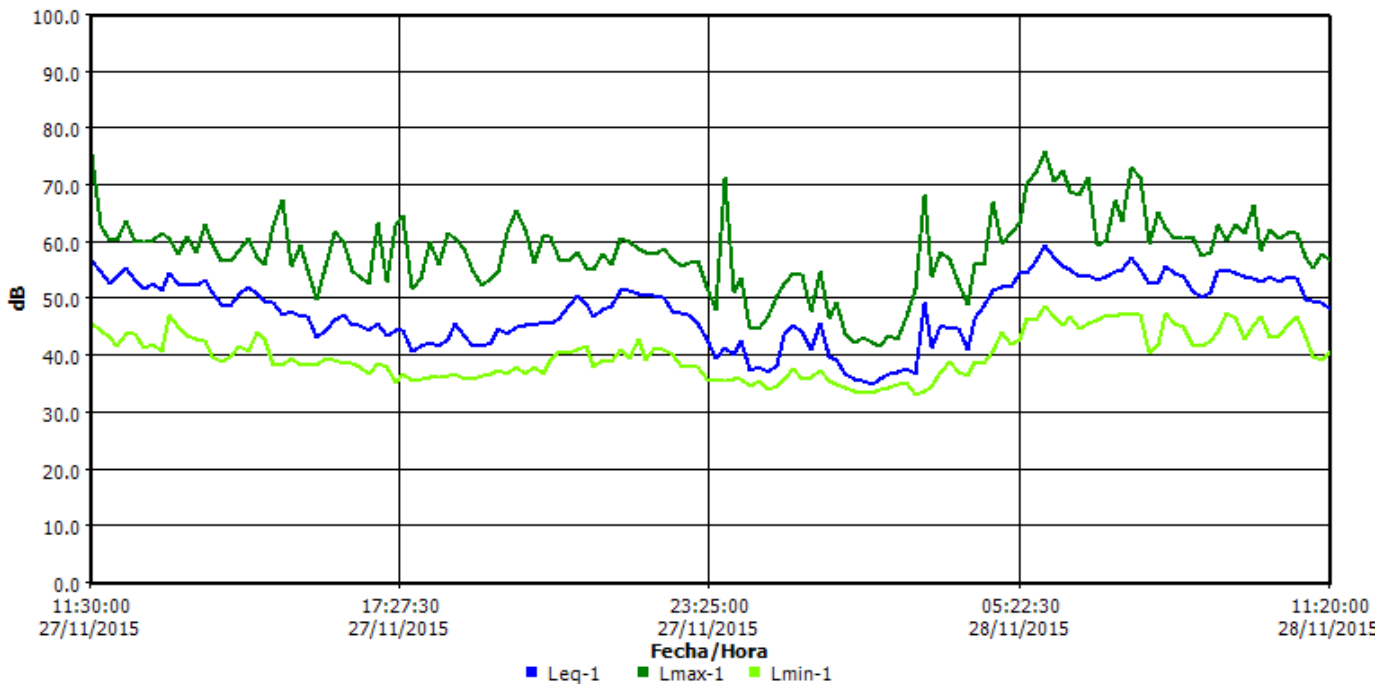
Panel de información

Ubicación Al norte del Proyecto, ruta a Mataquescuintla.
Nombre ER-6
Sesión padre S116
Hora de inicio Viernes, 27 de Noviembre de 2015 11:20:00
Hora de paro Sábado, 28 de Noviembre de 2015 11:20:00
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	33.3 dB	Lmax	1	76 dB
Lpk	1	95.5 dB	Leq	1	50.9 dB

Gráfica de datos de registro



ER-7A

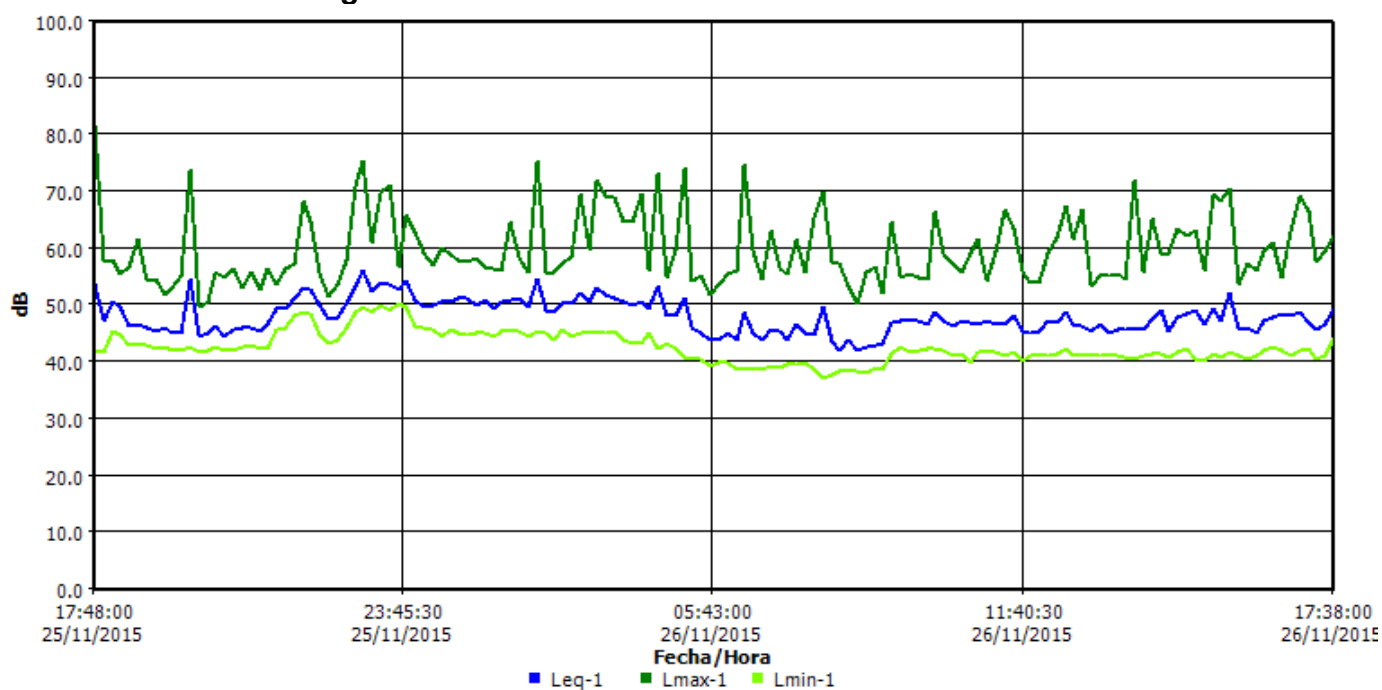
Panel de información

Ubicación Aledaño a aldea Los Planes.
Nombre ER-7A
Sesión padre S115
Hora de inicio Miércoles, 25 de Noviembre de 2015 17:38:00
Hora de paro Jueves, 26 de Noviembre de 2015 17:38:00
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	37.3 dB	Lmax	1	81.4 dB
Lpk	1	98.1 dB	Leq	1	49 dB

Gráfica de datos de registro



ER-7A

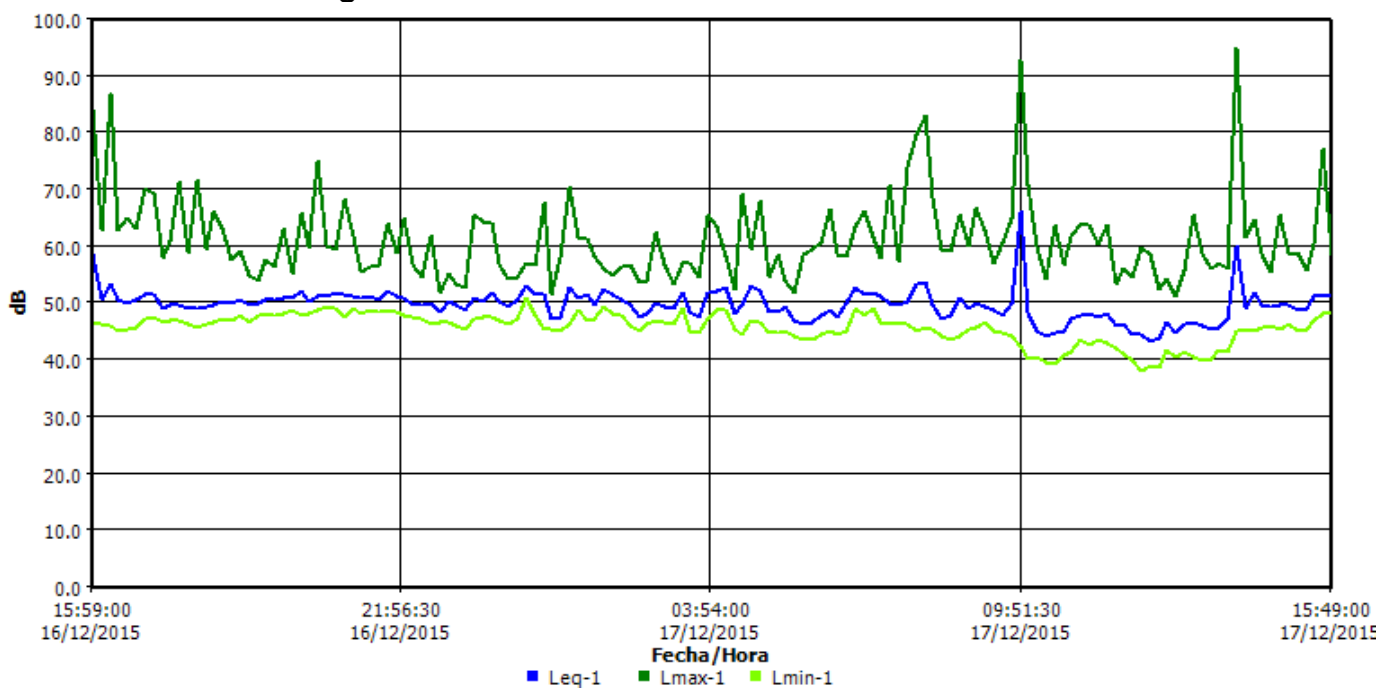
Panel de información

Ubicación Aledaño a aldea Los Planes.
Nombre ER-7A
Sesión padre S119
Hora de inicio Miércoles, 16 de Diciembre de 2015 15:49:00
Hora de paro Jueves, 17 de Diciembre de 2015 15:49:00
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	38.2 dB	Lmax	1	94.9 dB
Lpk	1	108.2 dB	Leq	1	51.4 dB

Gráfica de datos de registro



ER-3

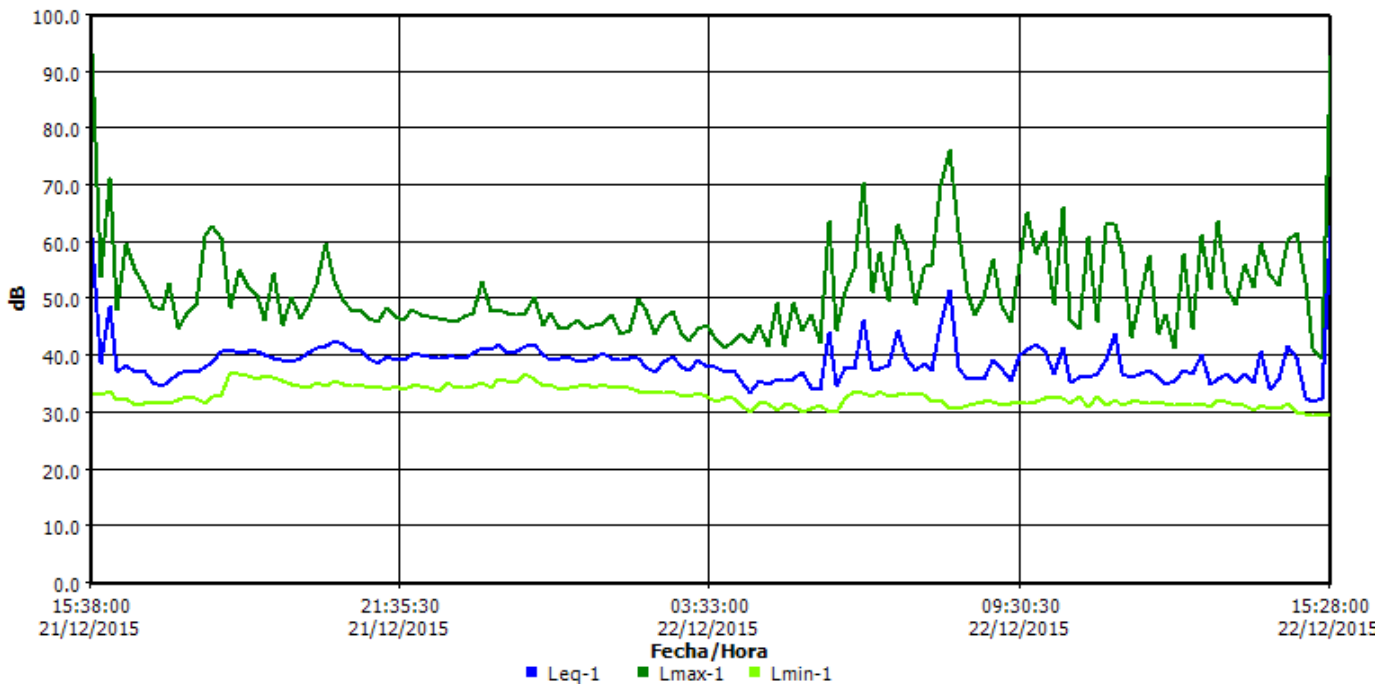
Panel de información

Ubicación Aledaño a Aldea El Fucío.
Nombre ER-3
Sesión padre S121
Hora de inicio Lunes, 21 de Diciembre de 2015 15:28:00
Hora de paro Martes, 22 de Diciembre de 2015 15:28:00
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	29.4 dB	Lmax	1	93.4 dB
Lpk	1	119.5 dB	Leq	1	45 dB

Gráfica de datos de registro



ER-2

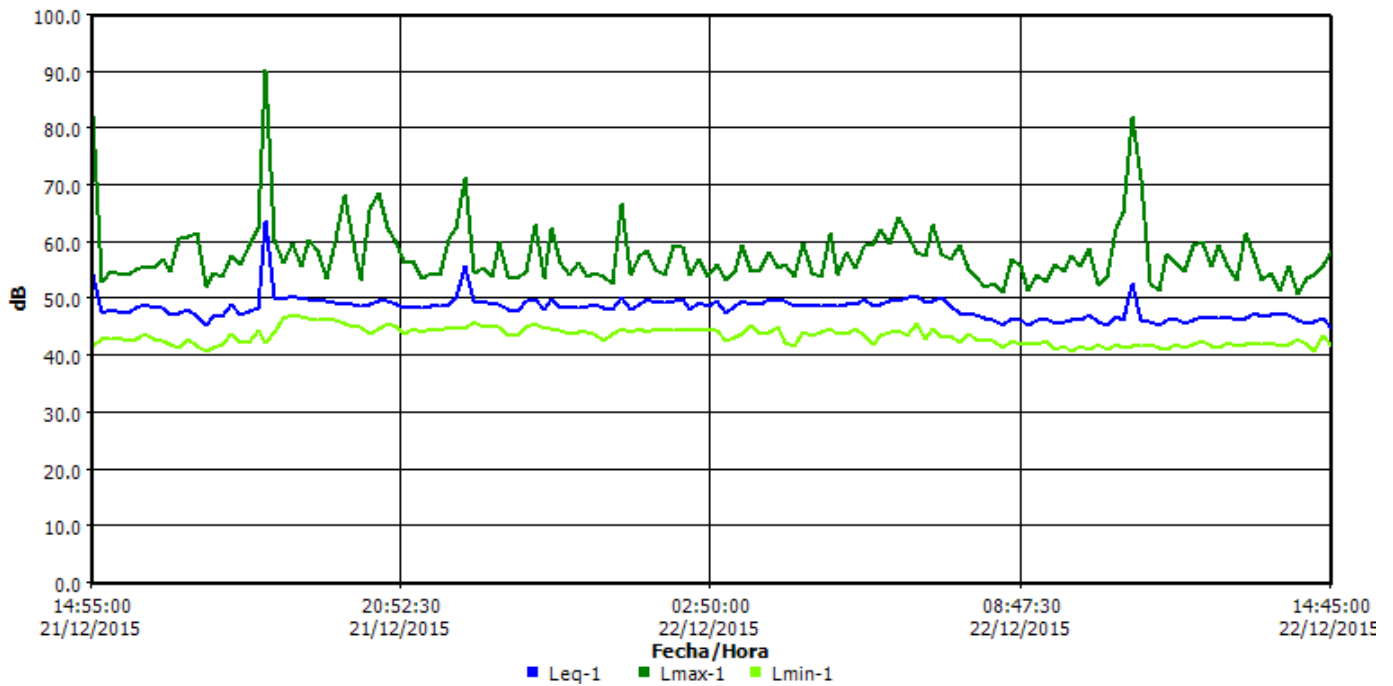
Panel de información

Ubicación Aldea La Cuchilla.
Nombre ER-2
Sesión padre S218
Hora de inicio Lunes, 21 de Diciembre de 2015 14:45:00
Hora de paro Martes, 22 de Diciembre de 2015 14:45:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	40.8 dB	Lmax	1	90.3 dB
Lpk	1	101.6 dB	Leq	1	49.5 dB

Gráfica de datos de registro



ER-1

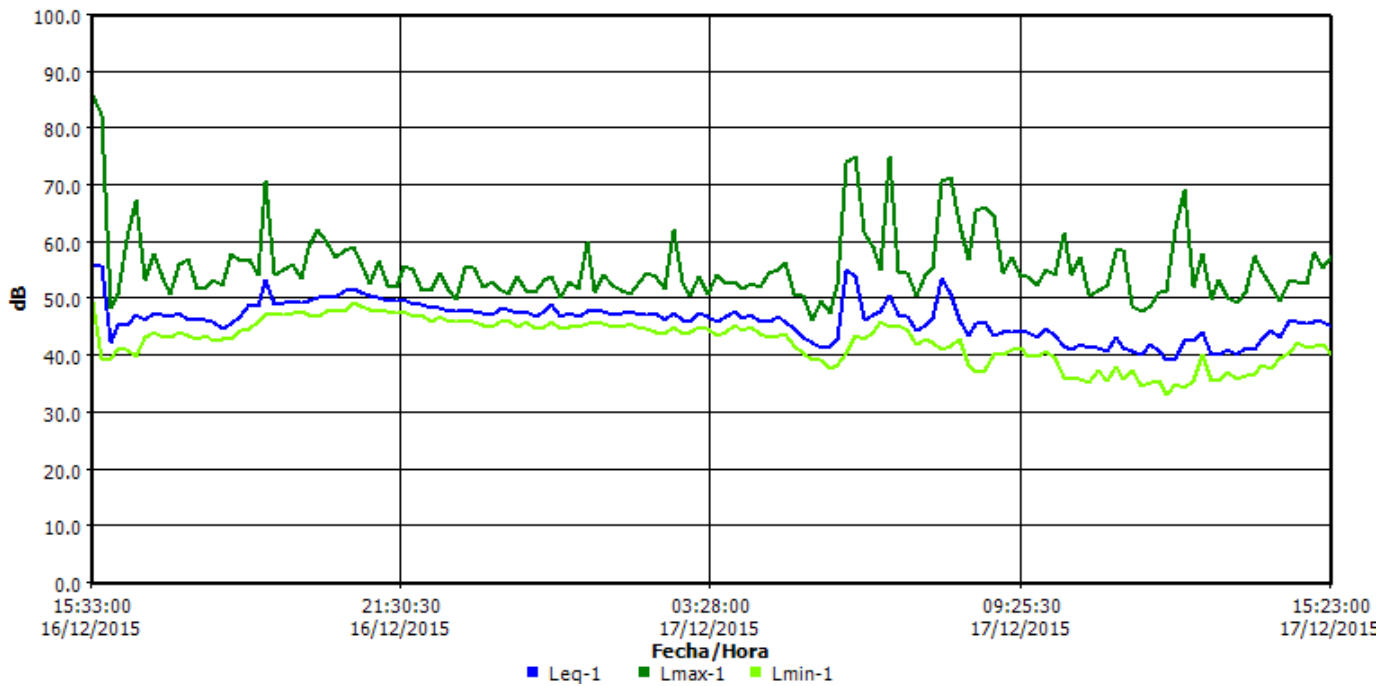
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S214
Hora de inicio Miércoles, 16 de Diciembre de 2015 15:23:00
Hora de paro Jueves, 17 de Diciembre de 2015 15:23:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	33.1 dB	Lmax	1	85.9 dB
Lpk	1	108.2 dB	Leq	1	47.7 dB

Gráfica de datos de registro



ER-7A

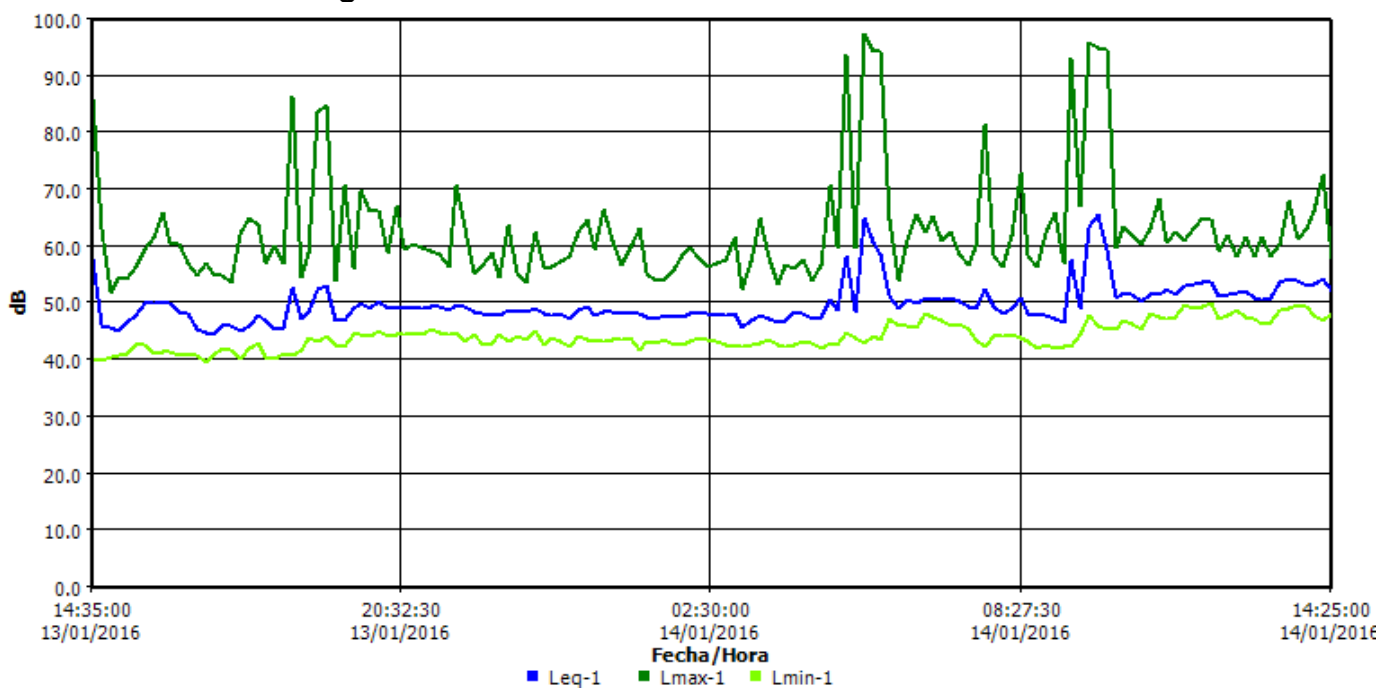
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S219
Hora de inicio Miércoles, 13 de Enero de 2016 14:25:00
Hora de paro Jueves, 14 de Enero de 2016 14:25:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.7 dB	Lmax	1	97.5 dB
Lpk	1	122.2 dB	Leq	1	52.6 dB

Gráfica de datos de registro



ER-3

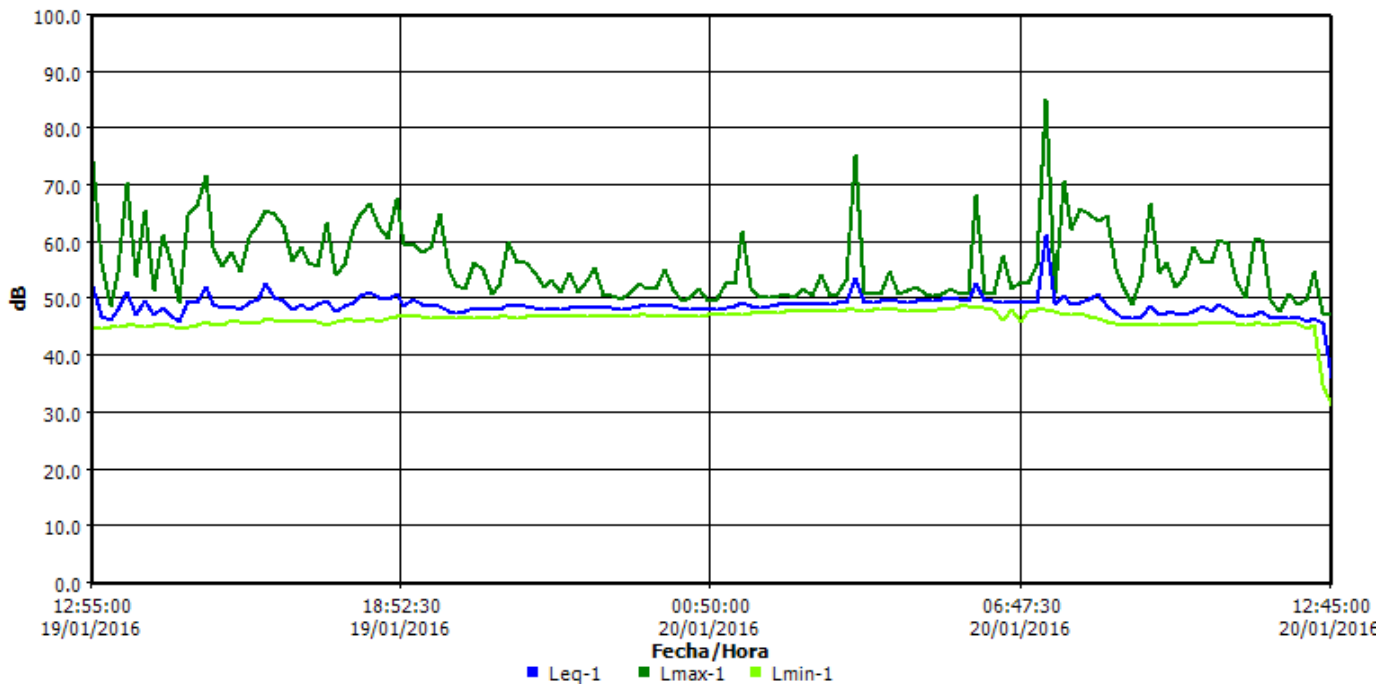
Panel de información

Ubicación Área Este del Proyecto, a inmediaciones de Aldea el Fucio
Nombre ER-3
Sesión padre S220
Hora de inicio Martes, 19 de Enero de 2016 12:45:00
Hora de paro Miércoles, 20 de Enero de 2016 12:45:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	31.4 dB	Lmax	1	85.2 dB
Lpk	1	100.4 dB	Leq	1	49.4 dB

Gráfica de datos de registro



ER-2

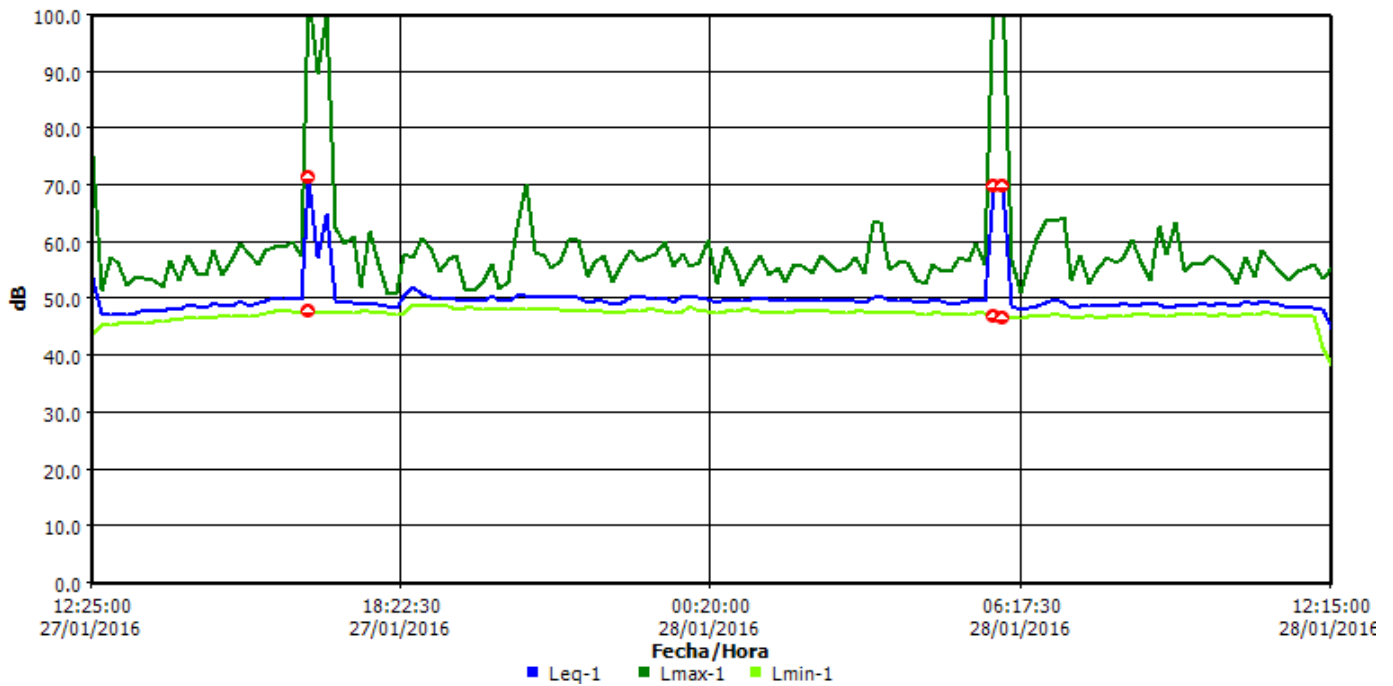
Panel de información

Ubicación
Nombre ER-2
Sesión padre S123
Hora de inicio Miércoles, 27 de Enero de 2016 12:15:00
Hora de paro Jueves, 28 de Enero de 2016 12:15:00
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	38.4 dB	Lmax	1	105.9 dB
Lpk	1	129.4 dB	Leq	1	55.3 dB

Gráfica de datos de registro



ER-1

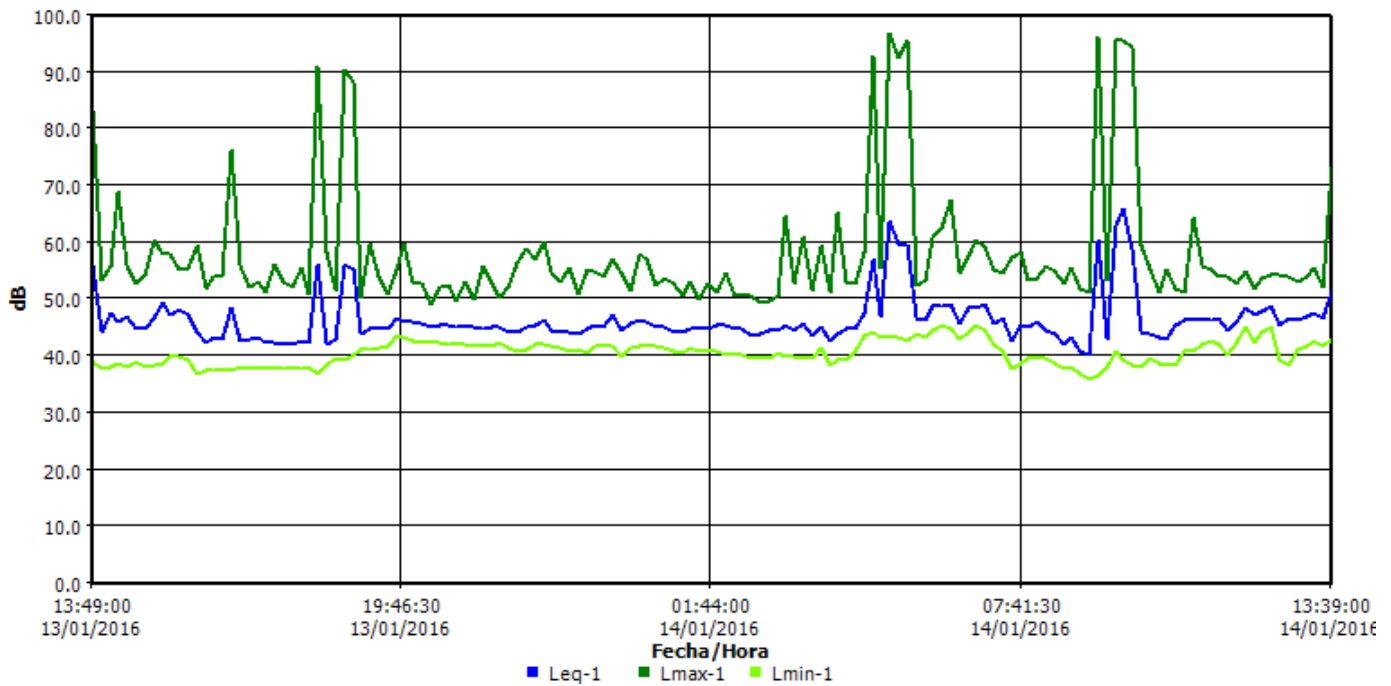
Panel de información

Ubicación Depósito de suelos, a inmediaciones de Aldea Los Planes
Nombre ER-1
Sesión padre S122
Hora de inicio Miércoles, 13 de Enero de 2016 13:39:00
Hora de paro Jueves, 14 de Enero de 2016 13:39:00
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	36 dB	Lmax	1	96.9 dB
Lpk	1	119.7 dB	Leq	1	51.1 dB

Gráfica de datos de registro



11.4 Certificados de verificación de los equipos utilizados

11.4.1 Material Particulado (PM₁₀) y Presión Sonora



Certificado de Calibración

Certificate of Calibration

No. de certificado: ICA- 5536/15
Certificate number

No. recepción: 7326
Reception number

Hoja: 1 de 2
page

Solicitante: CTA CONSULTORÍA Y TECNOLOGÍA AMBIENTAL S. A. DE C. V.
Customer

Domicilio: Insurgentes Sur 1763 Piso 5, Col. Guadalupe Inn. Ciudad de México, D. F. C. P. 01020
Address

Instrumento: Calibrador Acústico
Instrument

Marca: Quest
Manufacturer

Modelo: QC-10
Model

No. Serie: QII010006
Serial number

Clase o tipo: 1
Class or type

ID: N/E
Id number

Patrón de trabajo empleado: Pistófono Brüel & Kjær 4228
Standard used

Procedimiento / Método de calibración: PT-ACU-03: "Calibración de calibradores acústicos" / medición por comparación.
Procedure / Method of calibration

Incertidumbre estimada: Ver hoja 2 de 2
Calibration results

Resultados de la calibración: Ver hoja 2 de 2
Estimated uncertainty

Calibración realizada en: Meylab, S. A. de C. V.
Calibrated performed in

Número de acreditación ante ema A-03: Vigencia a partir del 20 de Octubre del 2010.
Acreditation number respect to ema

De acuerdo con la norma: CEI/IEC 60942
In agreement with standard

Condiciones ambientales de medición:
Environmental conditions in measurement

Temperatura: 26 °C
Temperature

Humedad relativa: 28 %
Relative humidity

Presión barométrica: 823 hPa
Barometric pressure

Fecha de calibración: 2015-abril-17
Calibration date

Fecha de emisión: 2015-abril-17
Date issued

Este certificado de calibración cumple con los requisitos de la norma NMX-EC-17025-IMNC-2006 (ISO/IEC 17025:2005)

"Requisitos generales para la competencia de los laboratorios de ensayo y de calibración".

Calibró: T.S.U. Roberto Arredondo Rodríguez
Calibrate by
Técnico Signatario

Aprobó: M. en A. C. Alejandro Rosales Peña Alfaro
Approved by
Jefe de Laboratorio

Trazabilidad
Traceability

El patrón de referencia es trazable al SI a través del CENAM, y la trazabilidad del patrón se logra a través de los procedimientos internos del laboratorio sustentados por un sistema de gestión de la calidad implementado en las mediciones.

Este certificado de calibración no puede ser modificado en forma parcial o total sin la autorización del laboratorio. Los resultados declarados son válidos para las condiciones prevalecientes durante la calibración.

15 1578

I) NIVEL DE PRESIÓN ACÚSTICA (NPA) EMITIDO

Se acopla un pistófono B&K 4228 a un micrófono patrón B&K 4192 para obtener la señal de referencia. Después, el pistófono se sustituye por el calibrador acústico bajo calibración en el micrófono. Posteriormente, se calcula el NPA emitido por el calibrador acústico con las señales registradas en cada medición.

NPA referido a 1013 hPa antes del ajuste: 113.6 dB

NPA Nominal: 114 dB re 20µPa

NPA referido a 1013 hPa: $\frac{113.96 \text{ dB re } 20\mu\text{Pa}}{U_e (k=2) = 0.12 \text{ dB re } 20\mu\text{Pa}}$

Clase de calib.	0	1	2
Tolerancia (dB)	±0.20	±0.40	±0.60

II) FRECUENCIA

Es obtenida empleando un contador de frecuencia el cual proporciona el valor del tono generado.

Frecuencia: 995.6 Hz $U_e (k=2) = 0.20\%$

Tolerancia Máxima (Hz)	Tolerancia Mínima (Hz)	Instrumento Clase
1010	990	0
1010	990	1
1020	980	2

III) DISTORSIÓN AL TERCER ARMÓNICO

Es obtenida empleando una relación de presiones respecto a la frecuencia central, la segunda y tercera armónica del tono generado por el calibrador.

DA_(3° ARMÓNICO): 0.27 % $U_e (k=2) = 0.35\%$

Tolerancia (%)	Instrumento Clase
2.5	0
3	1
4	2

NOTA: El Nivel de Presión Acústica emitido por el calibrador reportado en éste certificado de calibración, debe ser corregido para el valor de presión barométrica del lugar donde es empleado (ver instrucciones del fabricante).

INCERTIDUMBRE: La incertidumbre se obtuvo multiplicando la incertidumbre estándar combinada por un factor de k=2 correspondiente a un nivel de confianza del 95.45 % aproximadamente. La incertidumbre estándar fue estimada de acuerdo a NMX-CH-140-IMNC-2002. **Para la evaluación de la conformidad con la Norma Internacional CEI/IEC 60942, se toma en cuenta el error más la incertidumbre.**

Nota: Los resultados expresados en este certificado de calibración son el promedio de 5 lecturas tomadas para cada una de las pruebas

OBSERVACIONES:

Este documento "Certificado de Calibración" es propiedad del cliente, su reproducción parcial o total es responsabilidad del mismo. Tiene validez en su forma original (íntegro en su número total de páginas), con las firmas del personal responsable por la calibración. Los periodos de calibración son responsabilidad del cliente.

INSTRUMENTACIÓN EMPLEADA

Pistófono

Marca: Brüel & Kjaer
Modelo: 4228
Nº Serie: 2836196

Múltímetro

Marca: Hewlett Packard
Modelo: 33120A
Nº Serie: 3146A73611

Sonómetro

Marca: Quest
Modelo: Sound Pro
Nº Serie: BLL010009
Tipo: 1

Micrófono

Marca: Brüel & Kjaer
Modelo: 4192
Nº Serie: 2802752

Filtro para bandas en tercios de octava

Marca: Quest
Modelo: Int. a sonómetro Sound Pro

La trazabilidad del patrón de trabajo se mantiene a través del patrón de referencia Pistófono Marca B&K Modelo 4228 calibrado por el CENAM con No. de certificado CNM-CC-510-091/2015, incertidumbre ±0.06 dB (k=2) y el micrófono Brüel & Kjaer 4192 con No. de Certificado CNM-CC-510-089/2015, incertidumbre ±0.08 dB (k=2).

Fin del certificado

Este certificado de calibración no puede ser modificado en forma parcial o total sin la autorización del laboratorio. Los resultados declarados son válidos para las condiciones prevalecientes durante la calibración.

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

11.5 Informe Original de los Resultados Analíticos obtenidos de muestras de agua del Laboratorio ACZ Laboratories, INC. Correspondiente al Monitoreo de Diciembre de 2015.

11.5.1 Muestras de Agua Superficial (SW)

October 05, 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

Project ID: Escobal

ACZ Project ID: L26614

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 11, 2015. This project has been assigned to ACZ's project number, L26614. 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 L26614. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

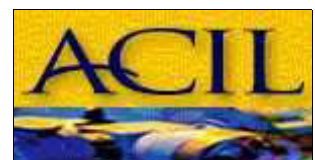
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 04, 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.



Scott Habermehl has reviewed
and approved this report.



Tahoe Resources, Inc.

October 05, 2015

Project ID: Escobal

ACZ Project ID: L26614

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 miscellaneous samples from Tahoe Resources, Inc. on September 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 L26614. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Samples were received outside the EPA recommended temperature of 0-6 degrees C.

Holding Times

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

Sample Analysis

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

1. For samples with a TDS ratio over 1.2 and a TDS greater than 250 mg/L, the samples were not retested based on historical re-analysis data and the sample's matrix.
2. We were not able to report any Oil and Grease data for this project due to a combined instrument/printer error. The samples were run but due to a problem uploading data and a printer error, all of the data was lost. There was no additional sample remaining for re-analysis.

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW1-E

ACZ Sample ID: **L26614-01**
 Date Sampled: 09/08/15 11:00
 Date Received: 09/11/15
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 13:10	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 14:02	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/23/15 15:45	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 14:24	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 15:03	bsu
Total Hot Plate Digestion	M200.2 ICP								09/18/15 11:19	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								09/24/15 19:00	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L26614-01**
Date Sampled: 09/08/15 11:00
Date Received: 09/11/15
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	09/22/15 20:19	aeb
Aluminum, total	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	09/21/15 16:23	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0015	B		mg/L	0.0004	0.002	09/23/15 8:33	msh
Antimony, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	09/25/15 22:11	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0030			mg/L	0.0002	0.001	09/23/15 8:33	msh
Arsenic, total	M200.8 ICP-MS	1	0.0028			mg/L	0.0002	0.001	09/25/15 22:11	msh
Barium, dissolved	M200.7 ICP	1	0.146			mg/L	0.003	0.02	09/22/15 20:19	aeb
Barium, total	M200.7 ICP	1	0.150			mg/L	0.003	0.02	09/21/15 16:23	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:19	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:23	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 20:19	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 14:55	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:19	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:23	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:33	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:11	msh
Calcium, dissolved	M200.7 ICP	1	44.1			mg/L	0.1	0.5	09/22/15 20:19	aeb
Calcium, total	M200.7 ICP	1	46.1			mg/L	0.1	0.5	09/21/15 16:23	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:19	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:23	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:19	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:23	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:19	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:23	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:19	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:23	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/22/15 20:19	aeb
Iron, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	09/21/15 16:23	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:33	msh
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:11	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:19	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:23	jjc
Magnesium, dissolved	M200.7 ICP	1	4.5			mg/L	0.2	1	09/22/15 20:19	aeb
Magnesium, total	M200.7 ICP	1	4.6			mg/L	0.2	1	09/21/15 16:23	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/22/15 20:19	aeb
Manganese, total	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	09/21/15 16:23	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/22/15 13:27	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:57	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 20:19	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/21/15 16:23	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:19	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:23	jjc
Potassium, dissolved	M200.7 ICP	1	4.7			mg/L	0.2	1	09/22/15 20:19	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L26614-01**
Date Sampled: 09/08/15 11:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4.7			mg/L	0.2	1	09/21/15 16:23	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:19	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:23	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/23/15 8:33	msh
Selenium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/25/15 22:11	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	09/23/15 8:33	msh
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/25/15 22:11	msh
Sodium, dissolved	M200.7 ICP	1	9			mg/L	0.2	1	09/22/15 20:19	aeb
Sodium, total	M200.7 ICP	1	9.1			mg/L	0.2	1	09/21/15 16:23	jjc
Strontium, dissolved	M200.7 ICP	1	0.194			mg/L	0.005	0.03	09/22/15 20:19	aeb
Strontium, total	M200.7 ICP	1	0.196			mg/L	0.005	0.03	09/21/15 16:23	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:33	msh
Thallium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:11	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/22/15 20:19	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	09/22/15 14:55	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/22/15 20:19	aeb
Titanium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	09/21/15 16:23	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/15 8:33	msh
Uranium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:11	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/22/15 20:19	aeb
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	09/21/15 16:23	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:19	aeb
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:23	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW1-E

ACZ Sample ID: **L26614-01**
 Date Sampled: 09/08/15 11:00
 Date Received: 09/11/15
 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	106		*	mg/L	2	20	09/17/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Total Alkalinity		1	107		*	mg/L	2	20	09/17/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			14.8			%			10/05/15 8:54	calc
Sum of Anions			2.3			meq/L			10/05/15 8:54	calc
Sum of Cations			3.1			meq/L			10/05/15 8:54	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/21/15 11:50	id
Chloride	SM4500Cl-E	1	4.1		*	mg/L	0.5	2	09/22/15 16:21	bsu
Conductivity @25C	SM2510B	1	305		*	umhos/cm	1	10	09/17/15 2:29	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:55	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:52	mss2
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	09/21/15 19:21	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		129			mg/L	0.8	4	10/05/15 8:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.27		*	mg/L	0.02	0.1	09/19/15 1:44	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/21/15 16:13	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/23/15 21:10	pjb
pH (lab)	SM4500H+ B									
pH		1	8.3	H	*	units	0.1	0.1	09/17/15 0:00	tms
pH measured at		1	19.4		*	C	0.1	0.1	09/17/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	10/05/15 8:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	09/24/15 20:55	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.01	0.05	09/11/15 22:24	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	09/24/15 0:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	224		*	mg/L	10	20	09/14/15 14:34	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/15/15 12:14	sck
Residue, Total (TS) @105C	SM2540B	1	238		*	mg/L	10	20	09/14/15 12:56	id
Sulfate	D516-02/-07 - Turbidimetric	1	3.3	B	*	mg/L	1	5	09/28/15 14:09	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/14/15 12:47	enb
TDS (calculated)	Calculation		135			mg/L			10/05/15 8:54	calc
TDS (ratio - measured/calculated)	Calculation		1.66						10/05/15 8:54	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L26614-02**
Date Sampled: 09/08/15 10:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 13:20	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 14:16	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/23/15 15:58	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 14:31	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 15:22	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/24/15 19:12	scp
Total Hot Plate Digestion	M200.2 ICP								09/18/15 11:54	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L26614-02**
Date Sampled: 09/08/15 10:00
Date Received: 09/11/15
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	09/22/15 20:22	aeb
Aluminum, total	M200.7 ICP	1	0.09	B		mg/L	0.03	0.2	09/21/15 16:38	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0211			mg/L	0.0004	0.002	09/23/15 8:36	msh
Antimony, total	M200.8 ICP-MS	1	0.0194			mg/L	0.0004	0.002	09/25/15 22:15	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0100			mg/L	0.0002	0.001	09/23/15 8:36	msh
Arsenic, total	M200.8 ICP-MS	1	0.0100			mg/L	0.0002	0.001	09/25/15 22:15	msh
Barium, dissolved	M200.7 ICP	1	0.060			mg/L	0.003	0.02	09/22/15 20:22	aeb
Barium, total	M200.7 ICP	1	0.062			mg/L	0.003	0.02	09/21/15 16:38	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:22	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:38	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 20:22	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:04	jjc
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	09/22/15 20:22	aeb
Boron, total	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/21/15 16:38	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:36	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:15	msh
Calcium, dissolved	M200.7 ICP	1	350			mg/L	0.1	0.5	09/22/15 20:22	aeb
Calcium, total	M200.7 ICP	1	370			mg/L	0.1	0.5	09/21/15 16:38	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:22	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:38	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:22	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:38	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:22	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:38	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:22	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:38	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/22/15 20:22	aeb
Iron, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	09/21/15 16:38	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/23/15 8:36	msh
Lead, total	M200.8 ICP-MS	1	0.0024			mg/L	0.0001	0.0005	09/25/15 22:15	msh
Lithium, dissolved	M200.7 ICP	1	0.092			mg/L	0.008	0.04	09/22/15 20:22	aeb
Lithium, total	M200.7 ICP	1	0.092			mg/L	0.008	0.04	09/21/15 16:38	jjc
Magnesium, dissolved	M200.7 ICP	1	20.3			mg/L	0.2	1	09/22/15 20:22	aeb
Magnesium, total	M200.7 ICP	1	21.1			mg/L	0.2	1	09/21/15 16:38	jjc
Manganese, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	09/22/15 20:22	aeb
Manganese, total	M200.7 ICP	1	0.029	B		mg/L	0.005	0.03	09/21/15 16:38	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/22/15 13:28	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:59	pta
Molybdenum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.1	09/22/15 20:22	aeb
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/21/15 16:38	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:22	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:38	jjc
Potassium, dissolved	M200.7 ICP	1	13.6			mg/L	0.2	1	09/22/15 20:22	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L26614-02**
Date Sampled: 09/08/15 10:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	14.1			mg/L	0.2	1	09/21/15 16:38	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:22	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:38	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0012			mg/L	0.0001	0.0003	09/23/15 8:36	msh
Selenium, total	M200.8 ICP-MS	1	0.0012			mg/L	0.0001	0.0003	09/25/15 22:15	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	09/23/15 8:36	msh
Silver, total	M200.8 ICP-MS	1	0.00013	B		mg/L	0.00005	0.0003	09/25/15 22:15	msh
Sodium, dissolved	M200.7 ICP	1	77			mg/L	0.2	1	09/22/15 20:22	aeb
Sodium, total	M200.7 ICP	1	79.4			mg/L	0.2	1	09/21/15 16:38	jjc
Strontium, dissolved	M200.7 ICP	1	3.820			mg/L	0.005	0.03	09/22/15 20:22	aeb
Strontium, total	M200.7 ICP	1	3.820			mg/L	0.005	0.03	09/21/15 16:38	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/23/15 8:36	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/25/15 22:15	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/22/15 20:22	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	09/22/15 15:04	jjc
Titanium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.005	0.03	09/22/15 20:22	aeb
Titanium, total	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	09/21/15 16:38	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/23/15 8:36	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/25/15 22:15	msh
Vanadium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	09/22/15 20:22	aeb
Vanadium, total	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	09/21/15 16:38	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:22	aeb
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:38	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2-E

ACZ Sample ID: **L26614-02**
 Date Sampled: 09/08/15 10:00
 Date Received: 09/11/15
 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	30.8		*	mg/L	2	20	09/17/15 0:00	tms
Carbonate as CaCO3		1	5.1	B	*	mg/L	2	20	09/17/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Total Alkalinity		1	35.9		*	mg/L	2	20	09/17/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			10/05/15 8:54	calc
Sum of Anions			23			meq/L			10/05/15 8:54	calc
Sum of Cations			23			meq/L			10/05/15 8:54	calc
Chemical Oxygen Demand	M410.4	1	17	B	*	mg/L	10	20	09/21/15 12:20	id
Chloride	SM4500Cl-E	1	69.7		*	mg/L	0.5	2	09/22/15 16:21	bsu
Conductivity @25C	SM2510B	1	1830		*	umhos/cm	1	10	09/17/15 2:39	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5	0.005	B	*	mg/L	0.003	0.01	09/22/15 20:56	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5	0.004	B	*	mg/L	0.003	0.01	09/21/15 17:52	mss2
Fluoride	SM4500F-C	1	1.22		*	mg/L	0.05	0.3	09/21/15 19:24	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		958			mg/L	0.8	4	10/05/15 8:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	8.37		*	mg/L	0.08	0.4	09/19/15 1:45	pjb
Nitrogen, ammonia	M350.1	1	0.15	B	*	mg/L	0.05	0.2	09/21/15 16:04	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	09/23/15 21:11	pjb
pH (lab)	SM4500H+ B									
pH		1	8.6	H	*	units	0.1	0.1	09/17/15 0:00	tms
pH measured at		1	19.7		*	C	0.1	0.1	09/17/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	10/05/15 8:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/24/15 20:56	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/11/15 21:47	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/24/15 0:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1630		*	mg/L	10	20	09/14/15 14:36	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	6.0	B	*	mg/L	5	20	09/15/15 12:17	sck
Residue, Total (TS) @ 105C	SM2540B	1	1690		*	mg/L	10	20	09/14/15 12:57	id
Sulfate	D516-02/-07 - Turbidimetric	50	944		*	mg/L	50	250	09/28/15 14:37	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/14/15 12:52	enb
TDS (calculated)	Calculation		1500			mg/L			10/05/15 8:54	calc
TDS (ratio - measured/calculated)	Calculation		1.09						10/05/15 8:54	calc

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L26614-03**
Date Sampled: 09/08/15 09:05
Date Received: 09/11/15
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 13:30	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 14:31	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/23/15 16:10	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 14:38	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 15:32	bsu
Total Hot Plate Digestion	M200.2 ICP								09/18/15 12:05	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								09/24/15 19:24	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L26614-03**
Date Sampled: 09/08/15 09:05
Date Received: 09/11/15
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	09/22/15 20:25	aeb
Aluminum, total	M200.7 ICP	1	0.07	B		mg/L	0.03	0.2	09/21/15 16:41	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0206			mg/L	0.0004	0.002	09/23/15 8:40	msh
Antimony, total	M200.8 ICP-MS	1	0.0194			mg/L	0.0004	0.002	09/25/15 22:18	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0109			mg/L	0.0002	0.001	09/23/15 8:40	msh
Arsenic, total	M200.8 ICP-MS	1	0.0104			mg/L	0.0002	0.001	09/25/15 22:18	msh
Barium, dissolved	M200.7 ICP	1	0.052			mg/L	0.003	0.02	09/22/15 20:25	aeb
Barium, total	M200.7 ICP	1	0.051			mg/L	0.003	0.02	09/21/15 16:41	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:25	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:41	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 20:25	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:07	jjc
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/22/15 20:25	aeb
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	09/21/15 16:41	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:40	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:18	msh
Calcium, dissolved	M200.7 ICP	1	365			mg/L	0.1	0.5	09/22/15 20:25	aeb
Calcium, total	M200.7 ICP	1	367			mg/L	0.1	0.5	09/21/15 16:41	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:25	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:41	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:25	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:41	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:25	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:41	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:25	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:41	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/22/15 20:25	aeb
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	09/21/15 16:41	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/15 8:40	msh
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/25/15 22:18	msh
Lithium, dissolved	M200.7 ICP	1	0.100			mg/L	0.008	0.04	09/22/15 20:25	aeb
Lithium, total	M200.7 ICP	1	0.095			mg/L	0.008	0.04	09/21/15 16:41	jjc
Magnesium, dissolved	M200.7 ICP	1	22			mg/L	0.2	1	09/22/15 20:25	aeb
Magnesium, total	M200.7 ICP	1	21.6			mg/L	0.2	1	09/21/15 16:41	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/22/15 20:25	aeb
Manganese, total	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	09/21/15 16:41	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/22/15 13:30	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 16:06	pta
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/22/15 20:25	aeb
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	09/21/15 16:41	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:25	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:41	jjc
Potassium, dissolved	M200.7 ICP	1	13.8			mg/L	0.2	1	09/22/15 20:25	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L26614-03**
Date Sampled: 09/08/15 09:05
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	13.7		mg/L	0.2	1	09/21/15 16:41	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 20:25	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/21/15 16:41	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0011		mg/L	0.0001	0.0003	09/23/15 8:40	msh
Selenium, total	M200.8 ICP-MS	1	0.0010		mg/L	0.0001	0.0003	09/25/15 22:18	msh
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	09/23/15 8:40	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 22:18	msh
Sodium, dissolved	M200.7 ICP	1	81.5		mg/L	0.2	1	09/22/15 20:25	aeb
Sodium, total	M200.7 ICP	1	79.9		mg/L	0.2	1	09/21/15 16:41	jjc
Strontium, dissolved	M200.7 ICP	1	4.040		mg/L	0.005	0.03	09/22/15 20:25	aeb
Strontium, total	M200.7 ICP	1	3.820		mg/L	0.005	0.03	09/21/15 16:41	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/23/15 8:40	msh
Thallium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/25/15 22:18	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 20:25	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 15:07	jjc
Titanium, dissolved	M200.7 ICP	1	0.017	B	mg/L	0.005	0.03	09/22/15 20:25	aeb
Titanium, total	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	09/21/15 16:41	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/23/15 8:40	msh
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/25/15 22:18	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	09/22/15 20:25	aeb
Vanadium, total	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	09/21/15 16:41	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 20:25	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/21/15 16:41	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L26614-03**
Date Sampled: 09/08/15 09:05
Date Received: 09/11/15
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	52.2		*	mg/L	2	20	09/17/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Total Alkalinity		1	52.2		*	mg/L	2	20	09/17/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.1			%			10/05/15 8:55	calc
Sum of Anions			23			meq/L			10/05/15 8:55	calc
Sum of Cations			24			meq/L			10/05/15 8:55	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/21/15 12:30	id
Chloride	SM4500Cl-E	1	70.7		*	mg/L	0.5	2	09/22/15 16:21	bsu
Conductivity @25C	SM2510B	1	1840		*	umhos/cm	1	10	09/17/15 2:47	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:57	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:53	mss2
Fluoride	SM4500F-C	1	1.19		*	mg/L	0.05	0.3	09/21/15 19:27	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		1000			mg/L	0.8	4	10/05/15 8:55	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	5	9.4		*	mg/L	0.1	0.5	09/19/15 1:46	pjb
Nitrogen, ammonia	M350.1	1	0.08	B	*	mg/L	0.05	0.2	09/21/15 16:05	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	09/23/15 21:12	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/17/15 0:00	tms
pH measured at		1	20.3		*	C	0.1	0.1	09/17/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	10/05/15 8:55	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/24/15 20:58	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.01	0.05	09/11/15 21:52	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/24/15 0:26	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1640		*	mg/L	10	20	09/14/15 14:38	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/15/15 12:19	sck
Residue, Total (TS) @ 105C	SM2540B	1	1680		*	mg/L	10	20	09/14/15 12:58	id
Sulfate	D516-02/-07 - Turbidimetric	50	924		*	mg/L	50	250	09/28/15 14:37	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/14/15 12:58	enb
TDS (calculated)	Calculation		1510			mg/L			10/05/15 8:55	calc
TDS (ratio - measured/calculated)	Calculation		1.09						10/05/15 8:55	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L26614-04**
Date Sampled: 09/08/15 08:40
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 13:40	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 14:45	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/23/15 16:22	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 14:45	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 15:42	bsu
Total Hot Plate Digestion	M200.2 ICP								09/18/15 12:17	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								09/24/15 19:36	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L26614-04**
Date Sampled: 09/08/15 08:40
Date Received: 09/11/15
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	09/22/15 20:28	aeb
Aluminum, total	M200.7 ICP	1	0.09	B	*	mg/L	0.03	0.2	09/21/15 16:45	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0147			mg/L	0.0004	0.002	09/23/15 8:56	msh
Antimony, total	M200.8 ICP-MS	1	0.0135			mg/L	0.0004	0.002	09/25/15 22:21	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0079			mg/L	0.0002	0.001	09/23/15 8:56	msh
Arsenic, total	M200.8 ICP-MS	1	0.0077			mg/L	0.0002	0.001	09/25/15 22:21	msh
Barium, dissolved	M200.7 ICP	1	0.092			mg/L	0.003	0.02	09/22/15 20:28	aeb
Barium, total	M200.7 ICP	1	0.093			mg/L	0.003	0.02	09/21/15 16:45	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:28	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:45	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 20:28	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:10	jjc
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	09/22/15 20:28	aeb
Boron, total	M200.7 ICP	1	0.10			mg/L	0.01	0.05	09/21/15 16:45	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:56	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:21	msh
Calcium, dissolved	M200.7 ICP	1	303			mg/L	0.1	0.5	09/22/15 20:28	aeb
Calcium, total	M200.7 ICP	1	317			mg/L	0.1	0.5	09/21/15 16:45	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:28	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:45	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:28	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:45	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:28	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:45	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:28	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:45	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/22/15 20:28	aeb
Iron, total	M200.7 ICP	1	0.10		*	mg/L	0.02	0.05	09/21/15 16:45	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/15 8:56	msh
Lead, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/25/15 22:21	msh
Lithium, dissolved	M200.7 ICP	1	0.070			mg/L	0.008	0.04	09/22/15 20:28	aeb
Lithium, total	M200.7 ICP	1	0.071			mg/L	0.008	0.04	09/21/15 16:45	jjc
Magnesium, dissolved	M200.7 ICP	1	20.1			mg/L	0.2	1	09/22/15 20:28	aeb
Magnesium, total	M200.7 ICP	1	20.7			mg/L	0.2	1	09/21/15 16:45	jjc
Manganese, dissolved	M200.7 ICP	1	0.260			mg/L	0.005	0.03	09/22/15 20:28	aeb
Manganese, total	M200.7 ICP	1	0.265			mg/L	0.005	0.03	09/21/15 16:45	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/22/15 13:33	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 16:08	pta
Molybdenum, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	09/22/15 20:28	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/21/15 16:45	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:28	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:45	jjc
Potassium, dissolved	M200.7 ICP	1	11.7			mg/L	0.2	1	09/22/15 20:28	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L26614-04**
Date Sampled: 09/08/15 08:40
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	12		mg/L	0.2	1	09/21/15 16:45	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 20:28	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/21/15 16:45	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0009		mg/L	0.0001	0.0003	09/23/15 8:56	msh
Selenium, total	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	09/25/15 22:21	msh
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	09/23/15 8:56	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 22:21	msh
Sodium, dissolved	M200.7 ICP	1	65.4		mg/L	0.2	1	09/22/15 20:28	aeb
Sodium, total	M200.7 ICP	1	66.6		mg/L	0.2	1	09/21/15 16:45	jjc
Strontium, dissolved	M200.7 ICP	1	3.130		mg/L	0.005	0.03	09/22/15 20:28	aeb
Strontium, total	M200.7 ICP	1	3.110		mg/L	0.005	0.03	09/21/15 16:45	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/23/15 8:56	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/25/15 22:21	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 20:28	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 15:10	jjc
Titanium, dissolved	M200.7 ICP	1	0.016	B	mg/L	0.005	0.03	09/22/15 20:28	aeb
Titanium, total	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	09/21/15 16:45	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	09/23/15 8:56	msh
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/25/15 22:21	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/22/15 20:28	aeb
Vanadium, total	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	09/21/15 16:45	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 20:28	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/21/15 16:45	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4-E

ACZ Sample ID: **L26614-04**
 Date Sampled: 09/08/15 08:40
 Date Received: 09/11/15
 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	74.1		*	mg/L	2	20	09/17/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Total Alkalinity		1	74.1		*	mg/L	2	20	09/17/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			10/05/15 8:55	calc
Sum of Anions			20			meq/L			10/05/15 8:55	calc
Sum of Cations			20			meq/L			10/05/15 8:55	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/21/15 13:00	id
Chloride	SM4500Cl-E	1	60.8		*	mg/L	0.5	2	09/22/15 16:21	bsu
Conductivity @25C	SM2510B	1	1620		*	umhos/cm	1	10	09/17/15 2:55	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:58	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:54	mss2
Fluoride	SM4500F-C	1	0.89		*	mg/L	0.05	0.3	09/21/15 19:31	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		839			mg/L	0.8	4	10/05/15 8:55	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	7.14		*	mg/L	0.08	0.4	09/19/15 1:48	pjb
Nitrogen, ammonia	M350.1	1	0.28		*	mg/L	0.05	0.2	09/21/15 16:07	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	09/23/15 21:13	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/17/15 0:00	tms
pH measured at		1	20.2		*	C	0.1	0.1	09/17/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	10/05/15 8:55	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/24/15 20:59	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	09/11/15 21:53	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.01	0.05	09/24/15 0:29	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1420		*	mg/L	10	20	09/14/15 14:40	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/15/15 12:22	sck
Residue, Total (TS) @ 105C	SM2540B	1	1490		*	mg/L	10	20	09/14/15 16:30	enb
Sulfate	D516-02/-07 - Turbidimetric	50	811		*	mg/L	50	250	09/28/15 14:38	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/14/15 13:03	enb
TDS (calculated)	Calculation		1320			mg/L			10/05/15 8:55	calc
TDS (ratio - measured/calculated)	Calculation		1.08						10/05/15 8:55	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L26614-05**
Date Sampled: 09/08/15 07:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 14:00	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 15:00	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/23/15 16:35	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 14:52	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 15:51	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								09/24/15 19:48	scp
Total Hot Plate Digestion	M200.2 ICP								09/18/15 12:28	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L26614-05**
Date Sampled: 09/08/15 07:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.08	B		mg/L	0.03	0.2	09/22/15 20:31	aeb
Aluminum, total	M200.7 ICP	1	1.15		*	mg/L	0.03	0.2	09/21/15 16:48	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/23/15 8:59	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/25/15 22:25	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0002	0.001	09/23/15 8:59	msh
Arsenic, total	M200.8 ICP-MS	1	0.0018			mg/L	0.0002	0.001	09/25/15 22:25	msh
Barium, dissolved	M200.7 ICP	1	0.042			mg/L	0.003	0.02	09/22/15 20:31	aeb
Barium, total	M200.7 ICP	1	0.054			mg/L	0.003	0.02	09/21/15 16:48	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:31	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:48	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 20:31	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:13	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:31	aeb
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/21/15 16:48	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:59	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:25	msh
Calcium, dissolved	M200.7 ICP	1	7.3			mg/L	0.1	0.5	09/22/15 20:31	aeb
Calcium, total	M200.7 ICP	1	7.5			mg/L	0.1	0.5	09/21/15 16:48	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:31	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:48	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:31	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:48	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:31	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:48	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:31	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:48	jjc
Iron, dissolved	M200.7 ICP	1	0.07			mg/L	0.02	0.05	09/22/15 20:31	aeb
Iron, total	M200.7 ICP	1	0.64		*	mg/L	0.02	0.05	09/21/15 16:48	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:59	msh
Lead, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/25/15 22:25	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:31	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:48	jjc
Magnesium, dissolved	M200.7 ICP	1	1.4			mg/L	0.2	1	09/22/15 20:31	aeb
Magnesium, total	M200.7 ICP	1	1.4			mg/L	0.2	1	09/21/15 16:48	jjc
Manganese, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	09/22/15 20:31	aeb
Manganese, total	M200.7 ICP	1	0.039			mg/L	0.005	0.03	09/21/15 16:48	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/22/15 13:35	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 16:14	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 20:31	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/21/15 16:48	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:31	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:48	jjc
Potassium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	09/22/15 20:31	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L26614-05**
Date Sampled: 09/08/15 07:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	2.7			mg/L	0.2	1	09/21/15 16:48	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:31	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:48	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/23/15 8:59	msh
Selenium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/25/15 22:25	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	09/23/15 8:59	msh
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/25/15 22:25	msh
Sodium, dissolved	M200.7 ICP	1	4.9			mg/L	0.2	1	09/22/15 20:31	aeb
Sodium, total	M200.7 ICP	1	4.9			mg/L	0.2	1	09/21/15 16:48	jjc
Strontium, dissolved	M200.7 ICP	1	0.063			mg/L	0.005	0.03	09/22/15 20:31	aeb
Strontium, total	M200.7 ICP	1	0.065			mg/L	0.005	0.03	09/21/15 16:48	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:59	msh
Thallium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:25	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/22/15 20:31	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	09/22/15 15:13	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/22/15 20:31	aeb
Titanium, total	M200.7 ICP	1	0.028	B		mg/L	0.005	0.03	09/21/15 16:48	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:59	msh
Uranium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:25	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/22/15 20:31	aeb
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	09/21/15 16:48	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:31	aeb
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:48	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L26614-05**
 Date Sampled: 09/08/15 07:30
 Date Received: 09/11/15
 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	22.7		*	mg/L	2	20	09/17/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Total Alkalinity		1	22.7		*	mg/L	2	20	09/17/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			21.2			%			10/05/15 8:56	calc
Sum of Anions			0.508			meq/L			10/05/15 8:56	calc
Sum of Cations			0.781			meq/L			10/05/15 8:56	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/21/15 13:10	id
Chloride	SM4500Cl-E	1	1.8	B	*	mg/L	0.5	2	09/22/15 16:21	bsu
Conductivity @25C	SM2510B	1	84.0		*	umhos/cm	1	10	09/17/15 3:03	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:59	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:55	mss2
Fluoride	SM4500F-C	1	0.06	B	*	mg/L	0.05	0.3	09/21/15 19:38	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		24			mg/L	0.8	4	10/05/15 8:56	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.20		*	mg/L	0.02	0.1	09/19/15 0:50	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/21/15 16:08	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/23/15 21:14	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	09/17/15 0:00	tms
pH measured at		1	19.5		*	C	0.1	0.1	09/17/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	10/05/15 8:56	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/24/15 21:00	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/11/15 21:54	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/24/15 0:30	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	84		*	mg/L	10	20	09/14/15 14:42	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/15/15 12:24	sck
Residue, Total (TS) @105C	SM2540B	1	96		*	mg/L	10	20	09/14/15 16:31	enb
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/28/15 14:09	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/14/15 13:09	enb
TDS (calculated)	Calculation		32.2			mg/L			10/05/15 8:56	calc
TDS (ratio - measured/calculated)	Calculation		2.61						10/05/15 8:56	calc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SW7-E

ACZ Sample ID: **L26614-06**

Date Sampled: 09/08/15 08:00

Date Received: 09/11/15

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 14:20	spl
Cyanide, WAD	SM4500-CN I- distillation								09/22/15 16:07	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/23/15 16:47	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 15:00	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 16:01	bsu
Total Hot Plate Digestion	M200.2 ICP								09/18/15 12:40	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								09/24/15 20:00	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L26614-06**

Date Sampled: 09/08/15 08:00

Date Received: 09/11/15

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	09/22/15 20:47	aeb
Aluminum, total	M200.7 ICP	1	0.84		*	mg/L	0.03	0.2	09/21/15 16:51	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	09/23/15 9:03	msh
Antimony, total	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	09/25/15 22:28	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0037			mg/L	0.0002	0.001	09/23/15 9:03	msh
Arsenic, total	M200.8 ICP-MS	1	0.0042			mg/L	0.0002	0.001	09/25/15 22:28	msh
Barium, dissolved	M200.7 ICP	1	0.090			mg/L	0.003	0.02	09/22/15 20:47	aeb
Barium, total	M200.7 ICP	1	0.095			mg/L	0.003	0.02	09/21/15 16:51	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:47	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:51	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 20:47	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:16	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:47	aeb
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/21/15 16:51	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 9:03	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/25/15 22:28	msh
Calcium, dissolved	M200.7 ICP	1	18			mg/L	0.1	0.5	09/22/15 20:47	aeb
Calcium, total	M200.7 ICP	1	18.4			mg/L	0.1	0.5	09/21/15 16:51	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:47	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:51	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:47	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:51	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 20:47	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/21/15 16:51	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 20:47	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/21/15 16:51	jjc
Iron, dissolved	M200.7 ICP	1	0.09			mg/L	0.02	0.05	09/22/15 20:47	aeb
Iron, total	M200.7 ICP	1	0.42		*	mg/L	0.02	0.05	09/21/15 16:51	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 9:03	msh
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/25/15 22:28	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:47	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:51	jjc
Magnesium, dissolved	M200.7 ICP	1	3.3			mg/L	0.2	1	09/22/15 20:47	aeb
Magnesium, total	M200.7 ICP	1	3.2			mg/L	0.2	1	09/21/15 16:51	jjc
Manganese, dissolved	M200.7 ICP	1	0.105			mg/L	0.005	0.03	09/22/15 20:47	aeb
Manganese, total	M200.7 ICP	1	0.112			mg/L	0.005	0.03	09/21/15 16:51	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/22/15 13:37	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 16:16	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 20:47	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/21/15 16:51	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 20:47	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/21/15 16:51	jjc
Potassium, dissolved	M200.7 ICP	1	3.5			mg/L	0.2	1	09/22/15 20:47	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L26614-06**
Date Sampled: 09/08/15 08:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.4		mg/L	0.2	1	09/21/15 16:51	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 20:47	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/21/15 16:51	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/23/15 9:03	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/25/15 22:28	msh
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	09/23/15 9:03	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 22:28	msh
Sodium, dissolved	M200.7 ICP	1	8.9		mg/L	0.2	1	09/22/15 20:47	aeb
Sodium, total	M200.7 ICP	1	8.8		mg/L	0.2	1	09/21/15 16:51	jjc
Strontium, dissolved	M200.7 ICP	1	0.130		mg/L	0.005	0.03	09/22/15 20:47	aeb
Strontium, total	M200.7 ICP	1	0.131		mg/L	0.005	0.03	09/21/15 16:51	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/15 9:03	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/25/15 22:28	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 20:47	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 15:16	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/22/15 20:47	aeb
Titanium, total	M200.7 ICP	1	0.024	B	mg/L	0.005	0.03	09/21/15 16:51	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/15 9:03	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/25/15 22:28	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/22/15 20:47	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/21/15 16:51	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 20:47	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/21/15 16:51	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW7-E

ACZ Sample ID: **L26614-06**
 Date Sampled: 09/08/15 08:00
 Date Received: 09/11/15
 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	53.0		*	mg/L	2	20	09/17/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Total Alkalinity		1	53.0		*	mg/L	2	20	09/17/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.0			%			10/05/15 8:56	calc
Sum of Anions			1.6			meq/L			10/05/15 8:56	calc
Sum of Cations			1.7			meq/L			10/05/15 8:56	calc
Chemical Oxygen Demand	M410.4	1	24		*	mg/L	10	20	09/21/15 13:20	id
Chloride	SM4500Cl-E	1	2.9		*	mg/L	0.5	2	09/22/15 16:21	bsu
Conductivity @25C	SM2510B	1	166		*	umhos/cm	1	10	09/17/15 3:12	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 21:01	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 22:52	pjb
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	09/22/15 13:35	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		59			mg/L	0.8	4	10/05/15 8:56	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.22		*	mg/L	0.02	0.1	09/19/15 0:51	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/21/15 16:10	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/23/15 21:15	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/17/15 0:00	tms
pH measured at		1	19.3		*	C	0.1	0.1	09/17/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	10/05/15 8:56	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/24/15 21:01	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/11/15 21:55	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/24/15 0:31	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	156		*	mg/L	10	20	09/14/15 14:44	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	09/15/15 12:27	sck
Residue, Total (TS) @ 105C	SM2540B	1	170		*	mg/L	10	20	09/14/15 16:33	enb
Sulfate	D516-02/-07 - Turbidimetric	1	22.9		*	mg/L	1	5	10/02/15 10:53	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/14/15 13:26	enb
TDS (calculated)	Calculation		92.3			mg/L			10/05/15 8:56	calc
TDS (ratio - measured/calculated)	Calculation		1.69						10/05/15 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>

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26614-01	WG390940	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.
	WG390540	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390789	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).
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390540	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	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).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391056	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390540	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG391060	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).
	WG390326	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390368	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).
	WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391260	Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG390306	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26614-02	WG390940	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.
	WG390540	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390789	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).
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390540	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	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).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391056	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390540	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG391060	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).
	WG390326	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390368	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).
	WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391260	Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG390306	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26614-03	WG390940	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.
	WG390540	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390789	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).
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390540	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	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).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391056	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390540	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG391060	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).
	WG390326	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390368	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).
	WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391260	Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG390306	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26614-04	WG390813	Aluminum, total	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Iron, total	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390940	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390789	Chemical Oxygen Demand	M410.4	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390540	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	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).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391056	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG391060	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).
	WG390326	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390368	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390349	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391260	Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			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).
	WG390306	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L26614**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26614-05	WG390813	Aluminum, total	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Iron, total	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390940	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390789	Chemical Oxygen Demand	M410.4	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390540	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	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).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391056	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG391060	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).
	WG390326	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390368	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L26614**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390349	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391260	Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			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).
	WG390306	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L26614**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26614-06	WG390813	Aluminum, total	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Iron, total	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390940	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390789	Chemical Oxygen Demand	M410.4	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390540	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390953	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390882	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391056	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG391060	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).
	WG390326	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390368	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).
	WG390349	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391611	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L26614**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390306	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L26614-01**
Date Sampled: 09/08/15 11:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG390748

Analyst: wts
Extract Date: 09/14/15 13:18
Analysis Date: 09/18/15 1:10

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	87.8		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L26614-02**
Date Sampled: 09/08/15 10:00
Date Received: 09/11/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390748Analyst: wts
Extract Date: 09/14/15 13:21
Analysis Date: 09/18/15 1:36

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.4		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L26614-03**

Date Sampled: 09/08/15 9:05

Date Received: 09/11/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG390748

Analyst: wts

Extract Date: 09/14/15 13:23

Analysis Date: 09/18/15 2:03

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	90.1		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L26614-03**

Date Sampled: 09/08/15 9:05

Date Received: 09/11/15

Sample Matrix: Surface Water

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

Extract Method:

Workgroup: WG390865

Analyst: id

Extract Date:

Analysis Date: 09/22/15 15:10

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: SW4-EACZ Sample ID: **L26614-04**
Date Sampled: 09/08/15 8:40
Date Received: 09/11/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390748Analyst: wts
Extract Date: 09/14/15 13:26
Analysis Date: 09/18/15 2:55

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	90.4		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L26614-04**
Date Sampled: 09/08/15 8:40
Date Received: 09/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG390865

Analyst: id

Extract Date:

Analysis Date: 09/22/15 15:20

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1	*	mg/L	2	10

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L26614-05**

Date Sampled: 09/08/15 7:30

Date Received: 09/11/15

Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG390748

Analyst: wts

Extract Date: 09/14/15 13:29

Analysis Date: 09/18/15 3:21

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	86.1		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L26614-05**

Date Sampled: 09/08/15 7:30

Date Received: 09/11/15

Sample Matrix: Surface Water

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

Extract Method:

Workgroup: WG390865

Analyst: id

Extract Date:

Analysis Date: 09/22/15 15:30

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1	*	mg/L	2	10

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L26614-06**

Date Sampled: 09/08/15 8:00

Date Received: 09/11/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG390748

Analyst: wts

Extract Date: 09/14/15 13:32

Analysis Date: 09/18/15 3:47

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.03	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85.1		1.03	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L26614-06**

Date Sampled: 09/08/15 8:00

Date Received: 09/11/15

Sample Matrix: Surface Water

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

Extract Method:

Workgroup: WG390865

Analyst: id

Extract Date:

Analysis Date: 09/22/15 15:40

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.04	*	mg/L	2.1	10.4

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: **L26614**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26614-01	WG390748	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390305	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26614-02	WG390748	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390305	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26614-03	WG390748	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390865	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG390305	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L26614-04	WG390748	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390865	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG390305	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L26614-05	WG390748	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390865	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG390305	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L26614-06	WG390748	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390865	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG390305	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L26614**

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: L26614
 Date Received: 09/11/2015 10:15
 Received By: ddp
 Date Printed: 9/11/2015

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? 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	

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?
3251	16.3	16	N/A
4262	18.6	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.

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: L26614
Date Received: 09/11/2015 10:15
Received By: ddp
Date Printed: 9/11/2015

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.

L26614

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: 105 PROSPERAS BL Calle 24-69 20910
Company: Tahoe Resources Inc.	Embarcadero 30m. PASEO TALLE 110 FIRINA 1406
E-mail: mBerganza@santaford.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: Miguel Berganza	Address:
Company: Tahoe Resources Inc.	
E-mail: mBerganza@santaford.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: 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	SW	10	/															
PO#: C-50091																			
Reporting state for compliance testing:																			
Check box if samples include NRC licensed material?																			
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers																
SW 1-E	08/09/15 11:00	SW	10	/															
SW 2-E	08/09/15 10:00	SW	10	/															
SW 2B-E	08/09/15 09:05	SW	10	/															

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

REMARKS

COC 1/3 present results of all samples with COC 2 and 3

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	08-09-2015 17:00	[Signature]	8.9.15 19:00
			9:11:51:05

L26614 Chain of Custody

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

Report to:

Name: Miguel Berganza	Address: Av. los Pájaros 18 Calle 24-67 zona 10
Company: Tahoe Resources INC.	Comercial zona moderna Torre III oficina 1405
E-mail: MBerganza@saturno.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: Miguel Berganza	Address:
Company: Tahoe Resources INC.	
E-mail: MBerganza@saturno.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: 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)

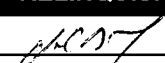
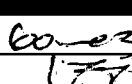
Quote #: Water Quality	# of Containers	MS											
PO#: Corral													
Reporting state for compliance testing:													
Check box if samples include NRC licensed material?													
SAMPLE IDENTIFICATION	DATE:TIME	Matrix											
SW4-E	08/09/15 08:40	SW	10	✓									
SW5-E	08/09/15 07:30	SW	10	✓									
SW7-E	08/09/15 08:00	SW	10	✓									

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

REMARKS

COC 2/3 Present results of all samples with COC 1 and 3

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
	08-09-2015 17:00		08-09-15 17:00
			9-11-15 10:15



Guatemala September 8th, 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).

Sincerely yours,

0234

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



Guatemala September 8th, 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).

Sincerely yours,

n 234

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

September 30, 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

Project ID: Escobal

ACZ Project ID: L26605

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 11, 2015. This project has been assigned to ACZ's project number, L26605. 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 L26605. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

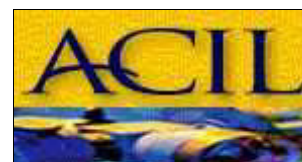
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 30, 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.

September 30, 2015

Project ID: Escobal

ACZ Project ID: L26605

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 miscellaneous samples from Tahoe Resources, Inc. on September 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 L26605. 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 Oil and Grease values flagged with an "N1", the Final weight 1 was acquired and archived although consecutive weight verification was lost due to automatic save and database error. The final weight consistency could not be verified. The results are estimated and potentially biased high.
2. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L26605-01**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/21/15 9:24	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 10:55	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 16:01	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 12:14	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 18:06	spl
Total Hot Plate Digestion	M200.2 ICP								09/17/15 10:48	aeb
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 16:14	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L26605-01**

Date Sampled: 09/09/15 11:30

Date Received: 09/11/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	09/22/15 10:08	aeb
Aluminum, total	M200.7 ICP	1	0.06	B	*	mg/L	0.03	0.2	09/19/15 1:24	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0190			mg/L	0.0004	0.002	09/23/15 7:37	msh
Antimony, total	M200.8 ICP-MS	1	0.0178			mg/L	0.0004	0.002	09/25/15 14:10	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0111			mg/L	0.0002	0.001	09/23/15 7:37	msh
Arsenic, total	M200.8 ICP-MS	1	0.0112			mg/L	0.0002	0.001	09/24/15 19:22	mfm
Barium, dissolved	M200.7 ICP	1	0.044			mg/L	0.003	0.02	09/22/15 10:08	aeb
Barium, total	M200.7 ICP	1	0.042			mg/L	0.003	0.02	09/19/15 1:24	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:08	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:24	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 14:57	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:24	aeb
Boron, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	09/22/15 10:08	aeb
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	09/19/15 1:24	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 7:37	msh
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/24/15 19:22	mfm
Calcium, dissolved	M200.7 ICP	1	348			mg/L	0.1	0.5	09/22/15 10:08	aeb
Calcium, total	M200.7 ICP	1	358			mg/L	0.1	0.5	09/19/15 1:24	aeb
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/22/15 10:08	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:24	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:08	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:24	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:08	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:24	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:08	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:24	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/22/15 10:08	aeb
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	09/19/15 1:24	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/23/15 7:37	msh
Lead, total	M200.8 ICP-MS	1	0.0017			mg/L	0.0001	0.0005	09/24/15 19:22	mfm
Lithium, dissolved	M200.7 ICP	1	0.097			mg/L	0.008	0.04	09/22/15 10:08	aeb
Lithium, total	M200.7 ICP	1	0.094			mg/L	0.008	0.04	09/19/15 1:24	aeb
Magnesium, dissolved	M200.7 ICP	1	21.6			mg/L	0.2	1	09/22/15 10:08	aeb
Magnesium, total	M200.7 ICP	1	21.8			mg/L	0.2	1	09/19/15 1:24	aeb
Manganese, dissolved	M200.7 ICP	1	0.088			mg/L	0.005	0.03	09/22/15 10:08	aeb
Manganese, total	M200.7 ICP	1	0.096			mg/L	0.005	0.03	09/19/15 1:24	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 14:59	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:21	pta
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/22/15 10:08	aeb
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/19/15 1:24	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:08	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:24	aeb
Potassium, dissolved	M200.7 ICP	1	10.4			mg/L	0.2	1	09/22/15 10:08	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L26605-01**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	10.6			mg/L	0.2	1	09/19/15 1:24	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:08	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:24	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0011			mg/L	0.0001	0.0003	09/23/15 7:37	msh
Selenium, total	M200.8 ICP-MS	1	0.0011			mg/L	0.0001	0.0003	09/24/15 19:22	mfm
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/23/15 7:37	msh
Silver, total	M200.8 ICP-MS	1	0.00006	B		mg/L	0.00005	0.0003	09/25/15 14:10	mfm
Sodium, dissolved	M200.7 ICP	1	68.9			mg/L	0.2	1	09/22/15 10:08	aeb
Sodium, total	M200.7 ICP	1	70.8			mg/L	0.2	1	09/19/15 1:24	aeb
Strontium, dissolved	M200.7 ICP	1	3.850		*	mg/L	0.005	0.03	09/22/15 10:08	aeb
Strontium, total	M200.7 ICP	1	3.910			mg/L	0.005	0.03	09/19/15 1:24	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/23/15 7:37	msh
Thallium, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	09/24/15 19:22	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/22/15 10:08	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	09/19/15 1:24	aeb
Titanium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.005	0.03	09/22/15 10:08	aeb
Titanium, total	M200.7 ICP	1	0.014	B		mg/L	0.005	0.03	09/19/15 1:24	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	09/23/15 7:37	msh
Uranium, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	09/24/15 19:22	mfm
Vanadium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/22/15 10:08	aeb
Vanadium, total	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	09/19/15 1:24	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:08	aeb
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:24	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2A-E

ACZ Sample ID: **L26605-01**
 Date Sampled: 09/09/15 11:30
 Date Received: 09/11/15
 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	71.0		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	71.0		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/30/15 13:44	calc
Sum of Anions			23			meq/L			09/30/15 13:44	calc
Sum of Cations			23			meq/L			09/30/15 13:44	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/15/15 11:55	enb
Chloride	SM4500Cl-E	1	68.4		*	mg/L	0.5	2	09/22/15 16:08	bsu
Conductivity @25C	SM2510B	1	1790		*	umhos/cm	1	10	09/18/15 21:11	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 18:05	mss2
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:37	mss2
Fluoride	SM4500F-C	1	1.10		*	mg/L	0.05	0.3	09/21/15 15:59	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		958			mg/L	0.8	4	09/30/15 13:44	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.35		*	mg/L	0.06	0.3	09/19/15 1:28	pjb
Nitrogen, ammonia	M350.1	1	0.12	B	*	mg/L	0.05	0.2	09/21/15 15:20	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	09/23/15 19:58	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/16/15 0:00	tms
pH measured at		1	19.6		*	C	0.1	0.1	09/16/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	09/30/15 13:44	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/24/15 20:30	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	09/11/15 21:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/18/15 21:21	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1580		*	mg/L	10	20	09/12/15 10:41	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	9.0	B	*	mg/L	5	20	09/16/15 14:45	sck
Residue, Total (TS) @ 105C	SM2540B	1	1670		*	mg/L	10	20	09/14/15 12:41	id
Sulfate	D516-02/-07 - Turbidimetric	50	932		*	mg/L	50	250	09/28/15 13:51	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 11:22	tms
TDS (calculated)	Calculation		1500			mg/L			09/30/15 13:44	calc
TDS (ratio - measured/calculated)	Calculation		1.05						09/30/15 13:44	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L26605-02**
Date Sampled: 09/09/15 12:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/21/15 9:48	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 11:09	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 16:23	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 12:28	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 18:12	spl
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 16:24	scp
Total Hot Plate Digestion	M200.2 ICP								09/17/15 10:59	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L26605-02**

Date Sampled: 09/09/15 12:30

Date Received: 09/11/15

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	09/22/15 10:11	aeb
Aluminum, total	M200.7 ICP	1	0.12	B	*	mg/L	0.03	0.2	09/19/15 1:27	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/23/15 7:41	msh
Antimony, total	M200.8 ICP-MS	1		U	*	mg/L	0.0004	0.002	09/24/15 19:25	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0086			mg/L	0.0002	0.001	09/23/15 7:41	msh
Arsenic, total	M200.8 ICP-MS	1	0.0093			mg/L	0.0002	0.001	09/24/15 19:25	mfm
Barium, dissolved	M200.7 ICP	1	0.143			mg/L	0.003	0.02	09/22/15 10:11	aeb
Barium, total	M200.7 ICP	1	0.144			mg/L	0.003	0.02	09/19/15 1:27	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:11	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:27	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:00	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:27	aeb
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/22/15 10:11	aeb
Boron, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/19/15 1:27	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 7:41	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:25	mfm
Calcium, dissolved	M200.7 ICP	1	39.9			mg/L	0.1	0.5	09/22/15 10:11	aeb
Calcium, total	M200.7 ICP	1	41.4			mg/L	0.1	0.5	09/19/15 1:27	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:11	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:27	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:11	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:27	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:11	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:27	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:11	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:27	aeb
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	09/22/15 10:11	aeb
Iron, total	M200.7 ICP	1	0.23			mg/L	0.02	0.05	09/19/15 1:27	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 7:41	msh
Lead, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/24/15 19:25	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:11	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:27	aeb
Magnesium, dissolved	M200.7 ICP	1	3.6			mg/L	0.2	1	09/22/15 10:11	aeb
Magnesium, total	M200.7 ICP	1	3.6			mg/L	0.2	1	09/19/15 1:27	aeb
Manganese, dissolved	M200.7 ICP	1	0.319			mg/L	0.005	0.03	09/22/15 10:11	aeb
Manganese, total	M200.7 ICP	1	0.334			mg/L	0.005	0.03	09/19/15 1:27	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 15:01	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:23	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 10:11	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/19/15 1:27	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:11	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:27	aeb
Potassium, dissolved	M200.7 ICP	1	5.2			mg/L	0.2	1	09/22/15 10:11	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L26605-02**
Date Sampled: 09/09/15 12:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.2		mg/L	0.2	1	09/19/15 1:27	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 10:11	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/19/15 1:27	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/23/15 7:41	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/24/15 19:25	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/15 7:41	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 14:13	mfm
Sodium, dissolved	M200.7 ICP	1	14.2		mg/L	0.2	1	09/22/15 10:11	aeb
Sodium, total	M200.7 ICP	1	14.4		mg/L	0.2	1	09/19/15 1:27	aeb
Strontium, dissolved	M200.7 ICP	1	0.245		mg/L	0.005	0.03	09/22/15 10:11	aeb
Strontium, total	M200.7 ICP	1	0.246		mg/L	0.005	0.03	09/19/15 1:27	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/15 7:41	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/24/15 19:25	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 10:11	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/19/15 1:27	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	09/22/15 10:11	aeb
Titanium, total	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	09/19/15 1:27	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/23/15 7:41	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/24/15 19:25	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/22/15 10:11	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/19/15 1:27	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 10:11	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/19/15 1:27	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L26605-02**
Date Sampled: 09/09/15 12:30
Date Received: 09/11/15
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	142		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	143		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.3			%			09/30/15 13:45	calc
Sum of Anions			2.9			meq/L			09/30/15 13:45	calc
Sum of Cations			3.1			meq/L			09/30/15 13:45	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/15/15 12:01	enb
Chloride	SM4500Cl-E	1	2.9		*	mg/L	0.5	2	09/22/15 16:08	bsu
Conductivity @25C	SM2510B	1	290		*	umhos/cm	1	10	09/18/15 21:12	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 18:07	mss2
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:38	mss2
Fluoride	SM4500F-C	1	0.18	B	*	mg/L	0.05	0.3	09/21/15 16:19	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		114			mg/L	0.8	4	09/30/15 13:45	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.14		*	mg/L	0.02	0.1	09/19/15 0:02	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/21/15 15:24	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/23/15 21:49	pjb
pH (lab)	SM4500H+ B									
pH		1	8.3	H	*	units	0.1	0.1	09/16/15 0:00	tms
pH measured at		1	20.2		*	C	0.1	0.1	09/16/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	09/30/15 13:45	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/24/15 20:33	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	09/11/15 21:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	09/18/15 21:23	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	244		*	mg/L	10	20	09/12/15 10:43	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	09/16/15 14:48	sck
Residue, Total (TS) @ 105C	SM2540B	1	248		*	mg/L	10	20	09/14/15 12:43	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/28/15 11:56	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 11:45	tms
TDS (calculated)	Calculation		153			mg/L			09/30/15 13:45	calc
TDS (ratio - measured/calculated)	Calculation		1.59						09/30/15 13:45	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L26605-03**
Date Sampled: 09/09/15 11:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/21/15 10:12	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 11:24	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 16:44	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 12:43	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 18:19	spl
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 16:33	scp
Total Hot Plate Digestion	M200.2 ICP								09/17/15 11:11	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L26605-03**

Date Sampled: 09/09/15 11:00

Date Received: 09/11/15

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	09/22/15 10:14	aeb
Aluminum, total	M200.7 ICP	1	0.09	B	*	mg/L	0.03	0.2	09/19/15 1:30	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0139			mg/L	0.0004	0.002	09/23/15 7:44	msh
Antimony, total	M200.8 ICP-MS	1	0.0138			mg/L	0.0004	0.002	09/25/15 14:16	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0083			mg/L	0.0002	0.001	09/23/15 7:44	msh
Arsenic, total	M200.8 ICP-MS	1	0.0087			mg/L	0.0002	0.001	09/24/15 19:28	mfm
Barium, dissolved	M200.7 ICP	1	0.088			mg/L	0.003	0.02	09/22/15 10:14	aeb
Barium, total	M200.7 ICP	1	0.082			mg/L	0.003	0.02	09/19/15 1:30	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:14	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:30	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:03	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:30	aeb
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	09/22/15 10:14	aeb
Boron, total	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/19/15 1:30	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 7:44	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:28	mfm
Calcium, dissolved	M200.7 ICP	1	292			mg/L	0.1	0.5	09/22/15 10:14	aeb
Calcium, total	M200.7 ICP	1	303			mg/L	0.1	0.5	09/19/15 1:30	aeb
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/22/15 10:14	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:30	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:14	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:30	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:14	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:30	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:14	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:30	aeb
Iron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	09/22/15 10:14	aeb
Iron, total	M200.7 ICP	1	0.08			mg/L	0.02	0.05	09/19/15 1:30	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/15 7:44	msh
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	09/24/15 19:28	mfm
Lithium, dissolved	M200.7 ICP	1	0.069			mg/L	0.008	0.04	09/22/15 10:14	aeb
Lithium, total	M200.7 ICP	1	0.069			mg/L	0.008	0.04	09/19/15 1:30	aeb
Magnesium, dissolved	M200.7 ICP	1	19.1			mg/L	0.2	1	09/22/15 10:14	aeb
Magnesium, total	M200.7 ICP	1	19.7			mg/L	0.2	1	09/19/15 1:30	aeb
Manganese, dissolved	M200.7 ICP	1	0.233			mg/L	0.005	0.03	09/22/15 10:14	aeb
Manganese, total	M200.7 ICP	1	0.221			mg/L	0.005	0.03	09/19/15 1:30	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 15:03	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:25	pta
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/22/15 10:14	aeb
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	09/19/15 1:30	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:14	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:30	aeb
Potassium, dissolved	M200.7 ICP	1	11.5			mg/L	0.2	1	09/22/15 10:14	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L26605-03**
Date Sampled: 09/09/15 11:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.4		mg/L	0.2	1	09/19/15 1:30	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 10:14	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/19/15 1:30	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0009		mg/L	0.0001	0.0003	09/23/15 7:44	msh
Selenium, total	M200.8 ICP-MS	1	0.0009		mg/L	0.0001	0.0003	09/24/15 19:28	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/15 7:44	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 14:16	mfm
Sodium, dissolved	M200.7 ICP	1	61.3		mg/L	0.2	1	09/22/15 10:14	aeb
Sodium, total	M200.7 ICP	1	62.9		mg/L	0.2	1	09/19/15 1:30	aeb
Strontium, dissolved	M200.7 ICP	1	2.960	*	mg/L	0.005	0.03	09/22/15 10:14	aeb
Strontium, total	M200.7 ICP	1	3.060		mg/L	0.005	0.03	09/19/15 1:30	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/23/15 7:44	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/24/15 19:28	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 10:14	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/19/15 1:30	aeb
Titanium, dissolved	M200.7 ICP	1	0.015	B	mg/L	0.005	0.03	09/22/15 10:14	aeb
Titanium, total	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	09/19/15 1:30	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	09/23/15 7:44	msh
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	09/24/15 19:28	mfm
Vanadium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	09/22/15 10:14	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/19/15 1:30	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 10:14	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/19/15 1:30	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L26605-03**
Date Sampled: 09/09/15 11:00
Date Received: 09/11/15
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	75.4		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	75.4		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.6			%			09/30/15 13:45	calc
Sum of Anions			20			meq/L			09/30/15 13:45	calc
Sum of Cations			19			meq/L			09/30/15 13:45	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/15/15 12:08	enb
Chloride	SM4500Cl-E	1	60.1		*	mg/L	0.5	2	09/22/15 16:08	bsu
Conductivity @25C	SM2510B	1	1580		*	umhos/cm	1	10	09/18/15 21:14	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 18:08	mss2
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:41	mss2
Fluoride	SM4500F-C	1	0.87		*	mg/L	0.05	0.3	09/21/15 16:22	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		808			mg/L	0.8	4	09/30/15 13:45	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.61		*	mg/L	0.06	0.3	09/19/15 1:29	pjb
Nitrogen, ammonia	M350.1	1	0.08	B	*	mg/L	0.05	0.2	09/21/15 15:25	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	09/23/15 21:51	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/16/15 0:00	tms
pH measured at		1	19.3		*	C	0.1	0.1	09/16/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	09/30/15 13:45	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/24/15 20:35	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	09/11/15 21:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/18/15 21:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1370		*	mg/L	10	20	09/12/15 10:44	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/16/15 14:50	sck
Residue, Total (TS) @ 105C	SM2540B	1	1390		*	mg/L	10	20	09/14/15 12:44	id
Sulfate	D516-02/-07 - Turbidimetric	20	793		*	mg/L	20	100	09/28/15 12:11	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 11:52	tms
TDS (calculated)	Calculation		1290			mg/L			09/30/15 13:45	calc
TDS (ratio - measured/calculated)	Calculation		1.06						09/30/15 13:45	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L26605-04**
Date Sampled: 09/09/15 08:10
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/21/15 10:24	mss2
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 11:38	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 16:55	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 12:50	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 18:25	spl
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 16:43	scp
Total Hot Plate Digestion	M200.2 ICP								09/17/15 11:23	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L26605-04**
Date Sampled: 09/09/15 08:10
Date Received: 09/11/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.14	B		mg/L	0.03	0.2	09/22/15 10:18	aeb
Aluminum, total	M200.7 ICP	1	1.24		*	mg/L	0.03	0.2	09/19/15 1:33	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/23/15 7:47	msh
Antimony, total	M200.8 ICP-MS	1		U	*	mg/L	0.0004	0.002	09/24/15 19:31	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0021			mg/L	0.0002	0.001	09/23/15 7:47	msh
Arsenic, total	M200.8 ICP-MS	1	0.0028			mg/L	0.0002	0.001	09/24/15 19:31	mfm
Barium, dissolved	M200.7 ICP	1	0.047			mg/L	0.003	0.02	09/22/15 10:18	aeb
Barium, total	M200.7 ICP	1	0.053			mg/L	0.003	0.02	09/19/15 1:33	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:18	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:33	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:06	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:33	aeb
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	09/22/15 10:18	aeb
Boron, total	M200.7 ICP	1	0.07			mg/L	0.01	0.05	09/19/15 1:33	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 7:47	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:31	mfm
Calcium, dissolved	M200.7 ICP	1	10.2			mg/L	0.1	0.5	09/22/15 10:18	aeb
Calcium, total	M200.7 ICP	1	10.4			mg/L	0.1	0.5	09/19/15 1:33	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:18	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:33	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:18	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:33	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:18	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:33	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:18	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:33	aeb
Iron, dissolved	M200.7 ICP	1	0.14			mg/L	0.02	0.05	09/22/15 10:18	aeb
Iron, total	M200.7 ICP	1	0.72			mg/L	0.02	0.05	09/19/15 1:33	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/15 7:47	msh
Lead, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	09/24/15 19:31	mfm
Lithium, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.008	0.04	09/22/15 10:18	aeb
Lithium, total	M200.7 ICP	1	0.019	B		mg/L	0.008	0.04	09/19/15 1:33	aeb
Magnesium, dissolved	M200.7 ICP	1	2.1			mg/L	0.2	1	09/22/15 10:18	aeb
Magnesium, total	M200.7 ICP	1	1.9			mg/L	0.2	1	09/19/15 1:33	aeb
Manganese, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	09/22/15 10:18	aeb
Manganese, total	M200.7 ICP	1	0.033			mg/L	0.005	0.03	09/19/15 1:33	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 15:05	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:27	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 10:18	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/19/15 1:33	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:18	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:33	aeb
Potassium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	09/22/15 10:18	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L26605-04**
Date Sampled: 09/09/15 08:10
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.1		mg/L	0.2	1	09/19/15 1:33	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 10:18	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/19/15 1:33	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/23/15 7:47	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	09/24/15 19:31	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/15 7:47	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 14:19	mfm
Sodium, dissolved	M200.7 ICP	1	9.7		mg/L	0.2	1	09/22/15 10:18	aeb
Sodium, total	M200.7 ICP	1	9.7		mg/L	0.2	1	09/19/15 1:33	aeb
Strontium, dissolved	M200.7 ICP	1	0.078		mg/L	0.005	0.03	09/22/15 10:18	aeb
Strontium, total	M200.7 ICP	1	0.075		mg/L	0.005	0.03	09/19/15 1:33	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/15 7:47	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/24/15 19:31	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 10:18	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/19/15 1:33	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	09/22/15 10:18	aeb
Titanium, total	M200.7 ICP	1	0.031		mg/L	0.005	0.03	09/19/15 1:33	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/15 7:47	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/24/15 19:31	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/22/15 10:18	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/19/15 1:33	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B	mg/L	0.01	0.05	09/22/15 10:18	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/19/15 1:33	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L26605-04**
Date Sampled: 09/09/15 08:10
Date Received: 09/11/15
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	35.3		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	35.3		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			12.0			%			09/30/15 13:46	calc
Sum of Anions			0.943			meq/L			09/30/15 13:46	calc
Sum of Cations			1.2			meq/L			09/30/15 13:46	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/15/15 12:15	enb
Chloride	SM4500Cl-E	1	8.3		*	mg/L	0.5	2	09/22/15 16:08	bsu
Conductivity @25C	SM2510B	1	129		*	umhos/cm	1	10	09/18/15 21:15	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 18:09	mss2
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:41	mss2
Fluoride	SM4500F-C	1	0.08	B	*	mg/L	0.05	0.3	09/21/15 16:38	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		34			mg/L	0.8	4	09/30/15 13:46	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/19/15 0:04	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/21/15 15:27	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/23/15 21:52	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/16/15 0:00	tms
pH measured at		1	19.1		*	C	0.1	0.1	09/16/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/30/15 13:46	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/24/15 20:36	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/11/15 21:17	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/18/15 21:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	118		*	mg/L	10	20	09/12/15 10:46	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/16/15 14:53	sck
Residue, Total (TS) @ 105C	SM2540B	1	116		*	mg/L	10	20	09/14/15 12:46	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/28/15 11:57	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 12:00	tms
TDS (calculated)	Calculation		55.4			mg/L			09/30/15 13:46	calc
TDS (ratio - measured/calculated)	Calculation		2.13						09/30/15 13:46	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L26605-05**
Date Sampled: 09/09/15 09:45
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 11:40	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 11:52	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 17:06	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 12:57	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 18:32	spl
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 16:52	scp
Total Hot Plate Digestion	M200.2 ICP								09/17/15 11:57	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L26605-05**
Date Sampled: 09/09/15 09:45
Date Received: 09/11/15
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	09/22/15 10:21	aeb
Aluminum, total	M200.7 ICP	1	0.11	B	*	mg/L	0.03	0.2	09/19/15 1:43	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0037			mg/L	0.0004	0.002	09/23/15 7:50	msh
Antimony, total	M200.8 ICP-MS	1	0.0039			mg/L	0.0004	0.002	09/25/15 14:22	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0059			mg/L	0.0002	0.001	09/23/15 7:50	msh
Arsenic, total	M200.8 ICP-MS	1	0.0064			mg/L	0.0002	0.001	09/24/15 19:34	mfm
Barium, dissolved	M200.7 ICP	1	0.107			mg/L	0.003	0.02	09/22/15 10:21	aeb
Barium, total	M200.7 ICP	1	0.112			mg/L	0.003	0.02	09/19/15 1:43	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:21	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:43	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:09	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:43	aeb
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/22/15 10:21	aeb
Boron, total	M200.7 ICP	1	0.05			mg/L	0.01	0.05	09/19/15 1:43	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 7:50	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:34	mfm
Calcium, dissolved	M200.7 ICP	1	94.2			mg/L	0.1	0.5	09/22/15 10:21	aeb
Calcium, total	M200.7 ICP	1	102			mg/L	0.1	0.5	09/19/15 1:43	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:21	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:43	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:21	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:43	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:21	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:43	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:21	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:43	aeb
Iron, dissolved	M200.7 ICP	1	0.13			mg/L	0.02	0.05	09/22/15 10:21	aeb
Iron, total	M200.7 ICP	1	0.41			mg/L	0.02	0.05	09/19/15 1:43	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/15 7:50	msh
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	09/24/15 19:34	mfm
Lithium, dissolved	M200.7 ICP	1	0.027	B		mg/L	0.008	0.04	09/22/15 10:21	aeb
Lithium, total	M200.7 ICP	1	0.028	B		mg/L	0.008	0.04	09/19/15 1:43	aeb
Magnesium, dissolved	M200.7 ICP	1	8.5			mg/L	0.2	1	09/22/15 10:21	aeb
Magnesium, total	M200.7 ICP	1	8.9			mg/L	0.2	1	09/19/15 1:43	aeb
Manganese, dissolved	M200.7 ICP	1	0.290			mg/L	0.005	0.03	09/22/15 10:21	aeb
Manganese, total	M200.7 ICP	1	0.299			mg/L	0.005	0.03	09/19/15 1:43	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 15:07	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:29	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 10:21	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/19/15 1:43	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:21	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:43	aeb
Potassium, dissolved	M200.7 ICP	1	9.7			mg/L	0.2	1	09/22/15 10:21	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L26605-05**
Date Sampled: 09/09/15 09:45
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	10		mg/L	0.2	1	09/19/15 1:43	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 10:21	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/19/15 1:43	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	09/23/15 7:50	msh
Selenium, total	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	09/24/15 19:34	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/15 7:50	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 14:22	mfm
Sodium, dissolved	M200.7 ICP	1	35.8		mg/L	0.2	1	09/22/15 10:21	aeb
Sodium, total	M200.7 ICP	1	37.4		mg/L	0.2	1	09/19/15 1:43	aeb
Strontium, dissolved	M200.7 ICP	1	1.070	*	mg/L	0.005	0.03	09/22/15 10:21	aeb
Strontium, total	M200.7 ICP	1	1.130		mg/L	0.005	0.03	09/19/15 1:43	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/15 7:50	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/24/15 19:34	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 10:21	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/19/15 1:43	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	09/22/15 10:21	aeb
Titanium, total	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	09/19/15 1:43	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/23/15 7:50	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	09/24/15 19:34	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/22/15 10:21	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/19/15 1:43	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 10:21	aeb
Zinc, total	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	09/19/15 1:43	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW8-E

ACZ Sample ID: **L26605-05**
 Date Sampled: 09/09/15 09:45
 Date Received: 09/11/15
 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	105		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	105		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.7			%			09/30/15 13:46	calc
Sum of Anions			7.6			meq/L			09/30/15 13:46	calc
Sum of Cations			7.5			meq/L			09/30/15 13:46	calc
Chemical Oxygen Demand	M410.4	1	26		*	mg/L	10	20	09/15/15 12:48	enb
Chloride	SM4500Cl-E	1	25.5		*	mg/L	0.5	2	09/22/15 16:08	bsu
Conductivity @25C	SM2510B	1	725		*	umhos/cm	1	10	09/18/15 21:17	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:45	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:42	mss2
Fluoride	SM4500F-C	1	0.35		*	mg/L	0.05	0.3	09/21/15 17:25	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		270			mg/L	0.8	4	09/30/15 13:46	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.94		*	mg/L	0.02	0.1	09/19/15 0:10	pjb
Nitrogen, ammonia	M350.1	1	2.62		*	mg/L	0.05	0.2	09/21/15 15:28	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	3.4		*	mg/L	0.1	0.5	09/23/15 21:53	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	09/16/15 0:00	tms
pH measured at		1	19.1		*	C	0.1	0.1	09/16/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		1.36			mg/L	0.03	0.2	09/30/15 13:46	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.44		*	mg/L	0.01	0.05	09/24/15 20:37	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.13	H	*	mg/L	0.01	0.05	09/11/15 21:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.55		*	mg/L	0.01	0.05	09/18/15 21:26	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	348		*	mg/L	10	20	09/12/15 10:48	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	7.0	B	*	mg/L	5	20	09/16/15 14:56	sck
Residue, Total (TS) @ 105C	SM2540B	1	358		*	mg/L	10	20	09/14/15 12:48	id
Sulfate	D516-02/-07 - Turbidimetric	20	228		*	mg/L	20	100	09/28/15 13:51	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 11:33	tms
TDS (calculated)	Calculation		470			mg/L			09/30/15 13:46	calc
TDS (ratio - measured/calculated)	Calculation		0.74						09/30/15 13:46	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L26605-06**
Date Sampled: 09/09/15 09:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 12:00	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 12:07	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 17:16	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 13:04	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 18:45	spl
Total Hot Plate Digestion	M200.2 ICP								09/17/15 12:09	aeb
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 17:21	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L26605-06**
Date Sampled: 09/09/15 09:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.07	B		mg/L	0.03	0.2	09/22/15 10:30	aeb
Aluminum, total	M200.7 ICP	1	0.49		*	mg/L	0.03	0.2	09/19/15 1:46	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0013	B		mg/L	0.0004	0.002	09/23/15 8:00	msh
Antimony, total	M200.8 ICP-MS	1	0.0012	B		mg/L	0.0004	0.002	09/25/15 14:31	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0041			mg/L	0.0002	0.001	09/23/15 8:00	msh
Arsenic, total	M200.8 ICP-MS	1	0.0046			mg/L	0.0002	0.001	09/24/15 19:48	mfm
Barium, dissolved	M200.7 ICP	1	0.085			mg/L	0.003	0.02	09/22/15 10:30	aeb
Barium, total	M200.7 ICP	1	0.090			mg/L	0.003	0.02	09/19/15 1:46	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:30	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:46	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:12	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:46	aeb
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	09/22/15 10:30	aeb
Boron, total	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/19/15 1:46	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:00	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:48	mfm
Calcium, dissolved	M200.7 ICP	1	51.8			mg/L	0.1	0.5	09/22/15 10:30	aeb
Calcium, total	M200.7 ICP	1	53.9			mg/L	0.1	0.5	09/19/15 1:46	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:30	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:46	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:30	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:46	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:30	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:46	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:30	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:46	aeb
Iron, dissolved	M200.7 ICP	1	0.07			mg/L	0.02	0.05	09/22/15 10:30	aeb
Iron, total	M200.7 ICP	1	0.49			mg/L	0.02	0.05	09/19/15 1:46	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/23/15 8:00	msh
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	09/24/15 19:48	mfm
Lithium, dissolved	M200.7 ICP	1	0.035	B		mg/L	0.008	0.04	09/22/15 10:30	aeb
Lithium, total	M200.7 ICP	1	0.035	B		mg/L	0.008	0.04	09/19/15 1:46	aeb
Magnesium, dissolved	M200.7 ICP	1	6.5			mg/L	0.2	1	09/22/15 10:30	aeb
Magnesium, total	M200.7 ICP	1	6.6			mg/L	0.2	1	09/19/15 1:46	aeb
Manganese, dissolved	M200.7 ICP	1	0.071			mg/L	0.005	0.03	09/22/15 10:30	aeb
Manganese, total	M200.7 ICP	1	0.111			mg/L	0.005	0.03	09/19/15 1:46	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 15:13	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:31	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 10:30	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/19/15 1:46	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:30	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:46	aeb
Potassium, dissolved	M200.7 ICP	1	5.4			mg/L	0.2	1	09/22/15 10:30	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L26605-06**
Date Sampled: 09/09/15 09:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.4		mg/L	0.2	1	09/19/15 1:46	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 10:30	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/19/15 1:46	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	09/23/15 8:00	msh
Selenium, total	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	09/24/15 19:48	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/15 8:00	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 14:31	mfm
Sodium, dissolved	M200.7 ICP	1	23.2		mg/L	0.2	1	09/22/15 10:30	aeb
Sodium, total	M200.7 ICP	1	23.7		mg/L	0.2	1	09/19/15 1:46	aeb
Strontium, dissolved	M200.7 ICP	1	0.498	*	mg/L	0.005	0.03	09/22/15 10:30	aeb
Strontium, total	M200.7 ICP	1	0.513		mg/L	0.005	0.03	09/19/15 1:46	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/23/15 8:00	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	09/24/15 19:48	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 10:30	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/19/15 1:46	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	09/22/15 10:30	aeb
Titanium, total	M200.7 ICP	1	0.022	B	mg/L	0.005	0.03	09/19/15 1:46	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/23/15 8:00	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	09/24/15 19:48	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	09/22/15 10:30	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/19/15 1:46	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 10:30	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/19/15 1:46	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW9-E

ACZ Sample ID: **L26605-06**
 Date Sampled: 09/09/15 09:00
 Date Received: 09/11/15
 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	65.4		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	65.4		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.3			%			09/30/15 13:47	calc
Sum of Anions			4.5			meq/L			09/30/15 13:47	calc
Sum of Cations			4.3			meq/L			09/30/15 13:47	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/15/15 12:55	enb
Chloride	SM4500Cl-E	1	21.4		*	mg/L	0.5	2	09/23/15 10:48	spl
Conductivity @25C	SM2510B	1	435		*	umhos/cm	1	10	09/18/15 21:18	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:47	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:43	mss2
Fluoride	SM4500F-C	1	0.24	B	*	mg/L	0.05	0.3	09/21/15 17:40	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		156			mg/L	0.8	4	09/30/15 13:47	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.25		*	mg/L	0.02	0.1	09/19/15 0:11	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/21/15 15:31	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	09/23/15 21:54	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	09/16/15 0:00	tms
pH measured at		1	19.7		*	C	0.1	0.1	09/16/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.34			mg/L	0.03	0.2	09/30/15 13:47	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.11		*	mg/L	0.01	0.05	09/24/15 20:38	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.47	H	*	mg/L	0.01	0.05	09/11/15 21:20	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.14		*	mg/L	0.01	0.05	09/18/15 21:28	pjb
Residue, Filterable (TDS) @180C	SM2540C	2	568		*	mg/L	20	40	09/12/15 10:49	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	13.0	B	*	mg/L	5	20	09/16/15 14:58	sck
Residue, Total (TS) @105C	SM2540B	1	578		*	mg/L	10	20	09/14/15 12:49	id
Sulfate	D516-02/-07 - Turbidimetric	5	124		*	mg/L	5	25	09/28/15 14:12	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 11:57	tms
TDS (calculated)	Calculation		273			mg/L			09/30/15 13:47	calc
TDS (ratio - measured/calculated)	Calculation		2.08						09/30/15 13:47	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW-11E

ACZ Sample ID: **L26605-07**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 12:20	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 12:21	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 17:27	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 13:12	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 18:58	spl
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 17:31	scp
Total Hot Plate Digestion	M200.2 ICP								09/17/15 12:21	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW-11E

ACZ Sample ID: **L26605-07**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	09/22/15 10:33	aeb
Aluminum, total	M200.7 ICP	1	0.07	B	*	mg/L	0.03	0.2	09/19/15 1:56	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0189			mg/L	0.0004	0.002	09/23/15 8:10	msh
Antimony, total	M200.8 ICP-MS	1	0.0175			mg/L	0.0004	0.002	09/25/15 14:34	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0114			mg/L	0.0002	0.001	09/23/15 8:10	msh
Arsenic, total	M200.8 ICP-MS	1	0.0117			mg/L	0.0002	0.001	09/24/15 19:51	mfm
Barium, dissolved	M200.7 ICP	1	0.044			mg/L	0.003	0.02	09/22/15 10:33	aeb
Barium, total	M200.7 ICP	1	0.043			mg/L	0.003	0.02	09/19/15 1:56	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:33	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:56	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:16	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:56	aeb
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/22/15 10:33	aeb
Boron, total	M200.7 ICP	1	0.13			mg/L	0.01	0.05	09/19/15 1:56	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:10	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:51	mfm
Calcium, dissolved	M200.7 ICP	1	347			mg/L	0.1	0.5	09/22/15 10:33	aeb
Calcium, total	M200.7 ICP	1	365			mg/L	0.1	0.5	09/19/15 1:56	aeb
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/22/15 10:33	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:56	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:33	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:56	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:33	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:56	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:33	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:56	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/22/15 10:33	aeb
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	09/19/15 1:56	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	09/23/15 8:10	msh
Lead, total	M200.8 ICP-MS	1	0.0017			mg/L	0.0001	0.0005	09/24/15 19:51	mfm
Lithium, dissolved	M200.7 ICP	1	0.096			mg/L	0.008	0.04	09/22/15 10:33	aeb
Lithium, total	M200.7 ICP	1	0.096			mg/L	0.008	0.04	09/19/15 1:56	aeb
Magnesium, dissolved	M200.7 ICP	1	21.5			mg/L	0.2	1	09/22/15 10:33	aeb
Magnesium, total	M200.7 ICP	1	22.2			mg/L	0.2	1	09/19/15 1:56	aeb
Manganese, dissolved	M200.7 ICP	1	0.088			mg/L	0.005	0.03	09/22/15 10:33	aeb
Manganese, total	M200.7 ICP	1	0.100			mg/L	0.005	0.03	09/19/15 1:56	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 15:15	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:41	pta
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/22/15 10:33	aeb
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	09/19/15 1:56	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:33	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:56	aeb
Potassium, dissolved	M200.7 ICP	1	10.4			mg/L	0.2	1	09/22/15 10:33	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW-11E

ACZ Sample ID: **L26605-07**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	10.9		mg/L	0.2	1	09/19/15 1:56	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/22/15 10:33	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	09/19/15 1:56	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0011		mg/L	0.0001	0.0003	09/23/15 8:10	msh
Selenium, total	M200.8 ICP-MS	1	0.0011		mg/L	0.0001	0.0003	09/24/15 19:51	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/23/15 8:10	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	09/25/15 14:34	mfm
Sodium, dissolved	M200.7 ICP	1	69		mg/L	0.2	1	09/22/15 10:33	aeb
Sodium, total	M200.7 ICP	1	72.3		mg/L	0.2	1	09/19/15 1:56	aeb
Strontium, dissolved	M200.7 ICP	1	3.850	*	mg/L	0.005	0.03	09/22/15 10:33	aeb
Strontium, total	M200.7 ICP	1	3.980		mg/L	0.005	0.03	09/19/15 1:56	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/23/15 8:10	msh
Thallium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	09/24/15 19:51	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	09/22/15 10:33	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	09/19/15 1:56	aeb
Titanium, dissolved	M200.7 ICP	1	0.016	B	mg/L	0.005	0.03	09/22/15 10:33	aeb
Titanium, total	M200.7 ICP	1	0.015	B	mg/L	0.005	0.03	09/19/15 1:56	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	09/23/15 8:10	msh
Uranium, total	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	09/24/15 19:51	mfm
Vanadium, dissolved	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	09/22/15 10:33	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	09/19/15 1:56	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	09/22/15 10:33	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	09/19/15 1:56	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW-11E

ACZ Sample ID: **L26605-07**
 Date Sampled: 09/09/15 11:30
 Date Received: 09/11/15
 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	71.0		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	71.0		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.2			%			09/30/15 13:47	calc
Sum of Anions			22			meq/L			09/30/15 13:47	calc
Sum of Cations			23			meq/L			09/30/15 13:47	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/15/15 13:15	enb
Chloride	SM4500Cl-E	1	68.6		*	mg/L	0.5	2	09/22/15 16:46	bsu
Conductivity @25C	SM2510B	1	1780		*	umhos/cm	1	10	09/18/15 21:20	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:49	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:44	mss2
Fluoride	SM4500F-C	1	1.12		*	mg/L	0.05	0.3	09/21/15 17:43	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		955			mg/L	0.8	4	09/30/15 13:47	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.33		*	mg/L	0.06	0.3	09/19/15 1:31	pjb
Nitrogen, ammonia	M350.1	1	0.12	B	*	mg/L	0.05	0.2	09/21/15 15:34	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/23/15 21:56	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/16/15 0:00	tms
pH measured at		1	20.2		*	C	0.1	0.1	09/16/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/30/15 13:47	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/24/15 20:42	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/11/15 21:21	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/18/15 21:31	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1580		*	mg/L	10	20	09/12/15 10:50	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/16/15 15:04	sck
Residue, Total (TS) @ 105C	SM2540B	1	1660		*	mg/L	10	20	09/14/15 12:50	id
Sulfate	D516-02/-07 - Turbidimetric	50	889		*	mg/L	50	250	09/28/15 14:37	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 12:05	tms
TDS (calculated)	Calculation		1450			mg/L			09/30/15 13:47	calc
TDS (ratio - measured/calculated)	Calculation		1.09						09/30/15 13:47	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L26605-08**
Date Sampled: 09/08/15 12:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/22/15 12:30	spl
Cyanide, WAD	SM4500-CN I- distillation								09/21/15 12:50	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/21/15 17:38	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/23/15 13:19	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 19:05	spl
Total Hot Plate Digestion	M200.2 ICP-MS								09/22/15 17:40	scp
Total Hot Plate Digestion	M200.2 ICP								09/17/15 12:32	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW10-E

ACZ Sample ID: **L26605-08**

Date Sampled: 09/08/15 12:00

Date Received: 09/11/15

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	09/22/15 10:36	aeb
Aluminum, total	M200.7 ICP	1		U	*	mg/L	0.03	0.2	09/19/15 1:59	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/23/15 8:13	msh
Antimony, total	M200.8 ICP-MS	1		U	*	mg/L	0.0004	0.002	09/24/15 19:55	mfm
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	09/23/15 8:13	msh
Arsenic, total	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	09/24/15 19:55	mfm
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	09/22/15 10:36	aeb
Barium, total	M200.7 ICP	1		U		mg/L	0.003	0.02	09/19/15 1:59	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:36	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:59	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/22/15 15:19	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/19/15 1:59	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:36	aeb
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/19/15 1:59	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:13	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:55	mfm
Calcium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.1	0.5	09/22/15 10:36	aeb
Calcium, total	M200.7 ICP	1		U		mg/L	0.1	0.5	09/19/15 1:59	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:36	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:59	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:36	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:59	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/22/15 10:36	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	09/19/15 1:59	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/22/15 10:36	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/19/15 1:59	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/22/15 10:36	aeb
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	09/19/15 1:59	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/23/15 8:13	msh
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/24/15 19:55	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:36	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:59	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/22/15 10:36	aeb
Magnesium, total	M200.7 ICP	1		U		mg/L	0.2	1	09/19/15 1:59	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/22/15 10:36	aeb
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	09/19/15 1:59	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/19/15 15:17	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/21/15 15:43	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/22/15 10:36	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	09/19/15 1:59	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/22/15 10:36	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	09/19/15 1:59	aeb
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/22/15 10:36	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L26605-08**
Date Sampled: 09/08/15 12:00
Date Received: 09/11/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	U	mg/L	0.2	1	09/19/15 1:59	aeb	
Scandium, dissolved	M200.7 ICP	1	U	*	mg/L	0.1	0.5	09/22/15 10:36	aeb
Scandium, total	M200.7 ICP	1	U	*	mg/L	0.1	0.5	09/19/15 1:59	aeb
Selenium, dissolved	M200.8 ICP-MS	1	U		mg/L	0.0001	0.0003	09/23/15 8:13	msh
Selenium, total	M200.8 ICP-MS	1	U		mg/L	0.0001	0.0003	09/24/15 19:55	mfm
Silver, dissolved	M200.8 ICP-MS	1	U		mg/L	0.00005	0.0003	09/23/15 8:13	msh
Silver, total	M200.8 ICP-MS	1	U		mg/L	0.00005	0.0003	09/25/15 14:37	mfm
Sodium, dissolved	M200.7 ICP	1	U		mg/L	0.2	1	09/22/15 10:36	aeb
Sodium, total	M200.7 ICP	1	U		mg/L	0.2	1	09/19/15 1:59	aeb
Strontium, dissolved	M200.7 ICP	1	U	*	mg/L	0.005	0.03	09/22/15 10:36	aeb
Strontium, total	M200.7 ICP	1	U		mg/L	0.005	0.03	09/19/15 1:59	aeb
Thallium, dissolved	M200.8 ICP-MS	1	U		mg/L	0.0001	0.0005	09/23/15 8:13	msh
Thallium, total	M200.8 ICP-MS	1	U		mg/L	0.0001	0.0005	09/24/15 19:55	mfm
Tin, dissolved	M200.7 ICP	1	U		mg/L	0.04	0.2	09/22/15 10:36	aeb
Tin, total	M200.7 ICP	1	U		mg/L	0.04	0.2	09/19/15 1:59	aeb
Titanium, dissolved	M200.7 ICP	1	U		mg/L	0.005	0.03	09/22/15 10:36	aeb
Titanium, total	M200.7 ICP	1	U		mg/L	0.005	0.03	09/19/15 1:59	aeb
Uranium, dissolved	M200.8 ICP-MS	1	U		mg/L	0.0001	0.0005	09/23/15 8:13	msh
Uranium, total	M200.8 ICP-MS	1	U		mg/L	0.0001	0.0005	09/24/15 19:55	mfm
Vanadium, dissolved	M200.7 ICP	1	U		mg/L	0.005	0.03	09/22/15 10:36	aeb
Vanadium, total	M200.7 ICP	1	U		mg/L	0.005	0.03	09/19/15 1:59	aeb
Zinc, dissolved	M200.7 ICP	1	U		mg/L	0.01	0.05	09/22/15 10:36	aeb
Zinc, total	M200.7 ICP	1	U		mg/L	0.01	0.05	09/19/15 1:59	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW10-E

ACZ Sample ID: **L26605-08**
 Date Sampled: 09/08/15 12:00
 Date Received: 09/11/15
 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	09/17/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Total Alkalinity		1		U	*	mg/L	2	20	09/17/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			09/30/15 13:48	calc
Sum of Anions				U		meq/L			09/30/15 13:48	calc
Sum of Cations				U		meq/L			09/30/15 13:48	calc
Chemical Oxygen Demand	M410.4	1	11	B	*	mg/L	10	20	09/15/15 13:22	enb
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	09/22/15 16:46	bsu
Conductivity @25C	SM2510B	1	4.4	B	*	umhos/cm	1	10	09/18/15 21:22	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/22/15 20:50	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/21/15 17:46	mss2
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	09/21/15 17:51	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation			U		mg/L	0.8	4	09/30/15 13:48	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/19/15 0:13	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/21/15 15:36	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/23/15 21:57	pjb
pH (lab)	SM4500H+ B									
pH		1	6.6	H	*	units	0.1	0.1	09/17/15 0:00	tms
pH measured at		1	19.6		*	C	0.1	0.1	09/17/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/30/15 13:48	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/24/15 20:43	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	09/11/15 21:24	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/18/15 21:32	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	09/12/15 10:52	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/15/15 12:09	sck
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	09/14/15 12:52	id
Sulfate	D516-02/-07 - Turbidimetric	1	2.2	B	*	mg/L	1	5	09/28/15 14:03	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/15/15 12:13	tms
TDS (calculated)	Calculation		2.4			mg/L			09/30/15 13:48	calc
TDS (ratio - measured/calculated)	Calculation		n/a						09/30/15 13:48	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: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-01	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390863	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390835	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390792	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391054	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).
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).	
WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG390503	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).	
WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	

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Tahoe Resources, Inc.

ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG391258	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.
	WG390362	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-02	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG391116	Antimony, total	M200.8 ICP-MS	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [$< MDL$].
	WG390863	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.
	WG390540	Bicarbonate as CaCO ₃ Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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 ($< 10x MDL$).
	WG390927	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390835	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 ($< 10x MDL$).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($< 10x MDL$).
	WG390792	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391054	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 ($< 10x MDL$).
	WG390540	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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 ($< 10x MDL$).
	WG390274	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 ($< 10x MDL$).
	WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG390503	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data	

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Tahoe Resources, Inc.

ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG390295		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG391258		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.
WG390362		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).
WG390540		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-03	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390863	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390835	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390792	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391054	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).
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).	
WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG390503	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).	
WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	

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Tahoe Resources, Inc.

ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG391258	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.
	WG390362	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-04	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG391116	Antimony, total	M200.8 ICP-MS	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [$< MDL$].
	WG390863	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.
	WG390540	Bicarbonate as CaCO ₃ Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			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 ($< 10x MDL$).
	WG390927	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390835	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 ($< 10x MDL$).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($< 10x MDL$).
	WG390792	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG391054	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 ($< 10x MDL$).
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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 ($< 10x MDL$).
	WG390274	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 ($< 10x MDL$).
	WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG390503	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($< 10x MDL$).	

Tahoe Resources, Inc.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391258	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.
	WG390362	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-05	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390863	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	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).
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391054	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).
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
WG391140	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).	
WG390274	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).	
WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG390503	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).	
WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG391258	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.
	WG390363	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-06	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390863	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	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).
	WG390992	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391054	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).
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390503	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).
	WG390295	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG391260	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG390363	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-07	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG390863	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.
	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	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).
	WG390927	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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).
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390833	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391054	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).
	WG390540	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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).
	WG390274	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).
	WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG390503	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

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG390295		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG391260		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG390363		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).
WG390540		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-08	WG390718	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG391116	Antimony, total	M200.8 ICP-MS	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [$< MDL$].
	WG390863	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.
	WG390540	Bicarbonate as CaCO ₃ Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390370	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 ($< 10x MDL$).
	WG390927	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390949	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 ($< 10x MDL$).
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG390836	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($< 10x MDL$).
	WG390833	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($< 10x MDL$).
	WG390540	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390762	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG390808	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($< 10x MDL$).
	WG391054	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 ($< 10x MDL$).
	WG390540	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391140	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 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
	WG390274	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($< 10x MDL$).
M365.1 - Automated Ascorbic Acid			Q6	Sample was received above recommended temperature.	
WG390679	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG390281	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG390368	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG390295		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG391260		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG390363		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).
WG390540		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L26605-01**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390820Analyst: itk
Extract Date: 09/16/15 9:35
Analysis Date: 09/18/15 15:10

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	92.4		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L26605-01**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 9:32

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.05	*	mg/L	2.1	10.5

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L26605-02**
Date Sampled: 09/09/15 12:30
Date Received: 09/11/15
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390820Analyst: itk
Extract Date: 09/16/15 9:45
Analysis Date: 09/18/15 15:36

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	91.8		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L26605-02**
Date Sampled: 09/09/15 12:30
Date Received: 09/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 10:04

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1	*	mg/L	2	10

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L26605-03**
Date Sampled: 09/09/15 11:00
Date Received: 09/11/15
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390820Analyst: itk
Extract Date: 09/16/15 9:56
Analysis Date: 09/18/15 16:02

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	91.2		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L26605-03**
Date Sampled: 09/09/15 11:00
Date Received: 09/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 10:36

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		2.8	B	1.04	*	mg/L	2.1	10.4

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L26605-04**

Date Sampled: 09/09/15 8:10

Date Received: 09/11/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG390820

Analyst: itk

Extract Date: 09/16/15 10:07

Analysis Date: 09/18/15 16:29

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	90.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L26605-04**

Date Sampled: 09/09/15 8:10

Date Received: 09/11/15

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

Extract Method:

Workgroup: WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 11:08

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L26605-05**

Date Sampled: 09/09/15 9:45

Date Received: 09/11/15

Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG390820

Analyst: itk

Extract Date: 09/16/15 10:18

Analysis Date: 09/18/15 17:21

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	82.2		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW8-EACZ Sample ID: **L26605-05**

Date Sampled: 09/09/15 9:45

Date Received: 09/11/15

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

Extract Method:

Workgroup: WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 11:40

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		3.2	B	1	*	mg/L	2	10

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L26605-06**

Date Sampled: 09/09/15 9:00

Date Received: 09/11/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG390820

Analyst: itk

Extract Date: 09/16/15 10:29

Analysis Date: 09/18/15 17:47

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: SW9-EACZ Sample ID: **L26605-06**

Date Sampled: 09/09/15 9:00

Date Received: 09/11/15

Sample Matrix: Surface Water

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

Extract Method:

Workgroup: WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 12:12

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1	*	mg/L	2	10

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW-11E

ACZ Sample ID: **L26605-07**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG390820

Analyst: itk
Extract Date: 09/16/15 10:40
Analysis Date: 09/18/15 18:13

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	90		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW-11EACZ Sample ID: **L26605-07**
Date Sampled: 09/09/15 11:30
Date Received: 09/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 12:45

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.04	*	mg/L	2.1	10.4

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SW10-E

ACZ Sample ID: **L26605-08**

Date Sampled: 09/08/15 12:00

Date Received: 09/11/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG390748

Analyst: wts

Extract Date: 09/14/15 12:48

Analysis Date: 09/17/15 19:56

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	62.7		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L26605-08**
Date Sampled: 09/08/15 12:00
Date Received: 09/11/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG391304

Analyst: id

Extract Date:

Analysis Date: 09/22/15 13:17

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1	*	mg/L	2	10

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: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26605-01	WG390820	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG391304	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG390484	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26605-02	WG390820	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG391304	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG390484	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26605-03	WG390820	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG391304	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG390484	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26605-04	WG390820	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG391304	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric 1664A - Gravimetric	N1 Q6 Q9	See Case Narrative. Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG390484	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26605-05	WG390820	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG391304	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric 1664A - Gravimetric	N1 Q6 Q9	See Case Narrative. Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG390484	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26605-06	WG390820	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG391304	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric 1664A - Gravimetric	N1 Q6 Q9	See Case Narrative. Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG390484	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26605-07	WG390820	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG391304	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.

Tahoe Resources, Inc.

ACZ Project ID: **L26605**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
	WG390484	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L26605-08	WG390748	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
		OTP	M8015D GC/FID	S7	Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.
	WG391304	Oil and Grease	1664A - Gravimetric	N1	See Case Narrative.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
	WG390305	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L26605**

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: L26605
 Date Received: 09/11/2015 10:12
 Received By: ddp
 Date Printed: 9/11/2015

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? 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	

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?
409	16.6	15	N/A
4212	18	14	N/A
4410	17.8	15	N/A
4471	18.4	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.

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: L26605
Date Received: 09/11/2015 10:12
Received By: ddp
Date Printed: 9/11/2015

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.

126605

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: Bulvar 105 Proceras B calle 24-69 zona 10
Company: Tane Resources INC.	Empresarial zona Proceras zona IV a finca oficina 1406
E-mail: mBerganza@sanrafael.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: Miguel Berganza	Address:
Company: Tane Resources INC.	
E-mail: mBerganza@sanrafael.com.gt	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

Sampler's Name: 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																			
SW2A-E	09/09/15 11:30	SW	10	✓																		
SW3-E	09/09/15 12:30	SW	10	✓																		
SW4A-E	09/09/15 11:00	SW	10	✓																		

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

REMARKS

COC # 1/3 Present results with COCs # 2 and 3. of all samples

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	09-09-2015 16:30	[Signature]	9.9.15 16:30
			9-11-15 10:12





Laboratories, Inc.

L26005

CHAIN of CUSTODY

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

Report to:

Name: Miquel Berganza	Address: Bivar las Proceras 18 Calle 14-69 700010
Company: Tahoe Resources Inc.	Empresarial Zona Pradera Torre W. Oficina 1406
E-mail: mBerganza @sanrafael.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: Miquel Berganza	Address:
Company: Tahoe Resources Inc.	
E-mail: mBerganza @ sanrafael.com.gt	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

Sampler's Name: 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	3																			
PO#: Escobal																					
Reporting state for compliance testing:																					
Check box if samples include NRC licensed material?																					
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																			
SW6-E	09/09/15 08:10	SW	10	/																	
SW8-E	09/09/15 09:45	SW	10	/																	
SW9-E	09/09/15 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

COC #2/3 Present results of all samples with COCs # 1 and 3.

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	09-09-2015 16:30	[Signature]	9.9.15 16:30
		[Signature]	9.11.15 10:10



Laboratories, Inc.

L26605

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: Buvar los Procesos 18 calle 24-69 zona 10
Company: Tahoe Resources INC.	Empleo: Zonal Zona Pradisa Torre IV oficina 1406
E-mail: M.Berganza @sanrafael.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name: AAT	E-mail:
Company:	Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

Sampler's Name: 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#: E-sobol
 Reporting state for compliance testing:
 Check box if samples include NRC licensed material?

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SW	Total						
SW 10-E	08/09/15 12:00	SW	10	✓							
Pileta 1	07/09/15 09:20	SW	1		/						
Pileta 2	07/09/15 08:45	SW	1		/						
Pileta de proceso	07/09/15 10:45	W	1		/						
WW 14	07/09/15 05:30-14:30	WW	1		/						
WW 13	07/09/15 15:00	WW	1		/						
WW 14	07/09/15 03-12h	WW	1		/						
TWD	02/09/15 09:25	SW	1		/						
TWD	02/09/15 09:25	SW	10	/							
Agua de proceso	07/09/15 11:25	SW	1		/						

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

REMARKS

* COC 3/3 Present results only of SW10-E with results of COC 1 and 2.

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	08-09-2015	[Signature]	8.9.15 17:00
	17:00	[Signature]	9.11.15 10:15



Guatemala September 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).

Sincerely yours,

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

MINERA 
SAN RAFAEL

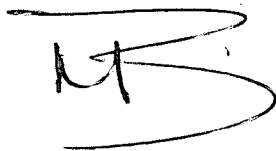
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Miguel Berganza
Environment Department.
Mina El Escobal
Minera San Rafael, S.A.



Guatemala September 9th, 2015

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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).

Sincerely yours,

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



Guatemala September 8th, 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).

Sincerely yours,

0234

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

REG 016 Resultados de Análisis

Muestra: 7 muestras de agua

Análisis solicitado por: Ing. Miguel Berganza

Dirección: Km. 97.5 carretera Mataquesuinta, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 080915

Fecha de ingreso de muestras: 080915

Fecha de análisis: 080915-280915

Fecha de informe: 280915

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)
2371	SW1-E	12	< 1	< 10	26	N.D.	540
2372	SW2-E	9	< 1	< 10	< 25	N.D.	23
2373	SW2B-E	4	< 1	< 10	< 25	N.D.	2.2 x 10 ³
2374	SW4-E	17	< 1	< 10	< 25	N.D.	2.4 x 10 ⁴
2375	SW5-E	85	26	< 10	< 25	N.D.	540
2376	SW7-E	62	13	< 10	< 25	N.D.	700
2377	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. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

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: 090915
Fecha de ingreso de muestras: 090915
Fecha de análisis: 090915-220915
Fecha de informe: 220915

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)
2390	SW2A-E	9	< 1	< 10	< 25	N.D.	240
2391	SW3-E	27	7	< 10	< 25	N.D.	5.2 x 10 ²
2392	SW4A-E	12	< 1	< 10	< 25	N.D.	1.6 x 10 ⁴
2393	SW6-E	103	23	< 10	< 25	N.D.	9.2 x 10 ³
2394	SW8-E	72	11	12	57	N.D.	9.2 x 10 ⁵
2395	SW9-E	82	10	< 10	< 25	N.D.	7.0 x 10 ²
2396	SW11-E	7	< 1	< 10	< 25	N.D.	5.4 x 10 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. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

11.5.2 Muestras de Agua Subterránea (GW) pozos de monitoreo y suministro

September 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

Project ID: Escobal

ACZ Project ID: L26511

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 08, 2015. This project has been assigned to ACZ's project number, L26511. 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 L26511. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

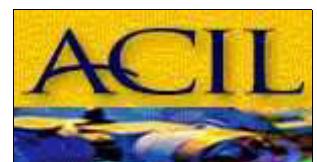
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 24, 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.

September 24, 2015

Project ID: Escobal

ACZ Project ID: L26511

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 ground water samples from Tahoe Resources, Inc. on September 8, 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 L26511. 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, HC), received either after the hold time expired or requiring re-analysis after the hold time had expired.

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-1A

ACZ Sample ID: **L26511-01**
Date Sampled: 09/02/15 06:00
Date Received: 09/08/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/15/15 13:42	spl
Cyanide, WAD	SM4500-CN I- distillation								09/15/15 16:51	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/15/15 15:14	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 15:57	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/15/15 18:08	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/16/15 16:29	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/18/15 20:58	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0002	0.001	09/18/15 20:58	msh
Barium, dissolved	M200.7 ICP	1	0.053			mg/L	0.003	0.02	09/16/15 16:29	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:29	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/15 16:29	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:29	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 20:58	msh
Calcium, dissolved	M200.7 ICP	1	6.1			mg/L	0.1	0.5	09/16/15 16:29	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:29	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:29	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:29	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:29	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/16/15 16:29	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 20:58	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:29	aeb
Magnesium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	09/16/15 16:29	aeb
Manganese, dissolved	M200.7 ICP	1	0.030			mg/L	0.005	0.03	09/16/15 16:29	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/17/15 11:40	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/16/15 16:29	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:29	aeb
Potassium, dissolved	M200.7 ICP	1	5.2			mg/L	0.2	1	09/16/15 16:29	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:29	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	09/21/15 20:20	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/18/15 20:58	msh
Sodium, dissolved	M200.7 ICP	1	7.9			mg/L	0.2	1	09/16/15 16:29	aeb
Strontium, dissolved	M200.7 ICP	1	0.051			mg/L	0.005	0.03	09/16/15 16:29	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 20:58	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/16/15 16:29	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:29	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 20:58	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:29	aeb
Zinc, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	09/16/15 16:29	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L26511-01**
 Date Sampled: 09/02/15 06:00
 Date Received: 09/08/15
 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	35.9		*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	35.9		*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.0			%			09/24/15 15:53	calc
Sum of Anions			0.921			meq/L			09/24/15 15:53	calc
Sum of Cations			0.998			meq/L			09/24/15 15:53	calc
Chloride	SM4500Cl-E	1	3.8		*	mg/L	0.5	2	09/16/15 12:00	jlf
Conductivity @25C	SM2510B	1	110		*	umhos/cm	1	10	09/12/15 3:32	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 19:59	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 21:21	pjb
Fluoride	SM4500F-C	1	0.11	B	*	mg/L	0.05	0.3	09/15/15 15:27	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		26			mg/L	0.8	4	09/24/15 15:53	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.85		*	mg/L	0.02	0.1	09/15/15 23:37	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/16/15 11:20	bsu
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1	0.3	B	*	mg/L	0.1	0.5	09/17/15 17:10	spl
pH		1	7.7	H	*	units	0.1	0.1	09/12/15 0:00	id
pH measured at		1	19.7		*	C	0.1	0.1	09/12/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	09/24/15 15:53	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/16/15 23:15	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.11	H	*	mg/L	0.01	0.05	09/10/15 19:35	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.01	0.05	09/16/15 20:30	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	162		*	mg/L	10	20	09/08/15 15:44	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/08/15 16:47	sck
Residue, Total (TS) @ 105C	SM2540B	1	176		*	mg/L	10	20	09/08/15 17:21	id
Sulfate	D516-02/-07 - Turbidimetric	1	4.3	B	*	mg/L	1	5	09/15/15 14:03	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/08/15 14:32	enb
TDS (calculated)	Calculation		52			mg/L			09/24/15 15:53	calc
TDS (ratio - measured/calculated)	Calculation		3.12						09/24/15 15:53	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L26511-02**
Date Sampled: 09/01/15 14:40
Date Received: 09/08/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/15/15 13:52	spl
Cyanide, WAD	SM4500-CN I- distillation								09/15/15 16:57	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/15/15 15:21	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 16:02	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/15/15 18:22	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/16/15 16:32	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	09/18/15 21:08	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0045			mg/L	0.0002	0.001	09/18/15 21:08	msh
Barium, dissolved	M200.7 ICP	1	0.080			mg/L	0.003	0.02	09/16/15 16:32	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:32	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/15 16:32	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:32	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:08	msh
Calcium, dissolved	M200.7 ICP	1	16.6			mg/L	0.1	0.5	09/16/15 16:32	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:32	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:32	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:32	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:32	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/16/15 16:32	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:08	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:32	aeb
Magnesium, dissolved	M200.7 ICP	1	2.9			mg/L	0.2	1	09/16/15 16:32	aeb
Manganese, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	09/16/15 16:32	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/17/15 11:42	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/16/15 16:32	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:32	aeb
Potassium, dissolved	M200.7 ICP	1	2.6			mg/L	0.2	1	09/16/15 16:32	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:32	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/21/15 20:29	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/18/15 21:08	msh
Sodium, dissolved	M200.7 ICP	1	8.1			mg/L	0.2	1	09/16/15 16:32	aeb
Strontium, dissolved	M200.7 ICP	1	0.127			mg/L	0.005	0.03	09/16/15 16:32	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:08	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/16/15 16:32	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:32	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:08	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:32	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:32	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-2

ACZ Sample ID: **L26511-02**
 Date Sampled: 09/01/15 14:40
 Date Received: 09/08/15
 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	58.9	H	*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		UH	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		UH	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	58.9	H	*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/24/15 15:53	calc
Sum of Anions			1.5			meq/L			09/24/15 15:53	calc
Sum of Cations			1.5			meq/L			09/24/15 15:53	calc
Chloride	SM4500Cl-E	1	2.2		*	mg/L	0.5	2	09/16/15 12:00	jlf
Conductivity @25C	SM2510B	1	153		*	umhos/cm	1	10	09/12/15 3:58	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 19:59	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 21:22	pjb
Fluoride	SM4500F-C	1	0.16	B	*	mg/L	0.05	0.3	09/15/15 15:31	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		53			mg/L	0.8	4	09/24/15 15:53	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.10		*	mg/L	0.02	0.1	09/15/15 23:38	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/16/15 11:22	bsu
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1	0.2	B	*	mg/L	0.1	0.5	09/17/15 17:11	spl
pH		1	8.1	H	*	units	0.1	0.1	09/12/15 0:00	id
pH measured at		1	20.5		*	C	0.1	0.1	09/12/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	09/24/15 15:53	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/16/15 23:16	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/10/15 19:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/16/15 20:31	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	128		*	mg/L	10	20	09/08/15 15:47	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8.0	B	*	mg/L	5	20	09/08/15 16:49	sck
Residue, Total (TS) @ 105C	SM2540B	1	148		*	mg/L	10	20	09/08/15 17:23	id
Sulfate	D516-02/-07 - Turbidimetric	1	12.5		*	mg/L	1	5	09/15/15 14:03	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/08/15 14:35	enb
TDS (calculated)	Calculation		81.1			mg/L			09/24/15 15:53	calc
TDS (ratio - measured/calculated)	Calculation		1.58						09/24/15 15:53	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-3

ACZ Sample ID: **L26511-03**

Date Sampled: 09/01/15 15:35

Date Received: 09/08/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/15/15 14:14	spl
Cyanide, WAD	SM4500-CN I- distillation								09/15/15 17:03	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/15/15 15:29	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 16:07	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/15/15 18:36	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/16/15 16:35	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/18/15 21:11	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	09/18/15 21:11	msh
Barium, dissolved	M200.7 ICP	1	0.144			mg/L	0.003	0.02	09/16/15 16:35	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:35	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/15 16:35	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:35	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:11	msh
Calcium, dissolved	M200.7 ICP	1	111			mg/L	0.1	0.5	09/16/15 16:35	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:35	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:35	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:35	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:35	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/16/15 16:35	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:11	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:35	aeb
Magnesium, dissolved	M200.7 ICP	1	26.5			mg/L	0.2	1	09/16/15 16:35	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:35	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/17/15 11:44	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/16/15 16:35	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:35	aeb
Potassium, dissolved	M200.7 ICP	1	11.4			mg/L	0.2	1	09/16/15 16:35	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:35	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	09/21/15 20:33	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/18/15 21:11	msh
Sodium, dissolved	M200.7 ICP	1	25.7			mg/L	0.2	1	09/16/15 16:35	aeb
Strontium, dissolved	M200.7 ICP	1	0.585			mg/L	0.005	0.03	09/16/15 16:35	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:11	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/16/15 16:35	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	09/16/15 16:35	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:11	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:35	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:35	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-3

ACZ Sample ID: **L26511-03**
 Date Sampled: 09/01/15 15:35
 Date Received: 09/08/15
 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	68.6	H	*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		UH	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		UH	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1	68.6	H	*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.5			%			09/24/15 15:54	calc
Sum of Anions			9.3			meq/L			09/24/15 15:54	calc
Sum of Cations			9.2			meq/L			09/24/15 15:54	calc
Chloride	SM4500Cl-E	1	26.6		*	mg/L	0.5	2	09/16/15 12:00	jlf
Conductivity @25C	SM2510B	1	885		*	umhos/cm	1	10	09/12/15 4:50	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 20:01	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 21:23	pjb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	09/15/15 15:41	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		386			mg/L	0.8	4	09/24/15 15:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	4.94		*	mg/L	0.06	0.3	09/16/15 0:26	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/16/15 11:58	bsu
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/17/15 17:12	spl
pH		1	7.7	H	*	units	0.1	0.1	09/12/15 0:00	id
pH measured at		1	20.0		*	C	0.1	0.1	09/12/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	09/24/15 15:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/16/15 23:17	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	09/10/15 19:37	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/16/15 20:34	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	696		*	mg/L	10	20	09/08/15 15:49	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/08/15 16:52	sck
Residue, Total (TS) @ 105C	SM2540B	1	742		*	mg/L	10	20	09/08/15 17:24	id
Sulfate	D516-02/-07 - Turbidimetric	20	340		*	mg/L	20	100	09/15/15 14:38	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/08/15 14:38	enb
TDS (calculated)	Calculation		584			mg/L			09/24/15 15:54	calc
TDS (ratio - measured/calculated)	Calculation		1.19						09/24/15 15:54	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L26511-04**
Date Sampled: 09/01/15 12:00
Date Received: 09/08/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/15/15 14:36	spl
Cyanide, WAD	SM4500-CN I- distillation								09/15/15 17:09	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/15/15 15:37	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 16:16	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/15/15 18:49	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/16/15 16:38	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/18/15 21:21	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	09/18/15 21:21	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	09/16/15 16:38	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:38	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/16/15 16:38	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:38	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:21	msh
Calcium, dissolved	M200.7 ICP	1	0.1	B		mg/L	0.1	0.5	09/16/15 16:38	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:38	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:38	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:38	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:38	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/16/15 16:38	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:21	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:38	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/16/15 16:38	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:38	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/17/15 11:54	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/16/15 16:38	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/16/15 16:38	aeb
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/16/15 16:38	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/16/15 16:38	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/21/15 20:36	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/18/15 21:21	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/16/15 16:38	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:38	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:21	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/16/15 16:38	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:38	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:21	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/16/15 16:38	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/16/15 16:38	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-10

ACZ Sample ID: **L26511-04**
 Date Sampled: 09/01/15 12:00
 Date Received: 09/08/15
 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		UH	*	mg/L	2	20	09/16/15 0:00	tms
Carbonate as CaCO3		1		UH	*	mg/L	2	20	09/16/15 0:00	tms
Hydroxide as CaCO3		1		UH	*	mg/L	2	20	09/16/15 0:00	tms
Total Alkalinity		1		UH	*	mg/L	2	20	09/16/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			09/24/15 15:54	calc
Sum of Anions			N/A			meq/L			09/24/15 15:54	calc
Sum of Cations				U		meq/L			09/24/15 15:54	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	09/16/15 12:00	jlf
Conductivity @25C	SM2510B	1	1.1	B	*	umhos/cm	1	10	09/12/15 5:15	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 20:05	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 21:24	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	09/15/15 15:49	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation			U		mg/L	0.8	4	09/24/15 15:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/15/15 23:45	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/16/15 11:59	bsu
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/17/15 17:13	spl
pH		1	6.7	H	*	units	0.1	0.1	09/12/15 0:00	id
pH measured at		1	19.9		*	C	0.1	0.1	09/12/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	09/24/15 15:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/16/15 23:19	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/10/15 19:38	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	09/16/15 20:36	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	09/08/15 15:52	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/08/15 16:54	sck
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	09/08/15 17:25	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	09/15/15 14:37	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/08/15 14:47	enb
TDS (calculated)	Calculation		0.1			mg/L			09/24/15 15:54	calc
TDS (ratio - measured/calculated)	Calculation		n/a						09/24/15 15:54	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-11

ACZ Sample ID: **L26511-05**
Date Sampled: 09/01/15 15:35
Date Received: 09/08/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/15/15 14:46	spl
Cyanide, WAD	SM4500-CN I- distillation								09/15/15 17:15	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/15/15 15:44	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 16:26	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/15/15 19:03	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/18/15 13:18	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/18/15 21:24	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0021			mg/L	0.0002	0.001	09/18/15 21:24	msh
Barium, dissolved	M200.7 ICP	1	0.144			mg/L	0.003	0.02	09/18/15 13:18	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:18	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/18/15 13:18	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/18/15 13:18	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:24	msh
Calcium, dissolved	M200.7 ICP	1	113			mg/L	0.1	0.5	09/18/15 13:18	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:18	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:18	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:18	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/18/15 13:18	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/18/15 13:18	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:24	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/18/15 13:18	jjc
Magnesium, dissolved	M200.7 ICP	1	26.4			mg/L	0.2	1	09/18/15 13:18	jjc
Manganese, dissolved	M200.7 ICP	1	0.009	B	*	mg/L	0.005	0.03	09/18/15 13:18	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/17/15 11:56	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/18/15 20:02	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/18/15 13:18	jjc
Potassium, dissolved	M200.7 ICP	1	11.4			mg/L	0.2	1	09/18/15 13:18	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/18/15 13:18	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	09/21/15 20:39	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/18/15 21:24	msh
Sodium, dissolved	M200.7 ICP	1	25.8			mg/L	0.2	1	09/18/15 13:18	jjc
Strontium, dissolved	M200.7 ICP	1	0.585			mg/L	0.005	0.03	09/18/15 13:18	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:24	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/18/15 13:18	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/18/15 13:18	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:24	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/18/15 13:18	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:18	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-11

ACZ Sample ID: **L26511-05**
 Date Sampled: 09/01/15 15:35
 Date Received: 09/08/15
 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	69.8		*	mg/L	2	20	09/15/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/15 0:00	enb
Total Alkalinity		1	69.8		*	mg/L	2	20	09/15/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.5			%			09/24/15 15:54	calc
Sum of Anions			9.2			meq/L			09/24/15 15:54	calc
Sum of Cations			9.3			meq/L			09/24/15 15:54	calc
Chloride	SM4500Cl-E	1	26.4		*	mg/L	0.5	2	09/16/15 12:23	jlf
Conductivity @25C	SM2510B	1	881		*	umhos/cm	1	10	09/12/15 5:42	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 20:06	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 21:26	pjb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	09/15/15 15:53	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		391			mg/L	0.8	4	09/24/15 15:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	4.89		*	mg/L	0.06	0.3	09/16/15 0:27	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/16/15 12:01	bsu
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/17/15 17:14	spl
pH		1	7.6	H	*	units	0.1	0.1	09/12/15 0:00	id
pH measured at		1	20.2		*	C	0.1	0.1	09/12/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	09/24/15 15:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/16/15 23:22	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	09/10/15 19:41	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	09/16/15 20:37	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	698		*	mg/L	10	20	09/08/15 15:54	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/08/15 16:57	sck
Residue, Total (TS) @ 105C	SM2540B	1	766		*	mg/L	10	20	09/08/15 17:27	id
Sulfate	D516-02/-07 - Turbidimetric	20	335		*	mg/L	20	100	09/15/15 14:38	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/08/15 14:50	enb
TDS (calculated)	Calculation		581			mg/L			09/24/15 15:54	calc
TDS (ratio - measured/calculated)	Calculation		1.20						09/24/15 15:54	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L26511-06**
Date Sampled: 09/01/15 15:10
Date Received: 09/08/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/15/15 14:57	spl
Cyanide, WAD	SM4500-CN I- distillation								09/15/15 17:21	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/15/15 15:52	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 16:31	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/15/15 14:27	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/18/15 13:21	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	09/18/15 21:27	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0002	0.001	09/18/15 21:27	msh
Barium, dissolved	M200.7 ICP	1	0.081			mg/L	0.003	0.02	09/18/15 13:21	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:21	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/18/15 13:21	jjc
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	09/18/15 13:21	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:27	msh
Calcium, dissolved	M200.7 ICP	1	173			mg/L	0.1	0.5	09/18/15 13:21	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:21	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:21	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:21	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/18/15 13:21	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/18/15 13:21	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	09/18/15 21:27	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/18/15 13:21	jjc
Magnesium, dissolved	M200.7 ICP	1	30.3			mg/L	0.2	1	09/18/15 13:21	jjc
Manganese, dissolved	M200.7 ICP	1	2.580		*	mg/L	0.005	0.03	09/18/15 13:21	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	09/17/15 11:58	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/18/15 20:05	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/18/15 13:21	jjc
Potassium, dissolved	M200.7 ICP	1	10.1			mg/L	0.2	1	09/18/15 13:21	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/18/15 13:21	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	09/21/15 20:43	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	09/18/15 21:27	msh
Sodium, dissolved	M200.7 ICP	1	44.2			mg/L	0.2	1	09/18/15 13:21	jjc
Strontium, dissolved	M200.7 ICP	1	1.220			mg/L	0.005	0.03	09/18/15 13:21	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	09/18/15 21:27	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/18/15 13:21	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/18/15 13:21	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0001	0.0005	09/18/15 21:27	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/18/15 13:21	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/18/15 13:21	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: RW-1

ACZ Sample ID: **L26511-06**
 Date Sampled: 09/01/15 15:10
 Date Received: 09/08/15
 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	09/15/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/15/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/15/15 0:00	enb
Total Alkalinity		1	126		*	mg/L	2	20	09/15/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/24/15 15:55	calc
Sum of Anions			14			meq/L			09/24/15 15:55	calc
Sum of Cations			14			meq/L			09/24/15 15:55	calc
Chloride	SM4500Cl-E	1	46.9		*	mg/L	0.5	2	09/16/15 12:23	jlf
Conductivity @25C	SM2510B	1	1190		*	umhos/cm	1	10	09/12/15 6:07	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 20:07	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/15/15 21:27	pjb
Fluoride	SM4500F-C	1	0.09	B	*	mg/L	0.05	0.3	09/15/15 15:58	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		557			mg/L	0.8	4	09/24/15 15:55	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.22		*	mg/L	0.02	0.1	09/15/15 23:48	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	09/16/15 12:02	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	09/17/15 17:15	spl
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/12/15 0:00	id
pH measured at		1	19.9		*	C	0.1	0.1	09/12/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	09/24/15 15:55	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/16/15 23:23	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	09/10/15 19:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/16/15 21:32	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	910		*	mg/L	10	20	09/08/15 15:57	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/08/15 17:00	sck
Residue, Total (TS) @ 105C	SM2540B	1	972		*	mg/L	10	20	09/08/15 17:28	id
Sulfate	D516-02/-07 - Turbidimetric	20	491		*	mg/L	20	100	09/15/15 14:38	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/08/15 14:53	enb
TDS (calculated)	Calculation		876			mg/L			09/24/15 15:55	calc
TDS (ratio - measured/calculated)	Calculation		1.04						09/24/15 15:55	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: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26511-01	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390519	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390233	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390467	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).
	WG390473	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390413	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390475	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).
	WG390506	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390663	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).
	WG390233	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG390580	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).
	WG390187	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).
	WG390576	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).
	WG389979	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG389982	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).
	WG389996	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG390404	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.

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG389972	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).
	WG390540	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26511-02	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390519	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390233	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390467	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).
	WG390473	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390413	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).
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390475	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).
	WG390506	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390663	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).
	WG390233	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG390580	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).
WG390187	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).	
WG390576	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).	
WG389979	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG389982	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).	
WG389996	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG390404	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG389972	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG390540	Total Alkalinity	SM2320B - Titration	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26511-03	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390519	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390233	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390467	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).
	WG390473	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390413	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390475	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).
	WG390506	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390663	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).
	WG390233	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG390580	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).
	WG390187	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).
	WG390576	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).
	WG389979	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG389982	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).
	WG389996	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG390404	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG389972	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).

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390540	Total Alkalinity	SM2320B - Titration	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26511-04	WG390540	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390519	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390233	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390467	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).
	WG390473	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390413	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390540	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390475	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).
	WG390506	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390663	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).
	WG390233	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG390580	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).
	WG390187	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).
	WG390576	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).
	WG389979	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG389982	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).
	WG389996	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG390404	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG389972	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).
	WG390540	Total Alkalinity	SM2320B - Titration	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.

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ACZ Project ID: **L26511**

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

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ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26511-05	WG390711	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.
	WG390329	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390519	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390233	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390467	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).
	WG390473	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390413	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390329	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390475	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).
	WG390506	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390663	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).
	WG390233	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG390580	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).
	WG390187	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).
	WG390576	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).
	WG389979	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG389982	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).
	WG389996	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG390404	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG389972	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

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390329	Total Alkalinity	SM2320B - Titration	B4	accurate evaluation (< 10x MDL). Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26511-06	WG390711	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.
	WG390329	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390519	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390233	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG390467	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).
	WG390473	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390413	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390329	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG390475	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).
	WG390506	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390663	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).
	WG390233	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG390580	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).
	WG390187	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).
	WG390578	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).
	WG389979	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG389982	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).
	WG389996	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG390404	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG389972	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

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390329	Total Alkalinity	SM2320B - Titration	B4	accurate evaluation (< 10x MDL). Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-1AACZ Sample ID: **L26511-01**
Date Sampled: 09/02/15 6:00
Date Received: 09/08/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390310Analyst: itk
Extract Date: 09/08/15 15:30
Analysis Date: 09/11/15 13:58

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	89		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-2ACZ Sample ID: **L26511-02**
Date Sampled: 09/01/15 14:40
Date Received: 09/08/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390310Analyst: itk
Extract Date: 09/08/15 15:30
Analysis Date: 09/11/15 14:24

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	90.7		1.02	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-3

ACZ Sample ID: **L26511-03**

Date Sampled: 09/01/15 15:35

Date Received: 09/08/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG390310

Analyst: itk

Extract Date: 09/08/15 15:30

Analysis Date: 09/11/15 14:50

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.1		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L26511-04**
Date Sampled: 09/01/15 12:00
Date Received: 09/08/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG390310

Analyst: itk
Extract Date: 09/08/15 15:30
Analysis Date: 09/11/15 15:16

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	88.5		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-11ACZ Sample ID: **L26511-05**
Date Sampled: 09/01/15 15:35
Date Received: 09/08/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG390310Analyst: itk
Extract Date: 09/08/15 15:30
Analysis Date: 09/11/15 15:42

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.4		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L26511-06**
Date Sampled: 09/01/15 15:10
Date Received: 09/08/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG390310

Analyst: itk
Extract Date: 09/08/15 15:30
Analysis Date: 09/11/15 16:08

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	91.3		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 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: **L26511**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26511-01	WG390310	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG389971	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26511-02	WG390310	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG389971	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26511-03	WG390310	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG389971	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26511-04	WG390310	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG389971	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26511-05	WG390310	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG389971	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26511-06	WG390310	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG389971	M3520	Q9	Insufficient sample received to meet method QC requirements.	

Tahoe Resources, Inc.

ACZ Project ID: **L26511**

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: L26511
 Date Received: 09/08/2015 09:49
 Received By: ddp
 Date Printed: 9/8/2015

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 1 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? 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? L26511-01 : A Orange container not received and the associated analysis could not be run. L26511-02 : A Orange container not received and the associated analysis could not be run. L26511-03 : A Orange container not received and the associated analysis could not be run. L26511-04 : A Orange container not received and the associated analysis could not be run. L26511-05 : A Orange container not received and the associated analysis could not be run. L26511-06 : 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	

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L26511
 Date Received: 09/08/2015 09:49
 Received By: ddp
 Date Printed: 9/8/2015

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3871	20.6	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.

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.

26511

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard Los Próceros 18 calle 24-69 Zona 10
Empresarial, zona Pradera, Torre 11 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: MBerganza@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: [Signature] I attest to the authenticity and validity of this sample. I understand that intentionally mislabelling 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 entries for GW-1A, GW-2, and GW-3.

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

REMARKS

COC 1 of 2

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 07-09-2015 and 7.9.15 10:45.

Chain of Custody 26511



Laboratories, Inc.

126511

CHAIN of CUSTODY

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

Report to:

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

Address: Bulvar Los Próceros 18 calle 24-69 zona 10
Empresarial, Zona Proadera, Torre 1 y 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: MBerganza@sanrafael.com.gt

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*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+PH, 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

COC 2 of 2
Please report COC 1 and 2 on a same 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.

MINERA 
SAN RAFAEL

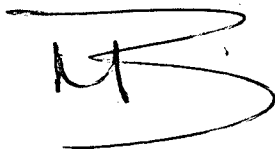
Guatemala August 31st, 2015

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).

Sincerely yours,



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

October 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

Project ID: Escobal

ACZ Project ID: L26754

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 18, 2015. This project has been assigned to ACZ's project number, L26754. 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 L26754. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

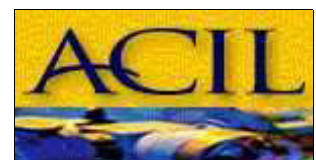
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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

October 13, 2015

Project ID: Escobal

ACZ Project ID: L26754

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 11 ground water samples from Tahoe Resources, Inc. on September 18, 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 L26754. 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 TDS values flagged with an "N1", the oven was out of specifications low at 62 degrees on 09/21/15. The oven was back in range when the workgroup was removed.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-3

ACZ Sample ID: **L26754-01**
Date Sampled: 09/15/15 13:25
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 9:12	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 10:50	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 17:02	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/25/15 13:12	krh/bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 14:49	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:14	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:16	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	10/01/15 3:16	msh
Barium, dissolved	M200.7 ICP	1	0.034			mg/L	0.003	0.02	09/26/15 13:14	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:14	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:14	aeb
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	09/26/15 13:14	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:16	msh
Calcium, dissolved	M200.7 ICP	1	75.5			mg/L	0.1	0.5	09/26/15 13:14	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:14	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:14	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:14	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:14	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/26/15 13:14	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:16	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	09/26/15 13:14	aeb
Magnesium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	09/26/15 13:14	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:14	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:35	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:14	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:14	aeb
Potassium, dissolved	M200.7 ICP	1	3.8			mg/L	0.2	1	09/26/15 13:14	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:14	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	10/01/15 3:16	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	10/01/15 3:16	msh
Sodium, dissolved	M200.7 ICP	1	26.6			mg/L	0.2	1	09/26/15 13:14	aeb
Strontium, dissolved	M200.7 ICP	1	0.720		*	mg/L	0.005	0.03	09/26/15 13:14	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:16	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:14	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/26/15 13:14	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	10/01/15 3:16	msh
Vanadium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	09/26/15 13:14	aeb
Zinc, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/26/15 13:14	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-3

ACZ Sample ID: **L26754-01**
 Date Sampled: 09/15/15 13:25
 Date Received: 09/18/15
 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	82.1		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	82.1		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.9			%			10/12/15 15:35	calc
Sum of Anions			5.9			meq/L			10/12/15 15:35	calc
Sum of Cations			5.8			meq/L			10/12/15 15:35	calc
Chloride	SM4500Cl-E	1	16.5		*	mg/L	0.5	2	10/01/15 14:47	mss2
Conductivity @25C	SM2510B	1	590		*	umhos/cm	1	10	09/19/15 4:43	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:00	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:51	mss2
Fluoride	SM4500F-C	1	0.70		*	mg/L	0.05	0.3	09/29/15 11:40	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		226			mg/L	0.8	4	10/12/15 15:35	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.36		*	mg/L	0.02	0.1	09/29/15 22:27	pjb
Nitrogen, ammonia	M350.1	1	0.11	B	*	mg/L	0.05	0.2	10/07/15 13:35	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/26/15 0:35	pjb
pH		1	7.6	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.7		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	10/12/15 15:35	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/25/15 15:12	krh/bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.12	H	*	mg/L	0.01	0.05	09/18/15 22:49	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/30/15 20:38	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1120		*	mg/L	10	20	09/19/15 10:44	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/22/15 16:09	tms
Residue, Total (TS) @ 105C	SM2540B	1	504		*	mg/L	10	20	09/21/15 16:06	id
Sulfate	D516-02/-07 - Turbidimetric	10	178		*	mg/L	10	50	10/05/15 14:20	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 14:40	enb
TDS (calculated)	Calculation		361			mg/L			10/12/15 15:35	calc
TDS (ratio - measured/calculated)	Calculation		3.10						10/12/15 15:35	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-4

ACZ Sample ID: **L26754-02**
Date Sampled: 09/15/15 14:25
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 9:40	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 10:57	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 17:17	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/25/15 13:23	krh/bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:03	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:17	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:18	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	10/01/15 3:18	msh
Barium, dissolved	M200.7 ICP	1	0.026			mg/L	0.003	0.02	09/26/15 13:17	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:17	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:17	aeb
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	09/26/15 13:17	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:18	msh
Calcium, dissolved	M200.7 ICP	1	74.6			mg/L	0.1	0.5	09/26/15 13:17	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:17	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:17	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:17	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:17	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/26/15 13:17	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:18	msh
Lithium, dissolved	M200.7 ICP	1	0.017	B		mg/L	0.008	0.04	09/26/15 13:17	aeb
Magnesium, dissolved	M200.7 ICP	1	8			mg/L	0.2	1	09/26/15 13:17	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:17	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:37	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:17	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:17	aeb
Potassium, dissolved	M200.7 ICP	1	3.9			mg/L	0.2	1	09/26/15 13:17	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:17	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	10/01/15 3:18	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	10/01/15 3:18	msh
Sodium, dissolved	M200.7 ICP	1	25.4			mg/L	0.2	1	09/26/15 13:17	aeb
Strontium, dissolved	M200.7 ICP	1	0.689			mg/L	0.005	0.03	09/26/15 13:17	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:18	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:17	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	09/26/15 13:17	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	10/01/15 3:18	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	09/26/15 13:17	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/26/15 13:17	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-4

ACZ Sample ID: **L26754-02**
 Date Sampled: 09/15/15 14:25
 Date Received: 09/18/15
 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	85.6		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	85.6		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.8			%			10/12/15 15:35	calc
Sum of Anions			5.8			meq/L			10/12/15 15:35	calc
Sum of Cations			5.6			meq/L			10/12/15 15:35	calc
Chloride	SM4500Cl-E	1	15.4		*	mg/L	0.5	2	10/01/15 14:47	mss2
Conductivity @25C	SM2510B	1	575		*	umhos/cm	1	10	09/19/15 5:00	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:02	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:52	mss2
Fluoride	SM4500F-C	1	0.84		*	mg/L	0.05	0.3	09/29/15 11:43	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		219			mg/L	0.8	4	10/12/15 15:35	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.46		*	mg/L	0.02	0.1	09/29/15 22:29	pjb
Nitrogen, ammonia	M350.1	1	0.13	B	*	mg/L	0.05	0.2	10/07/15 13:38	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/26/15 0:21	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.7		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	10/12/15 15:35	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/25/15 15:13	krh/bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	09/18/15 22:50	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	09/30/15 20:40	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	922		*	mg/L	10	20	09/19/15 10:46	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/22/15 16:10	tms
Residue, Total (TS) @ 105C	SM2540B	1	486		*	mg/L	10	20	09/21/15 16:08	id
Sulfate	D516-02/-07 - Turbidimetric	5	172		*	mg/L	5	25	10/05/15 14:13	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 14:55	enb
TDS (calculated)	Calculation		353			mg/L			10/12/15 15:35	calc
TDS (ratio - measured/calculated)	Calculation		2.61						10/12/15 15:35	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-5

ACZ Sample ID: **L26754-03**
Date Sampled: 09/15/15 11:50
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 10:07	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 11:04	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 17:31	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/25/15 13:35	krh/bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:17	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/29/15 18:37	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:20	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0002	0.001	10/01/15 3:20	msh
Barium, dissolved	M200.7 ICP	1	0.043			mg/L	0.003	0.02	09/29/15 18:37	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/29/15 18:37	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/29/15 18:37	aeb
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	09/29/15 18:37	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:20	msh
Calcium, dissolved	M200.7 ICP	1	208			mg/L	0.1	0.5	09/29/15 18:37	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/29/15 18:37	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/29/15 18:37	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/29/15 18:37	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/29/15 18:37	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/29/15 18:37	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:20	msh
Lithium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.008	0.04	09/29/15 18:37	aeb
Magnesium, dissolved	M200.7 ICP	1	27.1			mg/L	0.2	1	09/29/15 18:37	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/29/15 18:37	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:39	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/29/15 18:37	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/29/15 18:37	aeb
Potassium, dissolved	M200.7 ICP	1	9.1			mg/L	0.2	1	09/29/15 18:37	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/29/15 18:37	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	10/01/15 3:20	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:20	msh
Sodium, dissolved	M200.7 ICP	1	38.4			mg/L	0.2	1	09/29/15 18:37	aeb
Strontium, dissolved	M200.7 ICP	1	0.728			mg/L	0.005	0.03	09/29/15 18:37	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:20	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/29/15 18:37	aeb
Titanium, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	09/29/15 18:37	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	10/01/15 3:20	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/29/15 18:37	aeb
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	09/29/15 18:37	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-5

ACZ Sample ID: **L26754-03**
 Date Sampled: 09/15/15 11:50
 Date Received: 09/18/15
 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	82.6		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	82.6		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.4			%			10/12/15 15:36	calc
Sum of Anions			14			meq/L			10/12/15 15:36	calc
Sum of Cations			15			meq/L			10/12/15 15:36	calc
Chloride	SM4500Cl-E	1	39.9		*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	1230		*	umhos/cm	1	10	09/19/15 5:08	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:03	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:52	mss2
Fluoride	SM4500F-C	1	0.20	B	*	mg/L	0.05	0.3	09/29/15 11:58	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		631			mg/L	0.8	4	10/12/15 15:36	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	4.86		*	mg/L	0.06	0.3	09/29/15 23:01	pjb
Nitrogen, ammonia	M350.1	1	0.13	B	*	mg/L	0.05	0.2	10/07/15 13:39	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/26/15 0:22	pjb
pH		1	7.2	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.8		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	10/12/15 15:36	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/25/15 15:14	krh/bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	09/18/15 22:51	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/30/15 20:42	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1060		*	mg/L	10	20	09/19/15 10:48	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8.0	B	*	mg/L	5	20	09/22/15 16:11	tms
Residue, Total (TS) @ 105C	SM2540B	1	1110		*	mg/L	10	20	09/21/15 16:10	id
Sulfate	D516-02/-07 - Turbidimetric	20	555		*	mg/L	20	100	10/05/15 14:19	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 15:00	enb
TDS (calculated)	Calculation		929			mg/L			10/12/15 15:36	calc
TDS (ratio - measured/calculated)	Calculation		1.14						10/12/15 15:36	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-6

ACZ Sample ID: **L26754-04**

Date Sampled: 09/15/15 11:10

Date Received: 09/18/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 10:21	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 11:12	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 17:46	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/25/15 13:46	krh/bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:24	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:23	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:22	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	10/01/15 3:22	msh
Barium, dissolved	M200.7 ICP	1	0.110			mg/L	0.003	0.02	09/26/15 13:23	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:23	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:23	aeb
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/26/15 13:23	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:22	msh
Calcium, dissolved	M200.7 ICP	1	110			mg/L	0.1	0.5	09/26/15 13:23	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:23	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:23	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:23	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:23	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/26/15 13:23	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:22	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:23	aeb
Magnesium, dissolved	M200.7 ICP	1	13.9			mg/L	0.2	1	09/26/15 13:23	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:23	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:41	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:23	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:23	aeb
Potassium, dissolved	M200.7 ICP	1	7.2			mg/L	0.2	1	09/26/15 13:23	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:23	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	10/01/15 3:22	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:22	msh
Sodium, dissolved	M200.7 ICP	1	22.3			mg/L	0.2	1	09/26/15 13:23	aeb
Strontium, dissolved	M200.7 ICP	1	0.495			mg/L	0.005	0.03	09/26/15 13:23	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:22	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:23	aeb
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	09/26/15 13:23	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	10/01/15 3:22	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:23	aeb
Zinc, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/26/15 13:23	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-6

ACZ Sample ID: **L26754-04**
 Date Sampled: 09/15/15 11:10
 Date Received: 09/18/15
 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	78.0		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	78.0		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.6			%			10/12/15 15:36	calc
Sum of Anions			7.9			meq/L			10/12/15 15:36	calc
Sum of Cations			7.8			meq/L			10/12/15 15:36	calc
Chloride	SM4500Cl-E	1	20.3		*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	774		*	umhos/cm	1	10	09/19/15 5:16	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:04	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:55	mss2
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	09/29/15 12:06	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		332			mg/L	0.8	4	10/12/15 15:36	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.65		*	mg/L	0.06	0.3	09/29/15 23:02	pjb
Nitrogen, ammonia	M350.1	1	0.10	B	*	mg/L	0.05	0.2	10/07/15 13:41	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/26/15 0:23	pjb
pH		1	7.1	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.9		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	10/12/15 15:36	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/25/15 15:16	krh/bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.01	0.05	09/18/15 22:52	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	09/30/15 20:43	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	632		*	mg/L	10	20	09/19/15 10:49	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/22/15 16:13	tms
Residue, Total (TS) @ 105C	SM2540B	1	644		*	mg/L	10	20	09/21/15 16:11	id
Sulfate	D516-02/-07 - Turbidimetric	10	276		*	mg/L	10	50	10/05/15 14:22	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 15:05	enb
TDS (calculated)	Calculation		498			mg/L			10/12/15 15:36	calc
TDS (ratio - measured/calculated)	Calculation		1.27						10/12/15 15:36	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-7

ACZ Sample ID: **L26754-05**
Date Sampled: 09/15/15 10:30
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation		-						09/29/15 10:35	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 11:19	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 18:01	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/25/15 13:58	krh/bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:31	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:33	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	10/01/15 3:29	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	10/01/15 3:29	msh
Barium, dissolved	M200.7 ICP	1	0.451			mg/L	0.003	0.02	09/26/15 13:33	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:33	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:33	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:33	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:29	msh
Calcium, dissolved	M200.7 ICP	1	32.3			mg/L	0.1	0.5	09/26/15 13:33	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:33	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:33	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:33	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:33	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/26/15 13:33	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	10/01/15 3:29	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:33	aeb
Magnesium, dissolved	M200.7 ICP	1	9.9			mg/L	0.2	1	09/26/15 13:33	aeb
Manganese, dissolved	M200.7 ICP	1	0.030			mg/L	0.005	0.03	09/26/15 13:33	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:43	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:33	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:33	aeb
Potassium, dissolved	M200.7 ICP	1	8.8			mg/L	0.2	1	09/26/15 13:33	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:33	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	10/01/15 3:29	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:29	msh
Sodium, dissolved	M200.7 ICP	1	18.5			mg/L	0.2	1	09/26/15 13:33	aeb
Strontium, dissolved	M200.7 ICP	1	0.227			mg/L	0.005	0.03	09/26/15 13:33	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:29	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:33	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:33	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:29	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:33	aeb
Zinc, dissolved	M200.7 ICP	1	0.37			mg/L	0.01	0.05	09/26/15 13:33	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-7

ACZ Sample ID: **L26754-05**
 Date Sampled: 09/15/15 10:30
 Date Received: 09/18/15
 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	106		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	106		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-4.1			%			10/12/15 15:36	calc
Sum of Anions			3.8			meq/L			10/12/15 15:36	calc
Sum of Cations			3.5			meq/L			10/12/15 15:36	calc
Chloride	SM4500Cl-E	1	14.3		*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	371		*	umhos/cm	1	10	09/19/15 5:24	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:05	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:56	mss2
Fluoride	SM4500F-C	1	0.10	B	*	mg/L	0.05	0.3	09/29/15 12:13	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		121			mg/L	0.8	4	10/12/15 15:36	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.23		*	mg/L	0.02	0.1	09/29/15 22:33	pjb
Nitrogen, ammonia	M350.1	1	0.13	B	*	mg/L	0.05	0.2	10/07/15 13:45	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1	0.2	B	*	mg/L	0.1	0.5	09/26/15 0:24	pjb
pH		1	7.1	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.5		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	10/12/15 15:36	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/25/15 18:29	krh/bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	09/18/15 22:56	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	09/30/15 20:45	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	304		*	mg/L	10	20	09/19/15 10:50	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	6.0	B	*	mg/L	5	20	09/22/15 16:14	tms
Residue, Total (TS) @ 105C	SM2540B	1	338		*	mg/L	10	20	09/21/15 16:13	id
Sulfate	D516-02/-07 - Turbidimetric	5	61.4		*	mg/L	5	25	10/05/15 14:13	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 15:10	enb
TDS (calculated)	Calculation		211			mg/L			10/12/15 15:36	calc
TDS (ratio - measured/calculated)	Calculation		1.44						10/12/15 15:36	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-8

ACZ Sample ID: **L26754-06**
Date Sampled: 09/15/15 11:40
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 10:49	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 11:26	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 18:15	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/25/15 14:10	krh/bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:38	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:36	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	10/01/15 3:32	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0014			mg/L	0.0002	0.001	10/01/15 3:32	msh
Barium, dissolved	M200.7 ICP	1	0.076			mg/L	0.003	0.02	09/26/15 13:36	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:36	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:36	aeb
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/26/15 13:36	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:32	msh
Calcium, dissolved	M200.7 ICP	1	91.5			mg/L	0.1	0.5	09/26/15 13:36	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:36	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:36	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:36	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:36	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/26/15 13:36	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:32	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	09/26/15 13:36	aeb
Magnesium, dissolved	M200.7 ICP	1	14.4			mg/L	0.2	1	09/26/15 13:36	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:36	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:45	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:36	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:36	aeb
Potassium, dissolved	M200.7 ICP	1	5.7			mg/L	0.2	1	09/26/15 13:36	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:36	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	10/01/15 3:32	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:32	msh
Sodium, dissolved	M200.7 ICP	1	21.2			mg/L	0.2	1	09/26/15 13:36	aeb
Strontium, dissolved	M200.7 ICP	1	0.347			mg/L	0.005	0.03	09/26/15 13:36	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:32	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:36	aeb
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	09/26/15 13:36	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	10/01/15 3:32	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:36	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/26/15 13:36	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-8

ACZ Sample ID: **L26754-06**
 Date Sampled: 09/15/15 11:40
 Date Received: 09/18/15
 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	71.5		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	71.5		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.8			%			10/12/15 15:37	calc
Sum of Anions			7.3			meq/L			10/12/15 15:37	calc
Sum of Cations			6.9			meq/L			10/12/15 15:37	calc
Chloride	SM4500Cl-E	1	20.3		*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	699		*	umhos/cm	1	10	09/19/15 5:32	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:06	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:57	mss2
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	09/29/15 12:21	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		288			mg/L	0.8	4	10/12/15 15:37	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.93		*	mg/L	0.02	0.1	09/29/15 22:34	pjb
Nitrogen, ammonia	M350.1	1	0.12	B	*	mg/L	0.05	0.2	10/07/15 13:47	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/26/15 0:25	pjb
pH		1	7.4	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.7		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	10/12/15 15:37	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	09/25/15 18:30	krh/bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.09	H	*	mg/L	0.01	0.05	09/18/15 22:57	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	09/30/15 20:46	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	564		*	mg/L	10	20	09/19/15 10:52	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	31.0		*	mg/L	5	20	09/22/15 16:16	tms
Residue, Total (TS) @ 105C	SM2540B	1	608		*	mg/L	10	20	09/21/15 16:15	id
Sulfate	D516-02/-07 - Turbidimetric	10	251		*	mg/L	10	50	10/05/15 14:26	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 15:15	enb
TDS (calculated)	Calculation		448			mg/L			10/12/15 15:37	calc
TDS (ratio - measured/calculated)	Calculation		1.26						10/12/15 15:37	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-9

ACZ Sample ID: **L26754-07**
Date Sampled: 09/15/15 15:10
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 11:03	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 11:33	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 18:30	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 10:33	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:45	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:46	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:34	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0016			mg/L	0.0002	0.001	10/01/15 3:34	msh
Barium, dissolved	M200.7 ICP	1	0.055			mg/L	0.003	0.02	09/26/15 13:46	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:46	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:46	aeb
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	09/26/15 13:46	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:34	msh
Calcium, dissolved	M200.7 ICP	1	44.9			mg/L	0.1	0.5	09/26/15 13:46	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:46	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:46	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:46	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:46	aeb
Iron, dissolved	M200.7 ICP	1	5.32			mg/L	0.02	0.05	09/26/15 13:46	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	10/01/15 3:34	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	09/26/15 13:46	aeb
Magnesium, dissolved	M200.7 ICP	1	7.8			mg/L	0.2	1	09/26/15 13:46	aeb
Manganese, dissolved	M200.7 ICP	1	0.058			mg/L	0.005	0.03	09/26/15 13:46	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:47	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:46	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:46	aeb
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	09/26/15 13:46	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:46	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	10/01/15 3:34	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:34	msh
Sodium, dissolved	M200.7 ICP	1	24.7			mg/L	0.2	1	09/26/15 13:46	aeb
Strontium, dissolved	M200.7 ICP	1	0.328			mg/L	0.005	0.03	09/26/15 13:46	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:34	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:46	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:46	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:34	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:46	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	09/26/15 13:46	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-9

ACZ Sample ID: **L26754-07**
 Date Sampled: 09/15/15 15:10
 Date Received: 09/18/15
 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	112		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	112		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.3			%			10/12/15 15:37	calc
Sum of Anions			4.2			meq/L			10/12/15 15:37	calc
Sum of Cations			4.4			meq/L			10/12/15 15:37	calc
Chloride	SM4500Cl-E	1	7.7		*	mg/L	0.5	2	10/01/15 15:14	mss2
Conductivity @25C	SM2510B	1	407		*	umhos/cm	1	10	09/19/15 5:40	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:09	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:58	mss2
Fluoride	SM4500F-C	1	0.55		*	mg/L	0.05	0.3	09/29/15 12:40	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		144			mg/L	0.8	4	10/12/15 15:37	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.04	B	*	mg/L	0.02	0.1	09/29/15 22:40	pjb
Nitrogen, ammonia	M350.1	1	0.14	B	*	mg/L	0.05	0.2	10/07/15 13:48	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/26/15 0:27	pjb
pH		1	7.6	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.9		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.5			mg/L	0.03	0.2	10/12/15 15:37	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.16		*	mg/L	0.01	0.05	10/02/15 1:09	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	09/18/15 22:58	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.18		*	mg/L	0.01	0.05	09/30/15 20:49	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	336		*	mg/L	10	20	09/19/15 10:53	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1	9.0	B	*	mg/L	5	20	09/22/15 16:18	tms
Residue, Total (TS) @ 105C	SM2540B	1	348		*	mg/L	10	20	09/21/15 16:16	id
Sulfate	D516-02/-07 - Turbidimetric	5	81.0		*	mg/L	5	25	10/05/15 14:17	mss2
Sulfide as S	SM4500S2-D	1	0.02	B	*	mg/L	0.02	0.1	09/21/15 15:20	enb
TDS (calculated)	Calculation		245			mg/L			10/12/15 15:37	calc
TDS (ratio - measured/calculated)	Calculation		1.37						10/12/15 15:37	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-11

ACZ Sample ID: **L26754-08**

Date Sampled: 09/15/15 13:50

Date Received: 09/18/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 11:16	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 11:40	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/25/15 18:45	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 10:48	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:52	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:49	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:41	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0029			mg/L	0.0002	0.001	10/01/15 3:41	msh
Barium, dissolved	M200.7 ICP	1	0.026			mg/L	0.003	0.02	09/26/15 13:49	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:49	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:49	aeb
Boron, dissolved	M200.7 ICP	1	0.17			mg/L	0.01	0.05	09/26/15 13:49	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:41	msh
Calcium, dissolved	M200.7 ICP	1	237			mg/L	0.1	0.5	09/26/15 13:49	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:49	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:49	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:49	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:49	aeb
Iron, dissolved	M200.7 ICP	1	1.02			mg/L	0.02	0.05	09/26/15 13:49	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:41	msh
Lithium, dissolved	M200.7 ICP	1	0.081			mg/L	0.008	0.04	09/26/15 13:49	aeb
Magnesium, dissolved	M200.7 ICP	1	35.8			mg/L	0.2	1	09/26/15 13:49	aeb
Manganese, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.005	0.03	09/26/15 13:49	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:52	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:49	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:49	aeb
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	09/26/15 13:49	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:49	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	10/01/15 3:41	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:41	msh
Sodium, dissolved	M200.7 ICP	1	67			mg/L	0.2	1	09/26/15 13:49	aeb
Strontium, dissolved	M200.7 ICP	1	2.240			mg/L	0.005	0.03	09/26/15 13:49	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:41	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:49	aeb
Titanium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.005	0.03	09/26/15 13:49	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	10/01/15 3:41	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:49	aeb
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	09/26/15 13:49	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-11

ACZ Sample ID: **L26754-08**
 Date Sampled: 09/15/15 13:50
 Date Received: 09/18/15
 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	135		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	135		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.7			%			10/12/15 15:38	calc
Sum of Anions			19			meq/L			10/12/15 15:38	calc
Sum of Cations			18			meq/L			10/12/15 15:38	calc
Chloride	SM4500Cl-E	1	61.6		*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	1480		*	umhos/cm	1	10	09/19/15 5:49	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:10	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 12:59	mss2
Fluoride	SM4500F-C	1	2.54		*	mg/L	0.05	0.3	09/29/15 12:43	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		739			mg/L	0.8	4	10/12/15 15:38	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/29/15 22:41	pjb
Nitrogen, ammonia	M350.1	1	0.09	B	*	mg/L	0.05	0.2	10/07/15 13:50	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/26/15 0:28	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.9		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	10/12/15 15:38	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	10/02/15 1:10	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/18/15 22:59	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/30/15 20:50	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1260		*	mg/L	10	20	09/19/15 10:54	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/22/15 16:19	tms
Residue, Total (TS) @ 105C	SM2540B	1	1270		*	mg/L	10	20	09/21/15 16:18	id
Sulfate	D516-02/-07 - Turbidimetric	20	671		*	mg/L	20	100	10/05/15 14:19	mss2
Sulfide as S	SM4500S2-D	1	0.04	B	*	mg/L	0.02	0.1	09/21/15 15:25	enb
TDS (calculated)	Calculation		1160			mg/L			10/12/15 15:38	calc
TDS (ratio - measured/calculated)	Calculation		1.09						10/12/15 15:38	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-20

ACZ Sample ID: **L26754-09**
Date Sampled: 09/15/15 12:00
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 11:30	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 11:55	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/30/15 11:38	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 11:03	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 15:59	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:52	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:43	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	10/01/15 3:43	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	09/26/15 13:52	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:52	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:52	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:52	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:43	msh
Calcium, dissolved	M200.7 ICP	1		U		mg/L	0.1	0.5	09/26/15 13:52	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:52	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:52	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:52	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:52	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/26/15 13:52	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:43	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:52	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/26/15 13:52	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:52	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 11:54	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:52	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:52	aeb
Potassium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	09/26/15 13:52	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:52	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	10/01/15 3:43	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:43	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	09/26/15 13:52	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:52	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:43	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:52	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:52	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:43	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:52	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:52	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-20

ACZ Sample ID: **L26754-09**
 Date Sampled: 09/15/15 12:00
 Date Received: 09/18/15
 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	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			10/12/15 15:38	calc
Sum of Anions			N/A			meq/L			10/12/15 15:38	calc
Sum of Cations				U		meq/L			10/12/15 15:38	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	2.9	B	*	umhos/cm	1	10	09/19/15 5:57	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:10	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 13:00	mss2
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	09/29/15 12:51	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation			U		mg/L	0.8	4	10/12/15 15:38	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/29/15 22:43	pjb
Nitrogen, ammonia	M350.1	1	0.10	B	*	mg/L	0.05	0.2	10/07/15 13:51	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/30/15 22:46	pjb
pH		1	6.6	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	21.0		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	10/12/15 15:38	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	10/02/15 1:11	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	09/18/15 23:01	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/30/15 20:51	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	09/19/15 10:56	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/22/15 16:20	tms
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	09/21/15 16:21	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	10/05/15 14:17	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 15:40	enb
TDS (calculated)	Calculation		0.4			mg/L			10/12/15 15:38	calc
TDS (ratio - measured/calculated)	Calculation		n/a						10/12/15 15:38	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-21

ACZ Sample ID: **L26754-10**
Date Sampled: 09/15/15 13:25
Date Received: 09/18/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 11:44	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 12:09	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/30/15 12:16	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 11:19	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 16:06	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:56	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:45	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	10/01/15 3:45	msh
Barium, dissolved	M200.7 ICP	1	0.034			mg/L	0.003	0.02	09/26/15 13:56	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:56	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:56	aeb
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	09/26/15 13:56	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:45	msh
Calcium, dissolved	M200.7 ICP	1	76.5			mg/L	0.1	0.5	09/26/15 13:56	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:56	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:56	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:56	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:56	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	09/26/15 13:56	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:45	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	09/26/15 13:56	aeb
Magnesium, dissolved	M200.7 ICP	1	9.3			mg/L	0.2	1	09/26/15 13:56	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:56	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 12:01	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:56	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:56	aeb
Potassium, dissolved	M200.7 ICP	1	3.9			mg/L	0.2	1	09/26/15 13:56	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:56	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	10/01/15 3:45	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:45	msh
Sodium, dissolved	M200.7 ICP	1	26.7			mg/L	0.2	1	09/26/15 13:56	aeb
Strontium, dissolved	M200.7 ICP	1	0.715			mg/L	0.005	0.03	09/26/15 13:56	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:45	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:56	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	09/26/15 13:56	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	10/01/15 3:45	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:56	aeb
Zinc, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	09/26/15 13:56	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-21

ACZ Sample ID: **L26754-10**
 Date Sampled: 09/15/15 13:25
 Date Received: 09/18/15
 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	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	81.6		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.8			%			10/12/15 15:38	calc
Sum of Anions			6			meq/L			10/12/15 15:38	calc
Sum of Cations			5.9			meq/L			10/12/15 15:38	calc
Chloride	SM4500Cl-E	1	16.7		*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	593		*	umhos/cm	1	10	09/19/15 6:06	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:11	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 13:02	mss2
Fluoride	SM4500F-C	1	0.68		*	mg/L	0.05	0.3	09/29/15 12:59	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		229			mg/L	0.8	4	10/12/15 15:38	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.34		*	mg/L	0.02	0.1	09/29/15 22:44	pjb
Nitrogen, ammonia	M350.1	1	0.08	B	*	mg/L	0.05	0.2	10/07/15 13:54	mss2
Nitrogen, total Kjeldahl (lab)	M351.2 - TKN by Block Digester SM4500H+ B	1		U	*	mg/L	0.1	0.5	09/30/15 22:49	pjb
pH		1	7.5	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	21.0		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	10/12/15 15:38	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	10/02/15 1:14	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.12	H	*	mg/L	0.01	0.05	09/18/15 23:04	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	09/30/15 20:52	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	476		*	mg/L	10	20	09/19/15 10:57	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/22/15 16:22	tms
Residue, Total (TS) @ 105C	SM2540B	1	500		*	mg/L	10	20	09/21/15 16:23	id
Sulfate	D516-02/-07 - Turbidimetric	5	184		*	mg/L	5	25	10/05/15 14:17	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/21/15 15:45	enb
TDS (calculated)	Calculation		368			mg/L			10/12/15 15:38	calc
TDS (ratio - measured/calculated)	Calculation		1.29						10/12/15 15:38	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-1

ACZ Sample ID: **L26754-11**
 Date Sampled: 09/15/15 14:40
 Date Received: 09/18/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/29/15 11:58	spl
Cyanide, WAD	SM4500-CN I- distillation								09/28/15 12:16	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/30/15 12:55	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 11:34	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/29/15 16:13	krh/spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	09/26/15 13:59	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/01/15 3:48	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0056			mg/L	0.0002	0.001	10/01/15 3:48	msh
Barium, dissolved	M200.7 ICP	1	0.018	B		mg/L	0.003	0.02	09/26/15 13:59	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:59	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	09/26/15 13:59	aeb
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	09/26/15 13:59	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:48	msh
Calcium, dissolved	M200.7 ICP	1	187			mg/L	0.1	0.5	09/26/15 13:59	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:59	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:59	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:59	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:59	aeb
Iron, dissolved	M200.7 ICP	1	1.24			mg/L	0.02	0.05	09/26/15 13:59	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:48	msh
Lithium, dissolved	M200.7 ICP	1	0.087			mg/L	0.008	0.04	09/26/15 13:59	aeb
Magnesium, dissolved	M200.7 ICP	1	34.2			mg/L	0.2	1	09/26/15 13:59	aeb
Manganese, dissolved	M200.7 ICP	1	0.044			mg/L	0.005	0.03	09/26/15 13:59	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/01/15 12:02	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	09/26/15 13:59	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	09/26/15 13:59	aeb
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	09/26/15 13:59	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	09/26/15 13:59	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	10/01/15 3:48	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/01/15 3:48	msh
Sodium, dissolved	M200.7 ICP	1	43			mg/L	0.2	1	09/26/15 13:59	aeb
Strontium, dissolved	M200.7 ICP	1	1.780			mg/L	0.005	0.03	09/26/15 13:59	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/01/15 3:48	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	09/26/15 13:59	aeb
Titanium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	09/26/15 13:59	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	10/01/15 3:48	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	09/26/15 13:59	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	09/26/15 13:59	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-1

ACZ Sample ID: **L26754-11**
 Date Sampled: 09/15/15 14:40
 Date Received: 09/18/15
 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	159		*	mg/L	2	20	09/19/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/19/15 0:00	tms
Total Alkalinity		1	159		*	mg/L	2	20	09/19/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-6.7			%			10/12/15 15:39	calc
Sum of Anions			16			meq/L			10/12/15 15:39	calc
Sum of Cations			14			meq/L			10/12/15 15:39	calc
Chloride	SM4500Cl-E	1	42.3		*	mg/L	0.5	2	10/01/15 14:44	mss2
Conductivity @25C	SM2510B	1	1260		*	umhos/cm	1	10	09/19/15 6:15	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 15:12	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/29/15 13:03	mss2
Fluoride	SM4500F-C	1	2.49		*	mg/L	0.05	0.3	09/29/15 13:07	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		608			mg/L	0.8	4	10/12/15 15:39	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	09/29/15 22:45	pjb
Nitrogen, ammonia	M350.1	1	0.05	B	*	mg/L	0.05	0.2	10/07/15 13:56	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/30/15 22:51	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	09/19/15 0:00	tms
pH measured at		1	20.9		*	C	0.1	0.1	09/19/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	10/12/15 15:39	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	10/02/15 1:16	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/18/15 23:05	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/30/15 20:54	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	996		*	mg/L	10	20	09/19/15 10:58	tms
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/22/15 16:23	tms
Residue, Total (TS) @ 105C	SM2540B	1	1030		*	mg/L	10	20	09/21/15 16:25	id
Sulfate	D516-02/-07 - Turbidimetric	20	537		*	mg/L	20	100	10/05/15 14:19	mss2
Sulfide as S	SM4500S2-D	1	0.10		*	mg/L	0.02	0.1	09/21/15 15:50	enb
TDS (calculated)	Calculation		950			mg/L			10/12/15 15:39	calc
TDS (ratio - measured/calculated)	Calculation		1.05						10/12/15 15:39	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>

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ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-01	WG391462	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.
	WG391223	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.
	WG390742	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391193	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390761	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).
	WG391488	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).
	WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.
			SM2540C	Q6	Sample was received above recommended temperature.
	WG390910	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).
	WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391720	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

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ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					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).
WG390822		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).
WG390742		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-02	WG391462	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.
	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391193	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390761	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).
	WG391488	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).
	WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.
			SM2540C	Q6	Sample was received above recommended temperature.
	WG390910	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).
	WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391720	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

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390822	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).
	WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-03	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG391193	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390761	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).	
WG391488	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).	
WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.	
		SM2540C	Q6	Sample was received above recommended temperature.	
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	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).	
WG390822	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	

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ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG390742	Total Alkalinity	SM2320B - Titration		accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-04	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG391193	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390761	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).	
WG391488	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).	
WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.	
		SM2540C	Q6	Sample was received above recommended temperature.	
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	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).	
WG390822	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	

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ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
L26754-05	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391193	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390761	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).
	WG391488	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).
	WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.
			SM2540C	Q6	Sample was received above recommended temperature.
	WG390910	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).
	WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG391720	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG390822	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).
	WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-06	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG391193	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG390761	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).	
WG391488	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).	
WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.	
		SM2540C	Q6	Sample was received above recommended temperature.	
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG390822	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).	
WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-07	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG391589	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).
	WG390761	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).
	WG391488	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).
WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.	
		SM2540C	Q6	Sample was received above recommended temperature.	
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG390822	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).	
WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-08	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391216	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG391589	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).
	WG390761	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).
	WG391488	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).
WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.	
		SM2540C	Q6	Sample was received above recommended temperature.	
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG390822	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).	
WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-09	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391490	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).
	WG390742	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391589	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).
	WG390761	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).	
WG391488	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).	
WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.	
		SM2540C	Q6	Sample was received above recommended temperature.	
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG390822	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).	
WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-10	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391490	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).
	WG390742	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391589	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).
	WG390761	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).
	WG391488	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).
	WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.
			SM2540C	Q6	Sample was received above recommended temperature.
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG390822	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).	
WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-11	WG390742	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391557	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG390742	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG391357	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).
	WG391346	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391316	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG390742	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391386	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG391892	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391490	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).
	WG390742	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391589	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).
	WG390761	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).
WG391488	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).	
WG390766	Residue, Filterable (TDS) @180C	SM2540C	N1	See Case Narrative.	
		SM2540C	Q6	Sample was received above recommended temperature.	
WG390910	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).	
WG390834	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG391720	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
WG390822	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).	
WG390742	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-3

ACZ Sample ID: **L26754-01**

Date Sampled: 09/15/15 13:25

Date Received: 09/18/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG391138

Analyst: wts

Extract Date: 09/21/15 13:56

Analysis Date: 09/23/15 14:48

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.5		1.09	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.1		1.09	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-4

ACZ Sample ID: **L26754-02**
Date Sampled: 09/15/15 14:25
Date Received: 09/18/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG391138

Analyst: wts
Extract Date: 09/21/15 14:00
Analysis Date: 09/23/15 15:15

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.4	J	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.2		1.02	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-5

ACZ Sample ID: **L26754-03**

Date Sampled: 09/15/15 11:50

Date Received: 09/18/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG391138

Analyst: wts

Extract Date: 09/21/15 14:03

Analysis Date: 09/24/15 22:52

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.4	J	1.03	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	78.8		1.03	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-6

ACZ Sample ID: **L26754-04**
Date Sampled: 09/15/15 11:10
Date Received: 09/18/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG391138

Analyst: wts
Extract Date: 09/21/15 14:06
Analysis Date: 09/24/15 23:18

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.5		1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	92.7		1.02	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-7

ACZ Sample ID: **L26754-05**

Date Sampled: 09/15/15 10:30

Date Received: 09/18/15

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG391138

Analyst: wts

Extract Date: 09/21/15 14:10

Analysis Date: 09/24/15 23:45

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.6		1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.7		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-8ACZ Sample ID: **L26754-06**
Date Sampled: 09/15/15 11:40
Date Received: 09/18/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG391138Analyst: wts
Extract Date: 09/21/15 14:13
Analysis Date: 09/25/15 0:11

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	90.1		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-9ACZ Sample ID: **L26754-07**
Date Sampled: 09/15/15 15:10
Date Received: 09/18/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG391138Analyst: wts
Extract Date: 09/21/15 14:16
Analysis Date: 09/25/15 0:37

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	89.7		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-11ACZ Sample ID: **L26754-08**
Date Sampled: 09/15/15 13:50
Date Received: 09/18/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG391138Analyst: wts
Extract Date: 09/21/15 14:20
Analysis Date: 09/25/15 1:03

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.03	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.7		1.03	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-20

ACZ Sample ID: **L26754-09**
Date Sampled: 09/15/15 12:00
Date Received: 09/18/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG391138

Analyst: wts
Extract Date: 09/21/15 14:23
Analysis Date: 09/25/15 1:29

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	114.6		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-21ACZ Sample ID: **L26754-10**
Date Sampled: 09/15/15 13:25
Date Received: 09/18/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG391138Analyst: wts
Extract Date: 09/21/15 14:26
Analysis Date: 09/25/15 2:21

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.5		1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	95.1		1.01	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-1

ACZ Sample ID: **L26754-11**
Date Sampled: 09/15/15 14:40
Date Received: 09/18/15
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG391138

Analyst: wts
Extract Date: 09/21/15 14:30
Analysis Date: 09/25/15 2:47

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.09	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	94.6		1.09	*	%	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: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26754-01	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-02	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-03	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-04	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-05	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-06	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-07	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-08	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-09	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-10	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L26754-11	WG391138	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390810	M3520	Q9	Insufficient sample received to meet method QC requirements.	

Tahoe Resources, Inc.

ACZ Project ID: **L26754**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
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Tahoe Resources, Inc.

ACZ Project ID: **L26754**

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: L26754
 Date Received: 09/18/2015 09:52
 Received By: ddp
 Date Printed: 9/18/2015

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 copy of report and sample information 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? 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? 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?
4133	15.6	13	N/A
4229	13.1	15	N/A
4451	10.2	12	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: L26754
Date Received: 09/18/2015 09:52
Received By: ddp
Date Printed: 9/18/2015

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

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.

L26754

CHAIN of CUSTODY

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

Report to:

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

Address: Bulevar Los Proceres 18 calle 24-69 Zona 6
Empresarial, Zona Pradera, Torre LV Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: [Redacted]
Company: [Redacted]

E-mail: [Redacted]
Telephone: [Redacted]

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

Sampler's Name: LE 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 10 columns for ANALYSES REQUESTED. Includes rows for MW-3, MW-4, MW-5, MW-6.

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

REMARKS

C00 # 1/3

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.

L26754 Chain of Custody



Laboratories, Inc.

L26754

CHAIN of CUSTODY

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

Report to:

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

Address: Bulevar Los Proceres 18 calle 24-69 zona 10
Empresarial, Zona Proceres, Torre IV Oficina 1406
Telephone: (502) 5951 5248

Copy of Report to:

Name: [Redacted]
Company: [Redacted]

E-mail: [Redacted]
Telephone: [Redacted]

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*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 rows for MW-7, MW-8, MW-9, MW-11.

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

REMARKS

COC # 2/3

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.



Laboratories, Inc.

L206754

CHAIN of CUSTODY

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

Report to:

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

Address: Bulevar Los Proceres 18 calle 24-69 zona 1a
Empresarial, Zona Pradera, Torre IV Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: [Redacted]
Company: [Redacted]

E-mail: [Redacted]
Telephone: [Redacted]

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*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 10 columns for ANALYSES REQUESTED. Includes handwritten entries for Water Quality, Escobal, and sample data.

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

REMARKS

COC # 3/3 Please present results of the 3 chains of custody in the same 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 handwritten signatures and dates.



Guatemala September 16th, 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).

Sincerely yours,

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

MINERA 
SAN RAFAEL

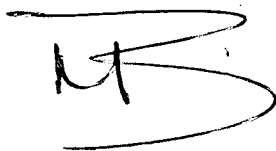
Guatemala September 16th, 2015

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).

Sincerely yours,



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



Guatemala September 16th, 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).

Sincerely yours,

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

October 14, 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

Project ID: Escobal

ACZ Project ID: L26902

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 25, 2015. This project has been assigned to ACZ's project number, L26902. 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 L26902. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

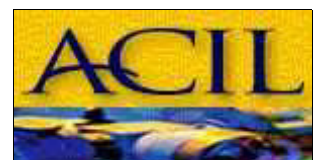
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 13, 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: PSA-SR

ACZ Sample ID: **L26902-01**
 Date Sampled: 09/21/15 11:55
 Date Received: 09/25/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/30/15 12:28	krh/ms s
Cyanide, WAD	SM4500-CN I- distillation								10/02/15 14:02	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/30/15 17:24	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 12:04	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 12:10	krh

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	10/04/15 0:43	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	10/07/15 1:12	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0128			mg/L	0.0002	0.001	10/07/15 1:12	msh
Barium, dissolved	M200.7 ICP	1	0.087			mg/L	0.003	0.02	10/04/15 0:43	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/04/15 0:43	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	10/06/15 17:04	aeb
Boron, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	10/04/15 0:43	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/07/15 1:12	msh
Calcium, dissolved	M200.7 ICP	1	106			mg/L	0.1	0.5	10/04/15 0:43	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/04/15 0:43	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/04/15 0:43	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/04/15 0:43	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	10/04/15 0:43	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	10/04/15 0:43	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/07/15 1:12	msh
Lithium, dissolved	M200.7 ICP	1	0.150			mg/L	0.008	0.04	10/04/15 0:43	aeb
Magnesium, dissolved	M200.7 ICP	1	6.5			mg/L	0.2	1	10/04/15 0:43	aeb
Manganese, dissolved	M200.7 ICP	1	0.026	B		mg/L	0.005	0.03	10/04/15 0:43	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	10/08/15 12:45	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	10/04/15 0:43	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	10/04/15 0:43	aeb
Potassium, dissolved	M200.7 ICP	1	2.2			mg/L	0.2	1	10/04/15 0:43	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	10/04/15 0:43	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	10/07/15 1:12	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	10/07/15 17:55	msh
Sodium, dissolved	M200.7 ICP	1	83.3			mg/L	0.2	1	10/04/15 0:43	aeb
Strontium, dissolved	M200.7 ICP	1	4.730		*	mg/L	0.005	0.03	10/04/15 0:43	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	10/07/15 1:12	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	10/04/15 0:43	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	10/04/15 0:43	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	10/07/15 1:12	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	10/04/15 0:43	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	10/04/15 0:43	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-SR

ACZ Sample ID: **L26902-01**
 Date Sampled: 09/21/15 11:55
 Date Received: 09/25/15
 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	188		*	mg/L	2	20	10/01/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	10/01/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	10/01/15 0:00	tms
Total Alkalinity		1	188		*	mg/L	2	20	10/01/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.5			%			10/14/15 16:12	calc
Sum of Anions			10			meq/L			10/14/15 16:12	calc
Sum of Cations			9.7			meq/L			10/14/15 16:12	calc
Chloride	SM4500Cl-E	1	4.8		*	mg/L	0.5	2	10/09/15 14:32	spl
Conductivity @25C	SM2510B	1	802		*	umhos/cm	1	10	10/01/15 2:47	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	10/01/15 23:14	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	10/02/15 20:36	pjb
Fluoride	SM4500F-C	1	0.87		*	mg/L	0.05	0.3	10/02/15 17:38	tms
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		291			mg/L	0.8	4	10/14/15 16:12	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.08	B	*	mg/L	0.02	0.1	10/02/15 23:36	pjb
Nitrogen, ammonia	M350.1	1	0.09	B	*	mg/L	0.05	0.2	10/13/15 13:13	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	09/30/15 23:39	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	10/01/15 0:00	tms
pH measured at		1	19.7		*	C	0.1	0.1	10/01/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	10/14/15 16:12	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	10/02/15 1:18	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	09/29/15 22:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	10/02/15 23:00	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	622		*	mg/L	10	20	09/25/15 16:35	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	09/28/15 13:47	sck
Residue, Total (TS) @ 105C	SM2540B	1	646		*	mg/L	10	20	09/25/15 16:48	enb
Sulfate	D516-02/-07 - Turbidimetric	20	287		*	mg/L	20	100	10/12/15 13:07	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	09/28/15 16:55	enb
TDS (calculated)	Calculation		610			mg/L			10/14/15 16:12	calc
TDS (ratio - measured/calculated)	Calculation		1.02						10/14/15 16:12	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: **L26902**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26902-01	WG391686	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.
	WG391425	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG392074	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG391425	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391587	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.
	WG391666	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391651	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG391425	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG391669	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).
	WG392238	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391490	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG391425	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG391589	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).
	WG391385	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).
	WG391670	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG391207	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG391262	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
	WG391211	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG392173	Sulfate	D516-02/-07 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG391274	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L26902**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG391425	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: PSA-SRACZ Sample ID: **L26902-01**
Date Sampled: 09/21/15 11:55
Date Received: 09/25/15
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG391721Analyst: wfg
Extract Date: 09/28/15 15:23
Analysis Date: 10/05/15 3:24

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	91.8		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: **L26902**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26902-01	WG391721	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	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: **L26902**

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: L26902
 Date Received: 09/25/2015 09:54
 Received By: ddp
 Date Printed: 9/25/2015

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? 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	

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?
3364	16.4	16	N/A

Was ice present in the shipment container(s)?

No - Wet or gel ice was not present in the shipment container(s).

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: L26902
Date Received: 09/25/2015 09:54
Received By: ddp
Date Printed: 9/25/2015

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.

L26902

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@Sarratad.com.gt

Address: Pkewor Los Proceres 18 calle 24-69 zona 10
Empresarial, Zona Proceres, Torre IV oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc.
E-mail: M.Berganza@Sarratad.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, Total an, SW, GW+PH. Includes rows for WW13, WW14, PSA-SR, Pileta 3, WW9, Poto PP, WW9, WW14.

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 "PSA-SR" 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 handwritten signatures and dates.

L26902 Chain of Custody

REG 016 Resultados de Análisis

Muestras: 6 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: 020915 (correlativo 2309) y 010915 (correlativos 2310 a 2314)
Fecha de ingreso de muestras: 020915
Fecha de análisis: 020915-110915
Fecha de informe: 110915

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)
2309	GW -1A	99	28	N.D.	2.2 x 10 ³
2310	GW -2	64	9	N.D.	49
2311	GW -3	< 1	< 1	N.D.	< 2
2312	GW -10	< 1	< 1	N.D.	< 2
2313	GW -11	< 1	< 1	N.D.	< 2
2314	RW -1	22	10	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)

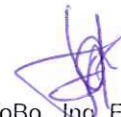
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

REG 016 Resultados de Análisis

Muestras: 11 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: 150915
Fecha de ingreso de muestras: 160915
Fecha de análisis: 160915-250915
Fecha de informe: 250915

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)
2476	MW-3	< 1	< 1	N.D.	< 2
2477	MW-4	< 1	< 1	N.D.	< 2
2478	MW-5	8	< 1	N.D.	< 2
2479	MW-6	< 1	< 1	N.D.	< 2
2480	MW-7	9	< 1	N.D.	240
2481	MW-8	12	< 1	N.D.	< 2
2482	MW-9	479	2	N.D.	< 2
2483	MW-11	102	< 1	N.D.	< 2
2484	MW-20	< 1	< 1	N.D.	< 2
2485	MW-21	< 1	< 1	N.D.	< 2
2486	PSA-1	245	< 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. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

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: 210915
Fecha de ingreso de muestras: 210915
Fecha de análisis: 210915-300915
Fecha de informe: 300915

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)
2512	PSA-SR	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

11.6 Informes Originales de los Resultados Analíticos obtenidos del muestreo de sedimentos, Diciembre de 2015.

October 21, 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

Project ID: Escobal

ACZ Project ID: L26868

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 24, 2015. This project has been assigned to ACZ's project number, L26868. 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 L26868. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

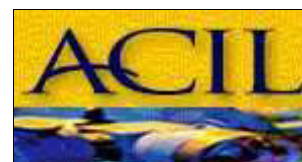
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 20, 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: SED-1

ACZ Sample ID: **L26868-01**
Date Sampled: 09/08/15 11:00
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 11:41	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 12:43	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	6510		*	mg/Kg	50	300	10/15/15 21:39	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.8	B	*	mg/Kg	0.2	1	10/14/15 18:11	msh
Arsenic, total (3050)	M6020 ICP-MS	505	17.1			mg/Kg	0.1	0.5	10/14/15 18:11	msh
Barium, total (3050)	M6020 ICP-MS	505	108			mg/Kg	0.3	1	10/14/15 18:11	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	10/13/15 23:52	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.17	B		mg/Kg	0.05	0.3	10/14/15 18:11	msh
Calcium, total (3050)	M6010B ICP	101	2860			mg/Kg	10	50	10/13/15 23:52	aeb
Chromium, total (3050)	M6020 ICP-MS	505	2.1			mg/Kg	0.3	1	10/14/15 18:11	msh
Copper, total (3050)	M6020 ICP-MS	505	10.8			mg/Kg	0.3	1	10/14/15 18:11	msh
Iron, total (3050)	M6010B ICP	101	16200		*	mg/Kg	2	5	10/13/15 23:52	aeb
Lead, total (3050)	M6020 ICP-MS	505	11.60		*	mg/Kg	0.05	0.3	10/14/15 18:11	msh
Magnesium, total (3050)	M6010B ICP	101	1040			mg/Kg	20	100	10/13/15 23:52	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	370		*	mg/Kg	30	100	10/15/15 21:39	msh
Mercury, total	M7471A CVAA	216		U	*	mg/Kg	0.04	0.2	10/05/15 10:11	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/13/15 23:52	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3.7		*	mg/Kg	0.3	2	10/14/15 18:11	msh
Potassium, total (3050)	M6010B ICP	101	1950			mg/Kg	20	100	10/13/15 23:52	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.11			mg/Kg	0.05	0.1	10/14/15 18:11	msh
Silver, total (3050)	M6020 ICP-MS	505	0.10		*	mg/Kg	0.03	0.1	10/14/15 18:11	msh
Zinc, total (3050)	M6020 ICP-MS	505	32		*	mg/Kg	1	3	10/14/15 18:11	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	74.5		*	%	0.1	0.5	10/09/15 16:09	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 15:30	arc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 2:15	bcc
Digestion - Hot Plate	M3050B ICP								10/11/15 2:15	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:31	jjo

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-1

ACZ Sample ID: **L26868-01**

Date Sampled: 09/08/15 11:00

Date Received: 09/24/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	24.5		UH	*	mg/Kg	0.1	0.5	10/02/15 12:23	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	161	0.0242		*	%	0.00161	0.00805	10/03/15 13:33	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2

ACZ Sample ID: **L26868-02**
Date Sampled: 09/08/15 10:00
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 11:53	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 12:52	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	11600		*	mg/Kg	50	300	10/20/15 12:32	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.6		*	mg/Kg	0.2	1	10/14/15 18:13	msh
Arsenic, total (3050)	M6020 ICP-MS	505	29.3			mg/Kg	0.1	0.5	10/14/15 18:13	msh
Barium, total (3050)	M6020 ICP-MS	505	40.4			mg/Kg	0.3	1	10/14/15 18:13	msh
Boron, total (3050)	M6010B ICP	101	3	B	*	mg/Kg	1	5	10/13/15 23:55	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	1.13			mg/Kg	0.05	0.3	10/14/15 18:13	msh
Calcium, total (3050)	M6010B ICP	101	26000			mg/Kg	10	50	10/13/15 23:55	aeb
Chromium, total (3050)	M6020 ICP-MS	505	4.2			mg/Kg	0.3	1	10/14/15 18:13	msh
Copper, total (3050)	M6020 ICP-MS	505	11.6			mg/Kg	0.3	1	10/14/15 18:13	msh
Iron, total (3050)	M6010B ICP	101	13200		*	mg/Kg	2	5	10/13/15 23:55	aeb
Lead, total (3050)	M6020 ICP-MS	505	53.30		*	mg/Kg	0.05	0.3	10/14/15 18:13	msh
Magnesium, total (3050)	M6010B ICP	101	5790			mg/Kg	20	100	10/13/15 23:55	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	1260		*	mg/Kg	30	100	10/20/15 12:32	msh
Mercury, total	M7471A CVAA	235	0.09	B	*	mg/Kg	0.05	0.2	10/05/15 10:14	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/13/15 23:55	aeb
Nickel, total (3050)	M6020 ICP-MS	505	5.5		*	mg/Kg	0.3	2	10/14/15 18:13	msh
Potassium, total (3050)	M6010B ICP	101	1300			mg/Kg	20	100	10/13/15 23:55	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B		mg/Kg	0.05	0.1	10/14/15 18:13	msh
Silver, total (3050)	M6020 ICP-MS	505	2.79		*	mg/Kg	0.03	0.1	10/14/15 18:13	msh
Zinc, total (3050)	M6020 ICP-MS	505	115		*	mg/Kg	1	3	10/14/15 18:13	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	76.6		*	%	0.1	0.5	10/09/15 19:57	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 15:35	arc
Digestion - Hot Plate	M3050B ICP								10/11/15 5:00	bcc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 5:00	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:34	jjo

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2

ACZ Sample ID: **L26868-02**

Date Sampled: 09/08/15 10:00

Date Received: 09/24/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	24.1		UH	*	mg/Kg	0.1	0.5	10/02/15 12:24	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	140	0.0351		*	%	0.0014	0.007	10/03/15 13:34	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2B

ACZ Sample ID: **L26868-03**
Date Sampled: 09/08/15 09:05
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 12:06	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 13:01	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	6670		*	mg/Kg	50	300	10/15/15 21:44	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.7		*	mg/Kg	0.2	1	10/14/15 18:15	msh
Arsenic, total (3050)	M6020 ICP-MS	505	22.7			mg/Kg	0.1	0.5	10/14/15 18:15	msh
Barium, total (3050)	M6020 ICP-MS	505	86.2			mg/Kg	0.3	1	10/14/15 18:15	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	10/13/15 23:58	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	1.32			mg/Kg	0.05	0.3	10/14/15 18:15	msh
Calcium, total (3050)	M6010B ICP	101	16900			mg/Kg	10	50	10/13/15 23:58	aeb
Chromium, total (3050)	M6020 ICP-MS	505	4.6			mg/Kg	0.3	1	10/14/15 18:15	msh
Copper, total (3050)	M6020 ICP-MS	505	6.9			mg/Kg	0.3	1	10/14/15 18:15	msh
Iron, total (3050)	M6010B ICP	101	10100		*	mg/Kg	2	5	10/13/15 23:58	aeb
Lead, total (3050)	M6020 ICP-MS	505	62.80		*	mg/Kg	0.05	0.3	10/14/15 18:15	msh
Magnesium, total (3050)	M6010B ICP	101	4140			mg/Kg	20	100	10/13/15 23:58	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	1830		*	mg/Kg	30	100	10/15/15 21:44	msh
Mercury, total	M7471A CVAA	205	0.05	B	*	mg/Kg	0.04	0.2	10/05/15 10:16	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/13/15 23:58	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3.9		*	mg/Kg	0.3	2	10/14/15 18:15	msh
Potassium, total (3050)	M6010B ICP	101	1370			mg/Kg	20	100	10/13/15 23:58	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.07	B		mg/Kg	0.05	0.1	10/14/15 18:15	msh
Silver, total (3050)	M6020 ICP-MS	505	9.71		*	mg/Kg	0.03	0.1	10/14/15 18:15	msh
Zinc, total (3050)	M6020 ICP-MS	505	125		*	mg/Kg	1	3	10/14/15 18:15	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	79.2		*	%	0.1	0.5	10/09/15 21:51	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 15:40	arc
Digestion - Hot Plate	M3050B ICP								10/11/15 7:45	bcc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 7:45	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:37	jjo

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2B

ACZ Sample ID: **L26868-03**

Date Sampled: 09/08/15 09:05

Date Received: 09/24/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	22.8		UH	*	mg/Kg	0.1	0.5	10/02/15 12:26	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	105	0.0245		*	%	0.00105	0.00525	10/03/15 13:37	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2A

ACZ Sample ID: **L26868-04**
Date Sampled: 09/09/15 11:30
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 12:18	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 13:10	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	51000	18900		*	mg/Kg	50	300	10/15/15 21:46	msh
Antimony, total (3050)	M6020 ICP-MS	510	3.9		*	mg/Kg	0.2	1	10/14/15 18:18	msh
Arsenic, total (3050)	M6020 ICP-MS	510	44			mg/Kg	0.1	0.5	10/14/15 18:18	msh
Barium, total (3050)	M6020 ICP-MS	510	202			mg/Kg	0.3	1	10/14/15 18:18	msh
Boron, total (3050)	M6010B ICP	102	4	B	*	mg/Kg	1	5	10/14/15 0:01	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	9.18			mg/Kg	0.05	0.3	10/14/15 18:18	msh
Calcium, total (3050)	M6010B ICP	102	33800			mg/Kg	10	50	10/14/15 0:01	aeb
Chromium, total (3050)	M6020 ICP-MS	510	9			mg/Kg	0.3	1	10/14/15 18:18	msh
Copper, total (3050)	M6020 ICP-MS	510	32.3			mg/Kg	0.3	1	10/14/15 18:18	msh
Iron, total (3050)	M6010B ICP	102	16300		*	mg/Kg	2	5	10/14/15 0:01	aeb
Lead, total (3050)	M6020 ICP-MS	51000	826		*	mg/Kg	5	30	10/15/15 21:46	msh
Magnesium, total (3050)	M6010B ICP	102	5750			mg/Kg	20	100	10/14/15 0:01	aeb
Manganese, total (3050)	M6020 ICP-MS	51000	2850		*	mg/Kg	30	100	10/15/15 21:46	msh
Mercury, total	M7471A CVAA	353	0.18	B	*	mg/Kg	0.07	0.4	10/05/15 10:18	pta
Molybdenum, total (3050)	M6010B ICP	102	4	B		mg/Kg	2	10	10/14/15 0:01	aeb
Nickel, total (3050)	M6020 ICP-MS	510	7		*	mg/Kg	0.3	2	10/14/15 18:18	msh
Potassium, total (3050)	M6010B ICP	102	2080			mg/Kg	20	100	10/14/15 0:01	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.20			mg/Kg	0.05	0.1	10/14/15 18:18	msh
Silver, total (3050)	M6020 ICP-MS	51000	33		*	mg/Kg	3	10	10/15/15 21:46	msh
Zinc, total (3050)	M6020 ICP-MS	51000	800		*	mg/Kg	100	300	10/15/15 21:46	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	51		*	%	0.1	0.5	10/09/15 23:46	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 15:46	arc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 10:30	bcc
Digestion - Hot Plate	M3050B ICP								10/11/15 10:30	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:40	jjo

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2A

ACZ Sample ID: **L26868-04**

Date Sampled: 09/09/15 11:30

Date Received: 09/24/15

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	10/02/15 12:27	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	100	0.0286		*	%	0.001	0.005	10/03/15 13:38	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-3

ACZ Sample ID: **L26868-05**
Date Sampled: 09/09/15 12:30
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 12:31	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 13:19	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	5980		*	mg/Kg	50	300	10/15/15 21:49	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.4	B	*	mg/Kg	0.2	1	10/14/15 18:20	msh
Arsenic, total (3050)	M6020 ICP-MS	505	7.3			mg/Kg	0.1	0.5	10/14/15 18:20	msh
Barium, total (3050)	M6020 ICP-MS	505	153			mg/Kg	0.3	1	10/14/15 18:20	msh
Boron, total (3050)	M6010B ICP	101	1	B	*	mg/Kg	1	5	10/14/15 0:04	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.22	B		mg/Kg	0.05	0.3	10/14/15 18:20	msh
Calcium, total (3050)	M6010B ICP	101	1790			mg/Kg	10	50	10/14/15 0:04	aeb
Chromium, total (3050)	M6020 ICP-MS	505	1.5			mg/Kg	0.3	1	10/14/15 18:20	msh
Copper, total (3050)	M6020 ICP-MS	505	3.6			mg/Kg	0.3	1	10/14/15 18:20	msh
Iron, total (3050)	M6010B ICP	101	7960		*	mg/Kg	2	5	10/14/15 0:04	aeb
Lead, total (3050)	M6020 ICP-MS	505	17.0		*	mg/Kg	0.05	0.3	10/14/15 18:20	msh
Magnesium, total (3050)	M6010B ICP	101	540			mg/Kg	20	100	10/14/15 0:04	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	630		*	mg/Kg	30	100	10/15/15 21:49	msh
Mercury, total	M7471A CVAA	227	0.05	B	*	mg/Kg	0.05	0.2	10/05/15 10:20	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/14/15 0:04	aeb
Nickel, total (3050)	M6020 ICP-MS	505	0.5	B	*	mg/Kg	0.3	2	10/14/15 18:20	msh
Potassium, total (3050)	M6010B ICP	101	1640			mg/Kg	20	100	10/14/15 0:04	aeb
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/14/15 18:20	msh
Silver, total (3050)	M6020 ICP-MS	505	0.05	B	*	mg/Kg	0.03	0.1	10/14/15 18:20	msh
Zinc, total (3050)	M6020 ICP-MS	505	24		*	mg/Kg	1	3	10/14/15 18:20	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	78		*	%	0.1	0.5	10/10/15 1:40	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 15:51	arc
Digestion - Hot Plate	M3050B ICP								10/11/15 13:15	bcc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 13:15	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:43	jjo

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-3

ACZ Sample ID: **L26868-05**
Date Sampled: 09/09/15 12:30
Date Received: 09/24/15
Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	23.8		UH	*	mg/Kg	0.1	0.5	10/02/15 12:28	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	97	0.0139		*	%	0.00097	0.00485	10/03/15 13:39	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4

ACZ Sample ID: **L26868-06**
Date Sampled: 09/08/15 08:40
Date Received: 09/24/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 12:44	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 13:28	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	9710		*	mg/Kg	50	300	10/15/15 21:56	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.6		*	mg/Kg	0.2	1	10/14/15 18:27	msh
Arsenic, total (3050)	M6020 ICP-MS	505	10.9			mg/Kg	0.1	0.5	10/14/15 18:27	msh
Barium, total (3050)	M6020 ICP-MS	505	139			mg/Kg	0.3	1	10/14/15 18:27	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	10/14/15 0:07	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.37			mg/Kg	0.05	0.3	10/14/15 18:27	msh
Calcium, total (3050)	M6010B ICP	101	2940			mg/Kg	10	50	10/14/15 0:07	aeb
Chromium, total (3050)	M6020 ICP-MS	505	4			mg/Kg	0.3	1	10/14/15 18:27	msh
Copper, total (3050)	M6020 ICP-MS	505	6.5			mg/Kg	0.3	1	10/14/15 18:27	msh
Iron, total (3050)	M6010B ICP	101	12300		*	mg/Kg	2	5	10/14/15 0:07	aeb
Lead, total (3050)	M6020 ICP-MS	505	11.70		*	mg/Kg	0.05	0.3	10/14/15 18:27	msh
Magnesium, total (3050)	M6010B ICP	101	1490			mg/Kg	20	100	10/14/15 0:07	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	440		*	mg/Kg	30	100	10/15/15 21:56	msh
Mercury, total	M7471A CVAA	234		U	*	mg/Kg	0.05	0.2	10/05/15 10:22	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/14/15 0:07	aeb
Nickel, total (3050)	M6020 ICP-MS	505	2.3		*	mg/Kg	0.3	2	10/14/15 18:27	msh
Potassium, total (3050)	M6010B ICP	101	1510			mg/Kg	20	100	10/14/15 0:07	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B		mg/Kg	0.05	0.1	10/14/15 18:27	msh
Silver, total (3050)	M6020 ICP-MS	505	0.21		*	mg/Kg	0.03	0.1	10/14/15 18:27	msh
Zinc, total (3050)	M6020 ICP-MS	505	38		*	mg/Kg	1	3	10/14/15 18:27	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	74.9		*	%	0.1	0.5	10/10/15 3:34	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 15:57	arc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 16:00	bcc
Digestion - Hot Plate	M3050B ICP								10/11/15 16:00	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:46	jjo

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4

ACZ Sample ID: **L26868-06**

Date Sampled: 09/08/15 08:40

Date Received: 09/24/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	27.1		UH	*	mg/Kg	0.2	0.5	10/02/15 12:29	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	95.5	0.00819		*	%	0.00096	0.00478	10/03/15 13:40	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4A

ACZ Sample ID: **L26868-07**
Date Sampled: 09/09/15 11:00
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 12:56	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 13:56	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	8010		*	mg/Kg	50	300	10/15/15 21:58	msh
Antimony, total (3050)	M6020 ICP-MS	505	2.4		*	mg/Kg	0.2	1	10/14/15 18:30	msh
Arsenic, total (3050)	M6020 ICP-MS	505	19.6			mg/Kg	0.1	0.5	10/14/15 18:30	msh
Barium, total (3050)	M6020 ICP-MS	505	147			mg/Kg	0.3	1	10/14/15 18:30	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	10/14/15 0:11	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.74			mg/Kg	0.05	0.3	10/14/15 18:30	msh
Calcium, total (3050)	M6010B ICP	101	7370			mg/Kg	10	50	10/14/15 0:11	aeb
Chromium, total (3050)	M6020 ICP-MS	505	6.3			mg/Kg	0.3	1	10/14/15 18:30	msh
Copper, total (3050)	M6020 ICP-MS	505	10.1			mg/Kg	0.3	1	10/14/15 18:30	msh
Iron, total (3050)	M6010B ICP	101	12600		*	mg/Kg	2	5	10/14/15 0:11	aeb
Lead, total (3050)	M6020 ICP-MS	505	32.20		*	mg/Kg	0.05	0.3	10/14/15 18:30	msh
Magnesium, total (3050)	M6010B ICP	101	2320			mg/Kg	20	100	10/14/15 0:11	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	1640		*	mg/Kg	30	100	10/15/15 21:58	msh
Mercury, total	M7471A CVAA	215		U	*	mg/Kg	0.04	0.2	10/05/15 10:24	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/14/15 0:11	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3.9		*	mg/Kg	0.3	2	10/14/15 18:30	msh
Potassium, total (3050)	M6010B ICP	101	1360			mg/Kg	20	100	10/14/15 0:11	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.06	B		mg/Kg	0.05	0.1	10/14/15 18:30	msh
Silver, total (3050)	M6020 ICP-MS	505	1.35		*	mg/Kg	0.03	0.1	10/14/15 18:30	msh
Zinc, total (3050)	M6020 ICP-MS	505	76		*	mg/Kg	1	3	10/14/15 18:30	msh

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	10/10/15 5:28	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 16:02	arc
Digestion - Hot Plate	M3050B ICP								10/11/15 18:45	bcc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 18:45	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:49	jjo

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-4AACZ Sample ID: **L26868-07**
Date Sampled: 09/09/15 11:00
Date Received: 09/24/15
Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	23.7		UH	*	mg/Kg	0.1	0.5	10/02/15 12:30	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	159	0.0240		*	%	0.00159	0.00795	10/03/15 13:44	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-5

ACZ Sample ID: **L26868-08**

Date Sampled: 09/08/15 07:30

Date Received: 09/24/15

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 13:09	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 14:14	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	12000		*	mg/Kg	50	300	10/15/15 22:00	msh
Antimony, total (3050)	M6020 ICP-MS	510	4.2		*	mg/Kg	0.2	1	10/14/15 18:32	msh
Arsenic, total (3050)	M6020 ICP-MS	510	13.1			mg/Kg	0.1	0.5	10/14/15 18:32	msh
Barium, total (3050)	M6020 ICP-MS	510	194			mg/Kg	0.3	1	10/14/15 18:32	msh
Boron, total (3050)	M6010B ICP	102	1	B	*	mg/Kg	1	5	10/14/15 0:20	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	0.35			mg/Kg	0.05	0.3	10/14/15 18:32	msh
Calcium, total (3050)	M6010B ICP	102	1750			mg/Kg	10	50	10/14/15 0:20	aeb
Chromium, total (3050)	M6020 ICP-MS	510	4.6			mg/Kg	0.3	1	10/14/15 18:32	msh
Copper, total (3050)	M6020 ICP-MS	510	7.2			mg/Kg	0.3	1	10/14/15 18:32	msh
Iron, total (3050)	M6010B ICP	102	15200		*	mg/Kg	2	5	10/14/15 0:20	aeb
Lead, total (3050)	M6020 ICP-MS	510	10.0		*	mg/Kg	0.05	0.3	10/14/15 18:32	msh
Magnesium, total (3050)	M6010B ICP	102	950			mg/Kg	20	100	10/14/15 0:20	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	700		*	mg/Kg	30	100	10/15/15 22:00	msh
Mercury, total	M7471A CVAA	250	0.10	B	*	mg/Kg	0.05	0.3	10/05/15 10:31	pta
Molybdenum, total (3050)	M6010B ICP	102		U		mg/Kg	2	10	10/14/15 0:20	aeb
Nickel, total (3050)	M6020 ICP-MS	510	1.8	B	*	mg/Kg	0.3	2	10/14/15 18:32	msh
Potassium, total (3050)	M6010B ICP	102	1230			mg/Kg	20	100	10/14/15 0:20	aeb
Selenium, total (3050)	M6020 ICP-MS	510		U		mg/Kg	0.05	0.1	10/14/15 18:32	msh
Silver, total (3050)	M6020 ICP-MS	510	0.07	B	*	mg/Kg	0.03	0.1	10/14/15 18:32	msh
Zinc, total (3050)	M6020 ICP-MS	510	24		*	mg/Kg	1	3	10/14/15 18:32	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	70.3		*	%	0.1	0.5	10/10/15 7:23	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 16:08	arc
Digestion - Hot Plate	M3050B ICP-MS								10/11/15 21:30	bcc
Digestion - Hot Plate	M3050B ICP								10/11/15 21:30	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:52	jjo

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-5

ACZ Sample ID: **L26868-08**

Date Sampled: 09/08/15 07:30

Date Received: 09/24/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	26.4		UH	*	mg/Kg	0.2	0.5	10/02/15 12:31	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	64.4	0.00759		*	%	0.00064	0.00322	10/03/15 13:46	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-6

ACZ Sample ID: **L26868-09**
Date Sampled: 09/09/15 08:10
Date Received: 09/24/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 13:22	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 14:32	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	5650		*	mg/Kg	50	300	10/15/15 22:02	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.3	B	*	mg/Kg	0.2	1	10/14/15 18:34	msh
Arsenic, total (3050)	M6020 ICP-MS	505	13.2			mg/Kg	0.1	0.5	10/14/15 18:34	msh
Barium, total (3050)	M6020 ICP-MS	505	53.7			mg/Kg	0.3	1	10/14/15 18:34	msh
Boron, total (3050)	M6010B ICP	101	4	B	*	mg/Kg	1	5	10/14/15 0:23	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.14	B		mg/Kg	0.05	0.3	10/14/15 18:34	msh
Calcium, total (3050)	M6010B ICP	101	1260			mg/Kg	10	50	10/14/15 0:23	aeb
Chromium, total (3050)	M6020 ICP-MS	505	3.9			mg/Kg	0.3	1	10/14/15 18:34	msh
Copper, total (3050)	M6020 ICP-MS	505	5.8			mg/Kg	0.3	1	10/14/15 18:34	msh
Iron, total (3050)	M6010B ICP	101	10500		*	mg/Kg	2	5	10/14/15 0:23	aeb
Lead, total (3050)	M6020 ICP-MS	505	4.95		*	mg/Kg	0.05	0.3	10/14/15 18:34	msh
Magnesium, total (3050)	M6010B ICP	101	920			mg/Kg	20	100	10/14/15 0:23	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	180		*	mg/Kg	30	100	10/15/15 22:02	msh
Mercury, total	M7471A CVAA	255		U	*	mg/Kg	0.05	0.3	10/05/15 10:33	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/14/15 0:23	aeb
Nickel, total (3050)	M6020 ICP-MS	505	1.2	B	*	mg/Kg	0.3	2	10/14/15 18:34	msh
Potassium, total (3050)	M6010B ICP	101	1170			mg/Kg	20	100	10/14/15 0:23	aeb
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/14/15 18:34	msh
Silver, total (3050)	M6020 ICP-MS	505	0.05	B	*	mg/Kg	0.03	0.1	10/14/15 18:34	msh
Zinc, total (3050)	M6020 ICP-MS	505	19		*	mg/Kg	1	3	10/14/15 18:34	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	73.9		*	%	0.1	0.5	10/10/15 9:17	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 16:13	arc
Digestion - Hot Plate	M3050B ICP-MS								10/12/15 0:15	bcc
Digestion - Hot Plate	M3050B ICP								10/12/15 0:15	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:55	jjo

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-6

ACZ Sample ID: **L26868-09**
Date Sampled: 09/09/15 08:10
Date Received: 09/24/15
Sample Matrix: Sediment

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	24.5		UH	*	mg/Kg	0.1	0.5	10/02/15 12:32	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	78.8	0.0138		*	%	0.00079	0.00394	10/03/15 13:51	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-7

ACZ Sample ID: **L26868-10**
Date Sampled: 09/08/15 08:00
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 13:34	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 14:41	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	10100		*	mg/Kg	50	300	10/15/15 22:05	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.6	B	*	mg/Kg	0.2	1	10/14/15 18:37	msh
Arsenic, total (3050)	M6020 ICP-MS	505	9.7			mg/Kg	0.1	0.5	10/14/15 18:37	msh
Barium, total (3050)	M6020 ICP-MS	505	132			mg/Kg	0.3	1	10/14/15 18:37	msh
Boron, total (3050)	M6010B ICP	101	1	B	*	mg/Kg	1	5	10/14/15 0:29	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.67			mg/Kg	0.05	0.3	10/14/15 18:37	msh
Calcium, total (3050)	M6010B ICP	101	2490			mg/Kg	10	50	10/14/15 0:29	aeb
Chromium, total (3050)	M6020 ICP-MS	505	8.2			mg/Kg	0.3	1	10/14/15 18:37	msh
Copper, total (3050)	M6020 ICP-MS	505	8.6			mg/Kg	0.3	1	10/14/15 18:37	msh
Iron, total (3050)	M6010B ICP	101	12200		*	mg/Kg	2	5	10/14/15 0:29	aeb
Lead, total (3050)	M6020 ICP-MS	505	9.86		*	mg/Kg	0.05	0.3	10/14/15 18:37	msh
Magnesium, total (3050)	M6010B ICP	101	1970			mg/Kg	20	100	10/14/15 0:29	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	450		*	mg/Kg	30	100	10/15/15 22:05	msh
Mercury, total	M7471A CVAA	218		U	*	mg/Kg	0.04	0.2	10/05/15 10:36	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/14/15 0:29	aeb
Nickel, total (3050)	M6020 ICP-MS	505	4.6		*	mg/Kg	0.3	2	10/14/15 18:37	msh
Potassium, total (3050)	M6010B ICP	101	1720			mg/Kg	20	100	10/14/15 0:29	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.06	B		mg/Kg	0.05	0.1	10/14/15 18:37	msh
Silver, total (3050)	M6020 ICP-MS	505	0.09	B	*	mg/Kg	0.03	0.1	10/14/15 18:37	msh
Zinc, total (3050)	M6020 ICP-MS	505	46		*	mg/Kg	1	3	10/14/15 18:37	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	80.6		*	%	0.1	0.5	10/10/15 11:11	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 16:19	arc
Digestion - Hot Plate	M3050B ICP-MS								10/12/15 3:00	bcc
Digestion - Hot Plate	M3050B ICP								10/12/15 3:00	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 16:58	jjo

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-7

ACZ Sample ID: **L26868-10**

Date Sampled: 09/08/15 08:00

Date Received: 09/24/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	17.7		UH	*	mg/Kg	0.1	0.4	10/02/15 12:33	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	55.2	0.0189		*	%	0.00055	0.00276	10/03/15 13:52	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-8

ACZ Sample ID: **L26868-11**
Date Sampled: 09/09/15 09:45
Date Received: 09/24/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 13:47	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 14:50	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	5610		*	mg/Kg	50	300	10/15/15 22:07	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.2	B	*	mg/Kg	0.2	1	10/14/15 18:39	msh
Arsenic, total (3050)	M6020 ICP-MS	505	6.1			mg/Kg	0.1	0.5	10/14/15 18:39	msh
Barium, total (3050)	M6020 ICP-MS	505	59.3			mg/Kg	0.3	1	10/14/15 18:39	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	10/14/15 0:33	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.22	B		mg/Kg	0.05	0.3	10/14/15 18:39	msh
Calcium, total (3050)	M6010B ICP	101	1450			mg/Kg	10	50	10/14/15 0:33	aeb
Chromium, total (3050)	M6020 ICP-MS	505	1.2			mg/Kg	0.3	1	10/14/15 18:39	msh
Copper, total (3050)	M6020 ICP-MS	505	6.5			mg/Kg	0.3	1	10/14/15 18:39	msh
Iron, total (3050)	M6010B ICP	101	6860		*	mg/Kg	2	5	10/14/15 0:33	aeb
Lead, total (3050)	M6020 ICP-MS	505	12.50		*	mg/Kg	0.05	0.3	10/14/15 18:39	msh
Magnesium, total (3050)	M6010B ICP	101	450			mg/Kg	20	100	10/14/15 0:33	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	260		*	mg/Kg	30	100	10/15/15 22:07	msh
Mercury, total	M7471A CVAA	252		U	*	mg/Kg	0.05	0.3	10/05/15 10:38	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/14/15 0:33	aeb
Nickel, total (3050)	M6020 ICP-MS	505		U	*	mg/Kg	0.3	2	10/14/15 18:39	msh
Potassium, total (3050)	M6010B ICP	101	1590			mg/Kg	20	100	10/14/15 0:33	aeb
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/14/15 18:39	msh
Silver, total (3050)	M6020 ICP-MS	505	0.31		*	mg/Kg	0.03	0.1	10/14/15 18:39	msh
Zinc, total (3050)	M6020 ICP-MS	505	41		*	mg/Kg	1	3	10/14/15 18:39	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	76		*	%	0.1	0.5	10/10/15 13:05	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 16:24	arc
Digestion - Hot Plate	M3050B ICP-MS								10/12/15 5:45	bcc
Digestion - Hot Plate	M3050B ICP								10/12/15 5:45	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 17:01	jjo

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-8ACZ Sample ID: **L26868-11**
Date Sampled: 09/09/15 09:45
Date Received: 09/24/15
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	10/02/15 12:33	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	119	0.0314		*	%	0.00119	0.00595	10/03/15 13:53	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-9

ACZ Sample ID: **L26868-12**
Date Sampled: 09/09/15 09:00
Date Received: 09/24/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								10/01/15 14:00	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								10/01/15 14:59	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	5120		*	mg/Kg	50	300	10/15/15 22:09	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.3	B	*	mg/Kg	0.2	1	10/14/15 18:42	msh
Arsenic, total (3050)	M6020 ICP-MS	505	4.4			mg/Kg	0.1	0.5	10/14/15 18:42	msh
Barium, total (3050)	M6020 ICP-MS	505	142			mg/Kg	0.3	1	10/14/15 18:42	msh
Boron, total (3050)	M6010B ICP	101	1	B	*	mg/Kg	1	5	10/14/15 0:36	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.16	B		mg/Kg	0.05	0.3	10/14/15 18:42	msh
Calcium, total (3050)	M6010B ICP	101	1430			mg/Kg	10	50	10/14/15 0:36	aeb
Chromium, total (3050)	M6020 ICP-MS	505	1.6			mg/Kg	0.3	1	10/14/15 18:42	msh
Copper, total (3050)	M6020 ICP-MS	505	4.1			mg/Kg	0.3	1	10/14/15 18:42	msh
Iron, total (3050)	M6010B ICP	101	6800		*	mg/Kg	2	5	10/14/15 0:36	aeb
Lead, total (3050)	M6020 ICP-MS	505	4.97		*	mg/Kg	0.05	0.3	10/14/15 18:42	msh
Magnesium, total (3050)	M6010B ICP	101	600			mg/Kg	20	100	10/14/15 0:36	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	260		*	mg/Kg	30	100	10/15/15 22:09	msh
Mercury, total	M7471A CVAA	276		U	*	mg/Kg	0.06	0.3	10/05/15 10:40	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	10/14/15 0:36	aeb
Nickel, total (3050)	M6020 ICP-MS	505		U	*	mg/Kg	0.3	2	10/14/15 18:42	msh
Potassium, total (3050)	M6010B ICP	101	1580			mg/Kg	20	100	10/14/15 0:36	aeb
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	10/14/15 18:42	msh
Silver, total (3050)	M6020 ICP-MS	505	0.05	B	*	mg/Kg	0.03	0.1	10/14/15 18:42	msh
Zinc, total (3050)	M6020 ICP-MS	505	25		*	mg/Kg	1	3	10/14/15 18:42	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	72.1		*	%	0.1	0.5	10/10/15 15:00	jjo/pta

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								10/06/15 16:29	arc
Digestion - Hot Plate	M3050B ICP								10/12/15 8:30	bcc
Digestion - Hot Plate	M3050B ICP-MS								10/12/15 8:30	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								10/08/15 17:04	jjo

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-9

ACZ Sample ID: **L26868-12**
Date Sampled: 09/09/15 09:00
Date Received: 09/24/15
Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	16.2		UH	*	mg/Kg	0.1	0.3	10/02/15 12:34	krh/ms s
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	101	0.0101		*	%	0.00101	0.00505	10/03/15 13:54	pjb

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-01	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
			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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION	
L26868-02	WG392624	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.	
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.	
			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.
	WG392286	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.	
			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.	
	WG392624	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.	
			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.	
	WG391582	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.	
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.	
			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.
WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.		
		M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.		
		M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.		
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).		

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-03	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
			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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-04	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG392432	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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-05	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
			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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-06	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-07	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391685	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-08	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG391685	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.	

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-09	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG391685	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.	

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-10	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391685	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-11	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391685	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26868-12	WG392432	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.
	WG392286	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG392248	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		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.
	WG392286	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.
	WG392432	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.
	WG391582	Mercury, total	M7471A CVAAs	Q6	Sample was received above recommended temperature.
	WG392286	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG391635	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG391685	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

Tahoe Resources, Inc.

ACZ Project ID: **L26868**

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: L26868
 Date Received: 09/24/2015 09:59
 Received By: ddp
 Date Printed: 9/24/2015

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 Copy of Report to: on COC 1 and Date: Time Line 1 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? 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? 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?
NA22627	17.4	13	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: L26868
Date Received: 09/24/2015 09:59
Received By: ddp
Date Printed: 9/24/2015

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

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. *C26868*

CHAIN of CUSTODY

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

Report to:

Name: <i>Miguel Berganza</i>	Address: <i>Bulevar Los Próceres 18 calle 24-69 zona 10</i>
Company: <i>Tahoe Resources Inc.</i>	<i>Empresarial, zona Prodera, Torre IV Oficina 1406</i>
E-mail: <i>MBerganza@sonrafael.com.gt</i>	Telephone: <i>(502) 5951-5248</i>

Copy of Report to:

Name: [REDACTED]	E-mail: [REDACTED]
Company: [REDACTED]	Telephone: [REDACTED]

Invoice to:

Name: <i>Miguel Berganza</i>	Address:
Company: <i>Tahoe Resources Inc.</i>	
E-mail: <i>MBerganza@sonrafael.com.gt</i>	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

Sampler's Name: *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 #: *Wates Quality*
 PO#: *Escobal*
 Reporting state for compliance testing: _____
 Check box if samples include NRC licensed material?

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SED									
SED-1	08/09/15 11:00	SO	1	/									
SED-2	08/09/15 10:00	SO	1	/									
SED-2B	08/09/15 09:05	SO	1	/									
SED-2A	09/09/15 11:30	SO	1	/									
SED-3	09/09/15 12:30	SO	1	/									
SED-4	08/09/15 08:40	SO	1	/									
SED-4A	09/09/15 11:00	SO	1	/									
SED-5	08/09/15 07:30	SO	1	/									
SED-6	09/09/15 08:10	SO	1	/									
SED-7	08/09/15 08:00	SO	1	/									

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

REMARKS

COC#1/2

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
		<i>[Signature]</i>	<i>09/15 07:59</i>



Chain of Custody

1



Laboratories, Inc.

26868

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard los Picones 19, Calle 24-69 Zona 10
Empresarial, Zona Picones, Torre IV Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc.
E-mail: MBerganza@scannafuel.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 for Quote #, PO#, Reporting state, and a grid for analyses requested. Quote #: Water Quality, PO#: Escobal.

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, SED, and a grid for analyses requested. Includes handwritten entries for SED-8, SED-9, SED-GW1A, SED-GW2, SED-Pieta, SED-WW9, SED-WW4, SED-WW7.

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

REMARKS

* COC # 2/2 Please present results of SED-8 and SED-9 with COC # 1.

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 MLC and date 9/25/09.

2

United States Department of Agriculture
 Animal and Plant Health Inspection Service
 4700 River Road
 Riverdale, MD 20737

Permit to Receive Soil
Regulated by 7 CFR 330

This permit was generated electronically via the ePermits system.

PERMITTEE NAME:	Ms. Audrey J Stover	PERMIT NUMBER:	P330-13-00153
COMPANY:	ACZ Laboratories, Inc.	APPLICATION NUMBER:	P525-130418-001
RECEIVING ADDRESS:	2773 Downhill Drive Steamboat Springs, CO 80487	DATE ISSUED:	05/22/2013
MAILING ADDRESS:	2773 Downhill Drive Steamboat Springs, CO 80487		
PHONE:	(970) 879-6590 Ext. 515	EXPIRES:	05/22/2016
FAX:	(815) 301-3857		


PORTS OF ARRIVAL/PLANT INSPECTION STATIONS: AK, Anchorage; AL, Huntsville; AL, Mobile; AZ, Douglas; AZ, Lukeville; AZ, Naco; AZ, Nogales; AZ, Phoenix; AZ, San Luis; AZ, Tucson; CA, Calexico; CA, Fresno; CA, Hawthorne; CA, Hawthorne; CA, Long Beach; CA, Oakland; CA, Ontario; CA, Otay Mesa; CA, Port Hueneme; CA, Sacramento; CA, San Diego; CA, San Francisco; CA, San Jose; CA, San Ysidro; CA, Tecate; CO, Denver; CT, Hartford; CT, New Haven; DE, Dover; DE, Wilmington; FL, Ft. Lauderdale; FL, Ft. Myers; FL, Ft. Pierce; FL, Jacksonville; FL, Key West; FL, Miami; FL, Orlando; FL, Pensacola; FL, Port Canaveral; FL, Port Everglades; FL, Sanford; FL, Tampa; FL, West Palm Beach; GA, Atlanta; GA, Savannah; GU, Agana; HI, Hilo; HI, Honolulu; HI, Kahului; HI, Kailua-Kona; HI, Lihue; ID, Eastport; IL, Chicago; IN, Indianapolis; KY, Louisville; MA, South Boston; MD, Baltimore; MD, Beltsville; ME, Bangor; ME, Calais; ME, Houlton; ME, Portland; MI, Detroit; MI, Port Huron; MI, Romulus; MI, Sault Saint Marie; MN, Duluth; MN, Grand Portage; MN, International Falls; MN, Minneapolis; MO, Kansas City; MO, St. Louis; MP, Commonwealth of the Northern Mariana Islands; MS, Gulfport; MS, Port Bienville; MT, Raymond; MT, Roosville; MT, Sweetgrass; NC, Raleigh; NC, Wilmington; ND, Dunseith; ND, Pembina; ND, Portal; NJ, Linden; NJ, Newark; NM, Albuquerque; NM, Columbus; NM, SantaTeresa; NV, Las Vegas; NY, Albany; NY, Alexandria Bay; NY, Brooklyn; NY, Buffalo; NY, Champlain, Rouses Point; NY, Jamaica; NY, Jamaica; NY, Newburgh; OH, Ashtabula; OH, Cincinnati; OH, Cleveland; OH, Columbus; OH, Toledo; OH, Wilmington; OK, Oklahoma City; OR, Portland; PA, Allentown; PA, Harrisburg; PA, Philadelphia; PA, Pittsburgh; PA, Scranton; PR, Aguadilla; PR, Carolina; PR, Fajardo; PR, Mayaguez; PR, Ponce; RI, Warwick/Providence; SC, Charleston; TN, Memphis; TN, Nashville; TX, Austin; TX, Brownsville; TX, Corpus Christi; TX, Dallas; TX, Del Rio; TX, Eagle Pass; TX, El Paso; TX, Fabens; TX, Falcon; TX, Fort Hancock; TX, Galveston; TX, Hidalgo; TX, Humble; TX, Laredo; TX, Los Indios; TX, Pharr; TX, Port Arthur; TX, Presidio; TX, Progresso; TX, Rio Grande City; TX, Roma; TX, San Antonio; TX, Victoria; UT, Salt Lake City; VA, Dulles; VA, Norfolk; VI, St. Croix; VI, St. Thomas; VT, Berlin; WA, Blaine; WA, Oroville; WA, Port Angeles; WA, SeaTac; WA, Sumas; WI, Green Bay; WI, Milwaukee

HAND CARRY: No

Under the conditions specified, this permit authorizes the following:
Quantity of Soil per Shipment and Treatment
 Over 3 lbs - Your facility MUST be inspected and approved to receive this soil

SPECIAL INSTRUCTIONS TO INSPECTORS
 See permit conditions below

Permit Number P330-13-00153

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITTS.  Osmond Baron	DATE 05/22/2013
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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:
- Soil must be autoclaved at 121 degrees Centigrade (250 degrees Fahrenheit) for a minimum of 30 minutes at 15 psi.
 - 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.
 - 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.
 - 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.
 - 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.
 - 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.

- 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.
- 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.
- 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.
- Any alteration, forgery, unauthorized use of this permit and/or associated Federal Forms are subject to civil and criminal penalties including fines and imprisonment.
- 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

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.	DATE
	
Osmond Baron	05/22/2013

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)

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.

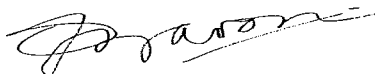
27. Incineration: With the exception of metal and glass containers, all regulated and associated material must be reduced completely to ash at the end of the incineration cycle.

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>Osmond Baron</p>	<p>DATE</p> <p>05/22/2013</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)

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

Audrey J. Stover

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

13. SIGNATURE

Patrick McPherran

12. ADDRESS

USDA APHIS PPQ
3950 N. Lewiston St. Suite 104
Aurora, CO 80011

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

Mitch Yergert

11.7 Informes Originales de los Resultados Analíticos obtenidos del Efluente en los meses de Noviembre de 2015 a Enero de 2016.

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: 310815

Fecha de ingreso de muestras: 310815

Fecha de análisis: 310815-100915

Fecha de informe: 100915

Identificación de la muestra: WW9

Correlativo Ecosistemas: 2305

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	7.60	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	0.008	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

					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	23	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	7	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	23	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 limites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 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*

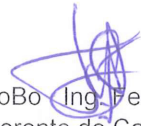
*** Análisis referido.*

****El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio.*

Comparación de descarga según información del cliente.



Ing. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

September 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:

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

Project ID: Escobal

ACZ Project ID: L26476

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 04, 2015. This project has been assigned to ACZ's project number, L26476. 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 L26476. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

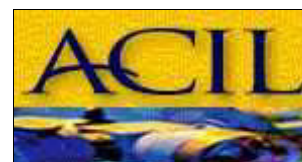
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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

September 23, 2015

Project ID: Escobal

ACZ Project ID: L26476

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 miscellaneous samples from Tahoe Resources, Inc. on September 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 L26476. 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 (H1, H3, HC), received either after the hold time expired, too close to the hold time or requiring re-analysis 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.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: WW9

ACZ Sample ID: **L26476-01**
Date Sampled: 08/31/15 12:00
Date Received: 09/04/15
Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								09/09/15 13:40	spl
Cyanide, WAD	SM4500-CN I- distillation								09/11/15 12:49	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								09/11/15 14:57	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								09/16/15 15:28	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								09/10/15 14:24	spl
Total Hot Plate Digestion	M200.2 ICP-MS								09/17/15 14:40	scp
Total Hot Plate Digestion	M200.2 ICP								09/11/15 13:22	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: WW9

ACZ Sample ID: **L26476-01**
Date Sampled: 08/31/15 12:00
Date Received: 09/04/15
Sample Matrix: Waste Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	82.9		*	mg/L	2	20	09/14/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	09/14/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	09/14/15 0:00	enb
Total Alkalinity		1	82.9		*	mg/L	2	20	09/14/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			09/23/15 8:54	calc
Sum of Anions			22			meq/L			09/23/15 8:54	calc
Sum of Cations			22			meq/L			09/23/15 8:54	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	09/15/15 9:40	enb
Chloride	SM4500Cl-E	1	65.4		*	mg/L	0.5	2	09/14/15 15:05	mss2
Conductivity @25C	SM2510B	1	1870		*	umhos/cm	1	10	09/11/15 18:27	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/10/15 14:33	spl
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	09/11/15 15:52	bsu
Fluoride	SM4500F-C	1	1.20		*	mg/L	0.05	0.3	09/09/15 19:35	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		934			mg/L	0.8	4	09/23/15 8:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.43		*	mg/L	0.02	0.1	09/11/15 22:08	pjb
Nitrogen, ammonia	M350.1	1	0.84		*	mg/L	0.05	0.2	09/10/15 13:25	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.2		*	mg/L	0.1	0.5	09/12/15 13:05	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	09/11/15 0:00	id
pH measured at		1	19.3		*	C	0.1	0.1	09/11/15 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	09/23/15 8:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	09/16/15 23:06	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	09/10/15 19:27	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	09/10/15 21:57	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1520		*	mg/L	10	20	09/04/15 14:34	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8.0	B	*	mg/L	5	20	09/04/15 16:39	sck
Residue, Total (TS) @ 105C	SM2540B	1	1600		*	mg/L	10	20	09/04/15 16:10	tms
Sulfate	D516-02/-07 - Turbidimetric	50	888		*	mg/L	50	250	09/15/15 14:16	bsu
Sulfide as S	SM4500S2-D	1		UH	*	mg/L	0.02	0.1	09/08/15 13:47	enb
TDS (calculated)	Calculation		1450			mg/L			09/23/15 8:54	calc
TDS (ratio - measured/calculated)	Calculation		1.05						09/23/15 8:54	calc

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>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: **L26476**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26476-01	WG390310	*All Compounds*	M8015D GC/FID	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).
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390115	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.
	WG389971	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L26476-02	WG390310	*All Compounds*	M8015D GC/FID	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).
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG390115	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.
	WG389971	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L26476
 Date Received: 09/04/2015 10:00
 Received By: ddp
 Date Printed: 9/4/2015

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? 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	

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?
NA22499	22.5	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.
Escobal

ACZ Project ID: L26476
Date Received: 09/04/2015 10:00
Received By: ddp
Date Printed: 9/4/2015

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.

L26476

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard Los Próceres 18 Calle 24-69 Zona 10
Empresarial Zona Pradera Torre IV 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@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)

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

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, SW, TOTAL CN. Rows include WW9, WW10, Pileta de Proceso, Pozo PP, EP-10, Agua de Proceso, Pileta 1, Pileta 2.

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

REMARKS

Please report cyanide results in a different document.

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.

Vertical barcode and Chain of Custody text on the left margin.

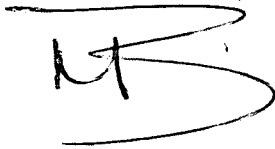
Guatemala August 31st, 2015

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).

Sincerely yours,

A handwritten signature in black ink, appearing to be the initials 'MB' with a large, sweeping flourish underneath.

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

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua 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: 280915

Fecha de ingreso de muestras: 280915

Fecha de análisis: 280915-091015

Fecha de informe: 091015

Identificación de la muestra: WW 9

Correlativo Ecosistemas: 2660

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	8.09	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

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	10	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	7.0 x 10 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.*

****"El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio".*

Comparación de descarga según información del cliente.



Ing. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

LUIS FERNANDO FUENTES MENDOZA
INGENIERO QUIMICO
COLEGIADO No. 876

October 07, 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

Project ID: Escobal

ACZ Project ID: L26963

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 01, 2015. This project has been assigned to ACZ's project number, L26963. Please reference this number in all future inquiries.

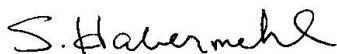
All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L26963. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

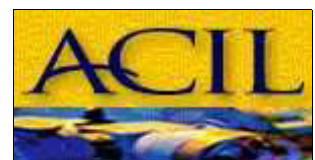
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 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.



Scott Habermehl has reviewed
and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: WW9

ACZ Sample ID: **L26963-01**
Date Sampled: 09/28/15 12:00
Date Received: 10/01/15
Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								10/05/15 14:01	krh/ms s

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5	0.006	B	*	mg/L	0.003	0.01	10/06/15 10:31	krh/ms s

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: **L26963**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L26963-01	WG391761	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).
L26963-02	WG391761	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).
L26963-03	WG391668	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).
L26963-04	WG391761	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L26963**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L26963
 Date Received: 10/01/2015 09:46
 Received By: kmo
 Date Printed: 10/1/2015

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 copy of report to and sample information 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? 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?
4540	16.7	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: L26963
Date Received: 10/01/2015 09:46
Received By: kmo
Date Printed: 10/1/2015

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.

L26963

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: Bulleker 105 Proceres 12 calle 24.69 Zona 10
Empresarial, Zona Proceres, Torre IV oficina 14.06
Telephone: (502) 5951 5248

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns for # of Containers, SW, Total, and other analysis categories. Includes handwritten 'SW' and 'Total' labels.

- 1. * WW9
2. * WW10
3. * Pileta 3
4. * WW11

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, SW, Total. Contains handwritten entries for WW9, WW10, Pileta 3, WW11.

COPY

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 cyanide samples 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: 08:34 horas

Alicuota 2: 11:34 horas

Alicuota 3: 14:34 horas

Alicuota 4: 17:34 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: 221015

Fecha de ingreso de muestras: 231015

Fecha de análisis: 231015-041115

Fecha de informe: 041115

Identificación de la muestra: Descarga PTAR (WW9)

Correlativo Ecosistemas: 2856

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.80	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

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	8	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	49	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.*

****"El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio".*

Comparación de descarga según información del cliente.



Ing. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

Luis Fernando Fuentes Méndez
Ingeniero Químico
Colegiado 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 221015
Fecha de ingreso de muestras: 231015
Fecha de análisis: 231015-041115
Fecha de informe: 041115

Identificación de la muestra: WW 10

Correlativo Ecosistemas: 2860

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	6.56	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 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

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/l	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/l	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	94	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.*

****El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio.*

Comparación de descarga según información del cliente.



Ing. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

Luis Fernando Fuentes Méndez
Ingiero Químico
Colegiado 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 08:34 horas

Alicuota 2: 11:34 horas

Alicuota 3: 14:34 horas

Alicuota 4: 17:34 horas

Análisis solicitado por: Ing. Miguel Berganza

Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 221015

Fecha de ingreso de muestras: 231015

Fecha de análisis: 231015-041115

Fecha de informe: 041115

Identificación de la muestra: WW11

Correlativo Ecosistemas: 2857

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.76	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
* Níquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/l	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/l	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	9	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	240	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.

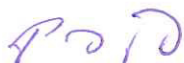
Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04

** Análisis referido.

***"El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio".

Comparación de descarga según información del cliente.



Ing. Oscar Páez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

Luis Fernando Fuentes Méndez
Ingeniero Químico
Colegiado 876

November 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

Project ID: Escobal

ACZ Project ID: L27498

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 29, 2015. This project has been assigned to ACZ's project number, L27498. 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 L27498. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

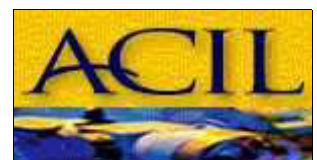
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 11, 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: DESCARGA PTAR (WW9)ACZ Sample ID: **L27498-01**
Date Sampled: 10/22/15 17:24
Date Received: 10/29/15
Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								11/05/15 11:04	krh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5	0.007	B	*	mg/L	0.003	0.01	11/05/15 15:38	rkh

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW10

ACZ Sample ID: **L27498-02**

Date Sampled: 10/22/15 12:00

Date Received: 10/29/15

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								11/05/15 11:13	krh

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	11/05/15 15:39	rkh

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW11

ACZ Sample ID: **L27498-03**

Date Sampled: 10/22/15 17:34

Date Received: 10/29/15

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								11/05/15 11:21	krh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5	0.007	B	*	mg/L	0.003	0.01	11/05/15 15:39	rkh

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: **L27498**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L27498-01	WG393778	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).
L27498-02	WG393778	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).
L27498-03	WG393778	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L27498**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L27498
 Date Received: 10/29/2015 10:26
 Received By: ddp
 Date Printed: 10/29/2015

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?
3925	10.6	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: L27498
Date Received: 10/29/2015 10:26
Received By: ddp
Date Printed: 10/29/2015

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.

L27498

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@santafuel.com.gt

Address: Bulevar los Proceres 18 calle 24-69 Zona 10
Empresarial, Zona Proceres, torre IV oficina 1406
Telephone: (502) 5951 5278

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

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

Address:
Telephone:

COPY

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES [] NO []

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

Are samples for SDWA Compliance Monitoring?

Yes [] No []

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

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

*Sampler's Signature: [Signature] I attest to the authenticity and validity of this sample. I understand that 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: # of Containers, Total CN, Oil & Grease + TPH, and multiple empty columns for analysis results.

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, and analysis results.

1. *
2. *
3. *

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

REMARKS

* Please report samples in a different document.

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

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

Table for Relinquished and Received signatures and dates.

L27498 Chain of Custody