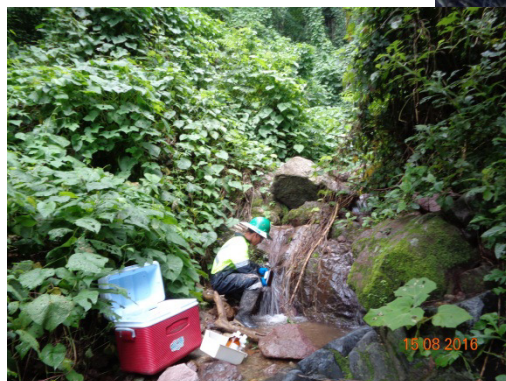


Proyecto Minero Escobal
San Rafael Las Flores, Santa Rosa

Informe de Monitoreo Ambiental



Preparado para:



Ministerio de Ambiente y Recursos Naturales (MARN)

Informe Trimestral de Monitoreo Ambiental

Preparado por:



Departamento de Ambiente

San Rafael Las Flores, Santa Rosa, Guatemala

AGOSTO - OCTUBRE 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 Agosto a Octubre de 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 (PM_{10}), en microgramos por metro cúbico ($\mu g/m^3$). También se monitorearon siete estaciones para medir la concentración de metales en PM_{10} , sólidos sedimentables totales (PST), y gases de combustión: dióxido de azufre (SO_2) 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. 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 877 voladuras durante los meses de Agosto a Octubre de 2016.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 20 muestras de material extraído de los túneles.
- Mediciones de Seguridad y Salud Ocupacional: Se analizaron seis estaciones de monitoreo de presión sonora, tres estaciones de material particulado y se presenta un extracto de las mediciones rutinarias de gases para determinar ácido sulfhídrico (H₂S).
- Copia de registro documentado del caudal bombeado de los pozos del agua bombeada desde los túneles hacia las piletas. En el anexo 11.1 se presenta copia de las lecturas diarias de flujómetros y los cálculos realizados para determinar los caudales bombeados del portal Este y el portal Oeste, durante los meses de Agosto a Octubre de 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 Agosto a Octubre de 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 Agosto a Octubre de 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
Agosto 2016										
31.55	10.24	20.93	67.17	0.31	7.93	69.05	100	29.62	78.33	188.74
Septiembre 2016										
32.05	14.8	21.5	45.77	0.31	4.95	64.49	99.43	37.75	74.78	201.39
Octubre 2016										
30.95	13.95	21.65	64.49	0.31	12.76	88.56	93.9	35.6	67.92	19.23

°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 20.93° a los 21.65°C y en el mes de Septiembre se registró la mayor precipitación (201.39 mm). El mes que mayor humedad relativa promedio presentó fue Agosto con 78.33% y el mes que en promedio presentó la mayor velocidad de vientos fue Octubre con 12.76 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.

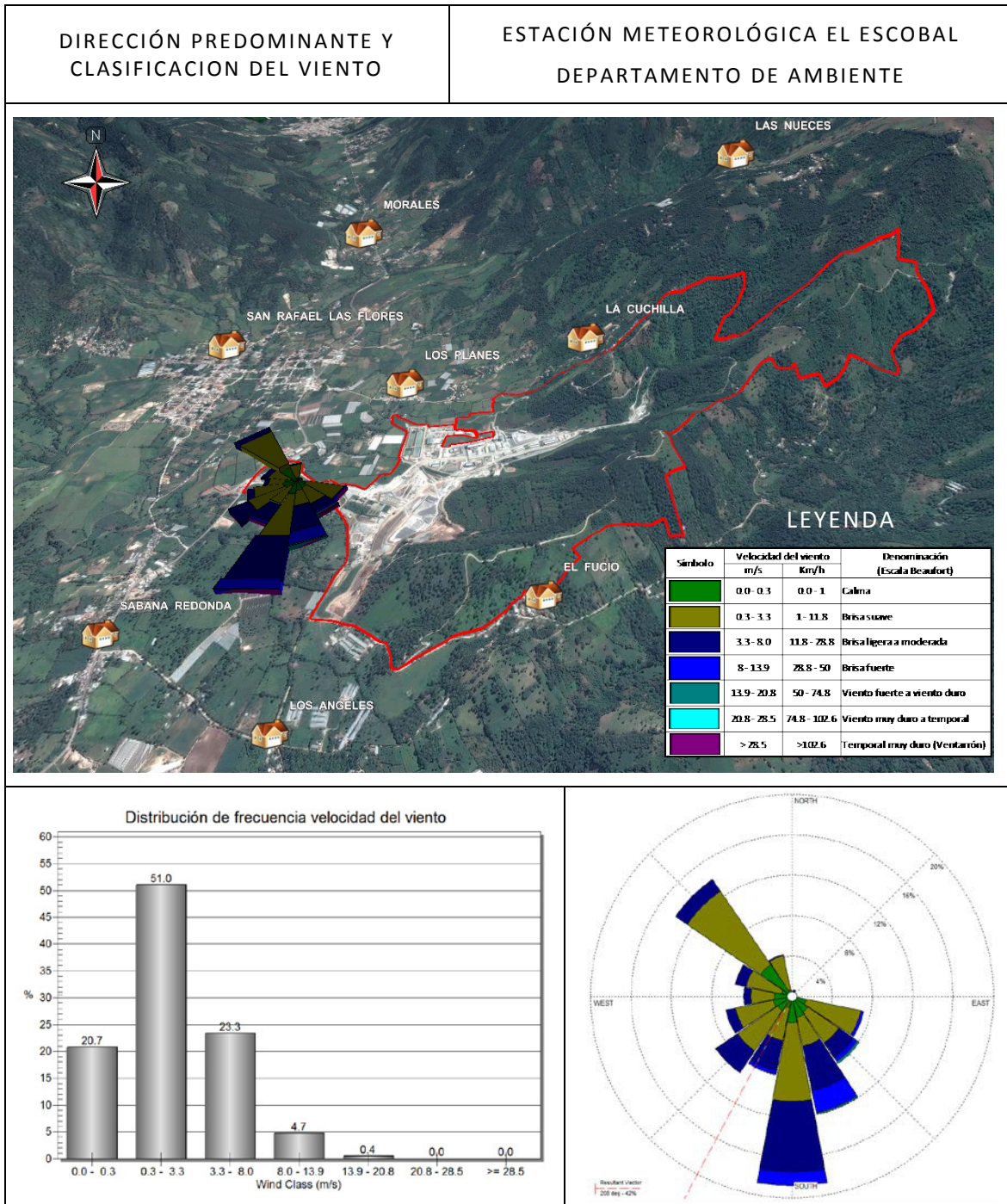


Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa

Fuente: MSR, 2016.

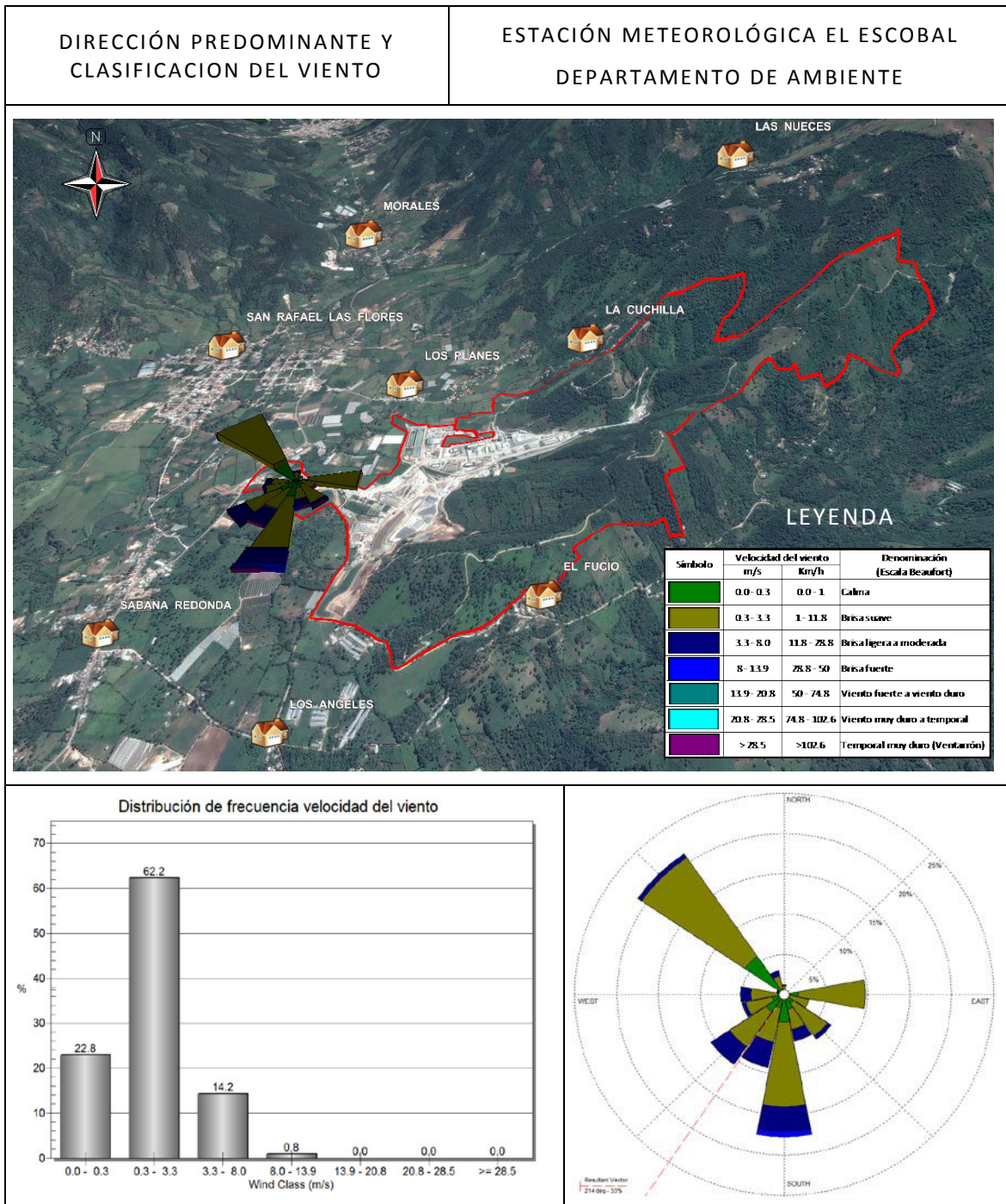
Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 y la predominancia de los vientos durante el trimestre fue de noroeste a sur.

Figura 2-1: Dirección del viento Agosto 2016, Proyecto Minero Escobal



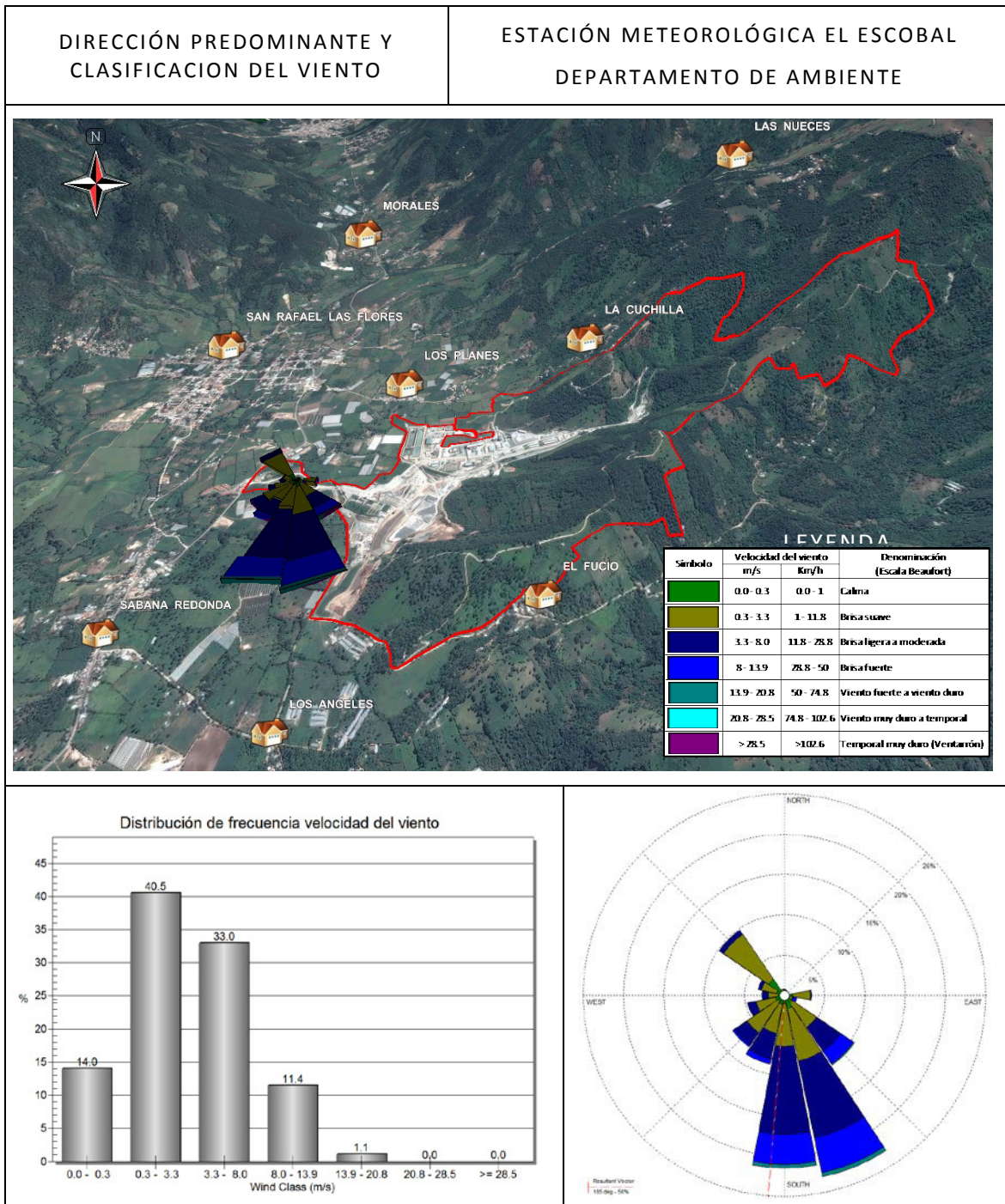
Fuente: MSR, 2016.

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



Fuente: MSR, 2016.

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



Fuente: MSR, 2016.

3 Calidad de Aire

3.1 Material Particulado

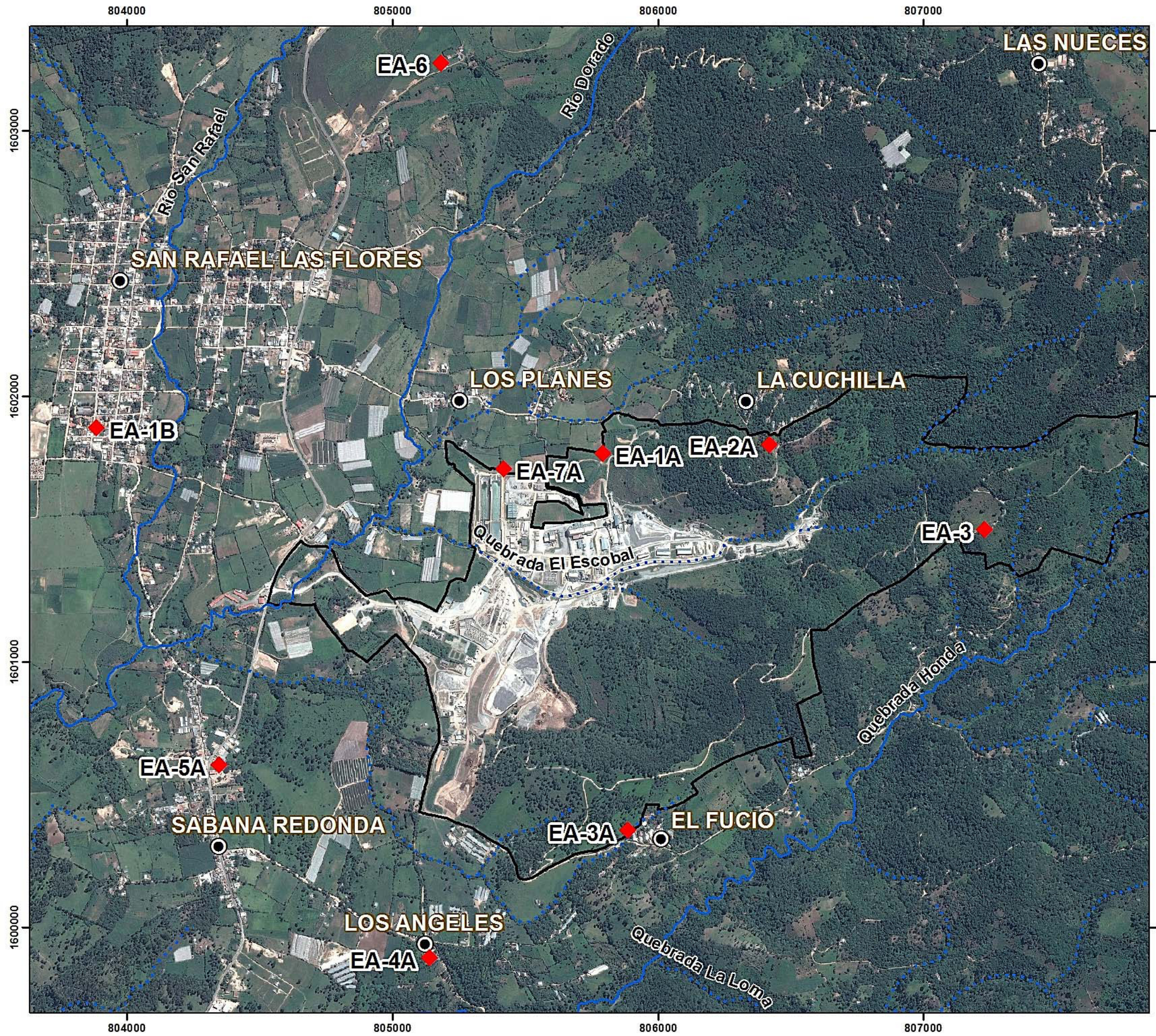
3.1.1 Sitios de Monitoreo

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, DATUM WGS84. 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

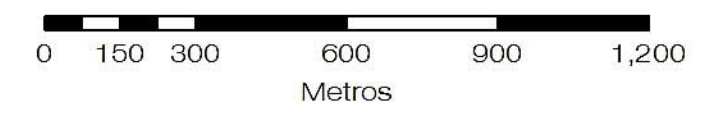
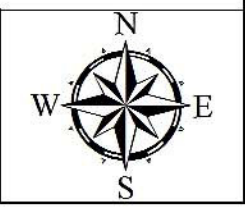
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

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 (2159-1) y Laguna de Ayarza (2159-1) 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: Octubre 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 Agosto a Octubre 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	Ago-16	Sep-16	Oct-16
				(µg/m ³)					
EA-1A	150	150**	50	24.36	89.95	3.67	29.44	11.23	14.14
EA-1B				NR	NR	NR	28.95	NA	NA
EA-2A				21.40	76.20	2.74	7.34	7.03	17.89
EA-3				25.68	78.85	1.25	5.44	11.85	7.49
EA-3A				NR	NR	NR	34.33	NA	NA
EA-4A				103.55	120.40	86.70	9.17	NA	NA
EA-5A				50.73 [¥]	104.80 [¥]	11.80 [¥]	26.85	NA	NA
EA-6				23.05	57.90	1.70	21.08	NA	NA
EA-7A				46.48 [¥]	115.90 [¥]	13.40 [¥]	37.31	2.5	12.9

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 el trimestre se encontraron entre los 2.5 a 37.31 µg/m³. En Septiembre se registró el menor valor de PM₁₀ en la estación EA-3 (5.44 µg/m³), mientras que en Agosto y Octubre se registró en la estación EA-7A y EA-3 (2.5 y 7.49 µg/m³ respectivamente). El valor más alto de PM₁₀ se registró en la estación EA-7A durante Agosto (37.31 µg/m³), mientras que los valores más altos en Septiembre y Octubre se registraron en las estación EA-3 y EA-2A (11.85 y 17.89 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 y 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 Mataquesuintla	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, DATUM WGS84. 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 metales en PM₁₀ durante el mes de Agosto de 2016. Los resultados de laboratorio del análisis de metales en filtros y los cálculos realizados para determinar el PM₁₀ se presentan en el anexo 11.3.2. La concentración de metales registradas durante Agosto de 2016 se encontraron cercanos a los valores registrados durante Agosto 2015 en todas las estaciones de monitoreo.

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

Parámetros	Unidades	EA-1B	EA-2A			EA-3A	EA-4A				
		ago-16	Línea Base			ago-16	Línea Base			ago-16	
		2739-0606	Promedio	Máximo	Mínimo	2707-0606	2736-0303	Promedio	Máximo	Mínimo	2737-0404
Aluminio	µg/m ³	0.3611	0.23	0.28	<0.34	N.D.	0.489	1.27	1.27	1.27	N.D.
Antimonio		N.D.	<0.10	<0.17	<0.04	N.D.	N.D.	<0.17	<0.17	<0.17	N.D.
Arsénico		N.D.	<0.07	<0.10	<0.03	N.D.	N.D.	<0.10	<0.10	<0.10	N.D.
Azufre		0.556	1.49	2.17	0.8	1.195	0.686	1.23	1.23	1.23	0.3782
Bario		0.0079	0.01	0.01	<0.02	N.D.	0.010	<0.02	<0.02	<0.02	0.015
Berilio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Bismuto		N.D.	<0.07	<0.10	<0.03	N.D.	N.D.	<0.1	<0.1	<0.1	N.D.
Boro		N.D.	0.27	0.5	0.03	N.D.	N.D.	<0.1	<0.1	<0.1	N.D.
Cadmio		N.D.	<0.02	<0.03	<0.01	N.D.	N.D.	<0.03	<0.03	<0.03	N.D.
Calcio		0.6991	0.65	1.1	0.2	0.263	0.817	0.78	0.78	0.78	0.430
Cromo		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Cobalto		N.D.				N.D.	N.D.				
Cobre		0.0005				N.D.	0.003				0.0041
Estaño		N.D.				N.D.	N.D.				
Estroncio		N.D.				N.D.	0.005				N.D.
Fósforo		0.0694				0.06	0.066				0.0829
Hierro		0.4028	0.26	0.32	0.2	N.D.	0.642	1.22	1.22	1.22	0.5026
Magnesio		N.D.	0.11	0.14	<0.17	N.D.	0.301	<0.33	<0.33	<0.33	N.D.
Manganeso		0.0157	0.01	0.01	<0.02	0.027	0.042	0.09	0.09	0.09	0.028
Molibdeno		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Níquel		N.D.	<0.03	<0.05	<0.01	N.D.	N.D.	<0.05	<0.05	<0.05	N.D.
Plata		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Plomo		N.D.	<0.03	<0.05	<0.01	0.025	0.017	<0.05	<0.05	<0.05	N.D.
Potasio		N.D.	0.55	0.6	0.5	N.D.	N.D.	0.73	0.73	0.73	N.D.
Selenio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Silicio		0.5139	0.42	0.53	0.3	0.211	0.541	0.55	0.55	0.55	0.456
Sodio		0.7454	0.53	0.6	0.46	0.256	0.638	1.4	1.4	1.4	0.285
Talio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Titanio		0.0116	0.02	0.02	0.02	N.D.	0.021	0.09	0.09	0.09	0.0254
Uranio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Vanadio	N.D.	N.D.				N.D.					
Zinc	N.D.	0.057				0.044	0.0865				
Zirconio	N.D.	<0.012	<0.02	<0.004	N.D.	N.D.	<0.01	<0.01	<0.01	N.D.	

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

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

Parámetros	Unidades	EA-5A				EA-6				EA-7A			
		Línea Base			ago-16	Línea Base			ago-16	Línea Base			ago-16
		Promedio	Máximo	Mínimo	2738-0505	Promedio	Máximo	Mínimo	2740-0707	Promedio	Máximo	Mínimo	2709-0808
Aluminio	µg/m ³	<0.33	<0.33	<0.33	N.D.	0.31	0.45	<0.33	N.D.	0.45	0.73	<0.33	N.D.
Antimonio		<0.17	<0.17	<0.17	N.D.	<0.17	<0.17	<0.17	N.D.	<0.17	<0.17	<0.17	N.D.
Arsénico		<0.1	<0.1	<0.1	N.D.	<0.10	<0.10	<0.10	N.D.	<0.10	<0.10	<0.10	N.D.
Azufre		<0.42	<0.42	<0.42	1	3.02	4.73	1.3	0.787	2.28	4.35	<0.42	0.604
Bario		<0.02	<0.02	<0.02	0.01	0.01	0.01	<0.02	N.D.	0.01	0.01	<0.02	0.008
Berilio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Bismuto		<0.1	<0.1	<0.1	N.D.	<0.10	<0.10	<0.10	N.D.	<0.10	<0.10	<0.10	N.D.
Boro		<0.1	<0.1	<0.1	N.D.	<0.10	<0.10	<0.10	N.D.	<0.10	<0.10	<0.10	N.D.
Cadmio		<0.03	<0.03	<0.03	N.D.	<0.03	<0.03	<0.03	N.D.	<0.03	<0.03	<0.03	N.D.
Calcio		1.03	1.03	1.03	0.437	0.79	1.5	<0.17	0.277	0.28	0.48	<0.17	0.513
Cromo					N.D.				N.D.				N.D.
Cobalto					N.D.				N.D.				N.D.
Cobre					0.003				N.D.				N.D.
Estaño		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Estroncio					N.D.				N.D.				N.D.
Fósforo					0.109				0.071				0.038
Hierro		0.18	0.18	0.18	N.D.	0.38	0.45	0.3	N.D.	0.31	0.58	<0.08	0.577
Magnesio		<0.33	<0.33	<0.33	N.D.	3.05	6.02	<0.17	N.D.	0.23	0.38	<0.17	0.283
Manganeso		<0.02	<0.02	<0.02	0.018	0.02	0.02	<0.02	0.01	0.02	0.03	<0.02	0.023
Molibdeno		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Níquel		<0.05	<0.05	<0.05	N.D.	0.25	0.48	<0.05	N.D.	0.04	0.05	<0.05	N.D.
Plata		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Plomo		<0.05	<0.05	<0.05	N.D.	<0.05	<0.05	<0.05	N.D.	<0.05	<0.05	<0.05	N.D.
Potasio		<0.5	<0.5	<0.5	N.D.	0.83	1.05	0.6	N.D.	0.8	1.43	<0.33	N.D.
Selenio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Silicio		<0.17	<0.17	<0.17	0.118	0.49	0.58	0.4	0.255	0.43	0.78	<0.17	0.604
Sodio		<0.08	<0.08	<0.08	0.336	0.07	0.1	<0.08	1.05	1.27	2.5	<0.08	0.675
Talio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Titanio		<0.02	<0.02	<0.02	N.D.	0.02	0.03	<0.02	0.009	0.02	0.03	<0.02	0.014
Uranio					N.D.				N.D.				N.D.
Vanadio	NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.	
Zinc				N.D.				N.D.				0.025	
Zirconio	<0.01	<0.01	<0.01	N.D.	0.01	0.01	<0.02	N.D.	<0.02	<0.02	<0.02	N.D.	

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

3.3 Partículas Sedimentables Totales (PST)

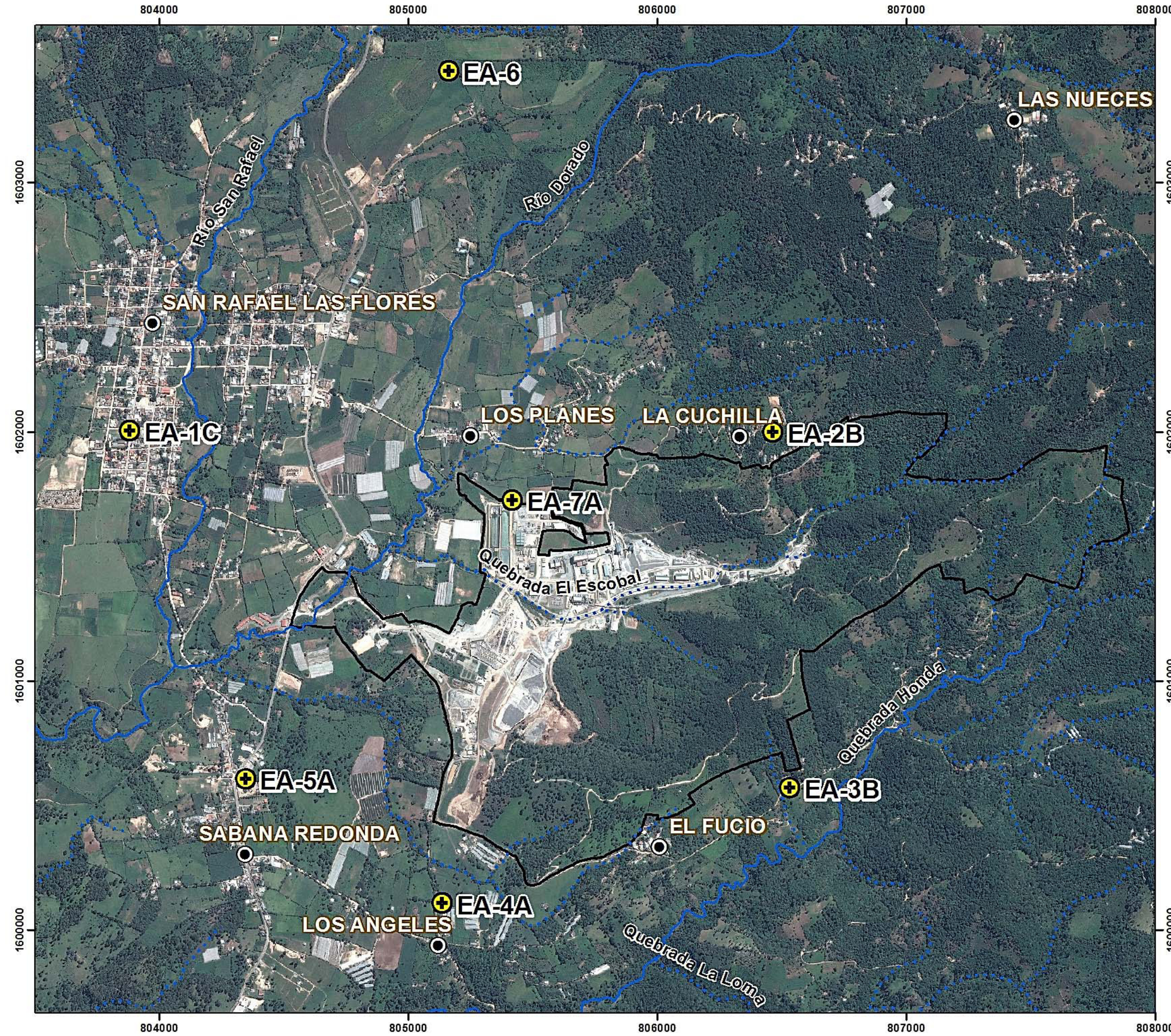
3.3.1 Sitios de Monitoreo

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 Mataquescuintla	
EA-7A	805,425	1,601,523	1,320	Noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción Aldea Los Planes	

*Se incluye como período de línea base de Agosto 2010 a Mayo 2011 la información registrada en la estación EA-5. Sistema de coordenadas proyectadas UTM, DATUM WGS84. 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

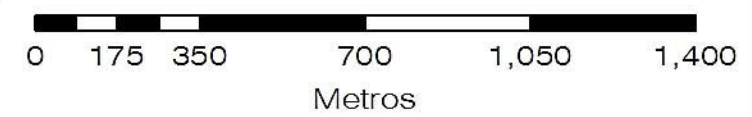
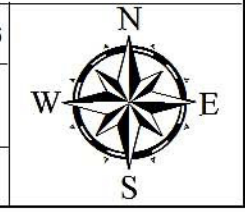
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas cartográficas año 2010 Mataquesuinta (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: Octubre 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 Septiembre de 2016. 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	Sep-16	Sep-16	Sep-16	Línea Base			Muestreo	Línea Base			Muestreo	Sep-16	Sep-16
						Promedio	Mínimo	Máximo	Sep-16	Promedio	Mínimo	Máximo	Sep-16		
	g/(m² x 30 días)														
Sólidos insolubles	ND	ND	21.06	3.49	5.49	6.27	2.60	10.80	15.89	6.50	0.80	16.00	6.01	0.71	2.48
Sólidos solubles			7.96	0.58	0.60	2.12	0.90	2.90	2.37	11.26	2.00	37.00	0.54	0.43	0.37
Sólidos totales			29.02	4.07	6.09	8.37	4.60	13.00	18.26	17.58	3.20	50.00	6.55	1.14	2.86

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 1.14 a 29.02 g/(m² x 30 días), los cuales corresponden a las estaciones EA-6 y EA-1C respectivamente. Los valores registrados para las estaciones EA-4A y EA-A se encuentran dentro de los valores mínimos y máximos registrados durante el establecimiento de la línea base, a excepción de la estación EA-4A la cual registró un valor por arriba del límite máximo de la línea base. Las estaciones EA-1C, EA-2B, EA-3B, EA-6 y EA-7A no cuentan con línea base. Sin embargo los valores registrados se encuentran dentro del rango de lo reportado en los anteriores trimestres.

3.4 Gases de Combustión (SO₂ y NO₂)

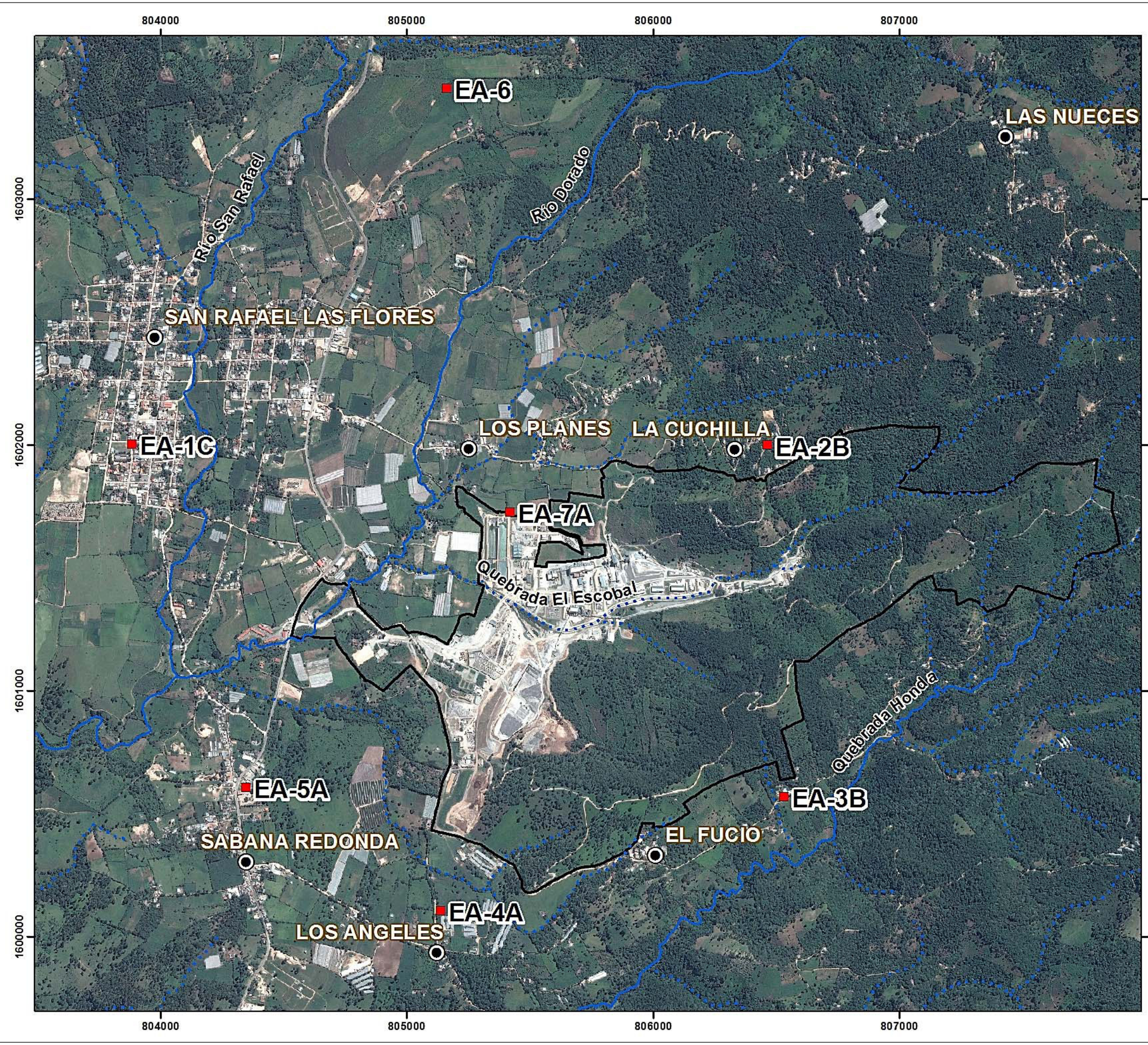
3.4.1 Sitios de Monitoreo

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

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

Estación	Coordenadas		Altitud (msnm)	Sitio	Período Línea Base
EA-1C	803,887	1,601,801	1,337	Poblado San Rafael Las Flores, cercano a Escuela	No se cuenta con línea base.
EA-2B	806,470	1,601,796	1,555	Aldea La Cuchilla	No cuenta con línea base
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	Julio 2010 a Abril 2011
EA-6	805,168	1,603,247	1,434	Al norte del Proyecto, ruta a Mataquesuintla	No cuenta con línea base
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	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, DATUM WGS84. 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

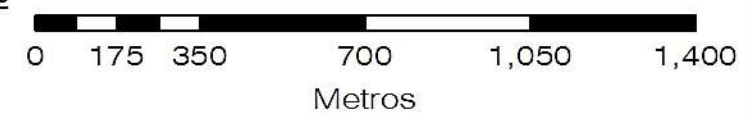
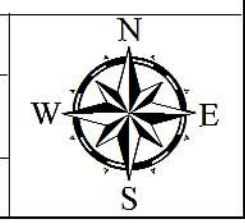
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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: Octubre 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 SO₂ y NO₂, Proyecto Minero Escobal

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

Fuente: MSR, 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). Los valores de NO₂ se encontraron entre 9 µg/m³ (EA-2B) y 10 µg/m³ (EA-6 y EA-7A). Todos los valores registrados de SO₂ y de NO₂ son menores a los valores guías establecidos por el Banco Mundial, la OMS, British Columbia y los valores norma establecidos por la USEPA. Lo que indica que las actividades realizadas durante el presente período, no han originado variaciones en los parámetros reportados en los trimestres anteriores.

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

Parámetro	Norma*	Guías*			EA-1C	EA-2B	EA-3B	EA-4A	EA-5A			EA-6	EA-7A					
		USEPA ¹	Banco Mundial ²	OMS ³					British Columbia ⁴	Línea base**			Muestreo	Línea base**		Muestreo		
	Promedio				Mínimo	Máximo	Promedio	Mínimo		Máximo								
					Sep-16	Sep-16	Sep-16	Sep-16	(µg/m ³)			Sep-16	Sep-16				Sep-16	
SO ₂	370	20	20	160	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
NO ₂	100 [¥]	40 [¥]	40 [¥]	200	<9	9	<9	<9	<9	<9	<9	<9	10	<9	<9	<9	<9	10

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

3.5 Niveles de Presión Sonora

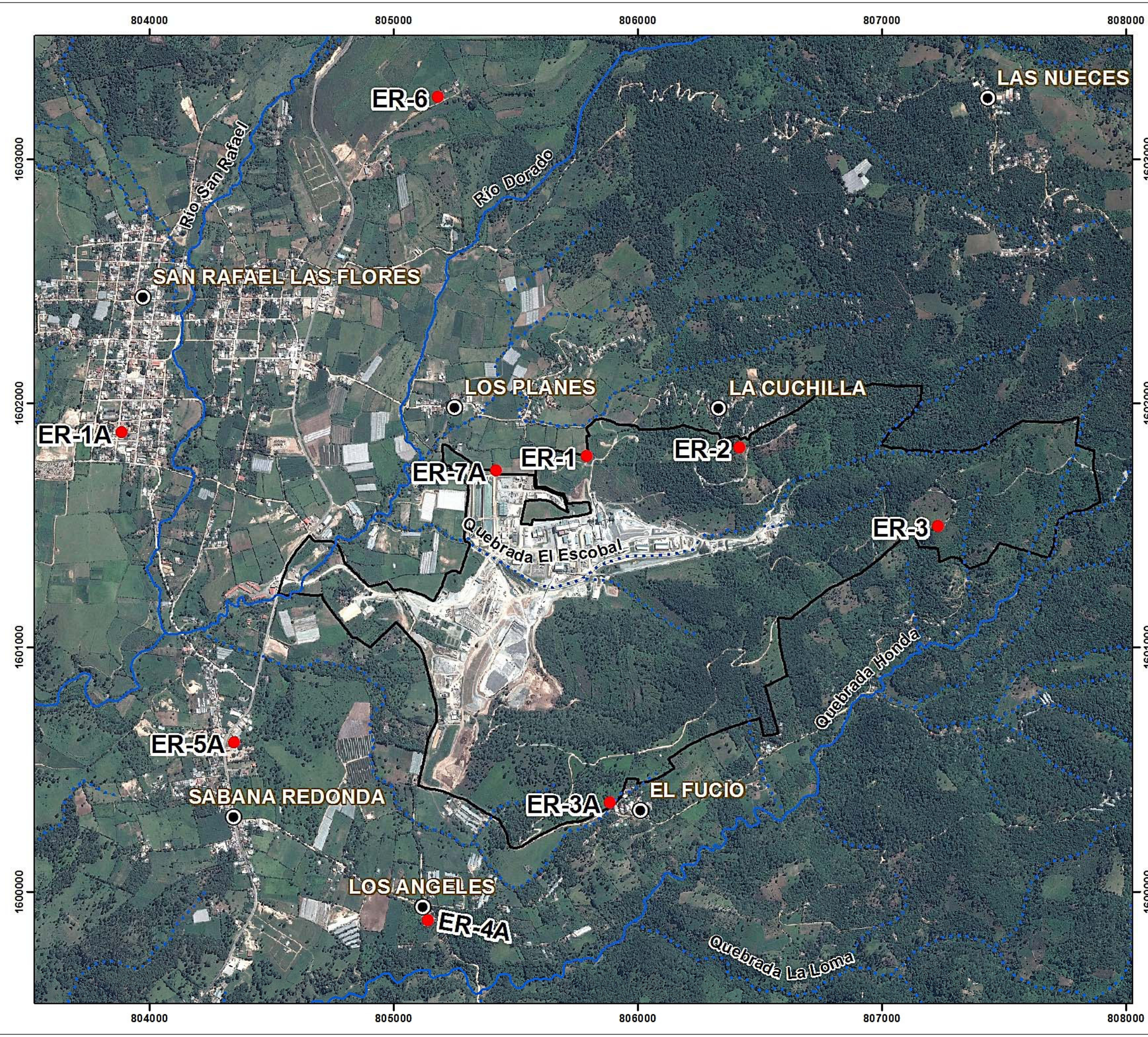
3.5.1 Sitios de Monitoreo

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 Mataquescuintla

Sistema de coordenadas proyectadas UTM, DATUM WGS84. 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

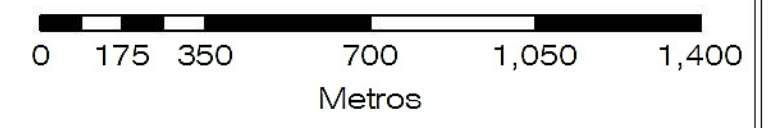
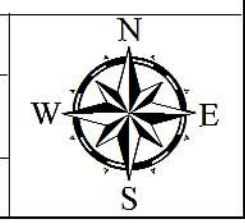
Símbolo	Estación	X	Y
	ER-1	805791	1601785
	ER-1A	803885	1601881
	ER-2	806419	1601819
	ER-3	807232	1601498
	ER-3A	805886	1600364
	ER-4A	805140	1599883
	ER-5A	804346	1600611
	ER-6	805181	1603257
	ER-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas cartográficas año 2010 M ataquescuinta (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: Octubre 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 Agosto a Octubre 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 L_{eq} , están dentro del rango de 44.3 dBa y 64.5 dBa, los cuales corresponden a las estaciones ER-3 y ER-2 respectivamente.

La estación ER-3 presentó el menor promedio diurno (44.3 dBa) y el menor promedio nocturno (44.3 dBa) de todas las mediciones efectuadas durante el monitoreo; mientras que la estación ER-2 presentó el mayor promedio diurno (64.6 dBa) y el mayor promedio nocturno (64.5 dBa) durante el trimestre.

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 ER-2 y ER-7A y ER-4A durante las mediciones del trimestre. Las estaciones ER-1A, ER-3A y ER-6 no cuentan con datos de línea base.

Los promedios diurnos registrados durante los meses de Agosto a Octubre 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-2, ER-5A y ER-7A. Los promedios nocturnos registrados estuvieron por debajo de la norma establecida por la USEPA (55 dBa), a excepción de la estación ER-2, ER-4A y ER-5A.

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

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

Parámetro	Norma*		Guías*		ER-1						ER-2					
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-16	Sep-16	Oct-16	Línea Base			Ago-16	Sep-16	Oct-16
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
			dBA													
Lmax					89.3	99.5	64.6	81.6	78.4	71	86.7	97.8	64.9	76.4	88.1	84
Lmin	NL	NL	NL	NL	32.5	37.7	27.0	34.7	44	36.6	35.2	42.8	26.5	48.7	58.3	55.2
Leq					49.9	57.1	41.2	46.8	47.8	48.6	49.4	58.7	39.7	58.6	64.5	63.2
PD	55	55	55	70	50.5	59.1	39.7	47.4	47.8	49.7	48.8	57.1	39.8	57.9	64.6	63.3
PN	55	50	45	70	47.6	55.7	39.3	45.9	47.9	46.2	46.6	54.5	37.9	59.8	64.5	63.2

Parámetro	Norma*		Guías*		ER-3						ER-7A					
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-16	Sep-16	Oct-16	Línea Base**			Ago-16	Sep-16	Oct-16
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
			dBA													
Lmax					87.4	100.7	67.2	80.4	68.6	68.4	87.5	89.0	82.1	92.5	81.1	80.2
Lmin	NL	NL	NL	NL	49.4	56.2	26.9	43.7	32.3	38.2	NR	NR	NR	46.3	39.3	39.3
Leq					56.8	63.2	39.7	45.8	44.3	48.7	52.8	54.5	50.9	53.2	52	52.7
PD	55	55	55	70	56.5	63.1	41.0	45.9	44.3	48.8	52.1	53.5	50.4	53.5	51.1	53.9
PN	55	50	45	70	57.2	64.0	34.1	45.7	44.9	48.6	49.7	50.9	48.8	53	53.2	49.3

*Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. ¹Guía USEPA, 2006. Normas nacionales de niveles de presión sonora. ²Guías sobre ruido comunitario, OMS 1999. ³Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. dBA = decibeles en escala A. PD = promedio diurno (de 07:00 a 22:00)- PN = promedio nocturno (de 22:00 a 7:00). Lmax = lectura máxima registrada de dBA. Lmin= lectura mínima registrada de dBA. NL = no hay límite establecido para este parámetro. NR = cálculo No Realizado por falta de datos de línea base. ** Los valores de línea base corresponden a la estación ER-7. Fuente: MSR, 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			Ago-16	Línea Base			Ago-16	Línea Base			Ago-16	
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
			dBA														
Lmax								95.1					88.9	80.6	78.2	82.1	91.8
Lmin	NL	NL	NL	NL				37.4					44.6	NR	NR	NR	44.1
Leq					NR	NR	NR	58.8	NR	NR	NR		50.4	50.2	49.3	50.9	55
PD	55	55	55	70				60.5					51.5	49.5	48.4	50.4	54.7
PN	55	50	45	70				52.9					49.3	48.6	48.2	48.9	55.6

Parámetro	Norma*		Guías*		ER-5A				ER-6				
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-16	Línea Base			Ago-16	
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
			dBA										
Lmax					91.6	85.1	92.2	99.6					88
Lmin	NL	NL	NL	NL	NR	NR	NR	50.4					43.7
Leq					65.8	51.6	67.6	62.8	NR	NR	NR		46.9
PD	55	55	55	70	61.2	50.2	63.8	63.4					47.5
PN	55	50	45	70	62.8	45.9	65.0	61.6					45.9

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

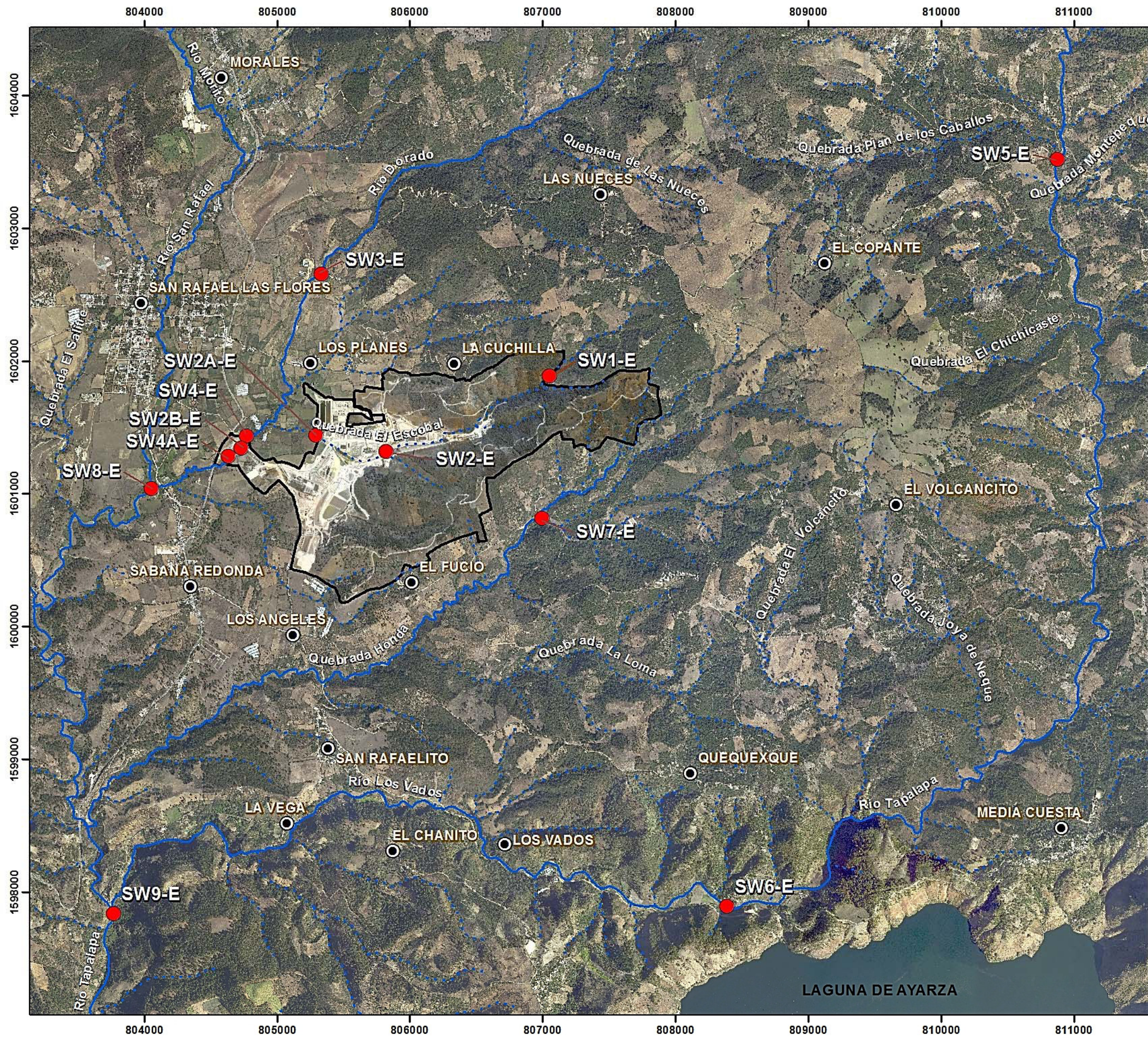
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua 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, DATUM WGS84. 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



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

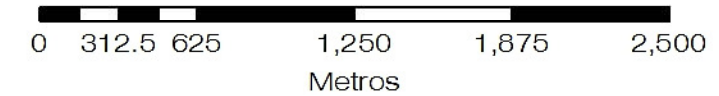
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW6-E	808385	1597892
	SW7-E	806995	1600815
SW8-E	804048	1601037	
SW9-E	803766	1597838	

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

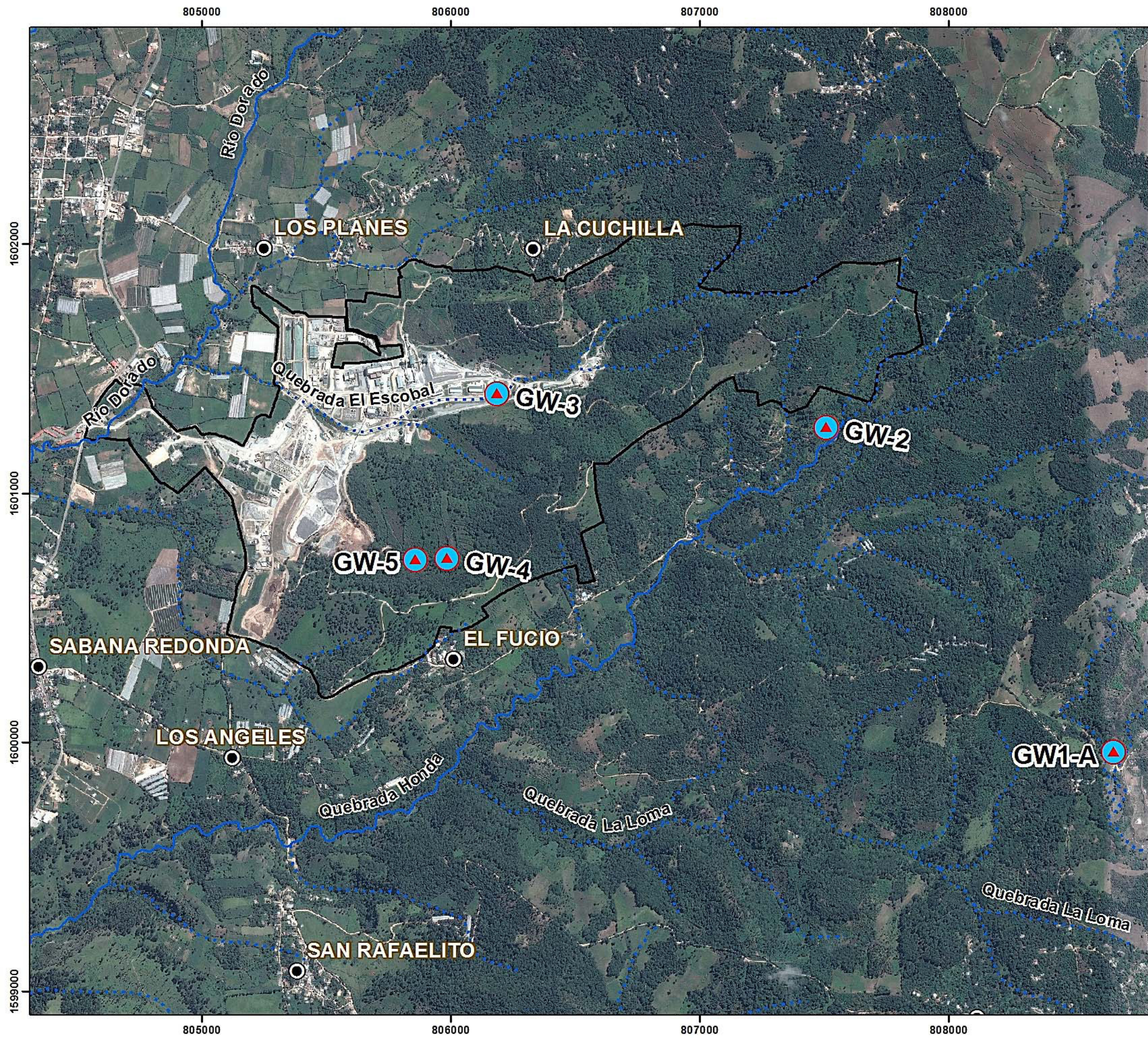
Fecha de Elaboración: Octubre de 2016

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



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

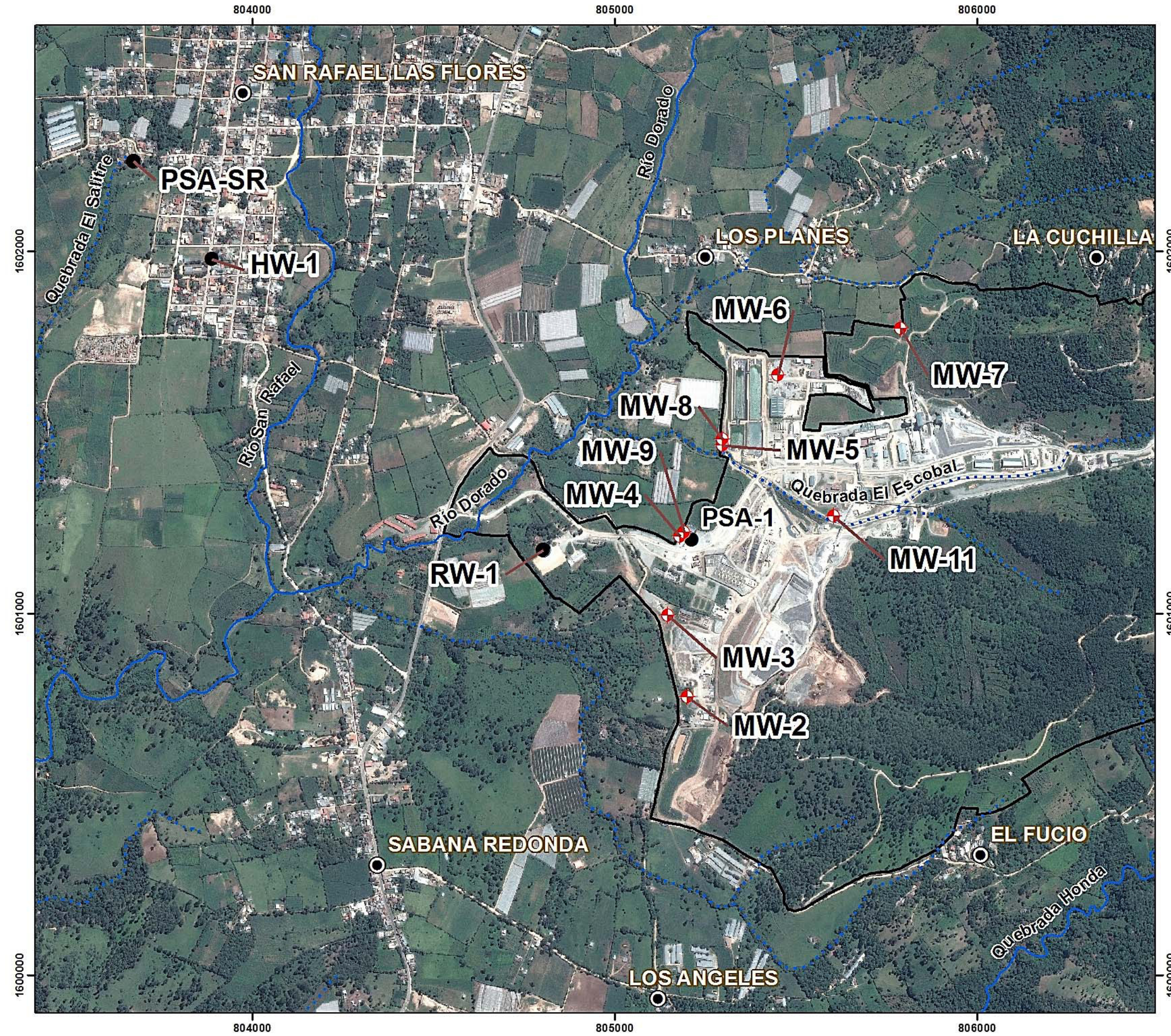
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 M ataquescuintia (2159-1) y Laguna de Ayarza (2159-11) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre 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)

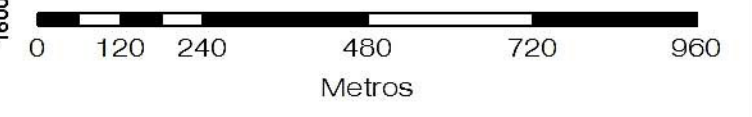
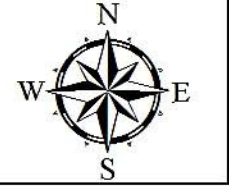
Símbolo	Estación	X	Y
	MW-2	805201	1600768
	MW-3	805148	1600993
	MW-4	805181	1601212
	MW-5	805299	1601463
	MW-6	805452	1601657
	MW-7	805791	1601785
	MW-8	805298	1601480
	MW-9	805192	1601222
	MW-11	805607	1601267
		RW-1	804803
PSA-SR		803672	1602247
HW-1		803888	1601977
PSA-1		805212	1601203

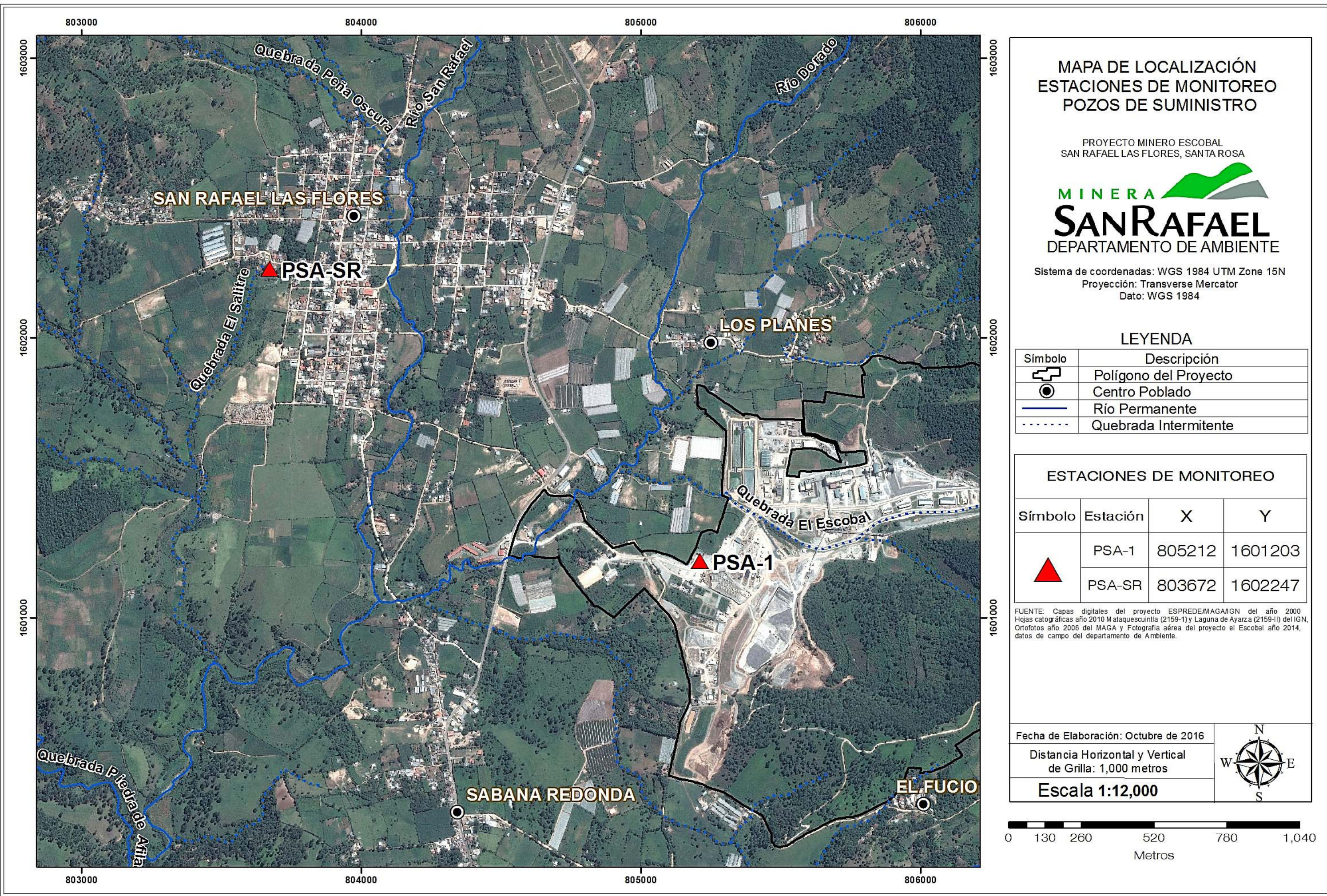
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas cartográficas año 2010 Mataquesuinta (2159-1) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre 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

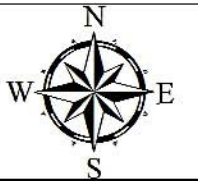
Símbolo	Estación	X	Y
	PSA-1	805212	1601203
	PSA-SR	803672	1602247

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas 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: Octubre 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 Septiembre 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 coliformes fecales (MW20), bario disuelto (SW10 y GW10), bario total (SW10), boro disuelto (GW10 y MW20), calcio disuelto (SW10 y MW20), cobalto disuelto (SW10), plomo disuelto (SW10), sodio disuelto (SW10 y MW20), estroncio disuelto (SW10), zinc disuelto (SW10) y amonio (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	94	9.4×10^2	2.3×10^3	540	240	<2	<2
Color Real	U Pt/Co	<1	<1	<1	<1	<1	15	<1	<1	<1
Materia flotante	U Pt/Co					Ausente		Ausente		Ausente
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	0.04	0.03	0.04	0.05	<0.03	<0.03
Aluminio Total		<0.03	NA	NA	0.12	0.12	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0133	0.0132	0.0004	0.0005	<0.0004	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0143	0.0143	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.0089	0.0092	0.0021	0.0022	0.0021	0.0008
Arsénico Total		<0.0002	NA	NA	0.0105	0.0094	NA			
Bario Disuelto		0.004	0.003	<0.003	0.078	0.078	0.126	0.125	0.033	0.033
Bario Total		0.003	NA	NA	0.073	0.074	NA			
Berilio Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total		<0.01	NA	NA	<0.01	<0.01	NA			
Bismuto Disuelto		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Bismuto Total		<0.04	NA	NA	<0.04	<0.04	NA			
Boro Disuelto		<0.01	0.01	0.01	0.09	0.09	<0.01	0.01	0.07	0.04
Boro Total		<0.01	NA	NA	0.09	0.09	NA			
Cadmio Disuelto		<0.0001	<0.0001	<0.0001	0.0003	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		<0.0001	NA	NA	<0.0001	<0.0001	NA			
Calcio Disuelto		1.1	<0.1	0.1	251	265	83.3	82.5	80.9	43.7
Calcio Total		<0.1	NA	NA	233	239	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	0.03	<0.01	<0.01	0.06	<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	0.03	<0.02	0.20
Hierro Total		<0.02	NA	NA	0.05	0.06	NA			
Plomo Disuelto		0.0003	<0.0001	<0.0001	0.0002	0.0002	0.0004	0.0006	<0.0001	<0.0001
Plomo Total		<0.0001	NA	NA	0.0008	0.0008	NA			
Litio Disuelto	<0.008	<0.008	<0.008	0.055	0.056	<0.008	<0.008	0.010	<0.008	

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	0.051	0.052	NA			
Magnesio Disuelto		<0.2	<0.2	<0.2	12.8	13.4	18	17.9	9.7	7.8
Magnesio Total		<0.2	NA	NA	11.9	12.2	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.301	0.313	0.056	0.057	<0.005	0.038
Manganeso Total		<0.005	NA	NA	0.295	0.305	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	0.04	0.04	<0.02	<0.02	<0.02	<0.02
Molibdeno Total		<0.02	NA	NA	0.04	0.04	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	10.4	11.1	9.9	9.9	4	4.2
Potasio Total		<0.2	NA	NA	9.8	10.1	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	0.0005	0.0005	0.0006	0.0009	0.0002	<0.0001
Selenio Total		<0.0001	NA	NA	0.0006	0.0006	NA			
Plata Disuelta		<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<0.00005	<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵
Plata Total		<0.00005	NA	NA	<0.00005	<0.00005	NA			
Sodio Disuelto		0.3	<0.2	0.2	58.7	61.5	23.8	23.5	28.2	26.1
Sodio Total		<0.2	NA	NA	55.1	56.4	NA			
Estroncio Disuelto		0.014	<0.005	<0.005	2.57	2.74	0.433	0.429	0.740	0.368
Estroncio Total		<0.005	NA	NA	2.46	2.52	NA			
Talio Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Talio Total		<0.0001	NA	NA	0.0002	0.0002	NA			
Estaño Disuelto		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Estaño Total		<0.04	NA	NA	<0.04	<0.04	NA			
Titanio Disuelto		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005
Titanio Total		<0.005	NA	NA	<0.005	0.005	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	0.0004	0.0004	<0.0001	<0.0001	0.0001	<0.0001
Uranio Total		<0.0001	NA	NA	0.0003	0.0003	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	0.007	0.006	<0.005	<0.005	0.006	<0.005
Vanadio Total		<0.005	NA	NA	0.012	0.01	NA			
Zinc Disuelto		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Zinc Total		<0.01	NA		<0.01	<0.01	NA			
Grasas y Aceites		<2.1	NA		<2.1	<2.2	NA			
DQO		<10	NA		<10	<10	NA			
Cloruros		<0.5	<0.5	<0.5	56.5	56.1	23.5	23.4	17.3	8.2
Cianuro Total		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoruros		<0.05	<0.05	<0.05	1.05	1.05	0.22	0.24	0.74	0.55
Nitratos/Nitritos como N	<0.02	<0.02	<0.02	2.13	2.2	4.9	4.97	2.6	<0.02	
Amonio	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	<1	<0.1	
Fosfatos	<0.06	<0.06	<0.06	0.09	0.09	0.06	<0.06	0.25	0.09	
Fósforo Disuelto (Orto)	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.03	0.09	0.07	
Fósforo Total	<0.02	<0.02	<0.02	0.03	0.03	0.1	0.08	0.08	0.05	
STD (TDS)	<10	<10	<10	1140	1140	584	572	492	254	
SST (TSS)	<5	<5	<5	<5	<5	247	233	<5	<5	
ST (TS)	<10	<10	<10	1170	1170	812	800	518	264	
Sulfatos	<0.02	<1	<1	679	677	228	227	179	39.4	

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	69.0	69.2	83.8	83.4	81.9	140
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. NA: no analizado. 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 Septiembre en las once estaciones de monitoreo y un resumen estadístico (promedio, valor máximo y valor mínimo) de la línea base establecida para cada estación. Los resultados del laboratorio se presentan en el anexo 11.5.1.

Las estaciones muestreadas presentaron un pH levemente alcalino (7.31 a 8.22 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. La Demanda Química de Oxígeno (**DQO**) se detectó en las estaciones SW1-E, SW2-E, SW4-E, SW4A-E, SW5-W, SW7-E, SW8-E y SW9-E en concentraciones entre 10-31 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**), a excepción de la estación SW8-E. Sin embargo la concentración registrada se encuentra dentro de los límites establecidos durante la línea base.

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 seis de las once estaciones se detectó sólidos suspendidos totales encontrándose por debajo de los valores establecidos por el Acuerdo (100 mg/L), por el Banco Mundial (50 mg/L) y dentro de los valores establecidos durante el levantamiento de línea base, a excepción de las estaciones SW4A-E y SW9-E.

Los Sulfatos Totales y los Sólidos Disueltos Totales (**TDS**) fueron detectados en la mayoría de las estaciones en concentraciones por debajo de los valores máximos

establecidos durante la línea base, a excepción de las estaciones SW2-E y SW2A-E para ambos parámetros y SW9-W para sulfatos.

La estación SW2A no cuenta con línea base pero se utiliza los valores registrados en la línea base de la estación SW2 como referencia para analizar su comportamiento, ya que las dos estaciones están ubicadas en la quebrada El Escobal aguas abajo y están separadas a escasos 400mts aproximadamente. El Aluminio fue detectado en todas las estaciones en diferentes concentraciones. Sin embargo los datos se encuentran dentro de los límites establecidos durante el levantamiento de la línea base. El Antimonio fue detectado en siete estaciones, excepto en SW1-W, SW3-E, SW5-E y SW6-E y se detectó en un rango de concentración de 0.0005 – 0.0143 mg/L, por debajo de los límites máximos establecidos durante la línea base.

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

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E			
					Quebrada Escobal-aguas arriba				Quebrada Escobal-en medio del Proyecto				Quebrada Escobal- salida del Proyecto			
					Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.509	7.14	8.06	8.06	7.42	6.56	7.87	8.22				8.02
Temperatura (campo)	°C				17.4	13	19.8	17.3	22.4	20.3	25.6	20.9				27.1
Conductividad (campo)	µS/cm				277.9	66.3	566.6	183.8	807.3	177.3	1965	868.6				1326
Oxígeno disuelto (campo)					3.6	0.1	6.4	7.97	4.76	3.5	5.8	7.41				6.65
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							9.2 x 10 ³				9.2 x 10 ³				2.3 x 10 ³
Color Real	U Pt/Co				NR	NR	NR	30	NR	NR	NR	12				<1
Materia Flotante								Ausente				Ausente				Ausente
Turbidez	NTU							22.5				6.93				2.75
Aluminio Disuelto					0.035	<0.03	0.09	0.13	0.043	<0.03	0.12	0.1				0.03
Aluminio Total		0.2			5.02	<0.03	35.1	2.06	2.35	0.06	8.77	0.33				0.12
Antimonio Disuelto					<0.0004	<0.0004	0.0006	<0.0004	<0.0004	<0.0004	<0.0004	0.0097				0.0132
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	<0.0004	<0.0004	<0.0004	0.0005	0.0093				0.0143
Arsénico Disuelto					0.00216	0.0005	0.0034	0.0013	0.00184	0.0013	0.0024	0.0058				0.0092
Arsénico Total		0.01		0.1	0.00339	0.0015	0.0094	0.0015	0.00266	0.0012	0.0054	0.0058				0.0094
Bario Disuelto					0.1361	0.086	0.207	0.085	0.109	0.088	0.133	0.108				0.078
Bario Total		1			0.186	0.1	0.434	0.105	0.131	0.096	0.186	0.111				0.074
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	0.05				0.09
Boro Total					<0.01	<0.01	0.02	0.01	0.11	<0.01	0.28	0.06				0.09
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	0.0003
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	22.6	144.9	20.7	333	149				265
Calcio Total					45.5	20.9	70.5	23.7	144.6	20.5	331	155				239
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				0.03
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	0.07	0.04	<0.02	0.12	0.03				<0.02
Hierro Total		0.3			2.7	<0.02	19.5	1.01	1.3	0.06	5.19	0.14				0.06
Plomo Disuelto					<0.0001	<0.0001	0.0003	0.0001	<0.0001	<0.0001	0.0001	0.0003				0.0002
Plomo Total		0.015		0.4	0.0025	<0.0001	0.0191	0.0007	0.00088	<0.0001	0.0038	0.0015				0.0008
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.035				0.056
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.035				0.052
Magnesio Disuelto					3.9	2.6	5.3	3	15.9	3.2	37.3	9.8				13.4
Magnesio Total					4.2	2.8	5.2	3.1	15.1	3.6	32.2	10.1				12.2
Manganeso Disuelto					0.0051	<0.005	0.02	0.011	0.0195	<0.005	0.07	0.106				0.313
Manganeso Total		0.4			0.1041	<0.005	0.721	0.061	0.0602	0.007	0.174	0.115				0.305
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	0.02				0.04

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E				
					Quebrada Escobal-aguas arriba				Quebrada Escobal-en medio del Proyecto				Quebrada Escobal- salida del Proyecto				
					Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	
					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	0.03				0.04	
Níquel Disuelto					<0.01	<0.01	0.03	<0.008	0.013	<0.01	0.04	<0.008				<0.008	
Níquel Total		0.61		2	<0.01	<0.01	0.04	<0.008	0.022	<0.01	0.04	<0.008				<0.008	
Potasio Disuelto					4.4	3.5	5.1	4.3	6.1	4.9	7.6	7				11.1	
Potasio Total					5.3	3.5	13	4.5	6.3	5.2	7.4	7.2				10.1	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00045	<0.0001	0.0002	0.0004				0.0005	
Selenio Total		0.17			0.0001	<0.0001	0.0003	<0.0001	0.00011	<0.0001	0.0002	0.0004				0.0006	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005	
Plata Total					<0.00005	<0.00005	0.00015	<0.00005	<0.00005	<0.00005	0.00006	<0.00005				<0.00005	
Sodio Disuelto					9.81	8.3	11.6	8.2	40.1	9.4	87.8	39				61.5	
Sodio Total					9.46	7.8	11.8	8.4	39.8	9.4	85.2	40.2				56.4	
Estroncio Disuelto					0.17	0.09	0.26	0.12	1.23	0.1	2.99	1.49				2.74	
Estroncio Total					0.18	0.1	0.25	0.121	1.23	0.11	2.91	1.53				2.52	
Talio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	0.0001	<0.0001				0.0002	
Talio Total		0.002			<0.0001	<0.0001	0.0004	<0.0001	0.0001	<0.0001	0.0002	<0.0001				0.0002	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	0.006	<0.005	<0.005	0.007	<0.005				<0.005	
Titanio Total					0.092	<0.005	0.591	0.061	0.2715	<0.005	0.171	0.01				0.005	
Uranio Disuelto					0.00013	<0.0001	0.0003	<0.0001	0.00028	<0.0001	0.0006	0.0002		NR	NR	NR	0.0004
Uranio Total					0.00038	<0.0001	0.0011	<0.0001	0.00024	<0.0001	0.0005	0.0002				0.0003	
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	0.0065	<0.005	0.015	<0.005				0.006	
Vanadio Total					0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	<0.005				0.01	
Zinc Disuelto					0.053	<0.01	0.1	<0.01	0.046	<0.02	0.1	<0.01				<0.01	
Zinc Total		7.4		10	0.064	<0.01	0.12	<0.01	0.041	<0.01	0.06	<0.01				<0.01	
Grasas y Aceites			10	10	<2.062	<2.062	<2.248	<2.6	<2.04	<2.04	<2.04	<2.3				<2.2	
DQO			125		15.7	<10	40	15	<2.04	<2.04	<2.04	11				<10	
Cloruros		250			5	4	7	8	<2.04	<2.04	<2.04	36.9				56.1	
Cianuro Total		0.14		1	0.004	<0.003	0.015	<0.0003	<0.003	<0.003	<0.003	<0.003				<0.003	
Fluoruros		4			0.125	<0.1	0.2	0.11	0.6	0.1	1.2	0.58				1.05	
Nitratos/Nitritos como N					1.61	0.08	4.87	5.1	2.46	0.03	4.9	3.76				2.2	
Amonio					<0.005	<0.005	0.07	<0.3	<0.05	<0.05	0.07	0.24				<0.05	
Nitrógeno Kjeldahl (TKN)					3.53	<0.1	25.9	0.6	0.32	<0.1	0.8	0.6				<0.1	
Fosfatos					0.185	0.1	0.3	0.16	0.19	0.1	0.4	0.12				0.09	
Fósforo Disuelto (Orto)					0.06	0.03	0.1	0.05	0.06	0.02	0.13	0.04				<0.02	
Fósforo Total			2	10	0.37	0.04	2.51	0.06	0.08	0.03	0.19	0.05				0.03	
STD (TDS)		500			225	170	280	174	754	170	1620	750				1140	
SST (TSS)			50	100	163.6	<5	780	16	67	<5	320	<5				<5	
ST (TS)					346.3	200	1080	230	850	230	1660	810				1170	
Sulfatos		250			26.3	10	42	20.5	472.6	14	1600	373				677	
Alcalinidad Total					104	38	161	46.6	80	44	119	65.3				69.2	
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			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					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	7.97	7.4	6.56	7.94	7.83				7.95
Temperatura (campo)	°C				19.8	17	24	19.7	21	17.2	24	19.2				24.4
Conductividad (campo)	µS/cm				219.7	80	374.5	168.3	308.9	120	612	582.4				566.0
Oxígeno disuelto (campo)					3.8	0.1	6.8	7.75	4.2	0.1	7.5	7.73				6.90
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							1.6 x 10 ⁴				1.6 x 10 ⁵				3.5 x 10 ⁵
Color Real	U Pt/Co				NR	NR	NR	8	NR	NR	NR	11				<1
Materia Flotante								Ausente				Ausente				Ausente
Turbidez	NTU							34.7				36.2				24.4
Aluminio Disuelto					0.061	<0.03	0.15	0.05	0.03	<0.03	0.1	0.06				<0.03
Aluminio Total		0.2			3.25	<0.03	17.4	2.03	5.72	0.1	36	3.23				4.59
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0047				0.0028
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.0012	0.0005	0.0037	0.004				0.0031
Arsénico Disuelto					0.00797	0.0041	0.0139	0.0091	0.00541	0.0039	0.0072	0.0075				0.0074
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0101	0.00873	0.0043	0.0326	0.0083				0.0098
Bario Disuelto					0.0915	0.051	0.118	0.081	0.1645	0.08	0.234	0.108				0.118
Bario Total		1			0.12445455	0.098	0.253	0.094	0.2356	0.144	0.567	0.136				0.152
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	0.03				0.03
Boro Total					<0.01	<0.01	0.02	<0.01	0.012	<0.01	0.02	0.03				0.03
Cadmio Disuelto					<0.0001	<0.0001	0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	0.0002
Cadmio Total		0.003		0.1	<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0005	<0.0001				0.0002
Calcio Disuelto					27.8	11.7	39.9	25.1	37.4	18.5	61.7	89.5				92.3
Calcio Total					27.9272727	12.3	38.7	23.2	38.3	17.2	58.9	90.7				85.3
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				0.03
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	0.06	0.032	<0.02	0.15	0.03				<0.02
Hierro Total		0.3			1.9	0.06	10.2	0.85	3.8	0.09	26.5	1.59				2.53
Plomo Disuelto					<0.0001	<0.0001	0.0004	0.0001	<0.0001	<0.0001	0.0002	<0.0001				0.0001
Plomo Total		0.015		0.4	0.0013	<0.0001	0.0072	0.0007	0.003	<0.0001	0.0198	0.002				0.0119
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.019				0.012
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.019				0.011
Magnesio Disuelto					2.6	1.3	3.5	2	4.2	2.4	7.3	6.1				6.9
Magnesio Total					2.7	1.6	3.5	1.9	4.6	2.5	7.3	6.2				6.6
Manganeso Disuelto					0.07418182	0.01	0.381	0.05	0.116	0.011	0.26	0.114				0.207
Manganeso Total		0.4			0.14745455	0.025	0.403	0.076	0.2844	0.101	1.23	0.175				0.362
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02				<0.02

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E								
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo								
					Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16					
					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				<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	5.7				6.9	
Potasio Total									4.5	3.6	7	3.6	6.5	4.4	11.7	6.2				6.7	
Escandio Disuelto									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Escandio Total									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Selenio Disuelto									<0.0001	<0.0001	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0002				0.0002	
Selenio Total						0.17			<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0002				0.0001	
Plata Disuelta									<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005	
Plata Total									<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	<0.00005				0.0004	
Sodio Disuelto									12.65	7.7	16.6	10.7	12.44	9	15.6	25				24.8	
Sodio Total									12.17	7.5	15.4	9.5	12.13	8.6	15.2	24.9				22.6	
Estroncio Disuelto									0.19	0.06	0.3	0.163	0.22	0.09	0.36	0.824				0.746	
Estroncio Total									0.18818182	0.08	0.3	0.158	0.228	0.11	0.33	0.816				0.701	
Talio Disuelto									<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	<0.0001				<0.0001	
Talio Total						0.002			<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007	<0.0001				<0.0001	
Estaño Disuelto									<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Estaño Total									<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Titanio Disuelto									<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005				<0.005	
Titanio Total									0.071	<0.005	0.307	0.05	0.127	0.005	0.534	0.074				0.145	
Uranio Disuelto									<0.0001	<0.0001	0.0002	0.0001	0.00012	<0.0001	0.0004	0.0002		NR	NR	NR	0.0002
Uranio Total									0.00019	<0.0001	0.0005	0.0001	0.00027	<0.0001	0.0009	0.0002				0.0003	
Vanadio Disuelto									<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	<0.005				<0.005	
Vanadio Total									0.0051	<0.005	0.019	<0.005	0.0085	<0.005	0.04	<0.005				0.008	
Zinc Disuelto									0.068	<0.01	0.14	<0.01	0.061	0.05	0.14	<0.01				<0.01	
Zinc Total						7.4		10	0.174	<0.01	1.01	<0.01	0.065	0.01	0.17	<0.01				0.02	
Grasas y Aceites							10	10	<2.062	<2.04	<2.326	<2.2	<2.062	<2.02	<2.084	<2.1				<2.4	
DQO							125		10.9	<10	40	<10	16.8	<10	60	17				17	
Cloruros						250			2.7	2	3	3.5	8.5	4	16	21.9				18.9	
Cianuro Total		0.14		1	<0.003	<0.003	0.015	<0.003	<0.003	<0.003	0.014	<0.003				<0.003					
Fluoruros		4			<0.003	<0.003	0.015	0.14	0.15	0.1	0.2	0.35				0.31					
Nitratos/Nitritos como N					0.59	<0.02	1.51	0.67	4.49	1.96	10.1	2.38				2.53					
Amonio					0.05	<0.05	0.21	<0.05	0.059	<0.05	0.15	0.16				<0.05					
Nitrógeno Kjeldahl (TKN)					0.35	<0.1	0.6	<0.1	0.58	0.1	1.3	0.5				0.5					
Fosfatos					0.12	0.1	0.4	0.09	0.36	0.1	1.2	0.19				0.28					
Fósforo Disuelto (Orto)					0.04	0.02	0.12	0.03	0.12	0.03	0.39	0.05				0.09					
Fósforo Total			2	10	0.05	0.02	0.14	0.04	0.17	0.04	0.39	0.09				0.16					
STD (TDS)		500			183.636364	140	220	168	233.6	150	350	454				430					
SST (TSS)			50	100	48	5	340	<5	115	<5	880	45				119					
ST (TS)					231.8	140	500	194	378.2	260	1180	540				548					
Sulfatos		250			16.9	4	25	16.7	27.5	10	57	215				176					
Alcalinidad Total					83	38	118	71.3	80	45	102	63.5				82.5					
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			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					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	7.31	7.4	7.1	7.8	7.75	7.5	6.9	8	7.54
Temperatura (campo)	°C				17.4	14.5	21.5	16.5	19.4	12.2	27.3	17.2	18.7	15	21.3	17.8
Conductividad (campo)	µS/cm				72.1	0.1	160.2	71.69	259	60	948	97.42	216	120	416.2	140.3
Oxígeno disuelto (campo)	mg/L				4	0	8	8.07	4	0	8.3	8.24	3.9	0.1	7.5	7.91
Cr VI								<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml				NR	NR	NR	4.3 x 10 ³	NR	NR	NR	4.9 x 10 ³	NR	NR	NR	9.2 x 10 ³
Color Real	U Pt/Co							24				11				63
Materia Flotante								Ausente				Ausente				Ausente
Turbidez	NTU							17.5				22.5				54.1
Aluminio Disuelto	mg/L				0.055	<0.03	0.14	0.12	0.031	<0.03	0.08	<0.03	0.033	<0.03	0.13	0.12
Aluminio Total		0.2			1.09	<0.03	3.7	1.9	1.89	<0.03	8.1	2.39	3.05	0.1	16.4	5.65
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	0.0005
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0005	<0.0004	0.0007	0.0007
Arsénico Disuelto					0.00139	0.0005	0.0024	0.0013	0.0032	0.0007	0.0076	0.0012	0.00382	0.0022	0.0054	0.0028
Arsénico Total		0.01	0.1		0.00177	0.0013	0.0028	0.0022	0.00387	0.0025	0.0074	0.0021	0.00446	0.003	0.0061	0.0041
Bario Disuelto					0.0447	0.023	0.072	0.041	0.0618	0.027	0.136	0.046	0.0946	0.052	0.143	0.067
Bario Total		1			0.0556	0.039	0.069	0.061	0.0806	0.055	0.136	0.062	0.2142	0.088	0.99	0.11
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	0.03	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	6.4	15.1	5.4	38.9	9	23.1	11.2	38.1	14
Calcio Total					7.73	3.4	13.1	6.6	14.81	5.9	37.5	8.3	23.04	11.5	36.7	14.8
Cromo Disuelto					<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total		0.1	0.1		0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Cobalto Disuelto				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	
Cobalto Total				<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	
Cobre Disuelto				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobre Total	1.3	3		<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<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	0.06	0.097	<0.02	0.28	0.04	0.022	<0.02	0.07	0.05	
Hierro Total	0.3			0.7	0.16	1.8	0.82	1.3	0.33	4.8	1.09	1.8	0.08	9.5	2.59	
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	0.0007	0.0007	<0.0001	0.0028	0.0007	0.0015	<0.0001	0.0083	0.0021	
Litio Disuelto				<0.02	<0.02	<0.02	0.01	0.13	<0.02	0.67	0.009	<0.02	<0.02	<0.02	<0.008	
Litio Total				<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.008	<0.02	<0.02	<0.02	<0.008	
Magnesio Disuelto				1.5	0.8	2.5	1.3	3	1.4	7.4	1.9	4.1	2.2	6.4	2.9	
Magnesio Total				1.5	0.9	2.5	1.3	3.1	1.8	7.5	1.9	4.3	2.6	6.5	3.2	
Manganeso Disuelto				0.025	0.006	0.047	0.021	0.114	<0.005	0.551	0.014	0.032	0.014	0.074	0.009	
Manganeso Total	0.4			0.0406	0.014	0.062	0.025	0.1482	0.04	0.543	0.043	0.0981	0.019	0.342	0.097	
Mercurio Disuelto				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Mercurio Total	0.002	0.01		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Molibdeno Disuelto				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW5-E				SW6-E				SW7-E			
					Río Tapalapa – Aguas arriba				Río Los Vados				Quebrada La Honda			
					Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					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	2.7	4.1	3.2	7.1	3.5	4.1	3.6	5.4	3.6
Potasio Total					3	2.2	4.1	3	4.2	3.1	7.5	3.1	4.5	3.6	7	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	4.9	32.16	6	135	8.4	11.69	8.7	15.4	7.8
Sodio Total					5.99	3.4	9.4	5	31.11	5.3	124	7.5	11.45	8.3	15.5	7.8
Estroncio Disuelto					0.06	0.02	0.09	0.053	0.12	0.03	0.33	0.064	0.17	0.07	0.29	0.098
Estroncio Total					0.057	0.02	0.08	0.055	0.122	0.04	0.35	0.065	0.174	0.09	0.28	0.101
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	0.006	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.006	<0.005
Titanio Total					0.027	<0.005	0.094	0.043	0.05	<0.005	0.22	0.061	0.069	<0.005	0.325	0.144
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	0.0002
Vanadio Disuelto					<0.005	<0.005	0.007	0.007	<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	0.007	0.0047	<0.0005	0.018	<0.005
Zinc Disuelto					0.04	<0.01	0.1	<0.01	<0.1	<0.1	0.4	<0.01	0.131	<0.01	0.81	<0.01
Zinc Total		7.4		10	0.197	<0.01	1.6	<0.01	<0.1	<0.1	0.22	<0.01	0.339	<0.01	1.87	0.01
Grasas y Aceites			10	10	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	<2.3	<2.062	<2.02	<2.084	<2.3
DQO			125		6.5	<10	20	10	<10	<10	30	<10	10	<10	40	20
Cloruros		250			1.8	1	3	3.1	43.9	3	230	6.2	3	5	3	5.4
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	0.06	0.11	<0.1	0.3	0.07	<0.1	0.2	0.1	0.12
Nitratos/Nitritos como N					0.13	0.03	0.42	0.62	0.3	<0.02	1.22	1.14	<0.1	3.53	0.19	3.64
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	0.3	0.2	0.1	0.5	<0.1	<0.1	0.7	0.4	0.7
Fosfatos					0.04	<0.03	0.2	0.06	0.08	<0.03	0.3	<0.06	0.1	0.2	0.09	0.19
Fósforo Disuelto (Orto)					0.15	<0.01	0.06	<0.02	0.03	<0.01	0.09	<0.02	0.03	0.08	0.03	0.06
Fósforo Total			2	10	0.02	<0.01	0.05	0.03	0.04	0.02	0.08	0.03	0.03	0.19	0.19	0.1
STD (TDS)		500			84	60	110	90	187	90	540	108	140	240	100	190
SST (TSS)			50	100	9	<5	32	<5	21	<5	105	16	<5	330	6	44.0
ST (TS)					97	70	130	94	221	120	550	134	150	610	140	260
Sulfatos		250			16.5	<10	47	12.6	14	<10	23	8.7	9	38	19.4	13.5
Alcalinidad Total					25	13	43	20.1	48	22	108	29.3	30	101	54	36.2
Hidrocarburos totales (TPH)					<0.1	<0.09	<0.09	0.3	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			Sep-16	Línea Base			Sep-16	
					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	7.59	7.86	7.5	10.7	8.05	
Temperatura (campo)	°C				22.1	18.9	25.1	21.1	21.8	19.1	24.2	18.9	
Conductividad (campo)	µS/cm				363.7	186.8	807.6	337.2	267.4	121.8	518	230.4	
Oxígeno disuelto (campo)	mg/L				5.14	0.28	7.48	6.52	6.2	0.8	8.5	8.09	
Cr VI					<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 ⁵	9x10 ⁴	1x10 ²	2x10 ⁵	9.2 x10 ³	
Color Real	U Pt/Co				172	19	351	<1	342	29	824	20	
Materia Flotante								Ausente				Ausente	
Turbidez	NTU				14.15	6.09	22.2	37.0	25.72	4.93	46.5	30.1	
Aluminio Disuelto	mg/L				0.033	<0.03	0.06	0.13	0.087	<0.03	0.22	<0.03	
Aluminio Total		0.2			2.39	0.04	7.35	1.85	2.96	0.4	8.6	3.07	
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0007	0.0006	<0.0004	0.0013	0.0004	
Antimonio Total		0.006			0.001	<0.0004	0.0027	0.0009	0.0007	<0.0004	0.0012	0.0005	
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0031	0.004	0.0023	0.0057	0.0024	
Arsénico Total		0.01	0.1		0.006	0.0041	0.0096	0.0051	0.0042	0.002	0.006	0.0036	
Bario Disuelto					0.107	0.074	0.143	0.114	0.094	0.056	0.135	0.077	
Bario Total		1			0.136	0.102	0.185	0.129	0.121	0.09	0.154	0.092	
Berilio Disuelto					<0.01	<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	0.02	0.041	<0.01	0.1	0.05	
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	42.8	35.7	18.2	78.3	28.6	
Calcio Total					52.1	18.6	156	41.4	36.2	18.5	79.7	24.9	
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cromo Total		0.1	0.1		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobalto Disuelto					<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	
Cobalto Total					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobre Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobre Total		1.3	3		<0.01	<0.01	<0.01	0.02	<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	0.34	0.09	<0.02	0.17	<0.02	
Hierro Total		0.3			1.53	0.05	4.36	1.61	1	0.25	2.2	1.52	
Plomo Disuelto					0.0001	<0.0001	0.0003	0.001	0.0002	<0.0001	0.0005	<0.0001	
Plomo Total		0.015	0.4		0.003	<0.0001	0.0089	0.0048	0.0022	0.0002	0.008	0.0018	
Litio Disuelto				<0.02	<0.02	0.04	<0.008	<0.02	<0.02	0.04	0.015		
Litio Total				<0.02	<0.02	0.04	<0.008	<0.02	<0.02	0.04	0.015		
Magnesio Disuelto				6.3	3.2	14.7	5.3	6	3.3	9.7	4.4		
Magnesio Total				6.6	3.3	14.8	5.1	6.2	3.4	10.1	4		
Manganeso Disuelto				0.095	0.009	0.118	0.157	0.057	0.023	0.148	0.038		
Manganeso Total	0.4			0.1808	0.047	0.349	0.213	0.115	0.043	0.187	0.094		
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			Sep-16	Línea Base			Sep-16
					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	9.2	6	4.5	8.1	5.8
Potasio Total					6.8	6.4	7.8	8.4	6.1	4.8	8.5	5.1
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto					<0.0001	<0.0001	0.0002	0.0001	<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	0.0002
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total					<0.00005	<0.00005	0.00007	0.0001	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					18.8	12.3	33.7	22	17.6	10.7	26.9	16.5
Sodio Total					18.4	12.9	34.3	20.6	17.4	11	28.5	14.4
Estroncio Disuelto					0.44	0.16	1.5	0.383	0.29	0.14	0.71	0.227
Estroncio Total					0.44	0.16	1.48	0.381	0.295	0.14	0.73	0.207
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	0.006	<0.005	<0.005	0.009	<0.005
Titanio Total					0.069	<0.005	0.195	0.068	0.084	0.015	0.237	0.085
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	0.0002	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	0.008	0.0054	<0.005	0.012	0.006
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	<2.3	<2.02	<2.02	<5	<2.5
DQO			125		20	<10	40	31	17.8	<10	35	12
Cloruros		250			10	7	19	14.4	12	6	20	12.4
Cianuro Total		0.14		1	0.007	<0.003	0.014	<0.003	0.006	<0.003	0.013	<0.003
Fluoruros		4			0.27	0.1	0.6	0.16	0.006	<0.003	0.013	0.14
Nitratos/Nitritos como N					3.07	2.01	5.23	2.99	1.97	1.14	3.85	1.67
Amonio					0.24	<0.05	0.58	0.56	0.129	<0.05	0.22	<0.05
Nitrógeno Kjeldahl (TKN)					0.74	<0.1	1.6	1.6	0.57	0.3	0.9	0.2
Fosfatos					0.55	0.3	1	0.87	0.49	0.22	1.3	0.25
Fósforo Disuelto (Orto)					0.18	0.08	0.33	0.24	0.18	0.09	0.49	0.08
Fósforo Total			2	10	0.27	0.12	0.51	0.44	0.25	0.09	0.58	0.08
STD (TDS)		500			312	160	750	286	255	160	440	0.14
SST (TSS)			50	100	34	<5	102	35.0	73	<5	340	228.0
ST (TS)					362	180	750	348	310	200	450	24
Sulfatos		250			91	22	360	54.5	60	25	169	258
Alcalinidad Total					79	50	110	96.3	70	45	90	55.3
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 y GW-4 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 la estación GW4 y materia flotante en GW2 están sobre los límites establecidos.

La temperatura de las estaciones muestreadas se encontró entre 15.2 y 22.8 °C. La lectura menor de pH se obtuvo en la estación GW-4 (5.55 u.e.) y la mayor en la estación GW-3 (6.18 u.e.). Los Sólidos Suspendidos Totales (**SST**) se registraron en la estación GW-2 (8 mg/L) por debajo de las guías del Acuerdo (100 mg/L) y del Banco Mundial (50 mg/L) y en GW-3 registrando valores por encima de las guías mencionadas. 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 GW3.

El Cadmio, Cianuro, Berilio, Bismuto, Cobre, Cromo, Galio, Litio, Cromo hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Talio, Estaño, Plata, Uranio, Vanadio, Zinc y Cianuro Total no fueron detectados en ninguna de las estaciones. El Selenio fue detectado únicamente en la estación GW-3 por debajo de la guía de la USEPA (0.17mg/L). El Antimonio fue detectado únicamente en las estación GW2 y GW-3 (0.0007 y 0.0005 mg/L) por debajo de la guía dada por la USEPA (0.01 mg/L). El Plomo se registró en GW3 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			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					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	6.10	6.54	6.01	7.16	6.06	6.54	6.21	7.13	6.18	6.13	6.13	6.13	5.55
Temperatura de campo	°C				15.2	14.8	15.6	15.2	21.4	19	23.7	22.8	19.4	18.5	21	21.7	18.1	18.1	18.1	21.0
Conductividad de campo	µS/cm				229.8	223	236.5	100.3	323.4	111.3	500.5	114.7	315.3	236.7	501.1	692.7	147.3	147.3	147.3	97.15
Oxígeno Disuelto de campo	mg/L				0.1	0.03	0.17	6.48	1.18	0.13	2.35	7.36	0.68	0.03	1.26	3.29	0.14	0.14	0.14	2.02
Turbidez	NTU							13.3				53.1				58.6				106
Materia Flotante				Ausente				Ausente				Presente				Ausente				Presente
Color Aparente	u Pt/Co			500				22				149				101				746
Color Real	u Pt/Co			500				<1				5				<1				370
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				23				23				240				4.5
Aluminio Disuelto		0.2			<0.03	<0.03	<0.03	<0.03	0.075	<0.03	0.24	0.04	<0.03	<0.03	0.04	0.05	1.42	1.42	1.42	0.18
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	0.00078	<0.0004	0.0011	0.0007	0.0004	<0.0004	0.001	0.0005	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01	0.1		0.001	0.0008	0.0011	0.0007	0.0156	0.0043	0.0299	0.007	0.0059	0.0037	0.0115	0.0022	0.0008	0.0008	0.0008	0.0004
Bario Disuelto		1			0.025	0.022	0.028	0.061	0.24	0.125	0.451	0.118	0.186	0.12	0.328	0.125	0.127	0.127	0.127	0.093
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	0.01	<0.01	<0.01	<0.01	<0.01
Cadmio Disuelto		0.003	0.1		<0.0001	<0.0001	<0.0001	0.0003	<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	7	33.5	9.6	65.3	14.2	31.6	25.7	43.4	82.6	4.4	4.4	4.4	4.1
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	0.03	<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	<0.02	0.103	<0.02	0.33	0.03	0.74	0.74	0.74	0.1
Plomo Disuelto		0.015	0.4		<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0006	0.0009	0.0009	0.0009	0.0001
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					3.1	2.9	3.3	2.5	5.9	1.8	12	2.6	4.9	3.3	8.3	17.9	2.6	2.6	2.6	2.3
Manganeso Disuelto		0.05			<0.005	<0.005	<0.005	<0.005	0.123	0.02	0.356	0.01	0.057	<0.005	0.133	0.057	0.069	0.069	0.069	0.045
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	mg/L	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	5.1	2.9	1.3	4.3	1.4	3.8	2.5	5	9.9	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	0.0009	<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	6.9	11.5	9.3	16.4	23.5	10.3	10.3	10.3	10.4
Estroncio Disuelto					0.03	0.03	0.03	0.059	0.26	0.08	0.56	0.122	0.2	0.12	0.37	0.429	0.03	0.03	0.03	0.043
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	0.011
Uranio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0001
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.006	0.006	<0.005
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	5.2	4	2	7	3.4	5	3	6	23.4	4	4	4	2.7
Cianuro Total		0.14	1		0.008	<0.003	0.014	<0.003	0.004	<0.003	0.012	<0.003	0.0046	<0.003	0.014	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoruros					<0.1	<0.1	<0.1	0.08	<0.1	<0.1	<0.1	0.18	0.15	0.1	0.2	0.24	<0.1	<0.1	<0.1	0.10
Nitratos/Nitritos como N					2.19	1.9	2.48	1.75	0.74	0.14	1.1	2.19	1.19	0.05	3.16	4.97	0.07	0.07	0.07	0.65
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	0.1	0.46	<0.05	1.2	0.5	0.3	0.3	0.3	0.4
Fosfatos					0.2	0.1	0.2	0.12	0.4	0.1	0.7	0.16	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	0.04	0.18	0.09	0.27	0.07	0.1	0.05	0.15	0.08	0.03	0.03	0.03	0.05

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			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
STD (TDS)	mg/L	500			190	190	190	156	223	130	350	152	213	190	260	572	170	170	170	390
SST (TSS)			50	100	6.5	6	7	<5	7.7	6	9	7.0	39	5	105	233	206	206	206	<5
ST (TS)					200	180	220	166	237.5	140	380	160	217.5	170	270	800	360	360	360	398
Sulfatos		250			12.5	11	14	4.3	43	7	90	<1	30	16	71	227	7	7	7	3.5
Alcalinidad Total					31	31	31	30.8	0.18	0.09	0.27	40.3	83	71	97	83.4	35	35	35	29.2

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			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	6.56	6.37	6.77	6.44	6.34	6.49	6.42	6.32	6.23	6.41	6.74	6.19	6.04	6.34	6.37	
Temperatura de campo	°C				24.4	23.4	25.1	24.1	23.7	24.5	25.4	23.3	22.2	24.4	24.1	23.4	23	24.6	24.7	
Conductividad de campo	µS/cm				427.5	211.9	1001.3	803.9	741.6	829.1	577.8	916.9	872.1	944.8	567.1	469.7	401.4	494.1	1197	
Oxígeno Disuelto de campo	mg/L				0.75	0.3	1.21	0.65	0.11	1.44	5.34	0.97	0.48	1.93	5.3	0.82	0.19	1.77	3.81	
Turbidez	NTU										3.08				24.10				2.19	
Materia flotante	Visual			Ausente							Ausente				Ausente				Ausente	
Color Aparente	u Pt/Co			500	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	<1	
Color Real																			<1	
Cr (VI)	mg/L			0.1															<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴															<2	
Aluminio Disuelto		0.2			0.038	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	
Arsénico Disuelto		0.01		0.1	0.0011	0.0008	0.0014	0.0023	0.0021	0.0027	0.0021	0.0023	0.0021	0.0028	0.0022	0.0013	0.001	0.0016	0.0009	
Bario Disuelto		1			0.03	0.024	0.039	0.036	0.032	0.041	0.033	0.042	0.038	0.047	0.021	0.162	0.157	0.166	0.044	
Berilio Disuelto		0.004			<0.002	<0.002	0.003	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Boro Disuelto					0.014	<0.01	0.04	0.06	0.05	0.07	0.08	0.078	0.06	0.09	0.07	0.015	<0.01	0.03	0.05	
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Calcio Disuelto					20.6	9.4	48.7	80.3	76.4	83.3	80.8	100	93	107	76.3	40.8	39.2	42.2	169	
Cromo Disuelto		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobalto Disuelto					<0.01	<0.01	<0.1	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobre Disuelto		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Hierro Disuelto		0.3			<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Plomo Disuelto		0.015		0.4	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	
Litio Disuelto					<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.01	<0.02	<0.02	0.02	0.01	<0.02	<0.02	<0.02	<0.008	
Magnesio Disuelto					3.5	2.4	6.1	10.3	10.1	10.7	9.7	11.3	10.9	11.6	8.1	7.3	6.8	7.6	21.6	
Manganeso Disuelto		0.05			0.108	0.03	0.308	<0.005	<0.005	0.008	<0.005	0.009	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	<0.005	
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	
Níquel Disuelto		0.61		2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	
Potasio Disuelto					2.2	1.9	2.4	4.2	3.9	4.6	4	4.7	4.5	5.2	4	6	5.5	6.5	8.8	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Selenio Disuelto		0.17			0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0003	0.0003	0.0004	0.0003	0.0004	0.0006	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	
Sodio Disuelto					22	17.4	33.6	29.5	28.2	30.9	28.4	32.3	30.4	35.8	26.5	16.9	15.6	19.1	34.7	
Estroncio Disuelto					0.18	0.07	0.46	0.74	0.71	0.77	0.744	0.89	0.84	0.98	0.676	0.27	0.26	0.29	0.641	
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Uranio Disuelto					0.00016	<0.0001	0.0005	0.0002	0.0002	0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0001	0.00033	0.0001	0.001	0.0006	
Vanadio Disuelto					0.0059	<0.005	0.008	0.0055	<0.005	0.009	0.006	0.006	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc Disuelto		7.4		10	0.031	<0.01	0.11	0.053	<0.01	0.1	0.02	<0.01	<0.01	0.1	0.01	<0.01	<0.01	0.1	0.02	
Cloruros		250			12	3	28	16	16	17	17.2	20	19	21	14.89	9	8	9	29	
Cianuro Total		0.14		1	0.0039	<0.003	0.011	0.005	<0.003	0.014	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	
Fluoruros					0.35	0.2	0.7	0.8	0.8	0.8	0.72	0.8	0.8	0.8	0.83	0.18	0.1	0.2	0.24	
Nitratos/Nitritos como N					2.48	2.04	2.93	2.2	2.08	2.26	2.53	2.13	1.98	2.32	2.51	3.32	3	3.57	6.68	
Amonio					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)					0.56	<0.1	1.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.3	<1	

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Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Fosfatos	mg/L				0.233	0.21	0.27	NA	0.315	0.27	0.37	0.25	0.248	0.24	0.27	0.22	0.203	0.15	0.24	0.09
Fósforo Total			2	10	0.24	0.06	0.44		0.09	0.08	0.1	0.08	0.07	0.06	0.08	0.06	0.06	0.05	0.07	0.04
STD (TDS)		500			253	190	360		470	460	480	488	553	540	560	460	305	290	320	836
SST (TSS)			50	100	345.8	137	584		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ST (TS)					597.5	350	810		487.5	450	510	502	555	520	580	476	325	280	350	884
Sulfatos		250			28.5	4	97		166	162	169	194	212.5	210	220	161	72.3	64	76	392
Alcalinidad Total					64	56	80		84	82	86	80.9	85	83	88	98.9	66	61	68	99.7

NA: no analizado por no encontrar agua al momento de la obtención de la muestra. u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. 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			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					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	6.27	6.38	6.14	6.98	6.03	6.16	6.07	6.29	6.34	7.15	6.9	7.4	8.13
Temperatura de campo	°C				22.3	21.6	22.8	25.2	22.4	22	23.1	23.1	23.3	23.2	23.4	24.5	27.5	25.9	29	25.5
Conductividad de campo	µS/cm				538.2	342.9	752.6	1325	299.6	285.9	323.8	286.2	426.8	424.6	428.1	636.4	1595	1569	1621	335.9
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	4.00	0.61	0.25	1.19	2.18	0.72	0.16	1.45	4.60	0.38	0.35	0.41	1.98
Turbidez	NTU							2.57								4.64				8.84
Materia flotante	Visual			Ausente				Ausente								Ausente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	39	NR	NR	NR	12
Color Real								<1				<1				<1				<1
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				1.6 x 10 ⁴				<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	<0.03	<0.03	<0.03	<0.03	<0.03
Antimonio Disuelto		0.01			0.00045	<0.0004	0.0012	<0.0004	0.00063	0.0005	0.0008	0.0005	0.001	0.0009	0.0011	0.0007	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01	0.1		0.0028	0.0024	0.0032	0.0019	0.0034	0.0029	0.0041	0.002	0.0021	0.0019	0.0024	0.0014	0.003	0.0007	0.0052	0.0008
Bario Disuelto		1			0.198	0.134	0.281	0.12	0.156	0.129	0.176	0.396	0.125	0.122	0.129	0.07	0.031	0.028	0.034	0.033
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	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.04	0.09	0.08	0.1	0.04
Cadmio Disuelto		0.003	0.1		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcio Disuelto					52.5	35.1	71.9	252	16.7	13.9	19.6	29.4	34.6	32.5	36.3	102	185.5	170	201	43.7
Cromo Disuelto		0.1	0.1		<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto		1.3	3		<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hierro Disuelto		0.3			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.03	<0.02	<0.02	<0.02	<0.02	5.52	1.53	9.51	0.2
Plomo Disuelto		0.015	0.4		<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.0002	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	0.07	0.07	0.07	<0.008
Magnesio Disuelto					7.5	4.9	10.5	27.1	4.8	4.6	5	9.1	6.4	6.3	6.7	15.8	35.8	34.4	37.2	7.8
Manganeso Disuelto		0.05			<0.005	<0.005	0.006	<0.005	0.0065	<0.005	0.012	0.009	0.019	0.012	0.029	<0.005	0.203	0.149	0.257	0.038
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	11.4	6.2	5.4	6.8	8.3	4.8	4.6	5.1	6.5	4.8	4.6	5	4.2
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto		0.17			0.0005	0.0004	0.0005	0.0008	0.0002	0.0001	0.0002	<0.0001	0.0004	0.0003	0.0006	0.0005	<0.0001	<0.0001	<0.0001	<0.0001
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					14	12.3	17	49	19.1	15.4	27.5	18.3	15.2	15	15.6	24.4	45.1	44.7	45.4	26.1
Estroncio Disuelto					0.26	0.18	0.35	1.18	0.1	0.09	0.11	0.196	0.22	0.21	0.23	0.366	1.64	1.58	1.69	0.368
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranio Disuelto					0.00013	0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	<0.0001	0.00017	0.0001	0.0002	0.0002	<0.0001	<0.0001	0.0004	<0.0001
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc Disuelto		7.4	10		0.034	<0.01	0.1	0.06	0.034	<0.01	0.1	0.48	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Cloruros		250			11	6	17	55.3	11	9	12	11.9	6	6	6	20	37	36	37	8.2
Cianuro Total		0.14	1		0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.007	<0.003	0.012	<0.003
Fluoruros					0.18	0.1	0.2	0.13	0.13	0.1	0.2	0.12	0.17	0.1	0.2	0.16	2.55	2.5	2.6	0.55
Nitratos/Nitritos como N Amonio					5.08	4.42	6.15	6.06	4.75	4.08	5.24	1.38	2.76	2.63	2.83	4.94	<0.02	<0.02	<0.02	<0.02
Nitrógeno Kjeldahl (TKN)					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
					<0.1	<0.1	0.2	<1	0.21	<0.1	0.4	<0.1	0.09	<0.1	0.2	<1	0.23	<0.1	0.4	<0.1

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Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Fosfatos	mg/L				0.173	0.15	0.21	0.09	0.113	0.09	0.18	<0.06	0.23	0.21	0.24	0.12	<0.03	<0.03	<0.03	0.09
Fósforo Total			2	10	0.05	0.04	0.06	0.05	0.04	0.01	0.07	0.04	0.07	0.06	0.08	0.05	<0.01	<0.01	0.02	0.05
STD (TDS)		500			340	260	440	1250	233	220	250	286	277	270	290	584	905	890	920	254
SST (TSS)			50	100	<5	<5	<5	<5	19.75	7	45	<5	9	6	14	30.0	27	25	29	<5
ST (TS)					345	240	450	1290	260	230	280	286	300	290	310	626	940	910	970	264
Sulfatos		250			85.3	33	153	687	19.3	17	23	33	54.7	54	55	245	440	440	440	39.4
Alcalinidad Total					65	62	68	56.2	48	41	60	108	68	66	70	72.8	147	136	157	140

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 (3/3)

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1			
					Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					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	7.98	7.45	7.45	7.45	6.9				6.80				6.99				7.42
Temperatura de campo	°C				30.4	30.4	30.4	30.4	27.8	27.8	27.8	28.9				25.5				23.5				31.7
Conductividad de campo	µS/cm				2.243	2.243	2.243	1360	663.9	663.9	663.9	898.0				561.4				851.6				1186
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	3.87	0.05	0.05	0.05	0.62				6.69				5.53				4.60
Turbidez	NTU							8.74				1.55				5.11				4.52				2.81
Materia flotante	Visual			Ausente				Ausente				Ausente				Ausente				Presente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	129	NR	NR	NR	<1				<1				<1				324
Color Real								<1				<1				<1				<1				<1
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2				23				49				240
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	0.0006				<0.0004				<0.0004				<0.0004
Arsénico Disuelto		0.01		0.1	0.0022	0.0022	0.0022	0.0024	0.0136	0.0136	0.0136	0.0122				0.0077				0.0005				0.0053
Bario Disuelto		1			0.033	0.033	0.033	0.02	0.125	0.125	0.125	0.083				0.092				0.08				0.017
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	0.1				0.09				0.04				0.11
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005				0.0003				<0.0001				<0.0001
Calcio Disuelto					271	271	271	247	47.5	47.5	47.5	104				74.2				80.4				198
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	0.03				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	0.77	0.05	0.05	0.05	<0.02	NR	NR	NR	<0.02	NR	NR	NR	<0.02	NR	NR	NR	2.7
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	0.077	0.08	0.08	0.08	0.143				0.096				<0.008				0.079
Magnesio Disuelto					41.3	41.3	41.3	36	4.1	4.1	4.1	6.2				5.3				12.6				35.7
Manganeso Disuelto		0.05			0.044	0.044	0.044	0.02	0.03	0.03	0.03	0.022				<0.005				<0.005				0.054
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002				<0.0002				<0.0002
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	4.6	2.5	2.5	2.5	2				3				9.4				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	0.0005				0.0003				<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	71.3	55.2	55.2	55.2	84.5				60.6				25.8				47.3
Estroncio Disuelto					2.23	2.23	2.23	2.28	1.33	1.33	1.33	4.52				2.92				0.561				1.87
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	<0.005	<0.005	<0.005	<0.005	<0.005				<0.005				<0.005				<0.005
Uranio Disuelto					0.0007	0.0007	0.0007	0.0005	0.0002	0.0002	0.0002	0.0003				0.0002				0.0004				0.0005
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				0.02				<0.01				<0.01
Cloruros		250			68	68	68	60.8	32	32	32	3.6				6.4				19.2				42
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	2.56	0.7	0.7	0.7	0.85				0.4				0.39				2.56
Nitratos/Nitritos como N					0.19	0.19	0.19	<0.02	<0.02	<0.02	<0.02	0.13				1.71				1.88				<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			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16	Línea Base			Sep-16
					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	NR	NR	NR	<0.05	NR	NR	NR	<0.05	NR	NR	NR	<0.05
Nitrógeno Kjeldahl (TKN)					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1				<0.1								
Fosfatos					0.03	0.03	0.03	<0.06	0.06	0.06	0.06	<0.06				0.09								
Fósforo Total		2	10		0.06	0.06	0.06	<0.02	0.02	0.02	0.02	<0.02				0.03								
STD (TDS)		500			1370	1370	1370	1300	320	320	320	590				456								
SST (TSS)			50	100	145	145	145	5	<5	<5	<5	<5				<5								
ST (TS)					1000	1000	1000	1370	300	300	300	618				482								
Sulfatos		250			700	700	700	666	45	45	45	265				178								
Alcalinidad Total					133	133	133	134	186	186	186	186				127								

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 Septiembre. Los resultados de laboratorio se presentan en el Anexo 11.5.2. La mayoría de los pozos monitoreados cumplen con los valores establecidos en el Acuerdo 236-2006 para entes generadores nuevos y los valores en general se encuentran dentro del rango estadístico de la línea base.

Los valores de pH estuvieron en el rango de 6.03 a 8.13 u.e. y la temperatura en el rango de 23.1 a 31.7 °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, MW11, PSA-SR y PSA-1 los valores registrados de sulfatos se encuentran por encima de los valores establecidos durante el levantamiento de línea base y por las guías de USEPA (250 mg/L). Todos los demás pozos se encuentran por debajo de las directrices que establece la USEPA.

Se reportaron valores de Sólidos Suspendidos Totales (**SST**) en los pozos MW8 y MW11, los cuales se encuentran debajo de las guías establecidas por el Banco Mundial y el Acuerdo (50 y 100 mg/L respectivamente) y dentro de los rangos establecidos en la línea base.

El Bismuto, Cobalto, Cobre, Galio, Cromo, Cromo Hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Talio, Estaño, Titanio y Cianuro Total no fueron detectados en ninguno de los pozos monitoreados.

El Antimonio se detectó en los pozos MW7, MW8 y PSA-SR, en concentraciones por debajo de la guía establecida por la USEPA (0.01 mg/L) y dentro del rango establecido durante la línea base. El Bario fue detectado en todas las estaciones en concentraciones menores a la guía de la USEPA (1 mg/L).

El Plomo fue detectado únicamente en los pozos MW-7 y las concentraciones registradas se encuentran por debajo de lo establecido por la USEPA (0.015 mg/L) y el acuerdo (0.4 mg/L).

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

5 Sedimentos

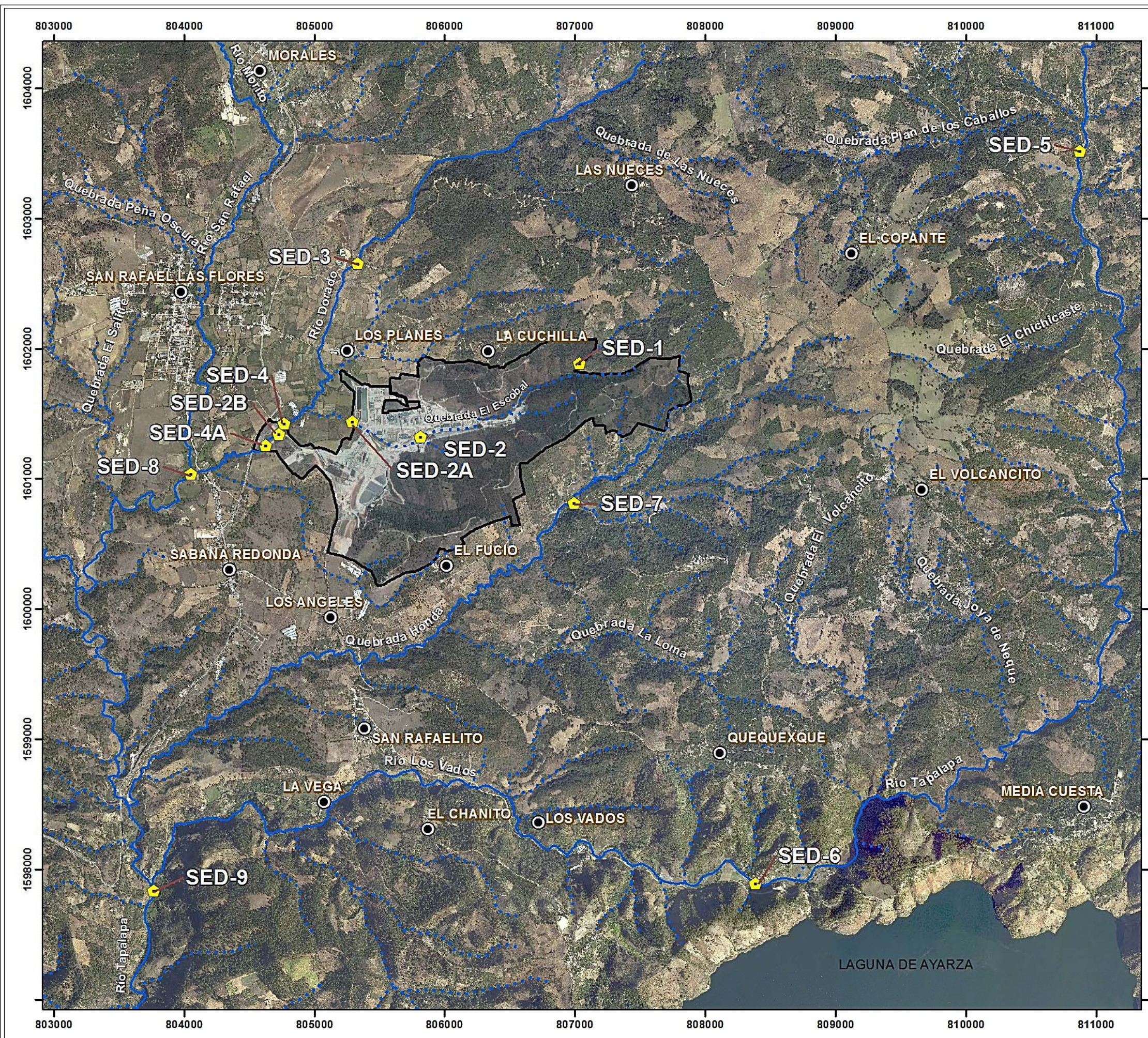
5.1 Sitios de Monitoreo

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

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


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

Nota: en ninguna de las estaciones monitoreadas se cuenta con línea base de metales en sedimentos. Sistema de coordenadas proyectadas UTM, DATUM WGS84. 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

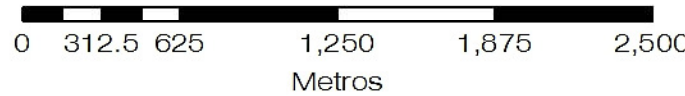
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

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 M ataquescuintla (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: Octubre 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 Septiembre de 2016. Los resultados del laboratorio se presentan en el Anexo 11.6.

El porcentaje de fósforo total se encuentra en el rango de 0.0076% (SED-6) a 0.0537% (SED-5). No se detectó cianuro en ninguna de las estaciones muestreadas.

El mercurio solo se detectó en las estaciones SED-2 en concentraciones por debajo de lo establecido (25 mg/kg) para la disposición de lodos en el suelo establecidos por el Acuerdo 236-2006. Las concentraciones de Cadmio, Cromo y Plomo registradas están muy por debajo de los valores guía. Todas las estaciones muestreadas registraron concentraciones de Arsénico menor al valor sugerido (50 mg/Kg).

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

Parámetro	Unidades	Acuerdo 236-2006	SED-1	SED-2	SED-2A	SED-3	SED-4	SED-4A
		Aplicación al suelo	Sep-16	Sep-16	Sep-16	Sep-16	Sep-16	Sep-16
Arsénico Total	mg/Kg**	50	11	25	20.7	12	9	10.6
Cadmio Total	mg/Kg**	50	<1	5	2.84	<1	<2	0.27
Cromo Total	mg/Kg**	1500	<5	<10	5.9	<5	<10	3.2
Plomo Total	mg/Kg**	500	12	236	104	10	9	12.2
Mercurio Total	mg/Kg**	25	<0.04	0.1	<0.06	<0.05	<0.06	<0.05
Cianuro Total	mg/Kg**		<0.2	<0.3	<0.2	<0.2	<0.2	<0.2
Fósforo Total	%		0.0211	0.0142	0.0151	0.00926	0.00866	0.0243

Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7	SED-8	SED-9
		Aplicación al suelo	Sep-16	Sep-16	Sep-16	Sep-16	Sep-16
Arsénico Total	mg/Kg**	50	12	12	14	5.3	2.7
Cadmio Total	mg/Kg**	50	<3	0.16	<1	0.2	0.12
Cromo Total	mg/Kg**	1500	<10	3.2	<5	2	1.9
Plomo Total	mg/Kg**	500	8	3.38	8	23.5	3.07
Mercurio Total	mg/Kg**	25	0.15	<0.03	<0.05	0.05	<0.04
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.2	<0.2	<0.2
Fósforo Total	%		0.0537	0.0076	0.007	0.0167	0.008

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, DATUM WGS84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.

805000 806000

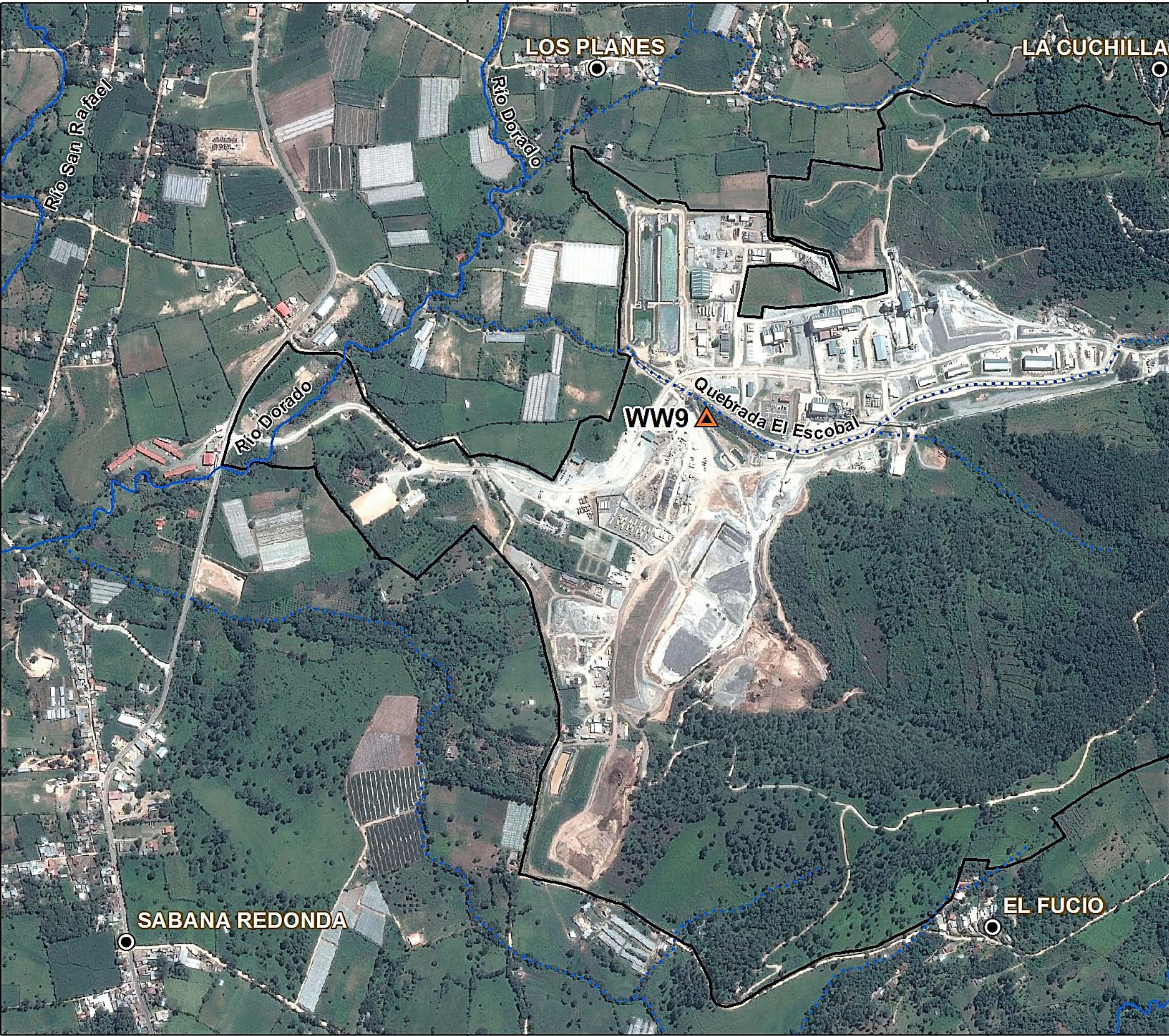
1602000

1602000

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805000 806000



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 Mataquesuintia (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: Octubre 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	Agosto	Septiembre	Octubre		
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11	WW9
No. Reporte Lab.			1560-16	1696-16	1940-16	1941-16	1939-16
Grasas y Aceites	mg/L	10	<5	<5	<5	<5	<5
Materia Flotante	NL	Ausente	ausente	ausente	ausente	ausente	ausente
DBO	mg/L	200	< 10	< 10	< 10	< 10	< 10
DQO		< 25	< 25	< 25	< 25	< 25	
SST (TSS)		100	< 10	< 10	< 10	< 10	< 10
Sólidos Sedimentables		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrógeno Total		20	<10	<10	<10	<10	<10
Fósforo Total		10	<0.05	<0.05	<0.05	0.05	0.05
Arsénico		0.1	<0.002	<0.002	<0.002	0.008	0.009
Cadmio		0.1	<0.02	<0.02	<0.02	<0.02	<0.02
Cobre		3	<0.03	<0.03	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Cianuro Total*		1	<0.03	<0.03	<0.03	<0.03	<0.03
Mercurio		0.01	<0.004	<0.004	<0.004	<0.004	<0.004
Níquel		2	<0.05	<0.05	<0.05	<0.05	<0.05
Plomo		0.4	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc		10	<0.01	<0.01	<0.01	<0.01	<0.01
Color Aparente		u Pt/Co	500	< 1	< 1	< 1	< 1
Color Real	< 1			< 1	< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	< 2	< 2	< 2	49	5.4 x 10 ³

*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 11.7.

Los valores de pH se encontraron en el rango de 6.86 a 7.53 u.e., cumpliendo con el rango establecido en el Acuerdo 6.0-9.0 u.e.

La concentración de Cianuro Total, Grasas y Aceites, Demanda Bioquímica de Oxígeno (**DBO**), Demanda Química de Oxígeno (**DQO**), sólidos sedimentables totales (**SST**), Arsénico Total, Plomo Total, Cadmio Total, Cobre Total, Cromo Hexavalente, Mercurio Total, Níquel Total y Coliformes fecales están por debajo de los valores establecidos por el acuerdo. Por lo tanto los resultados obtenidos durante las descargas de la planta de tratamiento cumplen con el Acuerdo Gubernativo 236-2006 para entes generadores nuevos, Banco Mundial para el sector minero y la USEPA.

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

Mes	Unidades	LMP Acuerdo 236-2006	Valores Indicador Banco Mundial Sector Minero	LMP EPA. CFR 440, Subparte J, 440.102, (a)	Agosto	Septiembre	Octubre
Fecha Muestreo					16/08/2016	27/09/2016	18/10/2016
ID Muestra					WW9	WW9	WW9
No. Reporte Lab.					1492-16	1760-16	1939-16
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.44	7.53	6.86
Temperatura de campo	°C		+/- 3		26.8	26.2	26.5
Temperatura. Quebrada El Escobal					25.8	23.0	23.4
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		0.008	0.008	0.009
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		<0.03	<0.03	<0.03
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			8	6
Color Real					< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10⁴	400		240	1.6 x 10 ³	5.4 x 10 ³

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

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

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

Sistema de coordenadas proyectadas UTM, DATUM WGS84. 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 Intermitente

ESTACIONES DE MONITOREO

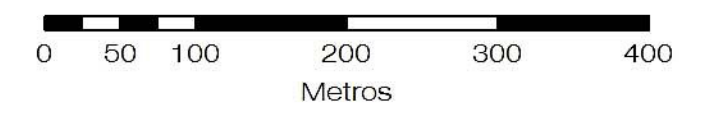
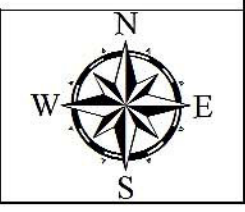
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuinta (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: Octubre 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 agosto a octubre 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 (2.5 mm/s). Según la norma del United States Bureau of Mines, el límite a partir del cual las vibraciones inducidas por una voladura pueden ocasionar daños a estructuras es de 50.8 mm/s. Por lo que se puede determinar que las mismas no son sensibles y por lo tanto no representan un impacto para el ambiente.

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

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1340-6810	1	0.25	<2.5
	1240-CFTO	1	0.25347	<2.5
	1215-6900	1	0.25694	<2.5
	1480-7360	1	0.75	<2.5
	1390-6840	1	0.75347	<2.5
	1290-CFTO	1	0.75694	<2.5
	1430-7340	2	0.25	<2.5
	1430-7370	2	0.25347	<2.5
	1390-6800	2	0.25694	<2.5
	1340-6770	2	0.26042	<2.5
	1480-7400	2	0.75	<2.5
	1505-RAMPA	2	0.75347	<2.5
	1480-7380	2	0.75694	<2.5
	1390-CFTO	2	0.76042	<2.5
	1455-7340	3	0.25	<2.5
	1215-6900	3	0.25347	<2.5
	1340-6960	3	0.25694	<2.5
	1480-7360	3	0.26042	<2.5
	1505-ACCE	3	0.75	<2.5
	1390-6900	3	0.75347	<2.5
	1340-6770	3	0.75694	<2.5
	1190-6500	3	0.76042	<2.5
	1190-6460	3	0.76389	<2.5
	1480-7400	3	0.76736	<2.5
	1240-c/f.o	4	0.25	<2.5
	1190-6940	4	0.25347	<2.5
1390-6800	4	0.25694	<2.5	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1430-7370	4	0.75	<2.5
	1240-6360	4	0.75347	<2.5
	1480-7380	4	0.75694	<2.5
	1390-6940	4	0.76042	<2.5
	1480-7400	4	0.76389	<2.5
	1390-6840	5	0.25	<2.5
	1290 C/F.E.	5	0.25347	<2.5
	1215-6920	5	0.25694	<2.5
	1340-6770	5	0.26042	<2.5
	1480-7360	5	0.75	<2.5
	1215-6940	5	0.75347	<2.5
	1505-Acc.	5	0.75694	<2.5
	15058-Rampa	5	0.76042	<2.5
	1190-6940	5	0.76389	<2.5
	1390 C/F.O.	6	0.25	<2.5
	1430-7370	6	0.25347	<2.5
	1480-7380	6	0.25694	<2.5
	1215-6920	6	0.75	<2.5
	1390-6900	6	0.75347	<2.5
	1415-6820	6	0.75694	<2.5
	1190-6920	6	0.76042	<2.5
	1190-6460	6	0.76389	<2.5
	1290-CFTO	7	0.25	<2.5
	1390-6920	7	0.25347	<2.5
	1215-6900	7	0.25694	<2.5
	1480-7360	7	0.26042	<2.5
	1240-6360	7	0.26389	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1390-6840	7	0.26736	<2.5
	1455-7400	7	0.27083	<2.5
	1190-6500	7	0.75	<2.5
	1215-6940	7	0.75347	<2.5
	1340-6770	7	0.75694	<2.5
	1315-6810	7	0.76042	<2.5
	1480-7380	7	0.76389	<2.5
	1190-6460	7	0.76736	<2.5
	1505-rampa	8	0.25	<2.5
	1340-6960	8	0.25347	<2.5
	1430-7370	8	0.25694	<2.5
	1215-6920	8	0.26042	<2.5
	1190-6940	8	0.26389	<2.5
	1390-6800	8	0.26736	<2.5
	1240-6360	8	0.75	<2.5
	1480-7360	8	0.75347	<2.5
	1190-6420	8	0.75694	<2.5
	1190-6460	8	0.76042	<2.5
	1190-6500	9	0.25	<2.5
	1215-6960	9	0.25347	<2.5
	1480-7380	9	0.25694	<2.5
	1415-6820	9	0.26042	<2.5
	1340-6770	9	0.26389	<2.5
	1505-RAMPA	9	0.26736	<2.5
	1390-CFTO	9	0.75	<2.5
	1390-6800	9	0.75347	<2.5
	1190-6920	10	0.25	<2.5
	1190-6900	10	0.25347	<2.5
	1290-6970	10	0.25694	<2.5
	1215-6500	10	0.75	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1240-6360	10	0.75347	<2.5
	1390-6840	10	0.75694	<2.5
	1190-6500	11	0.25	<2.5
	1190-6460	11	0.25347	<2.5
	1215-6460	11	0.25694	<2.5
	1390-6920	11	0.26042	<2.5
	1480-7360	11	0.26389	<2.5
	1480-7360	11	0.26736	<2.5
	1290-6970	11	0.75	<2.5
	1480-7380	11	0.75347	<2.5
	1355-RMUK	11	0.75694	<2.5
	1390-6900	12	0.25	<2.5
	1215-6500	12	0.25347	<2.5
	1215-6940	12	0.25694	<2.5
	1215-6920	12	0.26042	<2.5
	1215-6420	12	0.26389	<2.5
	1365-6560	12	0.26736	<2.5
	1340-6770	12	0.75	<2.5
	1190-6460	12	0.75347	<2.5
	1240-6780	12	0.75694	<2.5
	1390-6840	12	0.76042	<2.5
	1215-6460	12	0.76389	<2.5
	1480-7380	13	0.25	<2.5
	1190-6500	13	0.25347	<2.5
	1240-6360	13	0.25694	<2.5
	1390-CFTO	13	0.26042	<2.5
	1190-6920	13	0.26389	<2.5
	1190-6940	13	0.75	<2.5
	1390-6920	13	0.75347	<2.5
	1215-6920	13	0.75694	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1480-7380	13	0.76042	<2.5
	1215-6500	14	0.25	<2.5
	1340-6670	14	0.25347	<2.5
	1390-6900	14	0.25694	<2.5
	1365-6560	14	0.26042	<2.5
	1215-6940	14	0.75	<2.5
	1215-6420	14	0.75347	<2.5
	1190-6460	14	0.75694	<2.5
	1290-c/f.e.	14	0.76042	<2.5
	1215-6460	14	0.76389	<2.5
	1240-6360	15	0.25	<2.5
	1190-6920	15	0.25347	<2.5
	1340-6770	15	0.25694	<2.5
	1240-6340	15	0.26042	<2.5
	1215-6480	15	0.26389	<2.5
	1365-6560	15	0.26736	<2.5
	1290-6970	15	0.75	<2.5
	1190-6500	15	0.75347	<2.5
	1215-6500	15	0.75694	<2.5
	1390-6920	15	0.76042	<2.5
	1215-6460	15	0.76389	<2.5
	1290-CFTE	16	0.25	<2.5
	1215-6940	16	0.25347	<2.5
	1190-6460	16	0.25694	<2.5
	1215-6780	16	0.26042	<2.5
	1215-6480	16	0.26389	<2.5
	1215-6420	16	0.26736	<2.5
	1340-6810	16	0.75	<2.5
	1190-6500	16	0.75347	<2.5
	1240-6380	16	0.75694	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1365-6560	16	0.76042	<2.5
	1215-6920	16	0.76389	<2.5
	1390-6900	16	0.76736	<2.5
	1190-6920	17	0.25	<2.5
	1215-6480	17	0.25347	<2.5
	1215-6500	17	0.25694	<2.5
	1312-6460	17	0.26042	<2.5
	1430-7400	17	0.26389	<2.5
	1215-6800	17	0.26736	<2.5
	1340-6670	17	0.27083	<2.5
	1190-6540	17	0.75	<2.5
	1215-6380	17	0.75347	<2.5
	1215-6920	17	0.75694	<2.5
	1455-7420	17	0.76042	<2.5
	1190-6380	17	0.76389	<2.5
	1365-6560	18	0.25	<2.5
	1315-6440	18	0.25347	<2.5
	1190-6700	18	0.25694	<2.5
	1190-6460	18	0.26042	<2.5
	1390-6920	18	0.75	<2.5
	1390-CFTO	18	0.75347	<2.5
	1340-6820	18	0.75694	<2.5
	1430-7420	18	0.76042	<2.5
	1290-CFTE	18	0.76389	<2.5
	1215-6460	18	0.76736	<2.5
	1390-6900	19	0.25	<2.5
	1215-6500	19	0.25347	<2.5
	1215-6940	19	0.25694	<2.5
	1240-6380	19	0.26042	<2.5
	1430-7410	19	0.26389	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1365-6560	19	0.75	<2.5
	1190-6700	19	0.75347	<2.5
	1190-6500	19	0.75694	<2.5
	1415-CFTO	19	0.76042	<2.5
	1340-6810	19	0.76389	<2.5
	1215-6380	19	0.76736	<2.5
	1190-6460	20	0.25	<2.5
	1190-6380	20	0.25347	<2.5
	1390-cfto	20	0.25694	<2.5
	1190-6840 barri	20	0.26389	<2.5
	1340-6580 desv	20	0.75	<2.5
	1215-6920	20	0.75347	<2.5
	1215-6400	20	0.75694	<2.5
	1290-cfte	20	0.76042	<2.5
	1190-6500	20	0.76389	<2.5
	1240-6580	21	0.25	<2.5
	1215-6460	21	0.25347	<2.5
	1215-6790	21	0.25694	<2.5
	1430-7410	21	0.26042	<2.5
	1315-6440	21	0.26389	<2.5
	1365-6560	21	0.75	<2.5
	1190-6380	21	0.75347	<2.5
	1190-6500	21	0.75694	<2.5
	1190-6700	21	0.76042	<2.5
	1215-6500	21	0.76389	<2.5
	1240-6400	21	0.76736	<2.5
	1240-6860	22	0.25	<2.5
	1190-6460	22	0.25347	<2.5
	1390-6900	22	0.75	<2.5
	1215-6940	22	0.75347	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1290-CETE	22	0.75694	<2.5
	1190-6360	22	0.76042	<2.5
	1390-6920	22	0.76389	<2.5
	1455-CHIM	23	0.25	<2.5
	1340-6810	23	0.25347	<2.5
	1215-6920	23	0.25694	<2.5
	1315-6440	23	0.26042	<2.5
	1215-6460	23	0.26389	<2.5
	1365-6460	23	0.26736	<2.5
	1290-6860	23	0.75	<2.5
	1215-6790	23	0.75347	<2.5
	1190-6500	23	0.75694	<2.5
	1315-6450	23	0.76042	<2.5
	1240-6380	23	0.76389	<2.5
	1290-6950	24	0.25	<2.5
	1430-7410	24	0.25347	<2.5
	1215-6500	24	0.25694	<2.5
	1190-6380	24	0.26042	<2.5
	1190-6460	24	0.26389	<2.5
	1240-6760	24	0.26736	<2.5
	1240-6400	24	0.27083	<2.5
	1215-6380	24	0.75	<2.5
	1215-6940	24	0.75347	<2.5
	1480-7420	24	0.75694	<2.5
	1390-CFTO	24	0.76042	<2.5
	1365-6560	24	0.76389	<2.5
	1315-6450	25	0.25	<2.5
	1190-6700	25	0.25347	<2.5
	1390-6920	25	0.25694	<2.5
	1505-RAMPA	25	0.26042	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1415-C/F. O.	25	0.26389	<2.5
	1240-6760	25	0.26736	<2.5
	1430-7410	25	0.75	<2.5
	1215-6500	25	0.75347	<2.5
	1505-ACSSO	25	0.75694	<2.5
	1190-6380	25	0.76042	<2.5
	1415-CFET	25	0.76389	<2.5
	1290-6780	25	0.76736	<2.5
	1190-6500	26	0.25	<2.5
	1215-6920	26	0.25347	<2.5
	1240-6540	26	0.25694	<2.5
	1390-6900	26	0.26042	<2.5
	1415-Acc.	26	0.26389	<2.5
	1340-7000	26	0.75	<2.5
	1240-C/F.E.	26	0.75347	<2.5
	1315-6450	26	0.75694	<2.5
	1190-6700	26	0.76042	<2.5
	1215-6940	26	0.76389	<2.5
	1190-6380	27	0.25	<2.5
	1190-6500	27	0.25347	<2.5
	1215-6460	27	0.25694	<2.5
	1390 C/F.O.	27	0.26042	<2.5
	1430-7410	27	0.26389	<2.5
	1390-6920	27	0.75	<2.5
	1215-6500	27	0.75347	<2.5
	1215-6380	27	0.75694	<2.5
	1365-6560	27	0.76042	<2.5
	1190-6900	28	0.25	<2.5
1290-C/F.E.	28	0.25347	<2.5	
1240-6540	28	0.25694	<2.5	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1215-6920	28	0.26042	<2.5
	1415-C/F.O.	28	0.26389	<2.5
	1240-6480	28	0.26736	<2.5
	1190-6500	28	0.75	<2.5
	1390-6900	28	0.75347	<2.5
	1505-ASSO	28	0.75694	<2.5
	1215-6460	28	0.76042	<2.5
	1315-6450	29	0.25	<2.5
	1240-6540	29	0.25347	<2.5
	1190-6700	29	0.25694	<2.5
	1390-C/F.C.	29	0.26042	<2.5
	1215-6380	29	0.26389	<2.5
	1240-6480	29	0.26736	<2.5
	1190-6380	29	0.75	<2.5
	1290-CFTE	29	0.75347	<2.5
	1190-6500	29	0.75694	<2.5
	1215-6500	29	0.76042	<2.5
	1215-6380	29	0.76389	<2.5
	1290-6970	29	0.76736	<2.5
	1215-6900	29	0.77083	<2.5
	1430-7410	30	0.25	<2.5
	1390-6920	30	0.25347	<2.5
	1215-6460	30	0.25694	<2.5
	1290-CFTE	30	0.75	<2.5
	1190-6460	31	0.25	<2.5
	1340-6850	31	0.25347	<2.5
	1240-6540	31	0.25694	<2.5
	1390-6820	31	0.26042	<2.5
	1390-6900	31	0.26389	<2.5
	1215-6900	31	0.75	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1315-6450	31	0.75347	<2.5
	1390-CFTO	31	0.75694	<2.5
	1190-6500	31	0.76042	<2.5
	1190-6700	31	0.76389	<2.5
Septiembre	1315-6920	1	0.25	<2.5
	1215-6560	1	0.25347	<2.5
	1215-6940	1	0.25694	<2.5
	1240-6540	1	0.26042	<2.5
	1315-6770	1	0.26389	<2.5
	1215-6900	1	0.26736	<2.5
	1215-6380	1	0.27083	<2.5
	1430-7410	1	0.27431	<2.5
	1415-C/F.O.	1	0.75	<2.5
	1265-6930	1	0.75347	<2.5
	1290-C/F.E.	1	0.75694	<2.5
	1215-6460	1	0.76042	<2.5
	1190-6380	2	0.25	<2.5
	1215-6500	2	0.25347	<2.5
	1390-6960	2	0.25694	<2.5
	1430-7410	2	0.26042	<2.5
	1190-6500	2	0.26389	<2.5
	1190-6540	2	0.75	<2.5
	1240-6520	2	0.75347	<2.5
	1505-ACC	2	0.75694	<2.5
	1215-6380	2	0.76042	<2.5
	1190-6540	2	0.76389	<2.5
	1390-6920	3	0.25	<2.5
	1340-6850	3	0.25347	<2.5
	1315-6980	3	0.25694	<2.5
	1190-6700	3	0.26042	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1315-6450	3	0.26389	<2.5
	1390-6920	3	0.75	<2.5
	1340-6850	3	0.75347	<2.5
	1315-6980	3	0.75694	<2.5
	1190-6700	3	0.76042	<2.5
	1315-6450	3	0.76389	<2.5
	1190-6380	3	0.76736	<2.5
	1505-SUMI	4	0.25	<2.5
	1505-ACC	4	0.25347	<2.5
	1215-6460	4	0.25694	<2.5
	1190-6460	4	0.26042	<2.5
	1415-CFTO	4	0.26389	<2.5
	1315-6770	4	0.26736	<2.5
	1290-CFTE	4	0.27083	<2.5
	1390-6900	4	0.75	<2.5
	1215-6500	4	0.75347	<2.5
	1190-6380	4	0.75694	<2.5
	1190-6500	4	0.76042	<2.5
	1315-6450	4	0.76389	<2.5
	1390-CFTO	5	0.25	<2.5
	1290-CFTE	5	0.25347	<2.5
	1215-6380	5	0.25694	<2.5
	1240-6780	5	0.75	<2.5
	1215-6460	5	0.75347	<2.5
	1190-6700	5	0.75694	<2.5
	1390-6820	5	0.76042	<2.5
	1315-6930	5	0.76389	<2.5
	1455-CHIMENEA	6	0.25	<2.5
	1430-7410	6	0.25347	<2.5
	1415-CFTO	6	0.25694	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1290-CFTE	6	0.26042	<2.5
	1215-6360	6	0.26389	<2.5
	1190-6460	6	0.75	<2.5
	1190-6500	6	0.75347	<2.5
	1190-6860	6	0.75694	<2.5
	1315-6930	6	0.76042	<2.5
	1505-SUMI	6	0.76389	<2.5
	1480-7420	6	0.76736	<2.5
	1430-7410	6	0.77083	<2.5
	1390-CFTO	7	0.25	<2.5
	1240-6540	7	0.25347	<2.5
	1340-6850	7	0.25694	<2.5
	1190-6380	7	0.26042	<2.5
	1315-6940	7	0.26389	<2.5
	1480-7420	7	0.75	<2.5
	1290-C/F.E	7	0.75347	<2.5
	1190-6500	7	0.75694	<2.5
	1315-6450	7	0.76042	<2.5
	1215-6460	7	0.76389	<2.5
	1215-6720	7	0.76736	<2.5
	1390-6900	8	0.25	<2.5
	1190-6700	8	0.25347	<2.5
	1215-6500	8	0.25694	<2.5
	1390-6830	8	0.26042	<2.5
	1415-CFTE	8	0.75	<2.5
	1190-6380	8	0.75347	<2.5
	1415-CFTO	8	0.75694	<2.5
	1315-6930	8	0.76042	<2.5
	1190-6500	8	0.76389	<2.5
	1215-6380	9	0.25	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1215-6460	9	0.25347	<2.5
	1240-6540	9	0.25694	<2.5
	1290-CFTE	9	0.26042	<2.5
	1390-CFTE	9	0.75	<2.5
	1215-6720	9	0.75347	<2.5
	1190-6460	9	0.75694	<2.5
	1190-6820	9	0.76042	<2.5
	1390-6820	10	0.25	<2.5
	1190-6500	10	0.25347	<2.5
	1480-7420	10	0.25694	<2.5
	1505-ACESSO	10	0.26042	<2.5
	1240-6480	10	0.26389	<2.5
	1315-6450	10	0.26736	<2.5
	1365-VENTILACION	10	0.75	<2.5
	1215-6500	10	0.75347	<2.5
	1340-6850	10	0.75694	<2.5
	1315-6770	10	0.76042	<2.5
	1315-6930	10	0.76389	<2.5
	1315-6450	11	0.25	<2.5
	1365-VENTI	11	0.25347	<2.5
	1315-6930	11	0.25694	<2.5
	1215-6460	11	0.26042	<2.5
	1215-6380	11	0.75	<2.5
	1315-6770	11	0.75347	<2.5
	1405-SUMI	11	0.75694	<2.5
	1390-6820	11	0.76042	<2.5
	1340-6850	11	0.76389	<2.5
	1415-CETE	11	0.76736	<2.5
	1315-6450	12	0.25	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1365-VENTI	12	0.25347	<2.5
	1315-6930	12	0.25694	<2.5
	1215-6460	12	0.26042	<2.5
	1215-6380	12	0.75	<2.5
	1315-6770	12	0.75347	<2.5
	1405-SUMI	12	0.75694	<2.5
	1390-6820	12	0.76042	<2.5
	1340-6850	12	0.76389	<2.5
	1415-CETE	12	0.76736	<2.5
	1390-CFTO	13	0.25	<2.5
	1215-6720	13	0.25347	<2.5
	1290-CFTE	13	0.25694	<2.5
	1190-LONG	13	0.26042	<2.5
	1190-6380	13	0.75	<2.5
	1215-6500	13	0.75347	<2.5
	1365-VENT	14	0.25	<2.5
	1340-6980	14	0.25347	<2.5
	1315-6920	14	0.25694	<2.5
	1240-6540	14	0.26042	<2.5
	1215-6600	14	0.75	<2.5
	1215-6460	14	0.75347	<2.5
	1505-RAMPA	14	0.75694	<2.5
	1415-CFTE	14	0.76042	<2.5
	1215-6640	14	0.76389	<2.5
	1190-6700	15	0.25	<2.5
	1215-6600	15	0.25347	<2.5
	1240-6540	15	0.25694	<2.5
	1290 C/F.E.	15	0.26042	<2.5
	1505 RAMPA	15	0.26389	<2.5
	1190-6850	15	0.75	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1190-6380	15	0.75347	<2.5
	1390-CFTO	15	0.75694	<2.5
	1315-6930	15	0.76042	<2.5
	1190-6640	15	0.76389	<2.5
	1190-6700	16	0.25	<2.5
	1215-6600	16	0.25347	<2.5
	1240-6540	16	0.25694	<2.5
	1290 C/F.E.	16	0.26042	<2.5
	1505 RAMPA	16	0.26389	<2.5
	1190-6600	16	0.75	<2.5
	1240-6500	16	0.75347	<2.5
	1315-Vent.	16	0.75694	<2.5
	1415-C/F.E.	16	0.76042	<2.5
	1430-Sum.	16	0.76389	<2.5
	1190-6380	17	0.25	<2.5
	1215-6500	17	0.25347	<2.5
	1215-6720	17	0.25694	<2.5
	1355 RAMPA	17	0.26042	<2.5
	1390 C/F.O.	17	0.26389	<2.5
	1265-6930	17	0.75	<2.5
	1290-6970	17	0.75347	<2.5
	1190-6640	17	0.75694	<2.5
	1190-6850	17	0.76042	<2.5
	1315-6930	17	0.76389	<2.5
	1215-6380	18	0.25	<2.5
	1240-6500	18	0.25347	<2.5
	1290-C/F.E.	18	0.25694	<2.5
	1505-RAMPA	18	0.26042	<2.5
	1355-RAMPA	18	0.75	<2.5
	1215-6640	18	0.75347	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1190-6380	18	0.75694	<2.5
	1190-6600	18	0.76042	<2.5
	1215-6720	18	0.76389	<2.5
	1340-6980	18	0.76736	<2.5
	1215-6600	19	0.25	<2.5
	1215-6500	19	0.25347	<2.5
	1240-6540	19	0.25694	<2.5
	1214-6560	19	0.26042	<2.5
	1190-6700	19	0.26389	<2.5
	1365-VET.	19	0.75	<2.5
	1190-6640	19	0.75347	<2.5
	1190-6850	19	0.75694	<2.5
	1240-6500	19	0.76042	<2.5
	1505-rampa	20	0.25	<2.5
	1215-6380	20	0.25347	<2.5
	1190-6380	20	0.25694	<2.5
	1215-6720	20	0.26042	<2.5
	1240-6560	20	0.26389	<2.5
	1215-6640	20	0.75	<2.5
	1355-rampa	20	0.75347	<2.5
	1215-6460	21	0.25	<2.5
	1240-6500	21	0.25347	<2.5
	1315-6930	21	0.25694	<2.5
	1340-6850	21	0.26042	<2.5
	1240-6560	21	0.26389	<2.5
	1340-6980	21	0.26736	<2.5
	1240-6940	21	0.27083	<2.5
	1190-6940	21	0.75	<2.5
	1240-6540	21	0.75347	<2.5
	1215-6720	21	0.75694	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1190-6600	21	0.76042	<2.5
	1190-6640	21	0.76389	<2.5
	1190-6700	21	0.76736	<2.5
	1215-6600	22	0.25	<2.5
	1215-6500	22	0.25347	<2.5
	1190-6850	22	0.25694	<2.5
	1240-6930	22	0.26042	<2.5
	1340-6980	22	0.26389	<2.5
	1215-6380	22	0.75	<2.5
	1215-6640	22	0.75347	<2.5
	1355-RAMPA	22	0.75694	<2.5
	1365-VENT	22	0.76042	<2.5
	1390-VENT	22	0.76389	<2.5
	1190-6700	22	0.76736	<2.5
	1340-6670	22	0.77083	<2.5
	1505-RAMPA	23	0.25	<2.5
	1290-6640	23	0.25347	<2.5
	1240-6420	23	0.25694	<2.5
	1315-6930	23	0.26042	<2.5
	1340-6810	23	0.26389	<2.5
	1240-6940	23	0.75	<2.5
	1215-6460	23	0.75347	<2.5
	1190-6600	23	0.75694	<2.5
	1240-6540	23	0.76042	<2.5
	1215-6720	23	0.76389	<2.5
	1355-RAMPA	23	0.76736	<2.5
	1190-6850	24	0.25	<2.5
	1215-6600	24	0.25347	<2.5
	1290-CFTO	24	0.25694	<2.5
	1365-VENT	24	0.26042	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1330-RAMPA	24	0.75	<2.5
	1240-6940	24	0.75347	<2.5
	1240-6500	24	0.75694	<2.5
	1190-6700	24	0.76042	<2.5
	1390-VENT	25	0.25	<2.5
	1315-6930	25	0.25347	<2.5
	1215-6640	25	0.25694	<2.5
	1215-6500	25	0.26042	<2.5
	1290-6930	25	0.26389	<2.5
	1240-6420	25	0.75	<2.5
	1215-6720	25	0.75347	<2.5
	1190-6640	25	0.75694	<2.5
	1505-RAMPA	25	0.76042	<2.5
	1215-6380	25	0.76389	<2.5
	1290-6780	25	0.76736	<2.5
	1290-CFTE	26	0.25	<2.5
	1290-6970	26	0.25347	<2.5
	1240-6540	26	0.25694	<2.5
	1215-6600	26	0.26042	<2.5
	1265-6930	26	0.26389	<2.5
	1215-6540	26	0.26736	<2.5
	1365-VENT.	26	0.75	<2.5
	1340-6850	26	0.75347	<2.5
	1190-6600	26	0.75694	<2.5
	1240-6420	26	0.76042	<2.5
	1190-6850	26	0.76389	<2.5
	1330-RAMPA	27	0.25	<2.5
	1215-6640	27	0.25347	<2.5
	1390-6760	27	0.25694	<2.5
	1480-VENT.	27	0.75	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1240-6540	27	0.75347	<2.5
	1505-RAMPA	27	0.75694	<2.5
	1215-6380	27	0.76042	<2.5
	1315-6930	27	0.76389	<2.5
	1215-6540	28	0.25	<2.5
	1190-LONG.	28	0.25347	<2.5
	1340-7000	28	0.25694	<2.5
	1240-6940	28	0.26042	<2.5
	1240-6540	28	0.26389	<2.5
	1290-CFTE	28	0.26736	<2.5
	1215-6810	28	0.27083	<2.5
	1215-6500	28	0.75	<2.5
	1240-6420	28	0.75347	<2.5
	1215-6600	28	0.75694	<2.5
	1505-ACC.	28	0.76042	<2.5
	1505-RAMPA	29	0.25	<2.5
	1315-6630	29	0.25347	<2.5
	1480-VENT	29	0.25694	<2.5
	1190-6640	29	0.26042	<2.5
	1190-6850	29	0.26389	<2.5
	1190-6600	29	0.26736	<2.5
	1240-6460	29	0.75	<2.5
	1240-6500	29	0.75347	<2.5
	1215-6640	29	0.75694	<2.5
	1330-RAMPA	29	0.76042	<2.5
	1390-6760	30	0.25	<2.5
	1390-VENT	30	0.25347	<2.5
	1240-6540	30	0.25694	<2.5
	1190-LONG	30	0.26042	<2.5
	1505-ACCESO	30	0.26389	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1215-6540	30	0.26736	<2.5
	1315-6930	30	0.75	<2.5
	1365-VENT	30	0.75347	<2.5
	1505-RAMPA	30	0.75694	<2.5
	1290-CFTE	30	0.76042	<2.5
	1240-6940	30	0.76389	<2.5
	1390-6760	30	0.76736	<2.5
Octubre	1215-6000	1	0.25	<2.5
	1215-6380	1	0.25347	<2.5
	1505-ACCESO	1	0.25694	<2.5
	1265-7040	1	0.26042	<2.5
	1190-6600	1	0.75	<2.5
	1190-6640	1	0.75347	<2.5
	1215-6640	1	0.75694	<2.5
	1240-6420	1	0.76042	<2.5
	1340-6980	1	0.76389	<2.5
	1315-6810	2	0.25	<2.5
	1365-6980	2	0.25347	<2.5
	1215-LONG.	2	0.25694	<2.5
	1330-RAMPA	2	0.26042	<2.5
	1240-6500	2	0.26389	<2.5
	1240-6520	2	0.26736	<2.5
	1240-6460	2	0.75	<2.5
	1215-6600	2	0.75347	<2.5
	1505-ACC.	2	0.75694	<2.5
	1390-VENT.	3	0.25	<2.5
	1215-6640	3	0.25347	<2.5
1340-6760	3	0.25694	<2.5	
1340-6630	3	0.26042	<2.5	
1240-6540	3	0.75	<2.5	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1240-6940	3	0.75347	<2.5
	1265-7010	3	0.75694	<2.5
	1190-6640	3	0.76042	<2.5
	1215-6500	3	0.76389	<2.5
	1340-6980	3	0.76736	<2.5
	1240-6420	4	0.25	<2.5
	1240-6500	4	0.25347	<2.5
	1215-6500	4	0.25694	<2.5
	1365-6980	4	0.26042	<2.5
	1340-6560	4	0.26389	<2.5
	1215-6640	4	0.26736	<2.5
	1505-RAMPA	4	0.75	<2.5
	1505-SUB	4	0.75347	<2.5
	1305-RAMPA	4	0.75694	<2.5
	1215-LONG	4	0.76042	<2.5
	1330-RAMPA	4	0.76389	<2.5
	1240-6460	5	0.25	<2.5
	1265-7010	5	0.25347	<2.5
	1990-6700	5	0.25694	<2.5
	1190-6600	5	0.26042	<2.5
	1240-6540	5	0.75	<2.5
	1215-SERVI.	5	0.75347	<2.5
	1215-6600	5	0.75694	<2.5
	1240-6500	5	0.76042	<2.5
	1315-6930	5	0.76389	<2.5
	1340-6630	5	0.76736	<2.5
	1190-6640	6	0.25	<2.5
	1190-6920	6	0.25347	<2.5
	1240-6940	6	0.25694	<2.5
	1365-6980	6	0.26042	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1240-6520	6	0.26389	<2.5
	1315-6630	6	0.26736	<2.5
	1340-6630	6	0.75	<2.5
	1240-6420	6	0.75347	<2.5
	1390-VENT.	6	0.75694	<2.5
	1390-6760	6	0.76042	<2.5
	1290 Bypaas	7	0.25	<2.5
	1190-6600	7	0.25347	<2.5
	1505 Rampa	7	0.25694	<2.5
	1330 Rampa	7	0.26042	<2.5
	1340-7000 Prod.	7	0.26389	<2.5
	1315-7000	7	0.75	<2.5
	1265-7010	7	0.75347	<2.5
	1365-6980	7	0.75694	<2.5
	1215-6640	7	0.76042	<2.5
	1215-6600	8	0.25	<2.5
	1240-6500	8	0.25347	<2.5
	1215 Long.	8	0.25694	<2.5
	1390-C/F.O.	8	0.26042	<2.5
	1240-6460	8	0.75	<2.5
	1215-6500	8	0.75347	<2.5
	1240-6420	8	0.75694	<2.5
	1240-6940	9	0.25	<2.5
	1265-7010	9	0.25347	<2.5
	1240-6540	9	0.25694	<2.5
	1240-6520	9	0.26042	<2.5
	1365-6980	9	0.75	<2.5
	1505-RAMPA	9	0.75347	<2.5
	1190-LONG.	9	0.75694	<2.5
	1330-RAMPA	10	0.25	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1390-6760	10	0.25347	<2.5
	1390-VENT.	10	0.25694	<2.5
	1240-6420	10	0.26042	<2.5
	1215-6640	10	0.75	<2.5
	1240-6500	10	0.75347	<2.5
	1215-LONG.	10	0.75694	<2.5
	1390-CFTO	10	0.76042	<2.5
	1215-6600	10	0.76389	<2.5
	1340-6630	10	0.76736	<2.5
	1240-6460	11	0.25	<2.5
	1215-LONG.	11	0.25347	<2.5
	1505-RAMPA	11	0.25694	<2.5
	1240-6540	11	0.26042	<2.5
	1240-6940	11	0.75	<2.5
	1315-6590	11	0.75347	<2.5
	1240-6420	11	0.75694	<2.5
	1190-LONG.	12	0.25	<2.5
	1215-6500	12	0.25347	<2.5
	1265-7010	12	0.25694	<2.5
	1330-RAMPA	12	0.26042	<2.5
	1315-6630	12	0.26389	<2.5
	1240-6500	12	0.75	<2.5
	1415-CTFE	12	0.75347	<2.5
	1365-6980	12	0.75694	<2.5
	1240-6940	12	0.76042	<2.5
	1215-6600	12	0.76389	<2.5
	1390-vent.	13	0.25	<2.5
	1505-sumi	13	0.25347	<2.5
	1505-acc	13	0.25694	<2.5
	1215-6720	13	0.26042	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-6980	13	0.26389	<2.5
	1190-6580	13	0.75	<2.5
	1390-C/F.O.	13	0.75347	<2.5
	1330-RAMPA	13	0.75694	<2.5
	1340-6900	13	0.76042	<2.5
	1340-6810	13	0.76389	<2.5
	1265-6810	13	0.76736	<2.5
	1505-RAMPA	14	0.25	<2.5
	1240-6420	14	0.25347	<2.5
	1240-6460	14	0.25694	<2.5
	1240-6500	14	0.75	<2.5
	1290-BYPAAS	14	0.75347	<2.5
	1305-RAMPA	14	0.75694	<2.5
	1215-6770	14	0.76042	<2.5
	1315-6590	15	0.25	<2.5
	1190-long.	15	0.25347	<2.5
	1240-6940	15	0.25694	<2.5
	1240-6540	15	0.75	<2.5
	1505-rampa	15	0.75347	<2.5
	1365-6960	15	0.75694	<2.5
	1340-6980	15	0.76042	<2.5
	1415c/f.e.	15	0.76389	<2.5
	1330-RAMPA	16	0.25	<2.5
	1265-7010	16	0.25347	<2.5
	1390-CFTO	16	0.25694	<2.5
	1240-6460	16	0.26042	<2.5
	1340-6810	16	0.26389	<2.5
	1190-6580	16	0.75	<2.5
	1215-6770	16	0.75347	<2.5
	1505-SUBEST.	16	0.75694	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1215-6600	16	0.76042	<2.5
	1365-6960	16	0.76389	<2.5
	1215-6940	16	0.76736	<2.5
	1240-6420	17	0.25	<2.5
	1240-6500	17	0.25347	<2.5
	1505-RAMPA	17	0.25694	<2.5
	1240-6940	17	0.75	<2.5
	1240-6460	17	0.75347	<2.5
	1390-VENT.	17	0.75694	<2.5
	1340-6810	17	0.76042	<2.5
	1290-6800	17	0.76389	<2.5
	1505-RAMPA	17	0.76736	<2.5
	1315-6590	18	0.25	<2.5
	1240-6540	18	0.25347	<2.5
	1305-BYPASS	18	0.25694	<2.5
	1215-LONG.	18	0.26042	<2.5
	1190-6580	18	0.75	<2.5
	1365-6960	18	0.75347	<2.5
	1365-6980	18	0.75694	<2.5
	1265-7010	19	0.25	<2.5
	1240-6500	19	0.25347	<2.5
	1240-6360	19	0.25694	<2.5
	1190-LONG.	19	0.26042	<2.5
	1215-6940	19	0.26389	<2.5
	1330-RAMPA	19	0.26736	<2.5
	1330-RAMPA	19	0.75	<2.5
	1215-6770	19	0.75347	<2.5
	1215-6580	19	0.75694	<2.5
	1240-6420	19	0.76042	<2.5
	1505-7440	19	0.76389	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1305-CTFE	20	0.25	<2.5
	1290-BPASS	20	0.25347	<2.5
	1240-6940	20	0.25694	<2.5
	1505-SUB	20	0.26042	<2.5
	1340-6810	20	0.26389	<2.5
	1415-CFTE	20	0.75	<2.5
	1215-LONG.	20	0.75347	<2.5
	1315-6590	20	0.75694	<2.5
	1340-6810	20	0.76042	<2.5
	1330-RAMPA	21	0.25	<2.5
	1240-6500	21	0.25347	<2.5
	1190-6580	21	0.25694	<2.5
	1240-6460	21	0.26042	<2.5
	1315-6670	21	0.75	<2.5
	1365-6960	21	0.75347	<2.5
	1265-7010	21	0.75694	<2.5
	1240-6420	21	0.76042	<2.5
	1390-CTFO	22	0.25	<2.5
	1390-6740	22	0.25347	<2.5
	1315-6670	22	0.25694	<2.5
	1215-6580	22	0.26042	<2.5
	1415-CTFE	22	0.26389	<2.5
	1215-6920	22	0.26736	<2.5
	1215-6940	22	0.27083	<2.5
	1505-SBST	22	0.75	<2.5
	1190-LONG	22	0.75347	<2.5
	1315-6590	22	0.75694	<2.5
	1215-6770	22	0.76042	<2.5
	1340-6670	22	0.76389	<2.5
	1190-6580	23	0.25	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1315-6580	23	0.25347	<2.5
	1305-rampa	23	0.25694	<2.5
	1330-rampa	23	0.26042	<2.5
	1240-6460	23	0.26389	<2.5
	1215-6940	23	0.26736	<2.5
	1330-rampa	23	0.75	<2.5
	1365-6960	23	0.75347	<2.5
	1215-6580	23	0.75694	<2.5
	1305-CFTE	23	0.76042	<2.5
	1215-LONG.	24	0.25	<2.5
	1240-6500	24	0.25347	<2.5
	1365-6980	24	0.25694	<2.5
	1240-6360	24	0.75	<2.5
	1290-6790	24	0.75347	<2.5
	1215-6770	24	0.75694	<2.5
	1365-6960	24	0.76042	<2.5
	1390-6780	24	0.76389	<2.5
	1240-6420	25	0.25	<2.5
	1240-6460	25	0.25347	<2.5
	1505-7440	25	0.25694	<2.5
	1190-6580	25	0.26042	<2.5
	1290-6790	25	0.26389	<2.5
	1365-6980	25	0.75	<2.5
	1305-CFTE	25	0.75347	<2.5
	1215-6580	26	0.25	<2.5
	1505-RAMPA	26	0.25347	<2.5
	1340-6670	26	0.25694	<2.5
	1415-6810	26	0.26042	<2.5
	1340-6920	26	0.26389	<2.5
	1330-RAMPA	26	0.75	<2.5

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1390-6780	26	0.75347	<2.5
	1190-6580	26	0.75694	<2.5
	1290-BYPASS	26	0.76042	<2.5
	1240-6360	27	0.25	<2.5
	1290-6790	27	0.25347	<2.5
	1340-6920	27	0.25694	<2.5
	1365-6980	27	0.26042	<2.5
	1340-6920	27	0.26389	<2.5
	1240-6500	27	0.75	<2.5
	1240-6540	27	0.75347	<2.5
	1265-6920	27	0.75694	<2.5
	1215-LONG.	27	0.76042	<2.5
	1505-7440	27	0.76389	<2.5
	1215-6920	27	0.76736	<2.5
	1215-BYPASS	27	0.77083	<2.5
	1215-6580	28	0.25	<2.5
	1365-6960	28	0.25347	<2.5
	1505 RAMPA	28	0.25694	<2.5
	1240-6460	28	0.75	<2.5
	1190-6570	28	0.75347	<2.5
1415-6820	28	0.75694	<2.5	
1290-6790	28	0.76042	<2.5	
1330 RAMPA	28	0.76389	<2.5	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-6980	29	0.25	<2.5
	1240-6420	29	0.25347	<2.5
	13290 C/F.O.	29	0.25694	<2.5
	1390-6740	29	0.26042	<2.5
	1365-6960	29	0.26389	<2.5
	1390-6780	29	0.75	<2.5
	1505-RAMPA	29	0.75347	<2.5
	1240-6500	29	0.75694	<2.5
	1215-6580	29	0.76042	<2.5
	1390-6820	30	0.25	<2.5
	1190-6580	30	0.75	<2.5
	1290-6790	30	0.75347	<2.5
	1240-6460	30	0.75694	<2.5
	1240-6360	30	0.76042	<2.5
	1340-6930	30	0.76389	<2.5
	1365-6540	30	0.76736	<2.5
	1390-6740	31	0.75	<2.5
	1390-C/F.O	31	0.75347	<2.5
	1505-RAMPA	31	0.75694	<2.5
	1365-6980	31	0.76042	<2.5
1480-7360	31	0.76389	<2.5	

Donde mm/s: milímetros por segundo; NR: no registrado
 Fuente: MSR, 2016.

8 Geoquímica de Roca Estéril

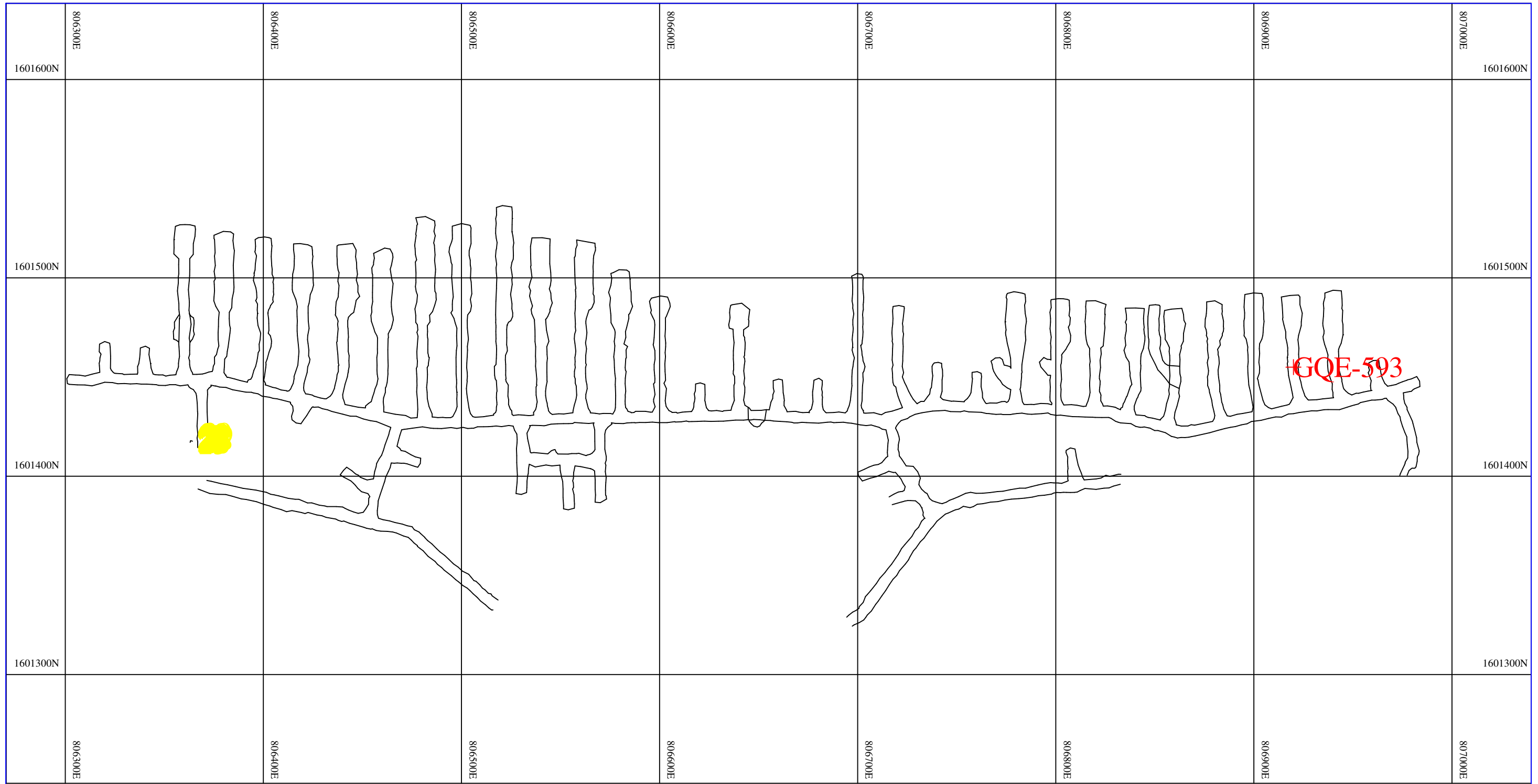
8.1 Sitios de Monitoreo

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 Agosto a Octubre 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, Figura 8-7, Figura 8-8, Figura 8-9 y Figura 8-10.

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

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-587	1480-7360-ZE	807360	1601610	1480
GQE-588	1430-7340-ZE	807340	1601587	1431
GQE-589	1290-CFTE	807072.1	1601444.47	1292
GQE-590	1240-CFTO	806343.45	1601472.17	1244
GQE-591	1390-CFTO-EC	806784.63	1601330.57	1391
GQE-592	1505-RAMP-ZE	807443.5	1601565.86	1506
GQE-593	1215-6920-EC	806920	1601455	1222
GQE-594	1415-ACC-EC	806816	1601354	1414
GQE-595	1240-6380-OC	806377	1601466.6	12144
GQE-596	1240-6360-OC	806360.39	1601483.95	1244
GQE-597	1240-6540-OC	806540	1601437	1240
GQE-598	1290-CFTE	807175	1601476.5	1300
GQE-599	1390-6820-EC	806811	1601354	1393
GQE-600	1390-CFTO-EC	806734.5	1601343	1394
GQE-601	1240-6940-EC	806940.5	1601461	1246
GQE-602	1355-RAMP-ZE	807249	1601434	1351
GQE-603	1505-RAMP-ZE	807440	1601525	1513
GQE-604	1390-6760-EC	806761	1601355.5	1394
GQE-605	1365-6980-EC	806980.5	1601408	1370
GQE-606	1505-ACC-ZE	807438.54	1601622.13	1507

Fuente: MSR, 2016.



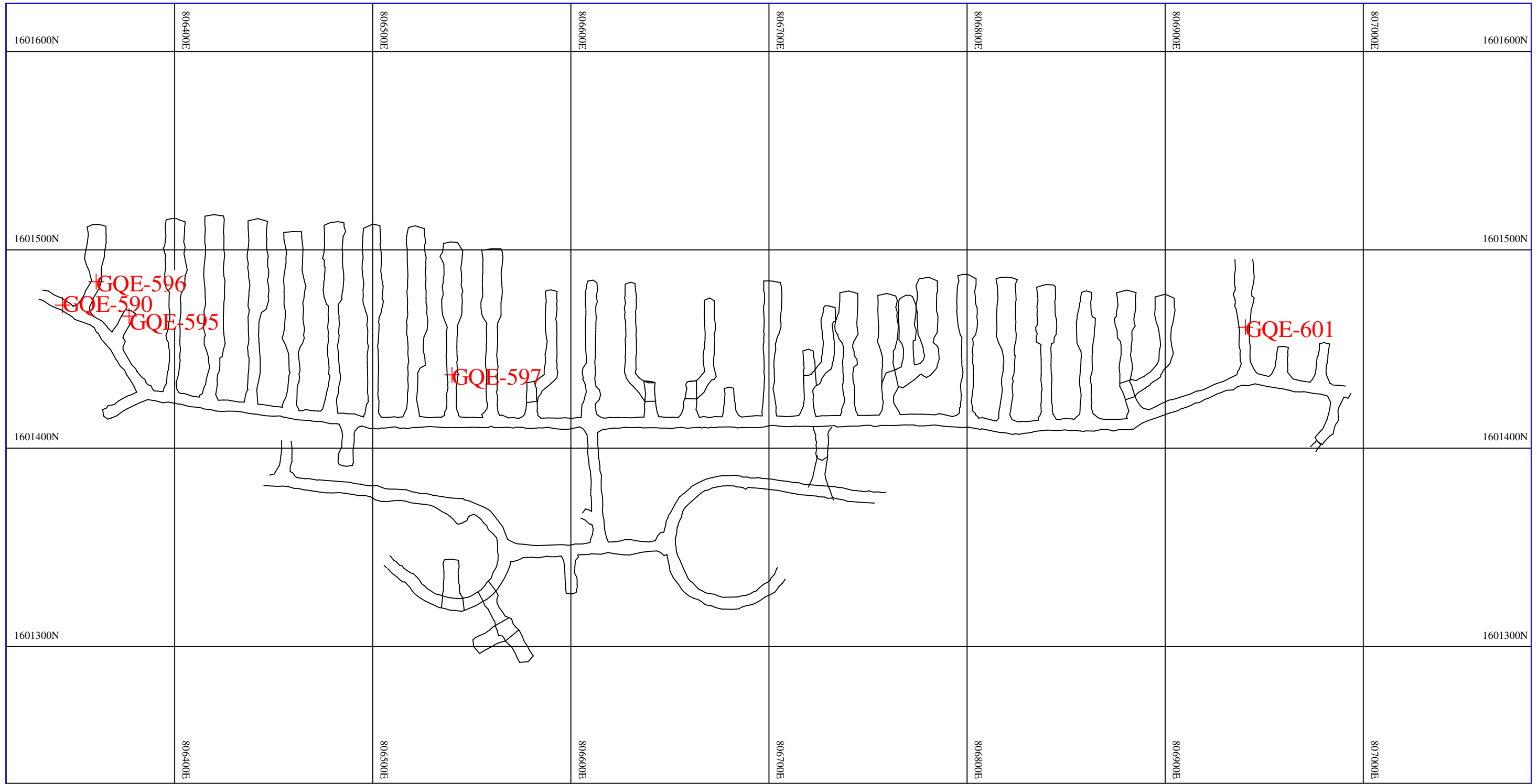
Drenaje Ácido de Roca (ARD)

Agosto-Octubre 2016

Nivel 1215

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1215



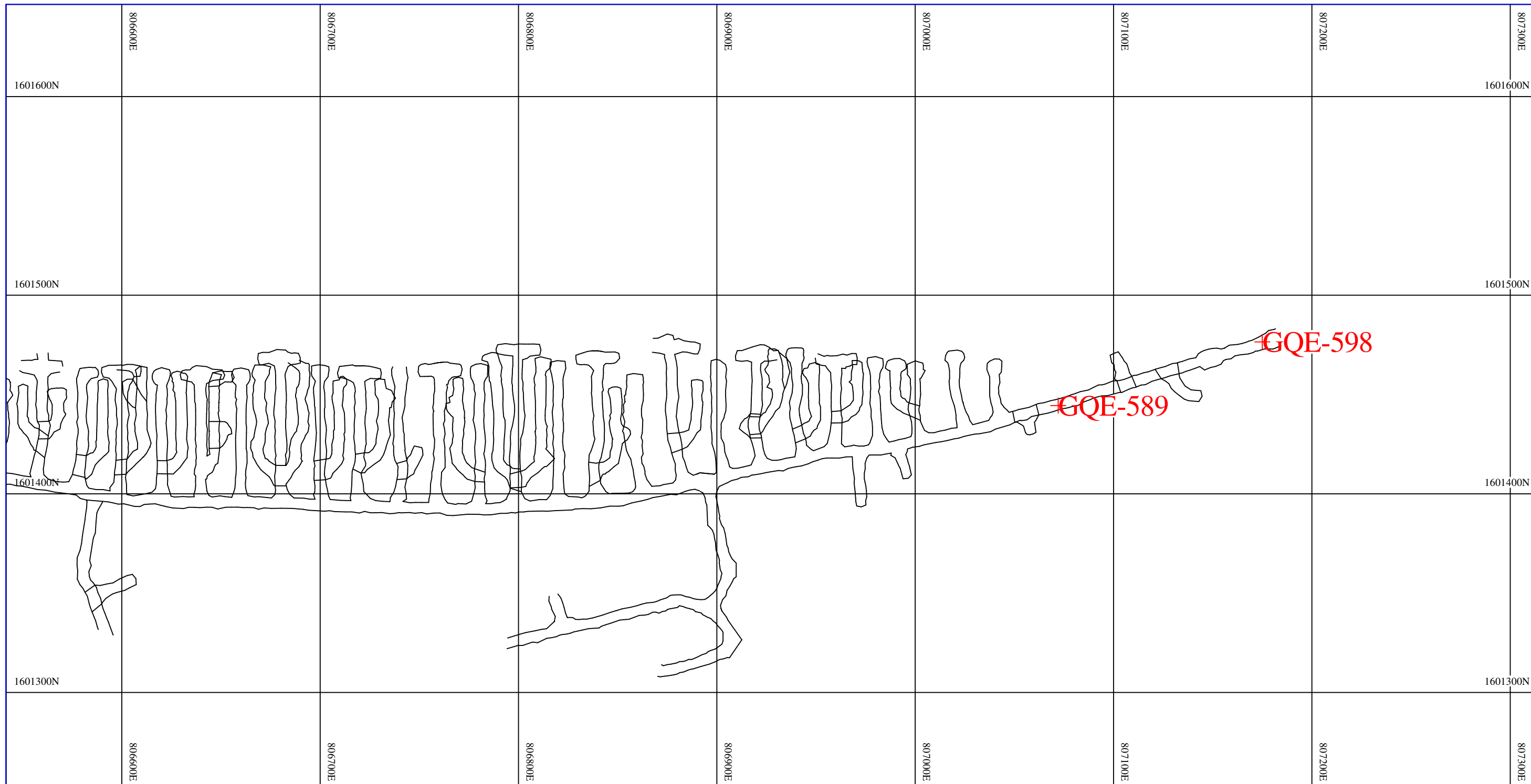
Drenaje Ácido de Roca (ARD)

Agosto-Octubre 2016

Nivel 1240

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1240_01



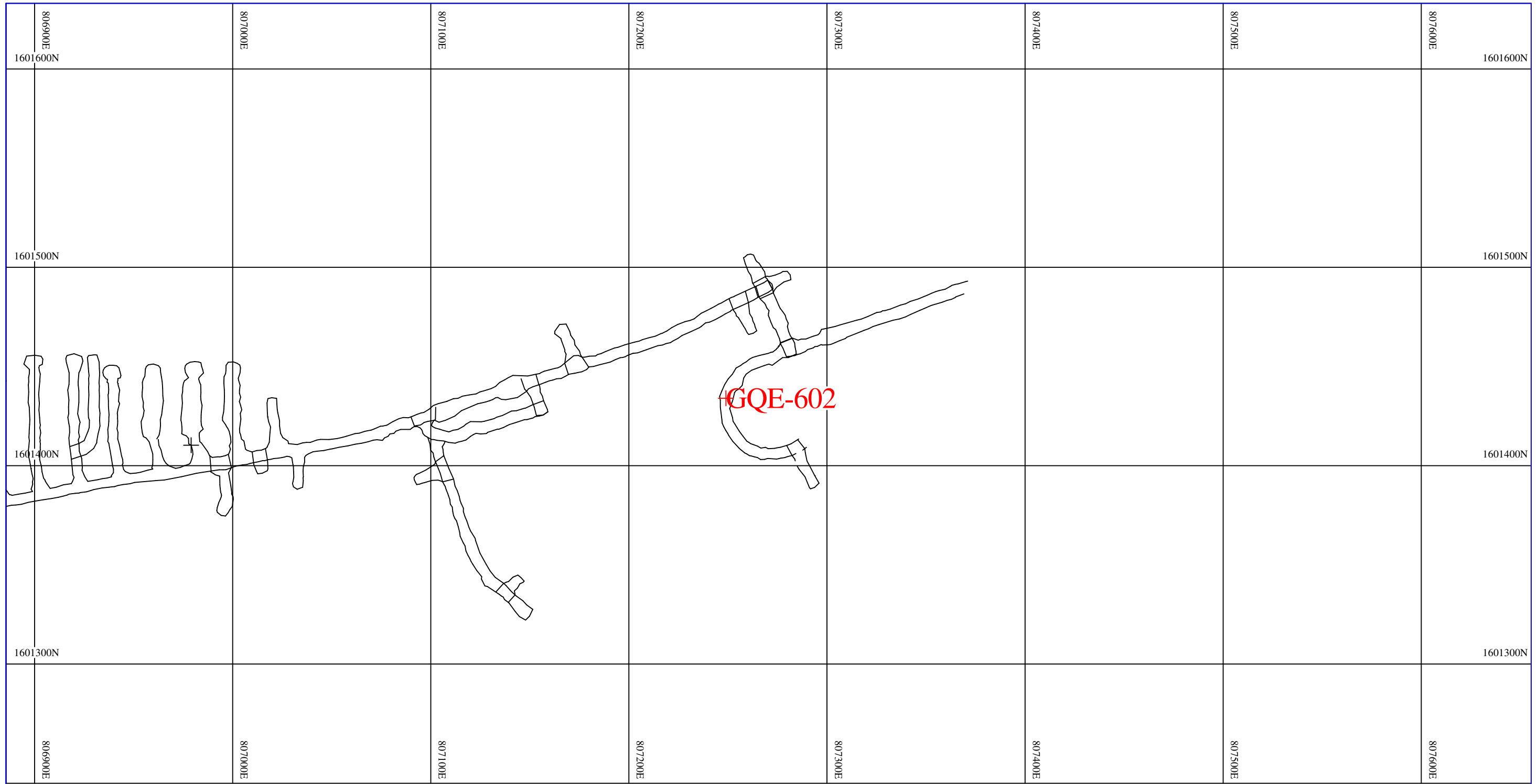
Drenaje Ácido de Roca (ARD)

Agosto-October 2016

Nivel1305-RAMP-ZE

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1305_ramp



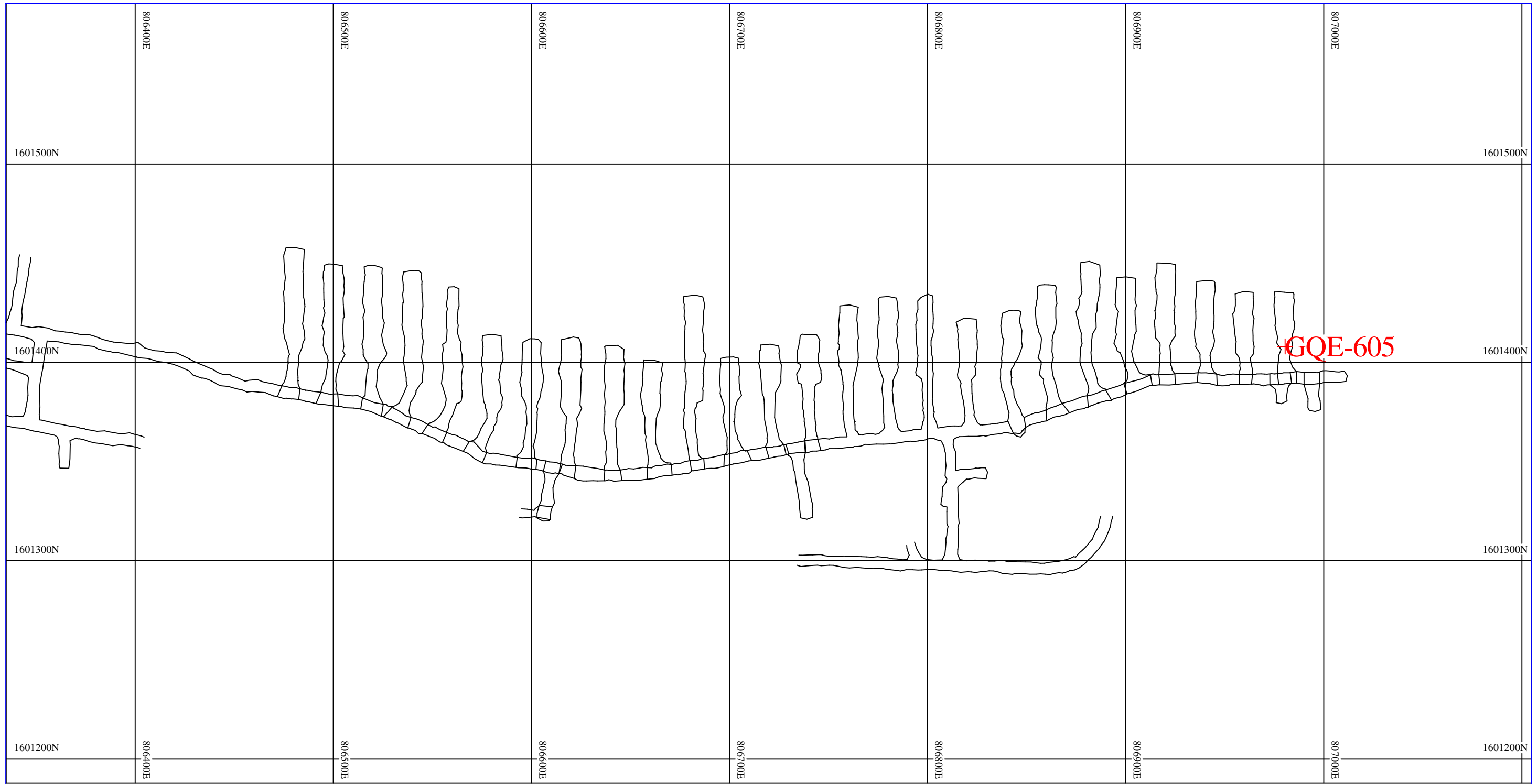
Drenaje Ácido de Roca (ARD)

Agosto-October 2016

Nivel 1355-RAMP-ZE

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1355_ramp



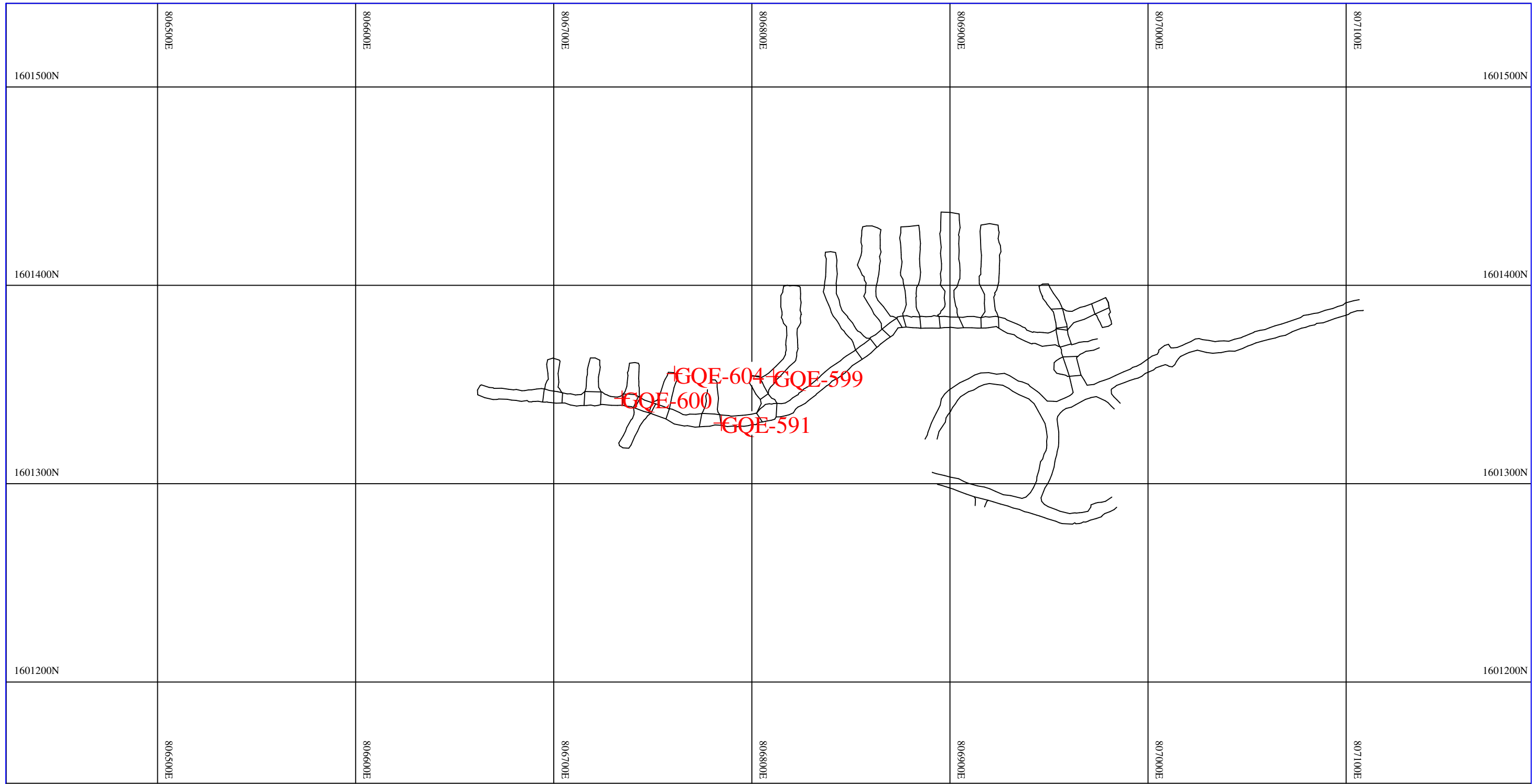
Drenaje Ácido de Roca (ARD)

Agosto-October 2016

Nivel 1365

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1365



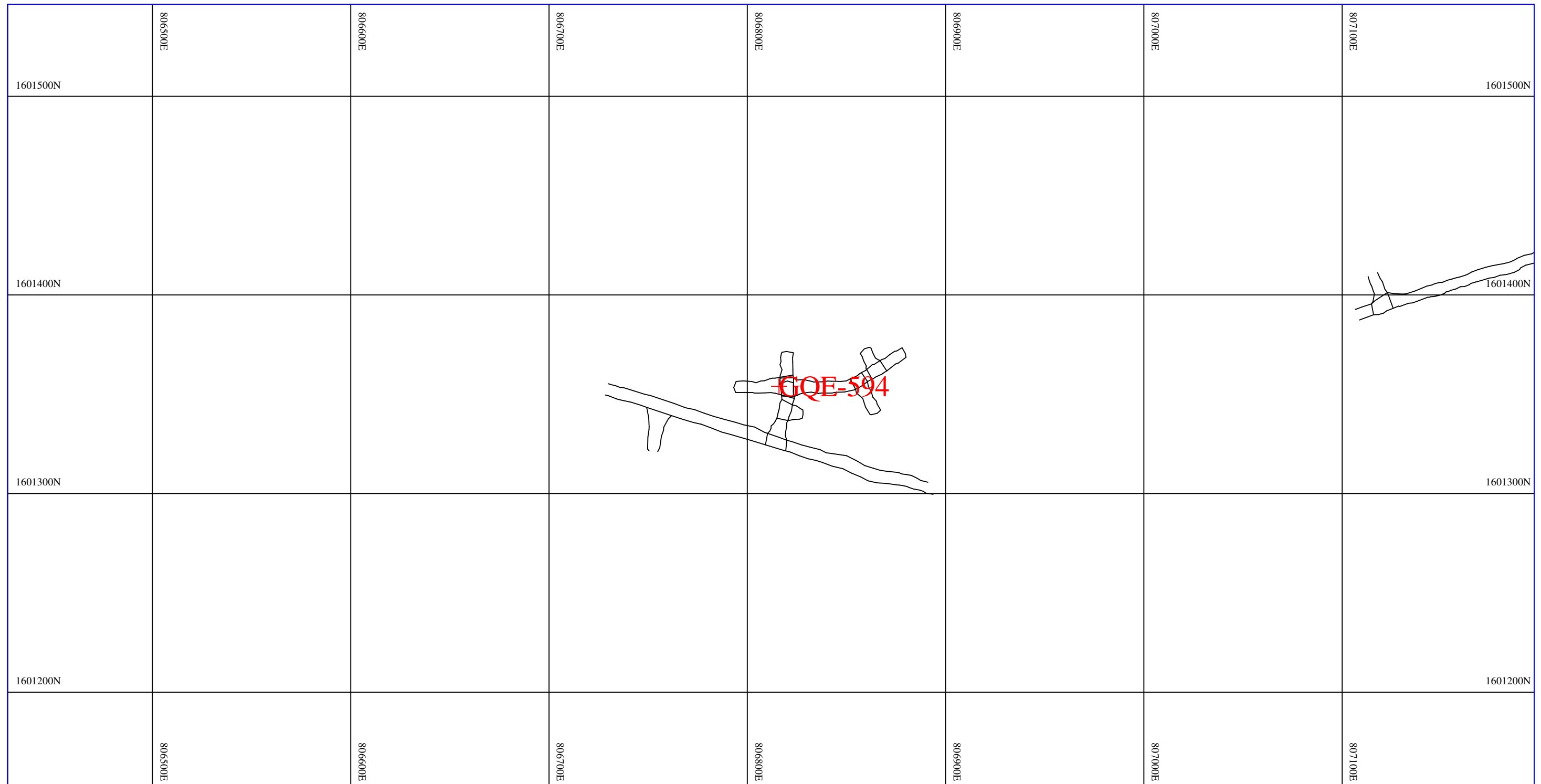
Drenaje Ácido de Roca (ARD)

Agosto-Octubre 2016

Nivel 1390

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1390

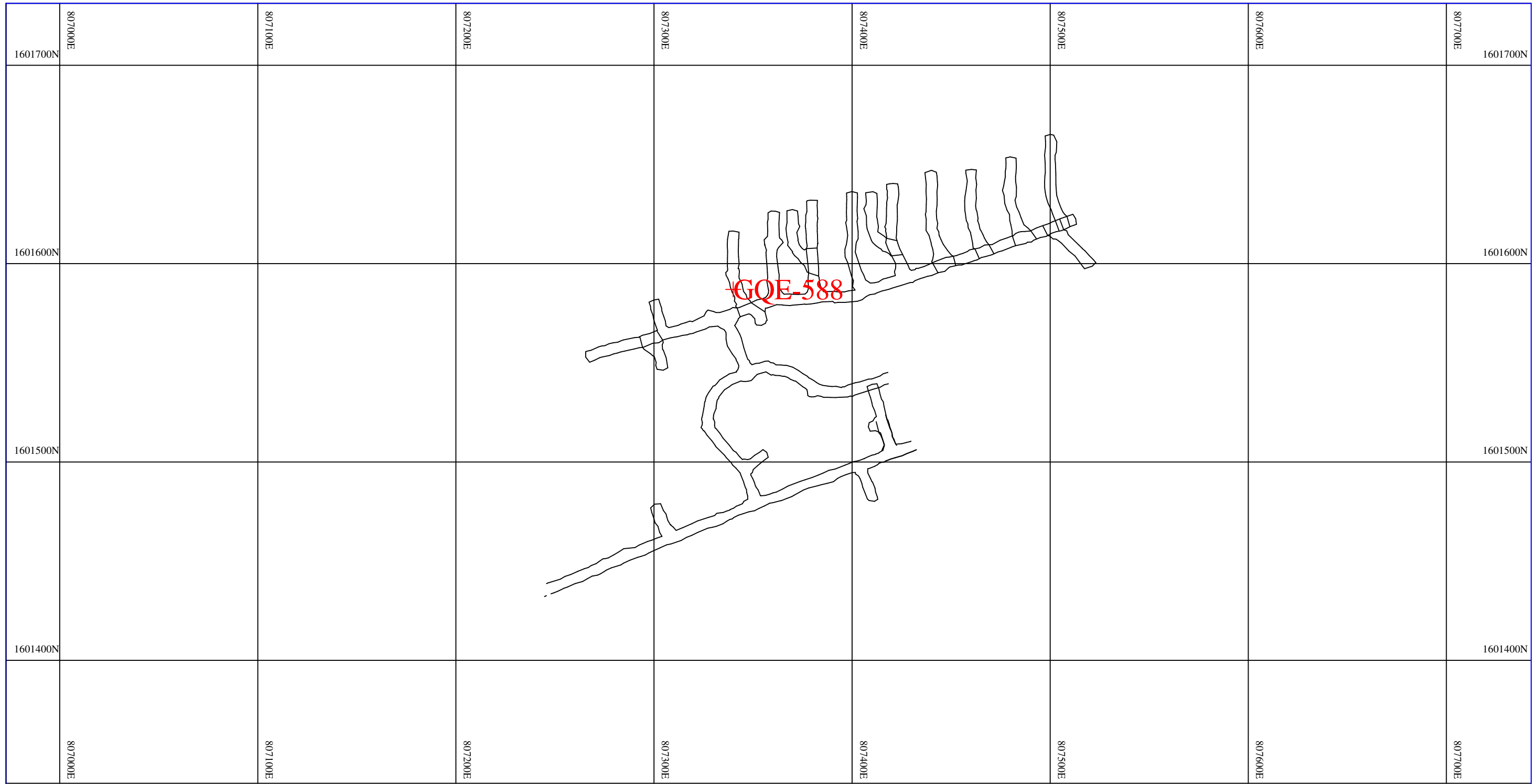


Drenaje Ácido de Roca (ARD)
 Agosto-October 2016

Nivel 1415

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1415



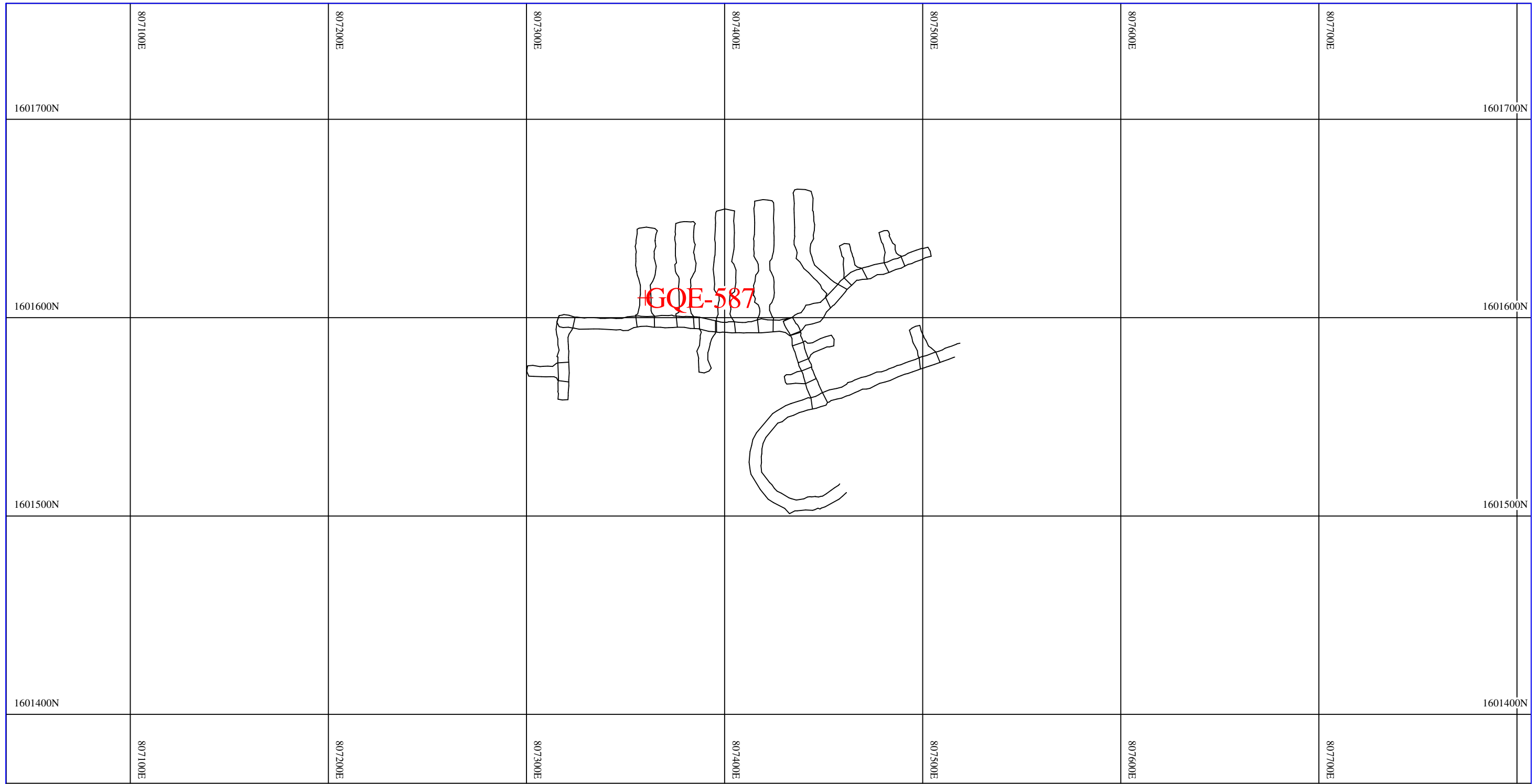
Drenaje Ácido de Roca (ARD)

Agosto-Octubre 2016

Nivel 1430-ZE

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1430

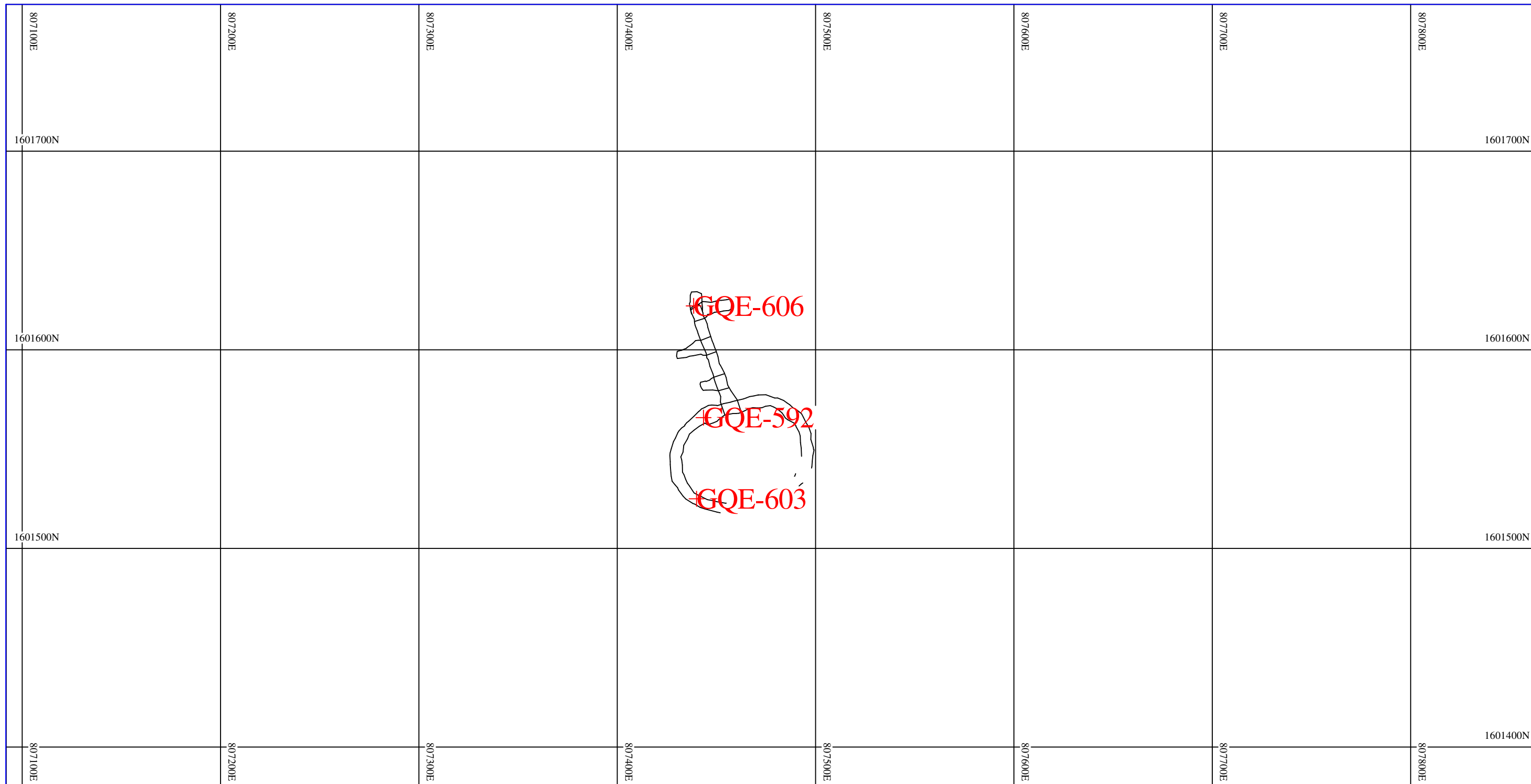


Drenaje Ácido de Roca (ARD)

Agosto-Octubre 2016

Nivel 1480-ZE

DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17



Drenaje Ácido de Roca (ARD)
 Agosto-Octubre 2016

Nivel 1505-ACC Y RAMPA-ZE		
DIBUJO:	HCacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 15-Jan-17

agosto_octubre_2016_ard_nivel_1505_acc_ramp

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 8.29 a 9.41 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-588	01/08/2016	03/08/2016	9.15	17.1
GQE-589	02/08/2016	08/08/2016	9.41	19
GQE-590	03/08/2016	08/08/2016	9.10	19.5
GQE-591	03/08/2016	08/08/2016	9.23	19.5
GQE-592	04/08/2016	08/08/2016	9.06	19.8
GQE-593	09/08/2016	15/08/2016	8.95	23.9
GQE-594	29/08/2016	03/09/2016	8.64	16.9
GQE-595	29/08/2016	03/09/2016	9.00	16.8
GQE-596	29/08/2016	03/09/2016	8.98	16.5
GQE-597	29/08/2016	03/09/2016	9.36	19.3
GQE-598	08/09/2016	12/09/2016	8.64	17.6

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-599	09/09/2016	12/09/2016	8.83	17.6
GQE-600	17/09/2016	17/09/2016	8.29	20.6
GQE-601	26/09/2016	29/09/2016	8.62	21.8
GQE-602	27/09/2016	29/09/2016	9.25	22.1
GQE-603	15/10/2016	17/10/2016	8.86	21.4
GQE-604	15/10/2016	17/10/2016	8.99	21.1
GQE-605	15/10/2016	17/10/2016	8.95	18.7
GQE-606	22/10/2016	23/10/2016	9.17	17.7

Fuente: MSR, 2016.

9 Mediciones de Seguridad Industrial y Salud Ocupacional

9.1 Presión Sonora

La medición de Presión Sonora en el trimestre de Agosto a Octubre 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 y al Acuerdo Gubernativo 229. 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

Superficie Planta de Proceso - TRITURADORA		2016		
Mes		Agosto	Septiembre	Octubre
Fecha		11/08/2016-12/08/2016	28/09/16	28/10/2016 - 29/10/2016
Hora Inicio		19:20:00	7:03:00	19:22:00
Duración		10:25 h	10:19 h	10:03 h
Lmax dBA		141.4	141.6	117.1
Lmin dBA		63.1	60.1	61
Prom. Diurno dBA		100.1	100.9	92.6
Límite Nivel de Sonido Ponderado-A dBA acorde a Acuerdo Gubernativo 229-2014, para 12 horas (12.1 horas y 10.6 horas)*		83	83	83
Leq (Normal sin uso de EPP)		100.1	100.9	92.6
Leq ajustado (Con EPP, homologación 33 dBA a 50% = NRR 16.5 dBA) (Orejera= Homologación 27 dB a 50%= NRR 13.5dB)		79.6	80.4	72.1
Resultado (Leq ajustado \leq Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - MOLINO		2016		
Mes		Agosto	Septiembre	Octubre
Fecha		11/08/16	28/09/16	28/10/16
Hora Inicio		7:50:00	7:09:00	7:29:00
Duración		09:42 h	10:16 h	09:57 h
Lmax dBA		114.7	112.3	126.3
Lmin dBA		63.1	60.5	60.1
Prom. Diurno dBA		86	84.2	98.4
Límite Nivel de Sonido Ponderado-A dBA acorde a Acuerdo Gubernativo 229-2014, para 12 horas (12.1 horas y 10.6 horas)*		83	83	83
Leq (Normal sin uso de EPP)		86	84.2	98.4
Leq ajustado (Con EPP, homologación 33 dBA a 50% = NRR 16.5 dBA)		69.5	67.7	81.9
Resultado (Leq ajustado \leq Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - FILTROS		2016		
Mes		Agosto	Septiembre	Octubre
Fecha		09/08/16	28/09/16	28/10/2016 29/10/2016
Hora Inicio		7:20:00	7:22:00	18:50:00
Duración		11:55 h	10:08:00 a.m.	10:00 h
Lmax dBA		115.5	120.4	112.9
Lmin dBA		63.1	60.2	60.5
Prom. Diurno dBA		88.7	90.6	86
Límite Nivel de Sonido Ponderado-A dBA acorde a Acuerdo Gubernativo 229-2014, para 12 horas (12.1 horas y 10.6 horas)*		83	83	83
Leq (Normal sin uso de EPP)		88.7	90.6	86
Leq ajustado (Con EPP, homologación 33 dBA a 50% = NRR 16.5 dBA)		72.2	74.1	69.5
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Scoop		2016		
Mes		Agosto	Septiembre	Octubre
Fecha		21/08/2016- 22/08/2016	29/09/16	28/10/16
Hora Inicio		19:05:00	7:05:00	7:36:00
Duración		10:46 h	10:44 h	10:06 h
Lmax dBA		115.2	120.2	121.4
Lmin dBA		63.1	60.1	60.1
Prom. Diurno dBA		99.3	98.8	102.8
Límite Nivel de Sonido Ponderado-A dBA acorde a Acuerdo Gubernativo 229-2014, para 12 horas (12.1 horas y 10.6 horas)*		83	83	83
Leq (Normal sin uso de EPP)		99.3	98.8	102.8
Leq ajustado (Con EPP, Tapón Auditivo=homologación 33 dBA a 50% = NRR 16.5 dBA) (Orejera= Homologación 27 dB a 50%= NRR 13.5dB)		78.8	78.3	82.3
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Jumbo		2016		
Mes		Agosto	Septiembre	Octubre
Fecha		20/08/2016 - 21/12/2016	29/09/16	28/10/16
Hora Inicio		19:39:00	7:14:00	7:36:00
Duración		11:01 h	10:17 h	10:11 h
Lmax dBA		139.4	117.7	113.4
Lmin dBA		63.1	60.2	60.1
Prom. Diurno dBA		102.5	96.8	94.2
Límite Nivel de Sonido Ponderado-A dBA acorde a Acuerdo Gubernativo 229-2014, para 12 horas (12.1 horas y 10.6 horas)*		83	83	83
Leq (Normal sin uso de EPP)		102.5	96.8	94.2
Leq ajustado (Con EPP, homologación 33 dBA a 50% = NRR 16.5 dBA) (Orejera= Homologación 27 dB a 50%= NRR 13.5dB)		82	76.3	73.7
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

Puesto de Operador de Boltec		2016		
Mes		Agosto	Septiembre	Octubre
Fecha		19/08/2016- 20/08/2016	29/09/16	28/10/12
Hora Inicio		19:39:00	7:14:00	7:41:00
Duración		10:44 h	10:17 h.	10:07 h
Lmax dBA		112.5	117	117
Lmin dBA		63.1	60.4	60.4
Prom. Diurno dBA		94.8	95.4	99.7
Límite Nivel de Sonido Ponderado-A dBA acorde a Acuerdo Gubernativo 229-2014,		83	83	83
Leq (Normal sin uso de EPP)		94.8	95.4	99.7
Leq ajustado (Con EPP, Tapón Auditivo=homologación 33 dBA a 50% = NRR 16.5 dBA) (Orejera= Homologación 27 dB a 50%= NRR 13.5dB)		74.3	74.9	79.2
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)		Aceptable	Aceptable	Aceptable

NOTA : Operadores utilizan doble protección Auditiva
 dBA = decibeles en escala A y respuesta Lenta.
 Lmax = lectura más alta durante la medición
 Lmin = lectura más baja durante la medición
 Leq = promedio ponderado equivalente de datos durante la medición.
 Prom. Diurno = promedio logarítmico de Leq registrados de 07:00 a 18:00 horas o turno diurno Mina

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							2016		
Trimestre							XIX		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	NORMA µg/m3	GUIA µg/m3		Agosto	Septiembre	Octubre
Fecha							25/08/2016	12/09/2016	06/10/2016
Hora Inicio							7:00	7:00	7:00
Duración							11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	0.040	3.39	2.91
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0.059	5.35	4.51

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							2016		
Trimestre							XIX		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	NORMA µg/m3	GUIA µg/m3		Agosto	Septiembre	Octubre
Fecha							12/09/2016	06/10/2016	
Hora Inicio							7:00	7:00	
Duración							11 h	11 h	
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	0.063	0.13	
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0.108	0.22	

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							2016		
Trimestre							XIX		
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	NORMA µg/m3	GUIA µg/m3		Agosto	Septiembre	Octubre
Fecha							25/08/2016	12/09/2016	06/10/2016
Hora Inicio							7:00	7:00	7:00
Duración							11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	0.044	0.11	0.022
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	0.059	0.204	0.035

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							2016			
Trimestre							XIX			
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	NORMA µg/m3	GUIA µg/m3		Agosto	Septiembre	Octubre	
Fecha					USEPA ¹	BANCO MUNDIAL ²	OMS ³	29/08/2016	11/09/2016	26/10/2016
Hora Inicio								7:00	7:00	7:00
Duración		OSHA	99.97%				11 h	11 h	11 h	
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	2.350	1.26	1.27	
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	2.710	1.32	1.44	

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							2016			
Trimestre							XIX			
Mes	Unidades	NORMA DE REFERENCIA PARA SILICE/SILICONA	AJUSTE DE EXPOSICIÓN CON LA CERTIFICACION DEL FILTRO 7093C/37173 3M P100 (99.97% DE EFICIENCIA MÍNIMA) CON EPP	NORMA µg/m3	GUIA µg/m3		Agosto	Septiembre	Octubre	
Fecha					USEPA ¹	BANCO MUNDIAL ²	OMS ³	09/08/2016	10/09/2016	26/10/2016
Hora Inicio								7:00	7:00	7:00
Duración		OSHA	99.97%				11 h	11 h	11 h	
OSHA Fraccion Respirable PM ₄	mg/m ³	5	16667	150	150	50	13.900	0.518	5.57	
OSHA Polvo Total @ PM ₁₀	mg/m ³	15	50000	150	150	50	18.000	0.586	7	

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 XV trimestre, acorde a procedimiento de tomar la primera etapa del ciclo que aparezca.

FECHA	Lugar	Maquinaria	Etapa de Ciclo	CO (PPM)	H2S (PPM)	Hora	Turno	Reportado por
				Límite Máximo Turno 25ppm, Exposición Breve 50 ppm	Límite 10ppm, Valores mayores a 1ppm alertar.			
01-ago-16	1240 CTFO	Ninguna	Medición posterior a voladura	37	0	18:55	Nocturno	Ludyn Lima/ Hansel Secaida
	1215 6900	Ninguna	Medición posterior a voladura	27	0	19:00		
	1340 6810	Ninguna	Medición posterior a voladura	47	0	19:29		
10-sep-16	1190-6380.OC	JD-03	Perforación.	6	0	02:40	Nocturno	José Carrillo.
	1190-6500.OC	RB-06	Fortificación.	10	0	03:50		
08-oct-16	1215-Taller.OC.	RB-06	Reparación de maquinaria.	7	0	11:30	Diurno	José Carrillo.
	1215-6500.OC	JD-02	Perforación.	15	0	13:00		

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.

10.2 Mediciones del agua, sedimentos y efluentes en el ambiente

- 2) Del control de calidad (blancos de campo) realizado a los dos laboratorios subcontratados (Laboratorio Ecosistemas Proyectos Ambientales S.A. y ACZ Laboratories, Inc.) para el análisis de agua superficial y efluentes, se obtuvieron resultados confiables tanto en la manipulación de las muestras como en los resultados de los análisis.
- 3) El agua superficial (**SW**), subterránea (**GW**) y los pozos de monitoreo (**MW**) presentaron un pH alcalino y dentro del rango establecido por la USEPA para la salud humana. No se detectó mercurio y cianuro total en ninguna categoría de agua (SW, GW y MW). Se registraron sólidos suspendidos totales en SW, GW y MW y los resultados encontrados están por debajo de lo establecido por las guías del banco mundial (50 mg/L) y el establecimiento de la línea base, a excepción de algunas estaciones de agua superficial. 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.
- 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 Agosto a Octubre de 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 (2.5 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.

Agosto 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")	191374.4	191374.4	191374.4	191374.4	191374	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4
Total Este (tubería 8")	261688.7	261941.7	262250.8	262460.3	262717.4	262916.2	263120.6	263370.9	263528.2	263528.4	263819.4	264110	264249	264569	264994	265413	265670.4	265672.6	265853.1	266402.9	266855.5	267208.5	267564.4	267938.8	268275.8	268582.9	269013.4	269367.5	269464.2	269629.7	270000.7
Portal Oeste (tubería 6")	526478	528182	529884	531411	533071	534886	536609	538611	539561	541371	543331	544975	546850	548727	550761	552246	554098	555548	556728	558522	560409	562248	564067	565937	567363	569160	570955	572822	574687	576510	578307
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	4524267	4527672	4538612	4545196	4548481	4553310	4556841	4563275	4586430	4609989	4636041	4660446	4668756	4684010	4687390	4690900	4696252	4702475	4705870	4716409	4724628	4737290	4750025	4759715	4765512	4769041	4775296	4792892	4800148	4806932	4813625
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Este (tubería 8")	442	253	309	210	257	199	204	250	157	0	291	290	139	320	425	418	258	2	180	550	453	353	356	374	337	307	430	354	97	165	371
Portal Oeste (tubería 6")	1726	1704	1702	1528	1659	1815	1724	2001	951	1809	1960	1644	1875	1877	2034	1485	1852	1450	1181	1794	1887	1839	1819	1870	1426	1797	1795	1867	1865	1823	1797
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	3283	3405	10940	6584	3285	4829	3531	6434	23155	23559	26052	24405	8310	15254	3380	3510	5352	6223	3395	10539	8219	12662	12735	9690	5797	3529	6255	17596	7256	6784	6693
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Este (tubería 8")	81	46	57	38	47	36	37	46	29	0	53	53	26	59	78	77	47	0	33	101	83	65	65	69	62	56	79	65	18	30	68
Portal Oeste (tubería 6")	316	312	312	280	304	333	316	367	174	332	359	301	344	344	373	272	340	266	216	329	346	337	334	343	261	330	329	342	342	334	329
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	602	624	2006	1207	602	885	647	1180	4245	4319	4776	4474	1524	2797	620	644	981	1141	622	1932	1507	2321	2335	1777	1063	647	1147	3226	1330	1244	1227

m³: metro cúbico. Gpm: galones por minuto. Celeste: Flujómetro presentó fallos al registrar el volumen acumulado, y éste fue menor al día previo. Fuente: MSR, 2016.

Septiembre 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
LECTURA FLUJÓMETRO (m³)																														
Portal Este (tubería 6")	191374.4	191374	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.4	191374.5	191374.5	191374.5	191374.5	191374.5	191374.5
Total Este (tubería 8")	270393.5	270963.1	271606.1	272342.3	272881.8	273618.7	274155.8	274570.3	274920	275173	275442	275891	276419	276778.2	277142.3	277859.2	277989.4	278317.4	279215.2	279679.5	279697.2	279697.5	279878.5	280486.8	280675.2	280814.8	281003.5	281367.3	281367.3	281367.3
Portal Oeste (tubería 6")	580102	582071	583782	585422	587038	588685	590456	592276	594200	596113	598019	599740	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	4824417	4783186	4751583	4735924	SR	48	1014	21054	SR	2233	6330	10012	13066	16839	19859.7	23983	28190	31587	35831	39586	43151	46651	50039	52948	57239	61588	64811	68836	72193	1901
VOLUMEN BOMBEADO (m³)																														
Portal Este (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139
Total Este (tubería 8")	393	570	643	736	539	737	537	415	349	253	269	450	528	359	364	717	130	328	898	464	18	0	181	608	188	140	189	364	0	0
Portal Oeste (tubería 6")	1794	1969	1711	1639	1617	1646	1772	1819	1924	1913	1906	1721	1769	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	10792	-41231	-31603	-15659	-4735924	48	966	20039	-21054	2233	4097	3681	3054	3773	3021	4124	4206	3397	4244	3755	3565	3500	3388	2909	4291	4349	3222	4025	3357	-70292
CAUDAL PROYECTADO (gpm)																														
Portal Este (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
Total Este (tubería 8")	72	104	118	135	99	135	98	76	64	46	49	82	97	66	67	131	24	60	165	85	3	0	33	112	35	26	35	67	0	0
Portal Oeste (tubería 6")	329	361	314	301	296	302	325	334	353	351	349	315	324	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	1979	-7559	-5794	-2871	-868253	9	177	3674	-3860	409	751	675	560	692	554	756	771	623	778	688	654	642	621	533	787	797	591	738	615	-12887

m³: metro cúbico. Gpm: galones por minuto. Celeste: Flujómetro presentó fallos al registrar el volumen acumulado, y éste fue menor al día previo. Fuente: MSR, 2016.

Octubre 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")	191514	191513.8	191513.8	191513.8	191513.8	191513.8	191513.8	191513.8	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9	191513.9
Total Este (tubería 8")	281367.3	281367.3	281367.3	281367.3	281367.3	281367.3	281367.3	281367.4	281367.4	281367.7	281368.7	281368.8	281368.9	281369	281369	281447.2	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3	281587.3
Portal Oeste (tubería 6")	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	601509	602024	603712	605528	607169	608874	610493	612261	613992	615669	617335	618843	620556	622144	623459	624515	625906
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	4860	7727	9263	11158	23482	34357	45642	56914	62258	78672	82373	99595	112182	37779	38705	50507	56273	68017	75795	81265	126814	129627	82703	86561	84018	87640	90994	102890	106400	110700	101930
VOLUMEN BOMBEO (m³)																															
Portal Este (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Este (tubería 8")	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	78	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	515	1688	1816	1641	1704	1620	1768	1731	1677	1666	1508	1713	1588	1314	1056	1391
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	2959	2867	1537	1895	12323	10876	11284	11273	5344	16414	3700	17222	12587	-74403	925	11802	5767	11744	7778	5470	45549	2813	-46924	3858	-2544	3622	3354	11896	3510	4300	-8770
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Este (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	309	333	301	312	297	324	317	307	306	276	314	291	241	194	255
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarificador	543	526	282	347	2259	1994	2069	2067	980	3009	678	3157	2308	-13640	170	2164	1057	2153	1426	1003	8351	516	-8603	707	-466	664	615	2181	644	788	-1608

m³: metro cúbico. Gpm: galones por minuto. Celeste: Flujómetro presentó fallos al registrar el volumen acumulado, y éste fue menor al día previo. Fuente: MSR, 2016.

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

Agosto 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.	7.48	Sin Descarga	7.06	7.50	7.10	7.12	7.42	7.17	7.15	7.20	7.45	7.42	7.46	7.37	7.42	7.44	7.08	7.53	7.42	7.87	7.14	7.48	7.39	6.75	7.10	7.46	8.45	7.31	7.22	7.42	7.78
Temperatura	°C	26.5		24.9	26.8	26.8	28.6	29.2	29.4	30.2	26	28.9	26.3	25.4	26.6	26.2	26.8	26.6	25.6	29.1	29.4	27.6	26.40	25.2	28.3	26.6	27.4	26.4	25.1	24.8	25.6	20.4
Conductividad	µS/cm	2278		1692	2271	2054	1970	2210	2460	2063	2355	2040	2251	2125	2231	1926	1895	1961	2703	2410	2344	2317	2203.00	2171	2172	2000	2061	2174	2060	2020	2134	2013
Turbidez	NTU	5.11		2.89	5.85	1.36	7.92	8.71	4.87	15.5	3.94	7.56	10.2	2.24	29	4.28	8.71	6.52	5.38	10.8	9.05	1.55	5.68	6.71	4.14	15	2.26	2.18	4.4	8.2	3.31	
kit CN	mg/L	0.003		0.006	0.004	0.004	0.004	0.002	0.003	0.004	0.007	0.000	0.000	0.001	0.000	0.013	0.004	0.014	0.003	0.003	0.001	0.003	0.01	0.003	0.002	0.004	0.011	0.009	0.004	0.003	0.005	0.005
CN Total		NA		NA	NA	<0.003	NA	0.003	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	8.04	7.89	7.89	8.19	8.16	7.72	8.24	8.15	8.02	8.26	8.16	8.23	8.37	8.14	8.12	7.65	8.23	8.35	8.34	8.2	8.13	8.19	7.91	7.98	8.12	8.26	8.41	8.35	7.98	8.39	8.37
Temperatura	°C	24.7	22	22.6	23.3	23	22.5	23.2	24.6	24	24.7	23.6	25.2	24.4	23.9	24.5	25.6	23	25.8	25	25.8	24	25.2	21.5	22	23	23.5	24.5	24	22.4	21.9	23
Conductividad	µS/cm	684.6	686.1	710.7	757.6	690.5	569.5	566.1	565.9	1043	890.4	789.2	738.6	725.1	635	726	474.2	649.1	751.4	1722	806.8	828.1	833.1	581.8	609.6	580.6	614.6	586.1	596.5	489	639.5	642.4
Turbidez	NTU	5.28	6.6	2.76	2.4	2.67	10.4	7.41	4.1	12.9	5.19	4.63	8.88	42.5	3.32	5.82	6.23	28.4	13.1	13.7	13.8	6.96	12.4	15.5	7.56	7.31	4.9	3.05	2.34	11.7	67.9	33.3
Kit CN	mg/L	0.001	0.001	0.002	0.004	0.004	0.001	0.002	0.002	0.004	0.003	0.003	0.008	0.001	0.002	0.002	0.002	0.002	0.001	0.005	0.001	0.002	0.001	0.003	0.002	0.003	0.004	0.001	0.002	0.002	0.002	0.001
CN Total		0.004	NA	NA	NA	0.004	NA	NA	NA	NA	NA	0.005	NA	NA	NA	0.005	NA	NA	0.005	0.007	NA	0.007	NA	NA	NA	0.006	NA	NA	NA	NA	0.008	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.

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Septiembre 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
Efluente Planta de Tratamiento Agua de Túneles (WW9)																															
pH	u.e.	7.33	7.61	6.87	7.06	7.26	7.43	7.18	7.05	7.21	7.35	7.21	6.79	7.5	6.81	7.34	7.63	8	7.76	7.47	7.62	7.18	Sin Descarga	8.97	7.48	7.56	7.16	7.37	Sin Descarga	6.59	Sin Descarga
Temperatura	°C	25.8	28.4	25.8	25.7	26.6	25.6	26.5	24.7	25.2	25.9	26.7	25.9	26	25.9	25.5	28.2	25.3	23.5	24.8	25.9	26.8		26.5	27.8	24	26.6	23		25.9	
Conductividad	µS/cm	2012	1951	2088	2022	2027	1992	2030	1978	1963	1896	1844	1915	1916	1921	1922	1850	1843	1120	1965	2022	1906		1951	1871	1913	1792	1757		1278	
Turbidez	NTU	4.05	9.2	3.19	9.22	6.51	4.2	14.8	7.83	8.94	6.34	4.25	1.87	4	3.95	9.2	3.33	8.7	6.77	22	8.88	3.51		2.48	10.1	15.7	10.1	4.6		6.2	
kit CN	mg/L	0.002	0.003	0.004	0.004	0.002	0.004	0.014	0.007	0.007	0.007	0.007	0.002	0.008	0.004	0.000	0.002	0.008	0.007	0.009	0.011	0.002		0.008	0.000	0.006	0.005	0.014		0.003	
CN Total		NA	<0.003	NA	0.005	NA	NA	NA	NA	NA	NA	0.003	NA	NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA		NA	NA	<0.003	NA	NA		NA	
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																															
pH	u.e.	8.33	8.25	7.98	8.31	8.22	8.29	8.54	8.81	8.49	8.47	8.33	8.23	8.13	8.6	8.48	8.36	8.41	8.39	8.13	8.25	8.4	8.5	8.53	8.52	8.45	8.51	8.54	8.55	8.58	8.11
Temperatura	°C	24.7	24.1	23.9	24.8	25.3	25	22.9	23	22	24.8	24.8	23.8	23.4	22.5	22.7	23.4	22.8	23.6	22.9	22.5	21.3	22.5	24.1	23.2	23.2	24.1	26.8	25.4	23.2	23.6
Conductividad	µS/cm	633.3	636.4	631.5	638.1	631.3	1262	608.7	575.6	586.7	595.7	773.1	560.5	520	514.9	526.2	529.1	510.3	476.2	491.5	499	493.4	504.6	493	491.2	493.9	479.6	471.4	477.3	496.9	491.1
Turbidez	NTU	11.7	8	7.05	6.02	4.97	2.8	25.3	20.1	12.9	6.47	29.5	12.9	18.1	48.3	17.6	21.5	87.1	37.1	13.9	10.5	9.3	8.49	7.55	4.01	4.12	6.03	3.14	64.7	6.76	2.17
Kit CN	mg/L	0.004	0.001	0.002	0.001	0.003	0.004	0.001	0.001	0.003	0.002	0.003	0.003	0.001	0.002	0.006	0.001	0.005	0.007	0.002	0.000	0.002	0.003	0.001	0.001	0.008	0.004	0.001	0.002	0.000	0.001
CN Total		NA	0.008	NA	NA	NA	NA	NA	NA	NA	0.006	0.008	NA	NA	0.004	NA	NA	0.006	NA	NA	NA	NA	NA	NA	NA	0.003	0.005	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.

Octubre 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.	Sin Descarga	6.88	Sin Descarga	7.15	7.2	7.14	6.71	8.37	6.81	6.68	7.22	7.31	7.52	7.4	Sin Descarga	7.23	7.39	7.04	6.76	7.44	7.33	7.47	Sin Descarga	7.05	6.17	6.71	6.31	Sin Descarga	7.62	Sin Descarga	6.99	
Temperatura	°C		26.2		25.5	28.4	24.5	27.6	28.5	25.4	25.6	24.5	26.3	25.7	24.1		27.6	25.1	26.2	24.5	22.6	26.5	23.6		26.8	24	27.4	26.9		24.5		26.1	
Conductividad	µS/cm		1860		1922	1871	1970	1848	1863	1887	2296	2330	2196	2164	2070		2291	2031	1958	2062	2276	2209	2031		1992	2153	2156	2043		2147		2158	
Turbidez	NTU		12.7		4.13	10.1	8.91	2.04	4.12	4.62	8.13	5.66	11.1	7.78	7.93		18.6	5.75	3.94	4.22	2.05	12.6	3.9		4.47	6.65	6.16	4.76		3.27		10.3	
kit CN	mg/L		0.001		0.002	0.001	0.004		0.003	0.002	0.001	0.004	0.003	0.000	0.004		0.005	0.010	0.003	0.002	0.008	0.003	0.004		0.007	0.005	0.006	0.007					
CN Total			<0.003		NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA		<0.003	NA	<0.003	<0.003	NA	NA	<0.003		NA	NA	NA	NA		<0.003		NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																	
pH	u.e.	8.56	8.44	8.47	8.52	8.7	8.49	8.52	8.64	8.82	8.79	8.82	8.71	8.81	8.67	8.7	8.49	8.47	8.67	8.66	8.79	8.78	8.89	8.84	8.76	8.76	8.72	8.59	8.63	8.63	8.74	8.74	
Temperatura	°C	23.6	20	22.1	22.6	25	25	24.5	23.4	23.8	22.4	22.7	22.3	23	19.9	21.1	21.3	21.9	22.7	22	21.3	20.5	22.4	20	19.6	19.6	21.6	18.7	20.3	20.5	21.8	21.3	
Conductividad	µS/cm	506.1	511.4	508	513.2	510.3	520.5	525.3	545.1	538.4	683.6	687.8	687.9	634.6	651.5	692.3	711.8	754.2	691.3	685.9	645.9	720.5	625.9	669.1	635.3	659.1	563.7	647.2	646.7	656.3	637.1	647	
Turbidez	NTU	7.59	9.05	2.83	3.46	2.47	10.2	8.26	7.21	2.92	5.25	2.77	3.42	3.11	3.13	12.8	22.2	13	1.99	2.3	68.7	7.67	2.19	9.12	10.7	6.07	3.28	6.69	3.2	3.29	3.77	3.7	
kit CN	mg/L	0.003	0.004	0.003	0.003	0.002	0.006	0.001	0.003	0.001	0.002	0.004	0.005	0.001	0.002	0.000	0.001	0.002	0.001	0.002	0.000	0.004	0.002	0.003	0.007	0.001	0.003	0.003	0.004	0.002	0.001	0.002	
CN Total		NA	NA	NA	NA	0.004	NA	NA	NA	NA	0.005	0.004	NA	NA	NA	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005	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 August 2016

Job Details:

Job Name: EA-1A
Version: PQ100
Serial No: 2.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	653	650	651	mmHg
TA	31.6	18.6	23.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Aug-16	11:00:00
Stop:	11-Aug-16	11:00:00

Mass Concentration Data:

Filter ID:	3102-0101
Final Wt:	152.330 mg
Initial Wt:	151.720 mg
Delta Wt:	0.610 mg
Total Vol:	20.72 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 29.44 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded August 2016

Job Details:

Job Name: EA-1B
Version: PQ100
Serial No: 3.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	653	649	651	mmHg
TA	30.7	16.9	23.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	18-Aug-16	12:06:00
Stop:	19-Aug-16	12:06:00

Mass Concentration Data:

Filter ID:	3104-0303
Final Wt:	151.540 mg
Initial Wt:	150.940 mg
Delta Wt:	0.600 mg
Total Vol:	20.72 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 28.95 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded August 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	23.9	16.8	18.7	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	5-Aug-16	10:33:00
Stop:	6-Aug-16	10:33:00

Mass Concentration Data:

Filter ID:	3113-1212
Final Wt:	151.860 mg
Initial Wt:	151.710 mg
Delta Wt:	0.150 mg
Total Vol:	20.43 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 7.34 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded August 2016

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	628	623	625	mmHg
TA	23.4	16.8	18.7	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	5-Aug-16	11:40:00
Stop:	6-Aug-16	11:40:00

Mass Concentration Data:

Filter ID:	3112-1111
Final Wt:	152.330 mg
Initial Wt:	152.220 mg
Delta Wt:	0.110 mg
Total Vol:	20.20 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 5.44 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2016

Job Details:

Job Name: EA-3A
Version: PQ100
Serial No: 2.00
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	648	646	647	mmHg
TA	29.4	17.5	22.2	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	23-Aug-16	11:37:00
Stop:	24-Aug-16	11:37:00

Mass Concentration Data:

Filter ID:	3110-0909
Final Wt:	151.710 mg
Initial Wt:	151.000 mg
Delta Wt:	0.710 mg
Total Vol:	20.68 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 34.33 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2016

Job Details:

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

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

	Max	Min	Avg	Units
BP	652	646	650	mmHg
TA	31.4	17.5	22.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Aug-16	14:45:00
Stop:	17-Aug-16	14:45:00

Mass Concentration Data:

Filter ID:	3105-0404
Final Wt:	151.820 mg
Initial Wt:	151.630 mg
Delta Wt:	0.190 mg
Total Vol:	20.73 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 9.17 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2016

Job Details:

Job Name: EA-5A
Version: PQ100
Serial No: 2.00
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	655	649	653	mmHg
TA	29.5	17.3	22.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Aug-16	15:20:00
Stop:	17-Aug-16	15:20:00

Mass Concentration Data:

Filter ID:	3106-0505
Final Wt:	152.580 mg
Initial Wt:	152.020 mg
Delta Wt:	0.560 mg
Total Vol:	20.86 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 26.85 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2016

Job Details:

Job Name: EA-6
Version: PQ200
Serial No: 2.00
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	646	641	644	mmHg
TA	28.6	21.8	18.1	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	18-Aug-16	15:12:00
Stop:	19-Aug-16	15:12:00

Mass Concentration Data:

Filter ID:	3103-0202
Final Wt:	150.730 mg
Initial Wt:	150.290 mg
Delta Wt:	0.440 mg
Total Vol:	20.87 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 21.08 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2016

Job Details:

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

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

	Max	Min	Avg	Units
BP	653	651	649	mmHg
TA	31.5	18.8	23.7	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Aug-16	11:40:00
Stop:	11-Aug-16	11:40:00

Mass Concentration Data:

Filter ID:	3108-0707
Final Wt:	150.180 mg
Initial Wt:	149.410 mg
Delta Wt:	0.770 mg
Total Vol:	20.64 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 37.31 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Cliente: Minera San Rafael, 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: Septiembre, 05 al 07 de 2016
Emisión de reporte: Septiembre, 08 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-1	3102-0101	0.15172	0.15233
2	EA-1B	3104-0303	0.15094	0.15154
3	EA-2A	3113-1212	0.15171	0.15186
4	EA-3	3112-1111	0.15222	0.15233
5	EA-3A	3110-0909	0.15100	0.15171
6	EA-4A	3105-0404	0.15163	0.15182
7	EA-5A	3106-0505	0.15202	0.15258
8	EA-6	3103-0202	0.15029	0.15073
9	EA-7	3108-0707	0.14941	0.15018
10	EA-10	3107-0606	0.15042	0.15041

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reportes analíticos RA-16-11595.

Anexos:

Anexo 1. Cadena de Custodia R-02-000783

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Sep, 09/16	J.J.	Sep, 09/16	A.G.J.	Sep, 09/16	01

BGI PQ200 Air Sampling System

Downloaded September 2016

Job Details:			Job Code: EA-1A																		
Job Name: EA-1A			Site Name: Los Planes (Top Soil Deposit)																		
Version: PQ200			Station Code:																		
Serial No: 3.00			Operators: EvQ																		
Pump Time:			User1: NA																		
Flags: NA			User2: NA																		
<table border="1"> <thead> <tr> <th>Max</th> <th>Min</th> <th>Avg</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>651</td> <td>647</td> <td>649</td> <td>mmHg</td> </tr> <tr> <td>29.4</td> <td>18.1</td> <td>21.5</td> <td>°C</td> </tr> <tr> <td>---</td> <td>---</td> <td>16.71</td> <td>Lpm</td> </tr> </tbody> </table>		Max	Min	Avg	Units	651	647	649	mmHg	29.4	18.1	21.5	°C	---	---	16.71	Lpm	Timer Information: Date: Time dd-mmm hh:mm:ss Start: 14-Sep-16 10:54:00 Stop: 15-Sep-16 10:54:00 ET: 23:59:00		Mass Concentration Data: Filter ID: 3118-1727 Final Wt: 152.020 mg Initial Wt: 151.750 mg Delta Wt: 0.270 mg Total Vol: 24.04 m ³ Mass Conc: 11.23 µg/m ³	
Max	Min	Avg	Units																		
651	647	649	mmHg																		
29.4	18.1	21.5	°C																		
---	---	16.71	Lpm																		
QCV		NA	%																		
Max overheat		NA	°C																		
occured NA																					
Notes 1: Depósito de Suelos, Proyecto El Escobal																					
Notes 2: Minera San Rafael, S.A.																					

BGI PQ200 Air Sampling System

Downloaded September 2016

Job Details:			Job Code: EA-2A																		
Job Name: EA-2A			Site Name: La Cuchilla.																		
Version: PQ200			Station Code:																		
Serial No: 1.00			Operators: EvQ																		
Pump Time:			User1: NA																		
Flags: NA			User2: NA																		
<table border="1"> <thead> <tr> <th>Max</th> <th>Min</th> <th>Avg</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>636</td> <td>631</td> <td>633</td> <td>mmHg</td> </tr> <tr> <td>28.9</td> <td>16.7</td> <td>20.9</td> <td>°C</td> </tr> <tr> <td>---</td> <td>---</td> <td>16.71</td> <td>Lpm</td> </tr> </tbody> </table>		Max	Min	Avg	Units	636	631	633	mmHg	28.9	16.7	20.9	°C	---	---	16.71	Lpm	Timer Information: Date: Time dd-mmm hh:mm:ss Start: 29-Sep-16 14:06:00 Stop: 30-Sep-16 14:06:00 ET: 23:59:00		Mass Concentration Data: Filter ID: 3114-1323 Final Wt: 150.680 mg Initial Wt: 150.540 mg Delta Wt: 0.140 mg Total Vol: 19.92 m ³ Mass Conc: 7.03 µg/m ³	
Max	Min	Avg	Units																		
636	631	633	mmHg																		
28.9	16.7	20.9	°C																		
---	---	16.71	Lpm																		
QCV		NA	%																		
Max overheat		NA	°C																		
occured NA																					
Notes 1: Aldea La Cuchilla, San Rafael Las Flores, Santa Rosa.																					
Notes 2: Minera San Rafael, S.A.																					

BGI PQ200 Air Sampling System

Downloaded September 2016

Job Details:			Job Code: EA-3																		
Job Name: EA-3			Site Name: El Fucío, zona este.																		
Version: PQ200			Station Code:																		
Serial No: 3.00			Operators: EvQ																		
Pump Time:			User1: NA																		
Flags: NA			User2: NA																		
<table border="1"> <thead> <tr> <th>Max</th> <th>Min</th> <th>Avg</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>267</td> <td>625</td> <td>625</td> <td>mmHg</td> </tr> <tr> <td>24.9</td> <td>15.4</td> <td>18.0</td> <td>°C</td> </tr> <tr> <td>---</td> <td>---</td> <td>16.70</td> <td>Lpm</td> </tr> </tbody> </table>		Max	Min	Avg	Units	267	625	625	mmHg	24.9	15.4	18.0	°C	---	---	16.70	Lpm	Timer Information: Date: Time dd-mmm hh:mm:ss Start: 23-Sep-16 11:34:00 Stop: 24-Sep-16 11:34:00 ET: 19:16:00		Mass Concentration Data: Filter ID: 3120-0202 Final Wt: 151.290 mg Initial Wt: 151.050 mg Delta Wt: 0.240 mg Total Vol: 20.25 m ³ Mass Conc: 11.85 µg/m ³	
Max	Min	Avg	Units																		
267	625	625	mmHg																		
24.9	15.4	18.0	°C																		
---	---	16.70	Lpm																		
QCV		NA	%																		
Max overheat		NA	°C																		
occured NA																					
Notes 1: Aldea El Fucío, San Rafael Las Flores, Santa Rosa.																					
Notes 2: Minera San Rafael, S.A.																					

BGI PQ200 Air Sampling System

Downloaded September 2016

Job Details:			Job Code: EA-7A																		
Job Name: EA-7A			Site Name: Los Planes																		
Version: PQ200			Station Code:																		
Serial No: 2.00			Operators: EvQ																		
Pump Time:			User1: NA																		
Flags: NA			User2: NA																		
<table border="1"> <thead> <tr> <th>Max</th> <th>Min</th> <th>Avg</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>654</td> <td>649</td> <td>651</td> <td>mmHg</td> </tr> <tr> <td>29.1</td> <td>18.9</td> <td>22.5</td> <td>°C</td> </tr> <tr> <td>---</td> <td>---</td> <td>16.71</td> <td>Lpm</td> </tr> </tbody> </table>		Max	Min	Avg	Units	654	649	651	mmHg	29.1	18.9	22.5	°C	---	---	16.71	Lpm	Timer Information: Date: Time dd-mmm hh:mm:ss Start: 14-Sep-16 10:38:00 Stop: 15-Sep-16 10:38:00 ET: 23:59:00		Mass Concentration Data: Filter ID: 3119-0101 Final Wt: 151.580 mg Initial Wt: 151.520 mg Delta Wt: 0.060 mg Total Vol: 24.04 m ³ Mass Conc: 2.50 µg/m ³	
Max	Min	Avg	Units																		
654	649	651	mmHg																		
29.1	18.9	22.5	°C																		
---	---	16.71	Lpm																		
QCV		NA	%																		
Max overheat		NA	°C																		
occured NA																					
Notes 1: Aldea Los Planes, San Rafael Las Flores, Santa Rosa.																					
Notes 2: Minera San Rafael, S.A.																					

Cliente:	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:	Octubre, 24 al 25 de 2016
Emisión de reporte:	Octubre, 25 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 PM ₁₀ 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	3118-1727	0.15175	0.15202
2	EA-2A	3114-1323	0.15054	0.15068
3	EA-3	3120-0202	0.15105	0.15129
4	EA-7A	3119-0101	0.15152	0.15158

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reportes analíticos RA-16-11611.

Anexos:

Anexo 1. Cadena de Custodia R-02-000790

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
J.J.	Oct., 25/16	D.S.	Oct., 25/16	A.G.J.	Oct., 25/16	01

BGI PQ200 Air Sampling System

Downloaded October 2016

Job Details:

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

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

	Max	Min	Avg	Units
BP	652	646	650	mmHg
TA	26.9	17.9	20.9	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 13-Oct-16	14:08:00
Stop: 14-Oct-16	14:08:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	3121-0303
Final Wt:	151.050 mg
Initial Wt:	150.710 mg
Delta Wt:	0.340 mg
Total Vol:	24.04 m ³
Mass Conc:	14.14 µg/m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

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

BGI PQ200 Air Sampling System

Downloaded September 2016

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	634	630	632	mmHg
TA	28.1	14.9	19.5	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 26-Oct-16	11:00:00
Stop: 27-Oct-16	11:00:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	3148-1212
Final Wt:	151.950 mg
Initial Wt:	151.520 mg
Delta Wt:	0.430 mg
Total Vol:	24.04 m ³
Mass Conc:	17.89 µg/m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

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

BGI PQ200 Air Sampling System

Downloaded September 2016

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	627	623	624	mmHg
TA	24.1	15.2	18.4	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 20-Oct-16	11:30:00
Stop: 21-Oct-16	11:30:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	3144-1010
Final Wt:	151.590 mg
Initial Wt:	151.410 mg
Delta Wt:	0.180 mg
Total Vol:	24.03 m ³
Mass Conc:	7.49 µg/m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

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

BGI PQ200 Air Sampling System

Downloaded September 2016

Job Details:

Job Name: EA-7A
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	652	647	649	mmHg
TA	26.8	18.1	21.0	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 18-Oct-16	16:17:00
Stop: 19-Oct-16	16:17:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	3147-1111
Final Wt:	151.960 mg
Initial Wt:	151.650 mg
Delta Wt:	0.310 mg
Total Vol:	24.04 m ³
Mass Conc:	12.90 µg/m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

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

Cliente: 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 y 178-089 (El Escobal)
Análisis de muestras: Noviembre, 08 al 10 de 2016
Emisión de reporte: Noviembre, 15 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-2A	3148-1212	0.15152	0.15195
2	EA-7A	3147-1111	0.15165	0.15196
3	EA-1A	3121-0303	0.15071	0.15105
4	EA-3	3144-1010	0.15141	0.15159

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reportes analíticos RA-16-11628.

Anexos:

Anexo 1. Cadena de Custodia R-02-000793

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Nov., 15/16	J.J.	Nov., 15/16	A.G.J.	Nov. 15/16	02

11.3.2 Informe de Metales en PM₁₀

Cliente: Minera San Rafael, S.A.
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial
Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-080
Análisis de muestras: Septiembre, 21 de 2016
Emisión del reporte: Septiembre, 26 de 2016

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

Análisis: Metales en filtros por ICP de Masas.

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

*Parámetros	LDM (µg)	Estación			
		EA-1B	EA-2A	EA-3A	EA-4A
Código de filtro		3104-0303	3113-1212	3110-0909	3105-0404
Aluminio (Al)	5.0	7.8	<5.0	11.2	10.1
Antimonio (Sb)	1.0	<1.0	<1.0	<1.0	<1.0
Arsénico (As)	0.60	<0.60	<0.60	<0.60	<0.60
Azufre (S)	2.5	12.0	15.9	15.7	7.3
Bario (Ba)	0.10	0.17	<0.10	0.22	0.29
Berilio (Be)	0.10	<0.10	<0.10	<0.10	<0.10
Bismuto (Bi)	0.60	<0.60	<0.60	<0.60	<0.60
Boro (B)	0.60	<0.60	<0.60	<0.60	<0.60
Cadmio (Cd)	0.20	<0.20	<0.20	<0.20	<0.20
Calcio (Ca)	5.0	24.4	12.8	28.0	17.6
Cobalto (Co)	0.20	<0.20	<0.20	<0.20	<0.20
Cobre (Cu)	0.50	<0.50	<0.50	<0.50	<0.50
Cromo (Cr)	0.50	1.02	0.99	1.09	1.09
Estaño (Sn)	1.0	<1.0	<1.0	<1.0	<1.0
Estroncio (Sr)	0.10	<0.10	<0.10	0.11	<0.10
Fósforo (P)	2.5	10.6	9.9	10.6	10.7
Hierro (Fe)	5.0	8.7	<5.0	14.7	9.7
Magnesio (Mg)	5.0	<5.0	<5.0	6.9	<5.0

*Parámetros	LDM (µg)	Estación			
		EA-1B	EA-2A	EA-3A	EA-4A
Código de filtro		3104-0303	3113-1212	3110-0909	3105-0404
Manganeso (Mn)	0.10	0.34	0.36	0.97	0.54
Molibdeno (Mo)	0.30	<0.30	<0.30	<0.30	<0.30
Níquel (Ni)	0.30	<0.30	<0.30	<0.30	<0.30
Plata (Ag)	0.50	<0.50	<0.50	<0.50	<0.50
Plomo (Pb)	0.30	<0.30	0.33	0.39	<0.30
Potasio (K)	10.0	<10.0	<10.0	<10.0	<10.0
Selenio (Se)	1.0	<1.0	<1.0	<1.0	<1.0
Silicio (Si)	1.0	21.6	13.3	22.9	19.3
Sodio (Na)	5.0	42.5	29.8	41.0	31.9
Talio (Tl)	1.0	<1.0	<1.0	<1.0	<1.0
Titanio (Ti)	0.10	0.25	<0.10	0.48	0.49
Uranio (U)	0.10	<0.10	<0.10	<0.10	<0.10
Vanadio (V)	0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)	0.50	<0.50	0.76	1.01	1.67
Zirconio (Zr)	0.50	<0.50	<0.50	<0.50	<0.50

*: 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.

*Parámetros	LDM (µg)	Estación			
		EA-5A	EA-6	EA-7	EA-10
Código de filtro		3106-0505	3103-0202	3108-0707	3107-0606
Aluminio (Al)	5.0	<5.0	<5.0	12.6	<5.0
Antimonio (Sb)	1.0	<1.0	<1.0	<1.0	<1.0
Arsénico (As)	0.60	<0.60	<0.60	<0.60	<0.60
Azufre (S)	2.5	6.5	11.1	16.0	<2.5
Bario (Ba)	0.10	0.12	<0.10	0.22	<0.10
Berilio (Be)	0.10	<0.10	<0.10	<0.10	<0.10
Bismuto (Bi)	0.60	<0.60	<0.60	<0.60	<0.60
Boro (B)	0.60	<0.60	<0.60	<0.60	<0.60
Cadmio (Cd)	0.20	<0.20	<0.20	<0.20	<0.20
Calcio (Ca)	5.0	14.5	13.2	22.9	9.3
Cobalto (Co)	0.20	<0.20	<0.20	<0.20	<0.20
Cobre (Cu)	0.50	<0.50	<0.50	<0.50	<0.50
Cromo (Cr)	0.50	1.04	0.94	1.01	1.01
Estaño (Sn)	1.0	<1.0	<1.0	<1.0	<1.0
Estroncio (Sr)	0.10	<0.10	<0.10	<0.10	<0.10
Fósforo (P)	2.5	10.4	10.1	10.1	9.1
Hierro (Fe)	5.0	<5.0	<5.0	15.3	<5.0
Magnesio (Mg)	5.0	<5.0	<5.0	7.5	<5.0
Manganeso (Mn)	0.10	0.21	0.14	0.61	<0.10
Molibdeno (Mo)	0.30	<0.30	<0.30	<0.30	<0.30
Níquel (Ni)	0.30	<0.30	<0.30	<0.30	<0.30
Plata (Ag)	0.50	<0.50	<0.50	<0.50	<0.50
Plomo (Pb)	0.30	<0.30	<0.30	<0.30	<0.30
Potasio (K)	10.0	<10.0	<10.0	<10.0	<10.0
Selenio (Se)	1.0	<1.0	<1.0	<1.0	<1.0
Silicio (Si)	1.0	11.9	14.1	26.5	10.5
Sodio (Na)	5.0	30.4	41.2	44.3	26.4
Talio (Tl)	1.0	<1.0	<1.0	<1.0	<1.0
Titanio (Ti)	0.10	<0.10	0.12	0.37	<0.10

*Parámetros	LDM (µg)	Estación			
		EA-5A	EA-6	EA-7	EA-10
Código de filtro		3106-0505	3103-0202	3108-0707	3107-0606
Uranio (U)	0.10	<0.10	<0.10	<0.10	<0.10
Vanadio (V)	0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)	0.50	<0.50	<0.50	0.65	<0.50
Zirconio (Zr)	0.50	<0.50	<0.50	<0.50	<0.50

*: 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-02-000783

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:
J.J.	Sept., 26/2016	D.S.	Sept., 26/2016	A.G.J.	Sept., 27/2016	01



Your P.O. #: 6063
 Your Project #: 178-080
 Site Location: MSR
 Your C.O.C. #: NA

Attention: Ana Gabriela Juarez

CTA Consultoria y Tecnologia Ambiental Mexico, 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: 2016/09/22
 Report #: R4176453
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6J6866
Received: 2016/09/13, 15:08
 Sample Matrix: Filter
 # Samples Received: 8

Analyses	Quantity Extracted	Date	Date	Laboratory Method	Reference
		2016/09/19	2016/09/20		
Total Metals (6010Cmod)	8	2016/09/19	2016/09/20	CAM SOP-00408 / BRL SOP-00102	EPA 6010C m
Total Uranium on a Small Filter	8	2016/09/19	2016/09/21	BRL SOP-00103 / BRL SOP- EPA 6020A m 00102	

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  Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
 Email: CJohnson@maxxam.ca
 Phone# (905)817-5769

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

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.



Maxxam Job #: B6J6866
 Report Date: 2016/09/22

CTA Consultoria y Tecnologia Ambiental Mexico, S.A. de C.V.
 Client Project #: 178-080
 Site Location: MSR
 Your P.O. #: 6063

RESULTS OF ANALYSES OF FILTER

Maxxam ID		DBL323	DBL323	DBL324	DBL356	DBL357	DBL358	DBL359		
Sampling Date		2016/08/18	2016/08/18	2016/08/05	2016/08/23	2016/08/16	2016/08/16	2016/08/18		
COC Number		NA	NA	NA	NA	NA	NA	NA		
	UNITS	3104-0303	3104-0303 Lab-Dup	3113-1212	3110-0909	3105-0404	3106-0505	3103-0202	RDL	QC Batch
Metals										
Total Uranium (U)	ug	ND	ND	ND	ND	ND	ND	ND	0.10	4666457
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected										

Maxxam ID		DBL360	DBL361		
Sampling Date		2016/08/10	2016/08/23		
COC Number		NA	NA		
	UNITS	3108-0707	3107-0606	RDL	QC Batch
Metals					
Total Uranium (U)	ug	ND	ND	0.10	4666457
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected					

MISCELLANEOUS (FILTER)

Maxxam ID		DBL323	DBL324	DBL356	DBL357	DBL358	DBL359	DBL360		
Sampling Date		2016/08/18	2016/08/05	2016/08/23	2016/08/16	2016/08/16	2016/08/18	2016/08/10		
COC Number		NA	NA	NA	NA	NA	NA	NA		
	UNITS	3104-0303	3113-1212	3110-0909	3105-0404	3106-0505	3103-0202	3108-0707	RDL	QC Batch
Metals										
Aluminum (Al)	ug	7.8	ND	11.2	10.1	ND	ND	12.6	5.0	4666278
Antimony (Sb)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4666278
Arsenic (As)	ug	ND	ND	ND	ND	ND	ND	ND	0.60	4666278
Barium (Ba)	ug	0.17	ND	0.22	0.29	0.12	ND	0.22	0.10	4666278
Beryllium (Be)	ug	ND	ND	ND	ND	ND	ND	ND	0.10	4666278
Bismuth (Bi)	ug	ND	ND	ND	ND	ND	ND	ND	0.60	4666278
Boron (B)	ug	ND	ND	ND	ND	ND	ND	ND	0.60	4666278
Cadmium (Cd)	ug	ND	ND	ND	ND	ND	ND	ND	0.20	4666278
Calcium (Ca)	ug	24.4	12.8	28.0	17.6	14.5	13.2	22.9	5.0	4666278
Chromium (Cr)	ug	1.02	0.99	1.09	1.09	1.04	0.94	1.01	0.50	4666278
Cobalt (Co)	ug	ND	ND	ND	ND	ND	ND	ND	0.20	4666278
Copper (Cu)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4666278
Iron (Fe)	ug	8.7	ND	14.7	9.7	ND	ND	15.3	5.0	4666278
Lead (Pb)	ug	ND	0.33	0.39	ND	ND	ND	ND	0.30	4666278
Magnesium (Mg)	ug	ND	ND	6.9	ND	ND	ND	7.5	5.0	4666278
Manganese (Mn)	ug	0.34	0.36	0.97	0.54	0.21	0.14	0.61	0.10	4666278
Molybdenum (Mo)	ug	ND	ND	ND	ND	ND	ND	ND	0.30	4666278
Nickel (Ni)	ug	ND	ND	ND	ND	ND	ND	ND	0.30	4666278
Phosphorus (P)	ug	10.6	9.9	10.6	10.7	10.4	10.1	10.1	2.5	4666278
Potassium (K)	ug	ND	ND	ND	ND	ND	ND	ND	10	4666278
Selenium (Se)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4666278
Silicon (Si)	ug	21.6	13.3	22.9	19.3	11.9	14.1	26.5	1.0	4666278
Silver (Ag)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4666278
Sodium (Na)	ug	42.5	29.8	41.0	31.9	30.4	41.2	44.3	5.0	4666278
Strontium (Sr)	ug	ND	ND	0.11	ND	ND	ND	ND	0.10	4666278
Sulphur (S)	ug	12.0	15.9	15.7	7.3	6.5	11.1	16.0	2.5	4666278
Thallium (Tl)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4666278
Tin (Sn)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4666278
Titanium (Ti)	ug	0.25	ND	0.48	0.49	ND	0.12	0.37	0.10	4666278
Vanadium (V)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4666278
Zinc (Zn)	ug	ND	0.76	1.01	1.67	ND	ND	0.65	0.50	4666278
Zirconium (Zr)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4666278
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected										

MISCELLANEOUS (FILTER)

Maxxam ID		DBL361		
Sampling Date		2016/08/23		
COC Number		NA		
	UNITS	3107-0606	RDL	QC Batch
Metals				
Aluminum (Al)	ug	ND	5.0	4666278
Antimony (Sb)	ug	ND	1.0	4666278
Arsenic (As)	ug	ND	0.60	4666278
Barium (Ba)	ug	ND	0.10	4666278
Beryllium (Be)	ug	ND	0.10	4666278
Bismuth (Bi)	ug	ND	0.60	4666278
Boron (B)	ug	ND	0.60	4666278
Cadmium (Cd)	ug	ND	0.20	4666278
Calcium (Ca)	ug	9.3	5.0	4666278
Chromium (Cr)	ug	1.01	0.50	4666278
Cobalt (Co)	ug	ND	0.20	4666278
Copper (Cu)	ug	ND	0.50	4666278
Iron (Fe)	ug	ND	5.0	4666278
Lead (Pb)	ug	ND	0.30	4666278
Magnesium (Mg)	ug	ND	5.0	4666278
Manganese (Mn)	ug	ND	0.10	4666278
Molybdenum (Mo)	ug	ND	0.30	4666278
Nickel (Ni)	ug	ND	0.30	4666278
Phosphorus (P)	ug	9.1	2.5	4666278
Potassium (K)	ug	ND	10	4666278
Selenium (Se)	ug	ND	1.0	4666278
Silicon (Si)	ug	10.5	1.0	4666278
Silver (Ag)	ug	ND	0.50	4666278
Sodium (Na)	ug	26.4	5.0	4666278
Strontium (Sr)	ug	ND	0.10	4666278
Sulphur (S)	ug	ND	2.5	4666278
Thallium (Tl)	ug	ND	1.0	4666278
Tin (Sn)	ug	ND	1.0	4666278
Titanium (Ti)	ug	ND	0.10	4666278
Vanadium (V)	ug	ND	0.50	4666278
Zinc (Zn)	ug	ND	0.50	4666278
Zirconium (Zr)	ug	ND	0.50	4666278
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected				



Maxxam Job #: BG16866
Report Date: 2016/09/22

CTA Consultoria y Tecnologia Ambiental Mexico, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 6063

TEST SUMMARY

Maxxam ID: DBL323
Sample ID: 3104-0303
Matrix: Filter

Collected: 2016/08/18
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha

Maxxam ID: DBL323 Dup
Sample ID: 3104-0303
Matrix: Filter

Collected: 2016/08/18
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha

Maxxam ID: DBL324
Sample ID: 3113-1212
Matrix: Filter

Collected: 2016/08/05
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha

Maxxam ID: DBL356
Sample ID: 3110-0909
Matrix: Filter

Collected: 2016/08/23
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha

Maxxam ID: DBL357
Sample ID: 3105-0404
Matrix: Filter

Collected: 2016/08/16
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha

Maxxam ID: DBL358
Sample ID: 3106-0505
Matrix: Filter

Collected: 2016/08/16
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha



Maxxam Job #: BG16866
Report Date: 2016/09/22

CTA Consultoria y Tecnologia Ambiental Mexico, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 6063

TEST SUMMARY

Maxxam ID: D3L359
Sample ID: 3103-0202
Matrix: Filter

Collected: 2016/08/18
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha

Maxxam ID: D3L360
Sample ID: 3108-0707
Matrix: Filter

Collected: 2016/08/10
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha

Maxxam ID: D3L361
Sample ID: 3107-0606
Matrix: Filter

Collected: 2016/08/23
Shipped: 2016/09/13
Received: 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4666278	2016/09/19	2016/09/20	Archana Patel
Total Uranium on a Small Filter	ICP1/MS	4666457	2016/09/19	2016/09/21	Nan Raykha



Maxxam Job #: B6J6866
Report Date: 2016/09/22

CTA Consultoria y Tecnologia Ambiental Mexico, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 6063

GENERAL COMMENTS

RESULTS OF ANALYSES OF FILTER

Total Uranium on a Small Filter : Post digestion duplicate and spike were done on sample DBL323.

Results relate only to the items tested.



Maxxam Job #: B6J6866
Report Date: 2016/09/22

QUALITY ASSURANCE REPORT

CTA Consultoria y Tecnologia Ambiental Mexico, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 6063

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4666278	Aluminum (Al)	2016/09/20			96	85 - 115	ND, RDL=5.0	ug	1.2	20
4666278	Antimony (Sb)	2016/09/20			102	85 - 115	ND, RDL=1.0	ug	1.8	20
4666278	Arsenic (As)	2016/09/20			100	85 - 115	ND, RDL=0.60	ug	0.50	20
4666278	Barium (Ba)	2016/09/20			100	85 - 115	ND, RDL=0.10	ug	0.30	20
4666278	Beryllium (Be)	2016/09/20			98	85 - 115	ND, RDL=0.10	ug	0.31	20
4666278	Bismuth (Bi)	2016/09/20			103	85 - 115	ND, RDL=0.60	ug	0.58	20
4666278	Boron (B)	2016/09/20			96	85 - 115	ND, RDL=0.60	ug	0.41	20
4666278	Cadmium (Cd)	2016/09/20			103	85 - 115	ND, RDL=0.20	ug	0.097	20
4666278	Calcium (Ca)	2016/09/20			101	85 - 115	ND, RDL=5.0	ug	0.099	20
4666278	Chromium (Cr)	2016/09/20			98	85 - 115	ND, RDL=0.50	ug	0.31	20
4666278	Cobalt (Co)	2016/09/20			101	85 - 115	ND, RDL=0.20	ug	0	20
4666278	Copper (Cu)	2016/09/20			99	85 - 115	ND, RDL=0.50	ug	1.2	20
4666278	Iron (Fe)	2016/09/20			97	85 - 115	ND, RDL=5.0	ug	0	20
4666278	Lead (Pb)	2016/09/20			101	85 - 115	ND, RDL=0.30	ug	0.60	20
4666278	Magnesium (Mg)	2016/09/20			100	85 - 115	ND, RDL=5.0	ug	0.30	20
4666278	Manganese (Mn)	2016/09/20			100	85 - 115	ND, RDL=0.10	ug	0.10	20
4666278	Molybdenum (Mo)	2016/09/20			102	85 - 115	ND, RDL=0.30	ug	1.5	20
4666278	Nickel (Ni)	2016/09/20			99	85 - 115	ND, RDL=0.30	ug	0.30	20
4666278	Phosphorus (P)	2016/09/20			107	85 - 115	2.9, RDL=2.5	ug	2.1	20
4666278	Potassium (K)	2016/09/20			105	85 - 115	ND, RDL=10	ug	2.9	20
4666278	Selenium (Se)	2016/09/20			103	85 - 115	ND, RDL=1.0	ug	1.4	20
4666278	Silicon (Si)	2016/09/20			93	85 - 115	ND, RDL=1.0	ug	3.2	20
4666278	Silver (Ag)	2016/09/20			101	85 - 115	ND, RDL=0.50	ug	2.0	20
4666278	Sodium (Na)	2016/09/20			100	85 - 115	ND, RDL=5.0	ug	1.1	20
4666278	Strontium (Sr)	2016/09/20			100	85 - 115	ND, RDL=0.10	ug	0.30	20
4666278	Sulphur (S)	2016/09/20			104	85 - 115	ND, RDL=2.5	ug	1.6	20
4666278	Thallium (Tl)	2016/09/20			104	85 - 115	ND, RDL=1.0	ug	0.19	20
4666278	Tin (Sn)	2016/09/20			104	85 - 115	ND, RDL=1.0	ug	2.2	20
4666278	Titanium (Ti)	2016/09/20			98	85 - 115	ND, RDL=0.10	ug	1.5	20
4666278	Vanadium (V)	2016/09/20			99	85 - 115	ND, RDL=0.50	ug	0.71	20
4666278	Zinc (Zn)	2016/09/20			99	85 - 115	ND, RDL=0.50	ug	0.51	20



Maxxam Job #: 86J6866
Report Date: 2016/09/22

QUALITY ASSURANCE REPORT(CONT'D)

CTA Consultoria y Tecnologia Ambiental Mexico, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 6063

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4666278	Zirconium (Zr)	2016/09/20			99	85 - 115	ND, RDL=0.50	ug	1.8	20
4666457	Total Uranium (U)	2016/09/21	99	70 - 130	106	85 - 115	ND, RDL=0.10	ug	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
 Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
 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.
 NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).



Maxxam Job #: 86J6866
Report Date: 2016/09/22

CTA Consultoria y Tecnologia Ambiental Mexico, S.A. de C.V.
Client Project #: 178-080
Site Location: MSR
Your P.O. #: 6063

VALIDATION SIGNATURE PAGE

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

Brenda Moore

Brenda Moore, Team Lead

Frank Mo

Frank Mo, B.Sc., Inorganic Lab. Manager

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
EN LA MINA EL ESCOBAL**

Septiembre – Octubre 2016

San Rafael Las Flores, Santa Rosa, Guatemala

Noviembre de 2016

Este resumen presenta los resultados del monitoreo de calidad del aire realizado para la Mina El Escobal (**la Mina**). El monitoreo fue realizado por Consultoría y Tecnología Ambiental, S.A. (**CTA**) del 20 y 23 de Septiembre de 2016 para gases de combustión y del 22 de Septiembre al 24 de Octubre para partículas sedimentables totales (PST) en San Rafael Las Flores, Santa Rosa, donde se ubica la Mina. El propósito del monitoreo fue determinar la calidad de aire ambiental en las 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 (m): 803,887N (m): 1,601,801
EA-2B	Aldea La Cuchilla	E (m): 806,470N (m): 1,601,796
EA-3B	Aldea El Fucío	E (m): 806,538N (m): 1,600,367
EA-4A	Aldea La Puerta de Los Ángeles	E (m): 805,142N (m): 1,599,903
EA-5A	Aldea Sabana Redonda	E (m): 804,352N (m): 1,600,404
EA-6	Norte del proyecto, ruta a Mataquescuintla	E (m): 805,168N (m): 1,603,247
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	E (m): 805,425N (m): 1,601,523

Coordenadas en metros (m). Datum: NAD27 UTM zona 16N. Fuente: CTA, 2016.

Cuadro 2: Metodologías utilizadas para SO₂ y NO₂ y PST

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

Fuente: CTA, 2016.

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 dust fall, August 12, 2013).

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en Septiembre de 2016; y en el Cuadro 4 se presentan los resultados de la medición de PST para el período de 32 días de septiembre 22 a octubre 24 de 2016 (el período promedio de medición es de 30 ± 2 días, por lo que se cumple lo estipulado por la BC).

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

Estaciones de Muestreo	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guías del Banco
SO₂	<13	<13	<13	<13	<13	<13	<13	20 µg/m ³
NO₂	< 9	9	< 9	<9	< 9	10	10	*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., 2016.

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

Parámetros	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía de BC
Sólidos Insolubles	21.06	3.49	5.49	15.89	6.01	0.71	2.48	NA
Sólidos Solubles	7.96	0.58	0.60	2.37	0.54	0.43	0.37	

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

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

Parámetros	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía de BC
Sólidos Totales	29.02	4.07	6.09	18.26	6.55	1.14	2.86	
Partículas sedimentables totales mg/(dm ² *día) ²	9.67	1.36	2.03	6.09	2.18	0.38	0.95	2.90 ¹

g: gramos. m²: metro cuadrado. mg: miligramos. dm²: decímetro cuadrado. ¹: valor referido para un período promedio 30 ± 2 días. ²: Las estaciones fueron muestreadas dentro del período promedio de 30 ± 2 días aprobado por la BC.

Fuente: Laboratorio Ambiental, S. A., 2016.

Gases de Combustión

SO₂:

Como se puede apreciar en el Cuadro 3, las concentraciones se encuentran por debajo del límite de detección del método analítico utilizado en todas las estaciones monitoreadas

NO₂:

- En todas las estaciones de muestreo se obtuvieron resultados menores establecido por el Banco (**40 µg/m³**).

Partículas Sedimentables Totales

- Dos de las siete estaciones, presentan valores de PST que superan el valor guía. La estación que presentó la mayor concentración de PST fue la EA-1C (9.67 mg/(dm² x día), esto puede atribuirse parcialmente a que esta estación de muestreo se encuentran cerca del campo de foot ball de la escuela, el cual es de tierra y se encuentra en una zona con vientos fuertes. Las estaciones EA-4A, presenta una concentración entre de 6.09 mg / (dm² x día); en esta estación hay un alto flujo de tránsito pesado (camiones, pickups y buses) que generan cantidades significativas de polvo.
- Las estaciones que presentaron la menor concentración de PST durante el período de monitoreo, fueron la EA-6 y EA-7A con 0.38 mg/(dm²x día) y 0.95 mg/(dm² x día) respectivamente. En el caso de la estación EA-7A la baja concentración de PST se

puede atribuir a las medidas que toman dentro del Proyecto para reducir el polvo, consistente en el riego de caminos de terracería. La estación EA-6 es una estación de control que se encuentra alejada de la carretera y cuya influencia por tránsito y actividades agrícolas y humanas es mínima.

- Las estaciones EA-2B, EA-3B y EA-5A presentan valores de 1.36 mg/(dm² x día), 2.03 mg/(dm² x día) y 2.18 mg/(dm² x día) respectivamente. Las primeras dos estaciones se encuentran en lugares con caminos de terracería con tránsito vehicular de bajo a medio. La estación EA-5A, se encuentra cerca la carretera hacia Mataquescuintla (pavimentada) y cerca de una fábrica de block.



Anexos

Anexo 1-1: Reportes analíticos

Cliente: Minera San Rafael, S.A.
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-082 (CTA)
Fecha de muestreo: Septiembre, 20 al 23 de 2016
Fecha de análisis: Octubre, 15 de 2016
Emisión del reporte: Octubre, 17 de 2016

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	N: 1,601,801 E: 803,887		Casa dentro del pueblo, caminos pavimentados, presencia de lluvia. 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 tuvo presencia de lluvia en el sector.

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-3B	Aldea El Fucio	N: 1,600,367 E: 806,538		Camino de terracería cercano al terreno, trabajos de mejora del camino próximos al punto (carretera de cemento), presencia de lluvia, tráfico vehicular moderado.
EA-4A	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, presencia de lluvia en el sector.
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. Presencia de lluvia en el sector.
EA-6	Norte del proyecto, ruta a Mataquesuintla	N: 1,603,247 E: 805,168		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno y lluvia.
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	N: 1,601,523 E: 805,425		Camino de terracería, hay movimientos de tierra próximos al punto, el tráfico de vehículos es alto. Presencia de lluvia en el sector.

Coordenadas en metros (m). Datum: NAD27 UTM zona 16 N. Fuente: LAMSA, 2016. *: 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-1C	EA-2B	EA-3A	EA-4A	EA-5A	EA-6	EA-7A
Fecha de muestreo (Sept., 2016)			20-21	20-21	20-21	21-22	21-22	21-22	22-23
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	< 9	10	10
	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

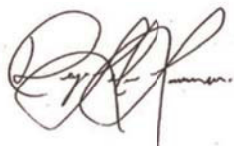
Parámetro	Control con duplicado			CDL		
	Unidades	DEA-4A	DEA-7A	Unidades	Teórica	Real
SO ₂	µg/m ³	NA	< 13	µg	15.1	15.7
	ppm	NA	< 0.005			
NO ₂	µg/m ³	< 9	NA	µg/mL	1.000	1.006
	ppm	< 0.005	NA			

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. DEA-4A: duplicado de la estación EA-4A. DEA-7A: duplicado de la estación EA-7A.

Anexos:

Anexo 1. Cadena de custodia R-02-000846

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. Ana Gabriela Juárez
Especialista ambiental, Director de Laboratorio

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Oct., 17/16	J. J.	Oct., 17/16	A.G.J.	Oct. 17/16	01

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-082 (CTA)
Fecha de muestreo: Septiembre 22 – Octubre 24 de 2016
Lugar de muestreo: San Rafael las Flores, Santa Rosa, Guatemala
Fecha de análisis: Octubre, 31 de 2016
Fecha de emisión: Noviembre, 4 de 2016

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

Cuadro 1: Ubicación de estaciones de muestreo

Estación	Ubicación	Fotografía	Factores ambientales
EA-1C	Frente a Escuela San Rafael		Casa dentro del pueblo, caminos pavimentados, vientos fuertes. Campo de foot ball de tierra frente a la casa. Durante el monitoreo se tuvo presencia de lluvias.
	Aldea La Cuchilla		Camino de terracería poco tráfico vehicular, transitan especialmente motos. Construcción de casas con adobe en los alrededores. Durante el monitoreo se tuvo presencia de lluvias.

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

Estación	Ubicación	Fotografía	Factores ambientales
EA-3B	Aldea El Fucío		Camino de terracería cercano al terreno, tráfico vehicular moderado. Se realizan trabajos construcción. Durante el monitoreo se tuvo presencia de lluvias.
	Aldea La Puerta de Los Ángeles		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan cantidades considerables de polvo. Evidencia de quema de leña para cocinar. Durante el monitoreo se tuvo presencia de lluvias.
EA-5A	Aldea Sabana Redonda		El terreno está cerca de la carretera principal (asfaltada), está en campo abierto y cercano a una fábrica de block. Durante el monitoreo se tuvo presencia de lluvias.
	Norte del proyecto, ruta a Mataquescuintla		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno. Durante el monitoreo se tuvo presencia de lluvias.

Estación	Ubicación	Fotografía	Factores ambientales
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes		Camino de terracería, poco tráfico vehicular, se realizaban trabajos en áreas cercanas a la pileta, existe acumulación de tierra próximo a la estación y existe transito de tractores y camiones de volteo.

²: Factores ambientales que pueden influir en los resultados. El tiempo de muestreo fue de 30 ± 2 días, de acuerdo a método analítico empleado.

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	21.06	7.96	29.02	9.67
2	EA-2B	3.49	0.58	4.07	1.36
3	EA-3B	5.49	0.60	6.09	2.03
4	EA-4A	15.89	2.37	18.26	6.09
5	EA-5A	6.01	0.54	6.55	2.18
6	EA-6	0.71	0.43	1.14	0.38
7	EA-7A	2.48	0.37	2.86	0.95

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

Anexos:

Anexo 1. Cadena de Custodia R-02-000855

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:
J.J.	Nov., 04/16	D.S.	Nov., 07/16	A.G.J.	Nov., 07/16	01

11.3.4 Presión Sonora

ER-1

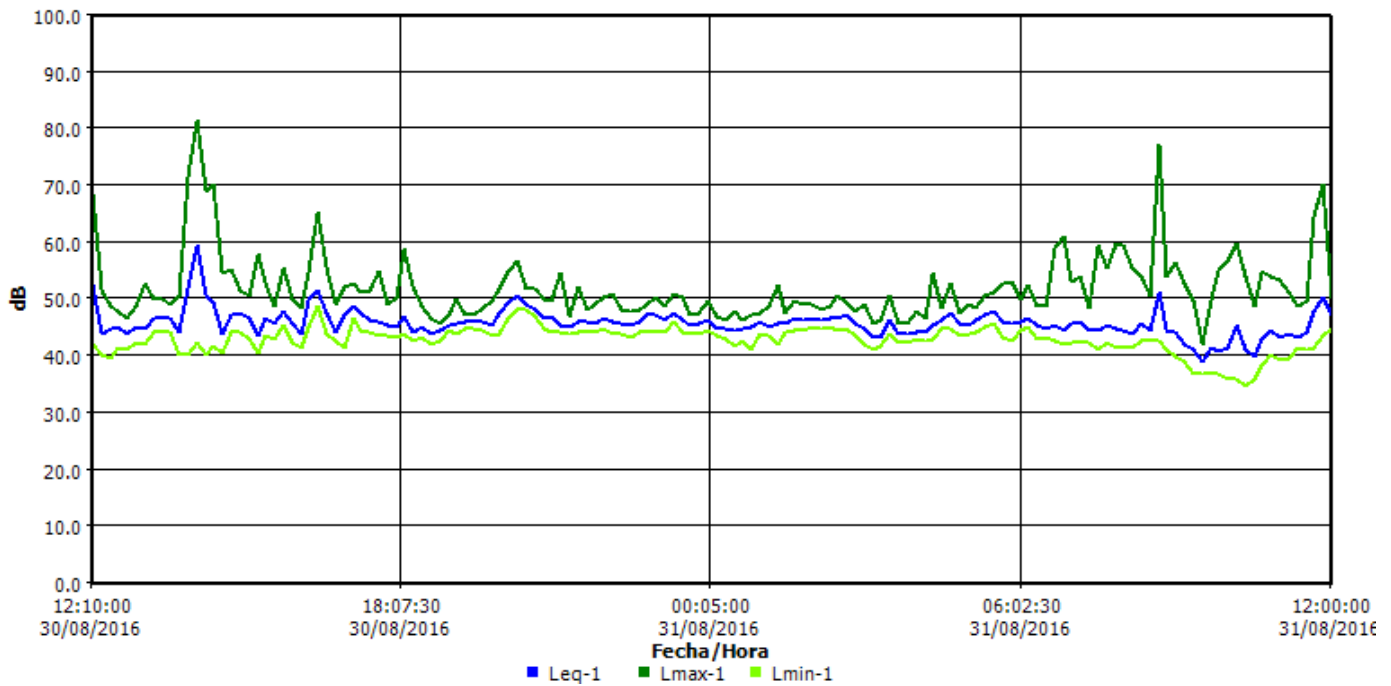
Panel de información

Ubicación Depósito de suelos norte, a inmediaciones de Aldea Los Planes
Nombre ER-1
Sesión padre S160
Hora de inicio Martes, 30 de Agosto de 2016 12:00:00
Hora de paro Miércoles, 31 de Agosto de 2016 12:00:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	34.7 dB	Lmax	1	81.6 dB
Lpk	1	101.5 dB	Leq	1	46.8 dB

Gráfica de datos de registro



ER-1A

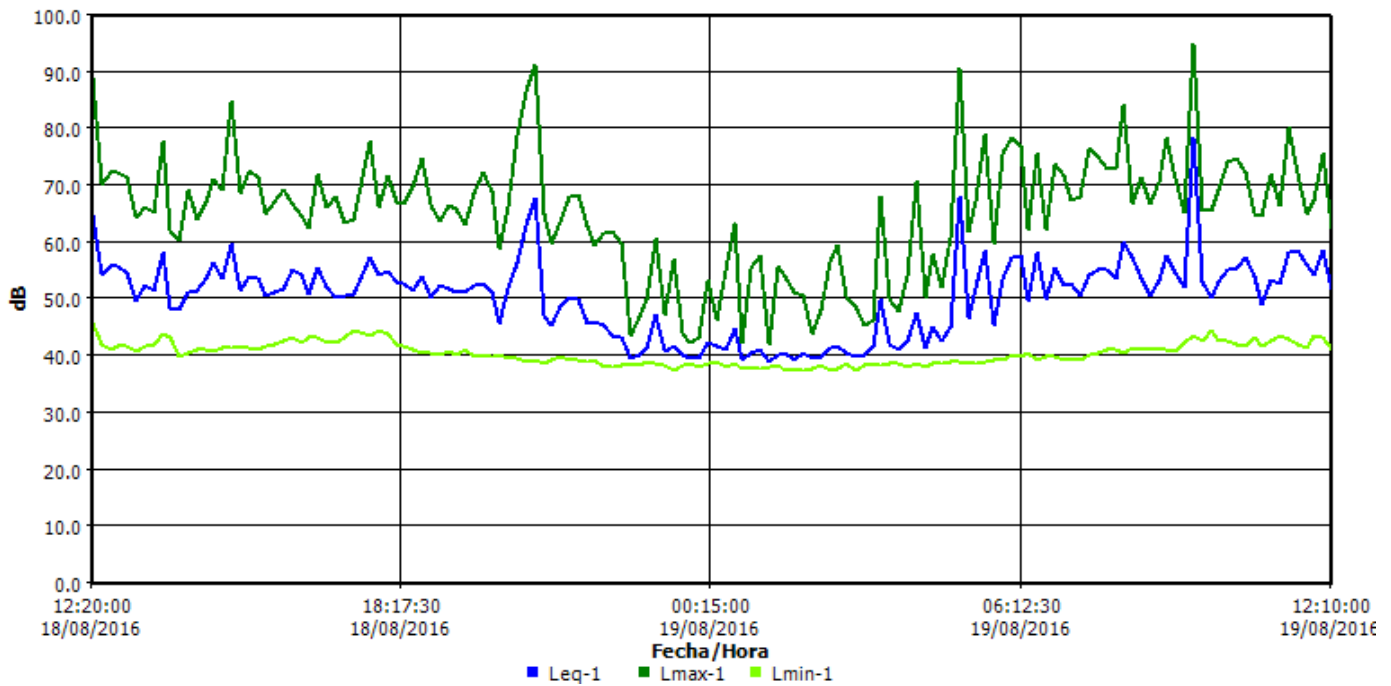
Panel de información

Ubicación San Rafael las Flores
Nombre ER-1A
Sesión padre S156
Hora de inicio Jueves, 18 de Agosto de 2016 12:10:00
Hora de paro Viernes, 19 de Agosto de 2016 12:10:00
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	SLOW
Lmin	1	37.4 dB	Lmax	1	95.1 dB
Lpk	1	109.8 dB	Leq	1	58.8 dB

Gráfica de datos de registro



ER-2

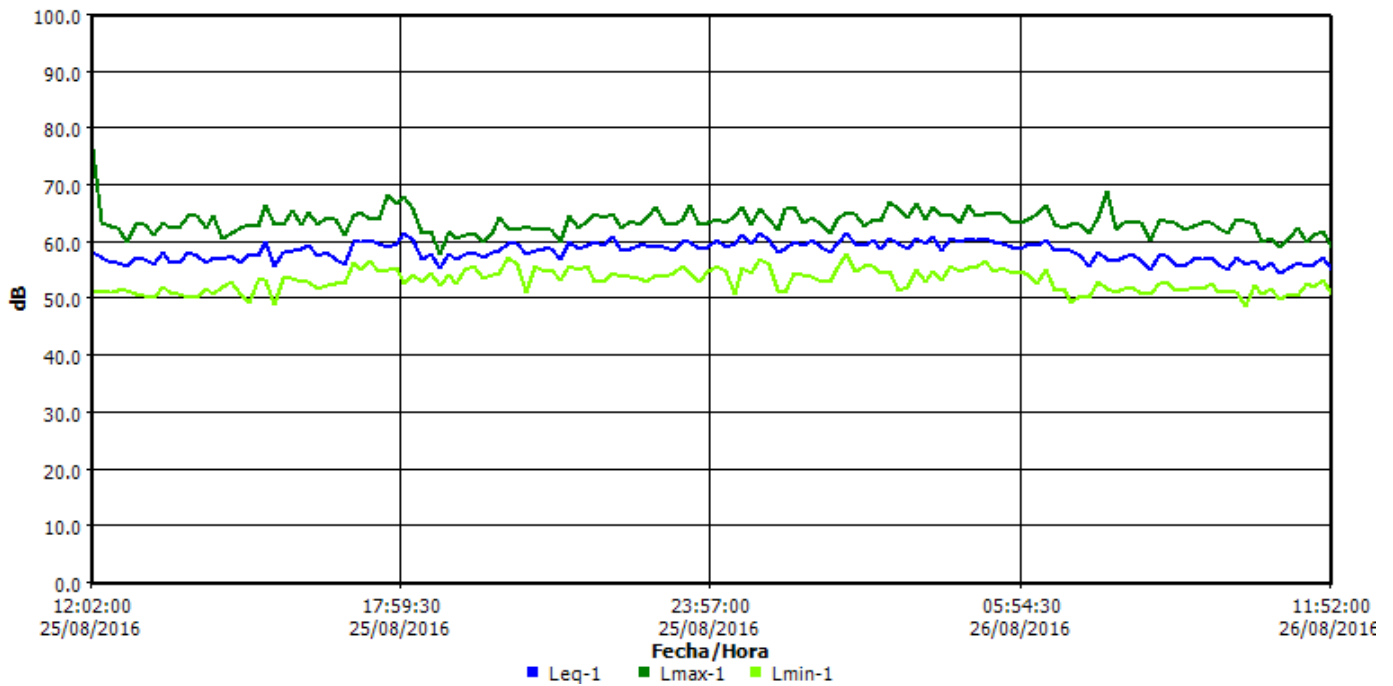
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S159
Hora de inicio Jueves, 25 de Agosto de 2016 11:52:00
Hora de paro Viernes, 26 de Agosto de 2016 11:52:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	48.7 dB	Lmax	1	76.4 dB
Lpk	1	103.7 dB	Leq	1	58.6 dB

Gráfica de datos de registro



ER-3

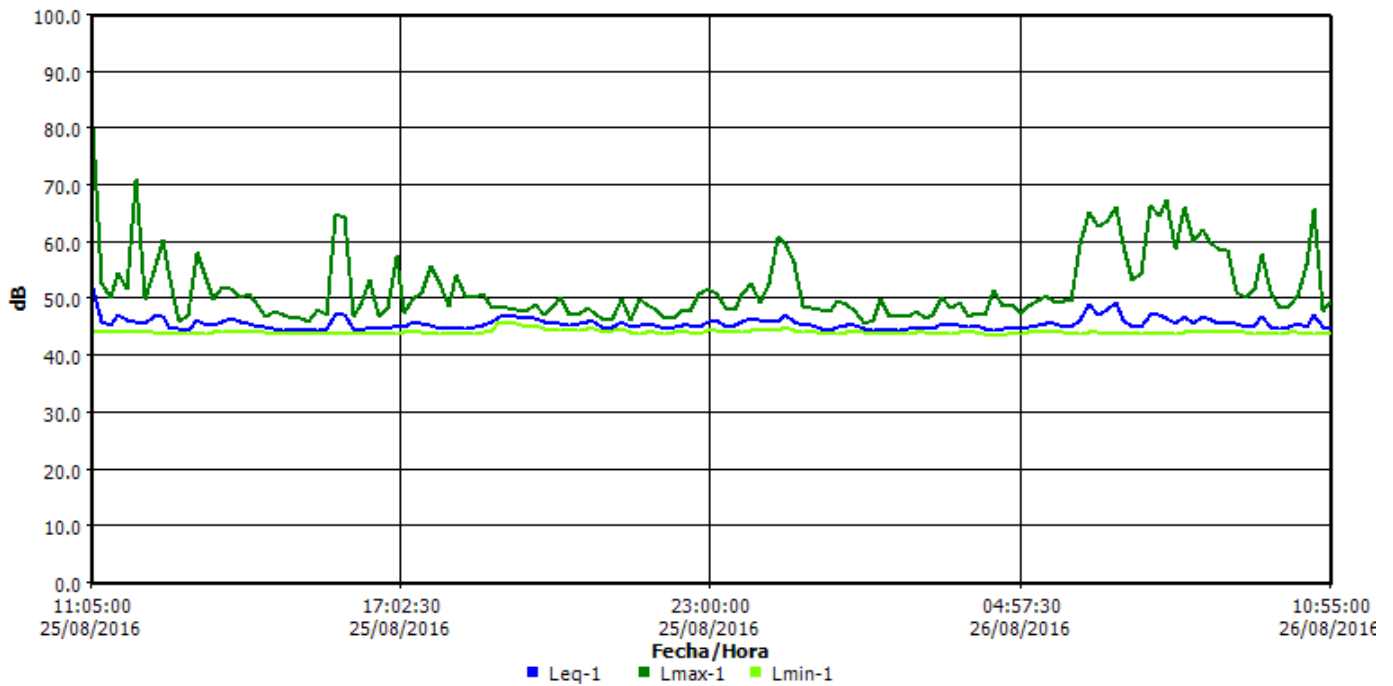
Panel de información

Ubicación Aledaño a Aldea El Fucio
Nombre ER-3
Sesión padre S033
Hora de inicio Jueves, 25 de Agosto de 2016 10:55:00
Hora de paro Viernes, 26 de Agosto de 2016 10:55:00
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	43.7 dB	Lmax	1	80.4 dB
Lpk	1	98.2 dB	Leq	1	45.8 dB

Gráfica de datos de registro



ER-3A

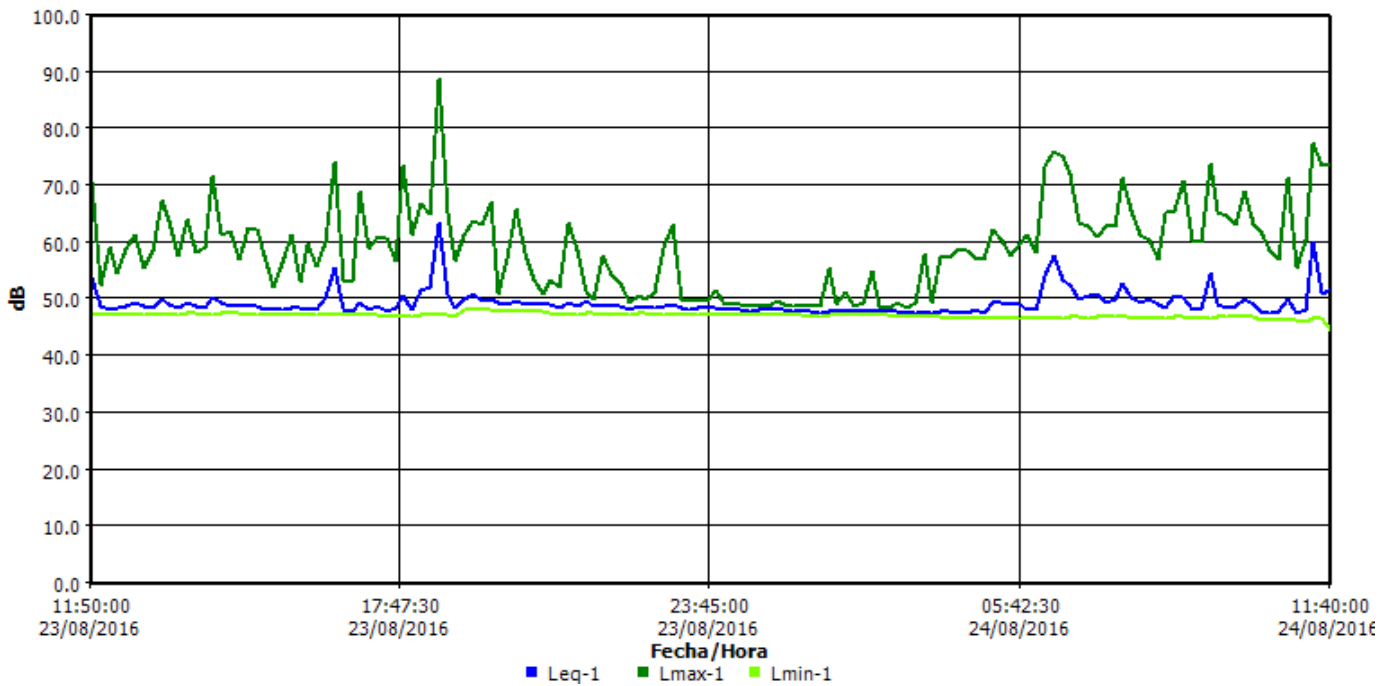
Panel de información

Ubicación
Nombre ER-3A
Sesión padre S032
Hora de inicio Martes, 23 de Agosto de 2016 11:40:00
Hora de paro Miércoles, 24 de Agosto de 2016 11:40:00
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	44.6 dB	Lmax	1	88.9 dB
Lpk	1	100.7 dB	Leq	1	50.4 dB

Gráfica de datos de registro



ER-4A

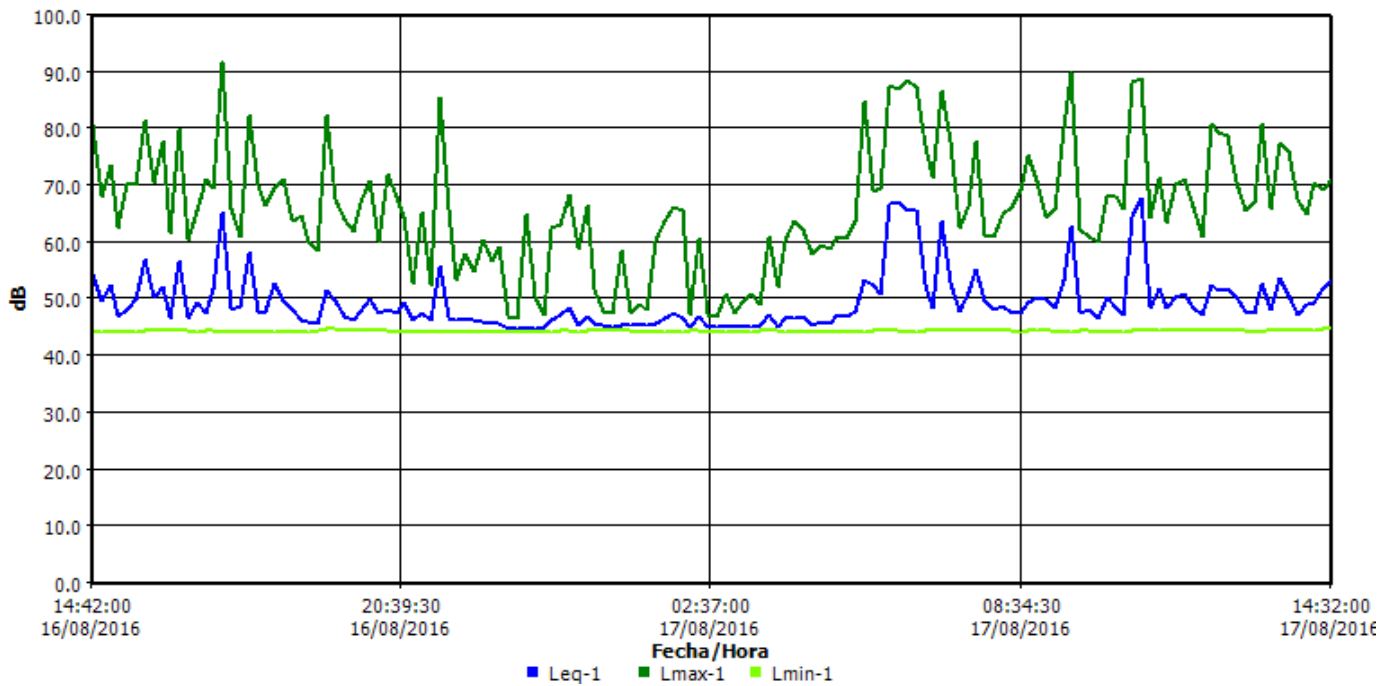
Panel de información

Ubicación Caserío El Portón de los Ángeles
Nombre ER-4A
Sesión padre S030
Hora de inicio Martes, 16 de Agosto de 2016 14:32:00
Hora de paro Miércoles, 17 de Agosto de 2016 14:32:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	44.1 dB	Lmax	1	91.8 dB
Lpk	1	111.3 dB	Leq	1	55 dB

Gráfica de datos de registro



ER-5A

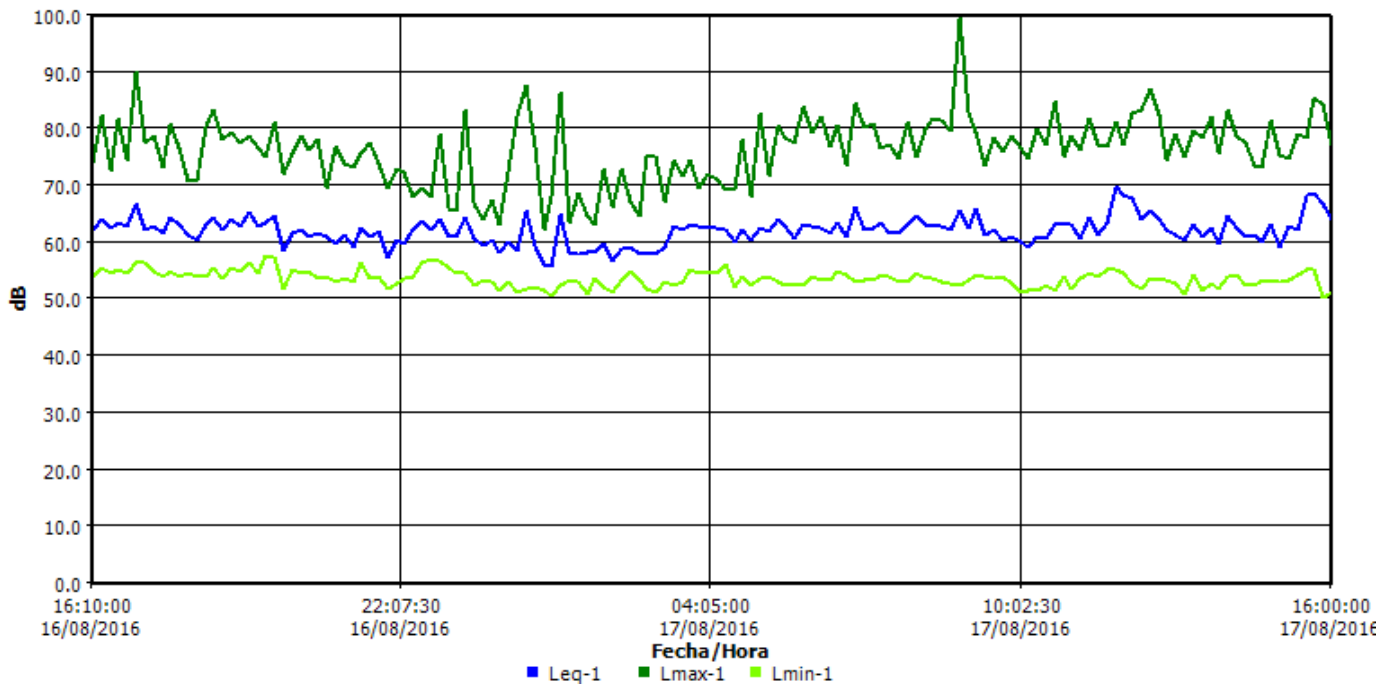
Panel de información

Ubicación Aldea Sabana Redonda
Nombre ER-5A
Sesión padre S242
Hora de inicio Martes, 16 de Agosto de 2016 16:00:00
Hora de paro Miércoles, 17 de Agosto de 2016 16:00:00
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	C	Respuesta	1	FAST
Lmin	1	50.4 dB	Lmax	1	99.6 dB
Lpk	1	123.8 dB	Leq	1	62.8 dB

Gráfica de datos de registro



ER-6

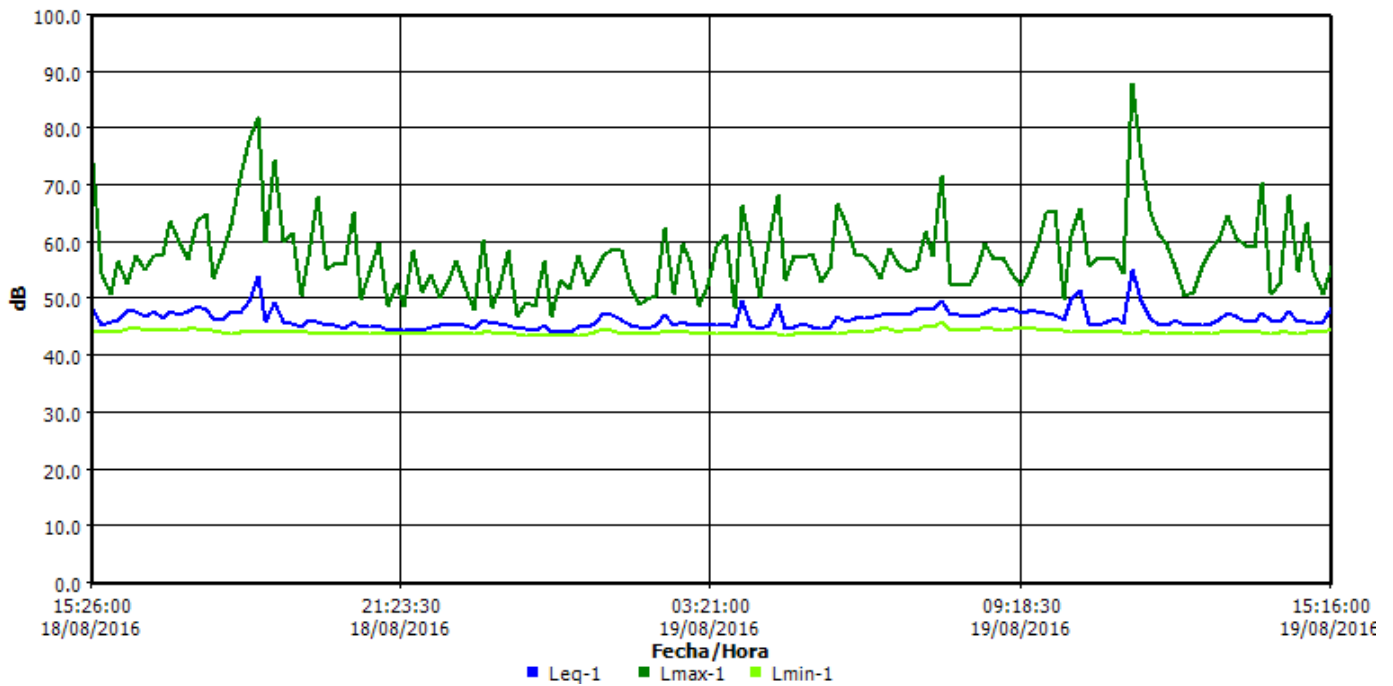
Panel de información

Ubicación Al nortedel proyecto, ruta a Mataquescuintla
Nombre ER-6
Sesión padre S031
Hora de inicio Jueves, 18 de Agosto de 2016 15:16:00
Hora de paro Viernes, 19 de Agosto de 2016 15:16:00
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	43.7 dB	Lmax	1	88 dB
Lpk	1	98.7 dB	Leq	1	46.9 dB

Gráfica de datos de registro



ER-7A

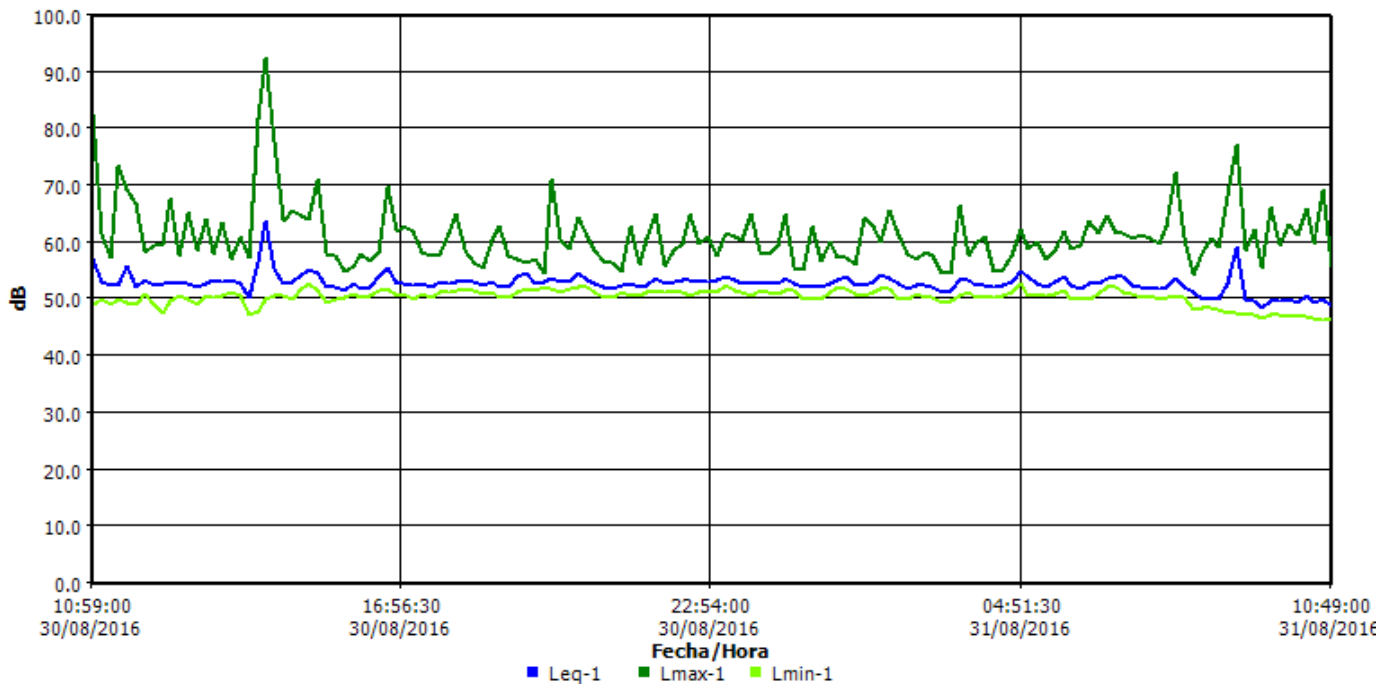
Panel de información

Ubicación Aledaño a Aldea Los Planes
Nombre ER-7A
Sesión padre S034
Hora de inicio Martes, 30 de Agosto de 2016 10:49:00
Hora de paro Miércoles, 31 de Agosto de 2016 10:49:00
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	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	46.3 dB	Lmax	1	92.5 dB
Lpk	1	106.1 dB	Leq	1	53.2 dB

Gráfica de datos de registro



ER-7A

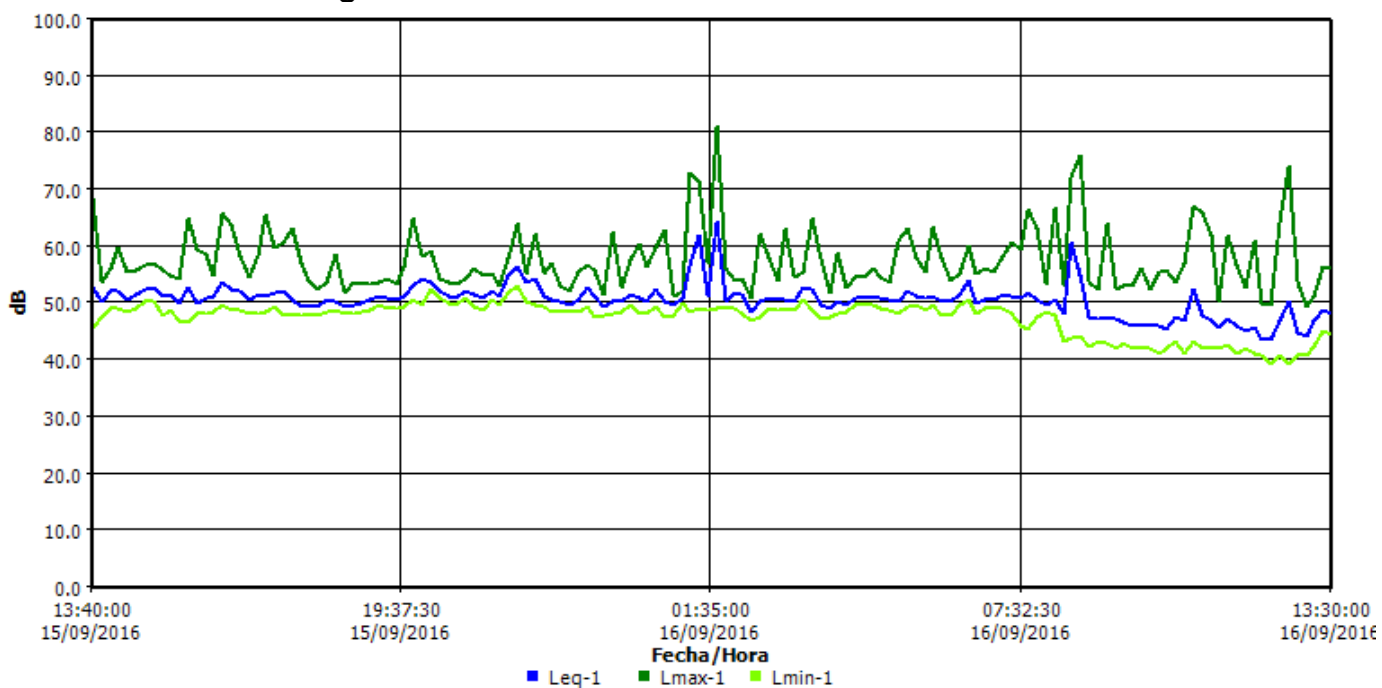
Panel de información

Ubicación Aledaño a Aldea Los Planes
Nombre ER-7A
Sesión padre S161
Hora de inicio Jueves, 15 de Septiembre de 2016 13:30:00
Hora de paro Viernes, 16 de Septiembre de 2016 13:30:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	39.3 dB	Lmax	1	81.1 dB
Lpk	1	96 dB	Leq	1	52 dB

Gráfica de datos de registro



ER-3

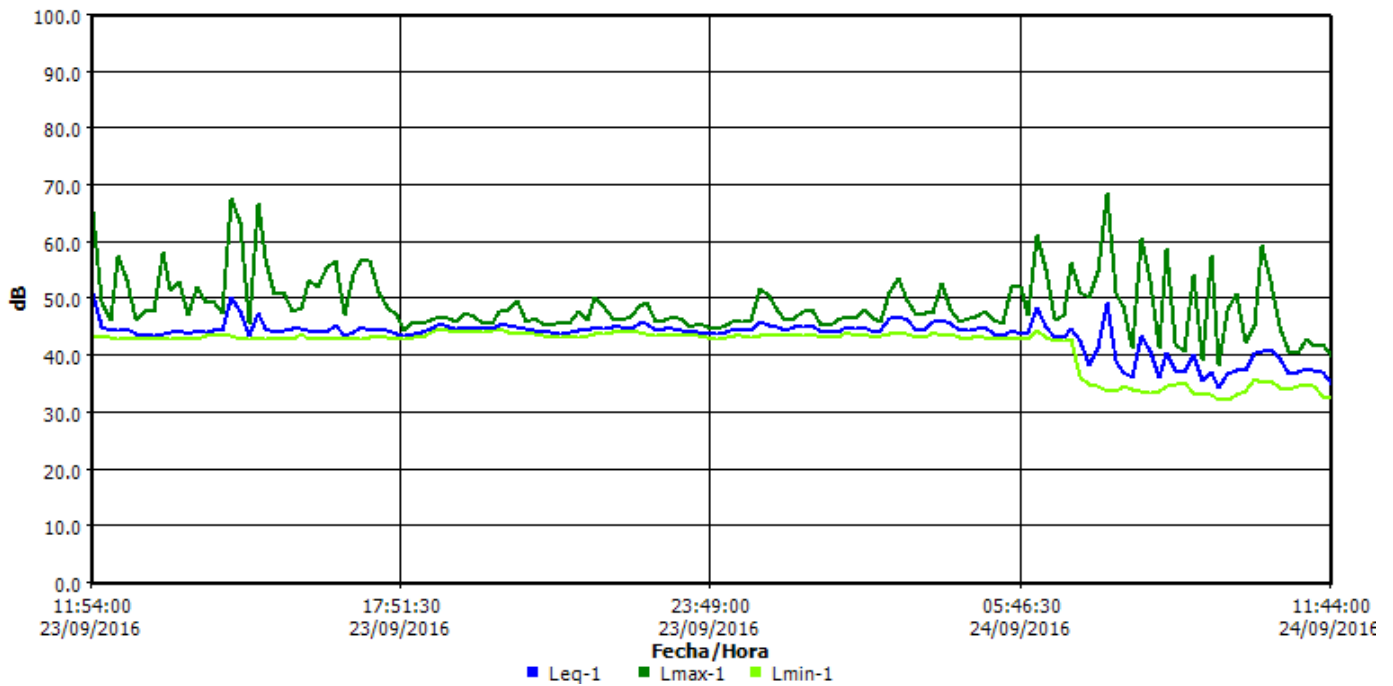
Panel de información

Ubicación Aledaño a Aldea El Fucio.
Nombre ER-3
Sesión padre S163
Hora de inicio Viernes, 23 de Septiembre de 2016 11:44:00
Hora de paro Sábado, 24 de Septiembre de 2016 11:44:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	32.3 dB	Lmax	1	68.6 dB
Lpk	1	94.2 dB	Leq	1	44.3 dB

Gráfica de datos de registro



ER-2

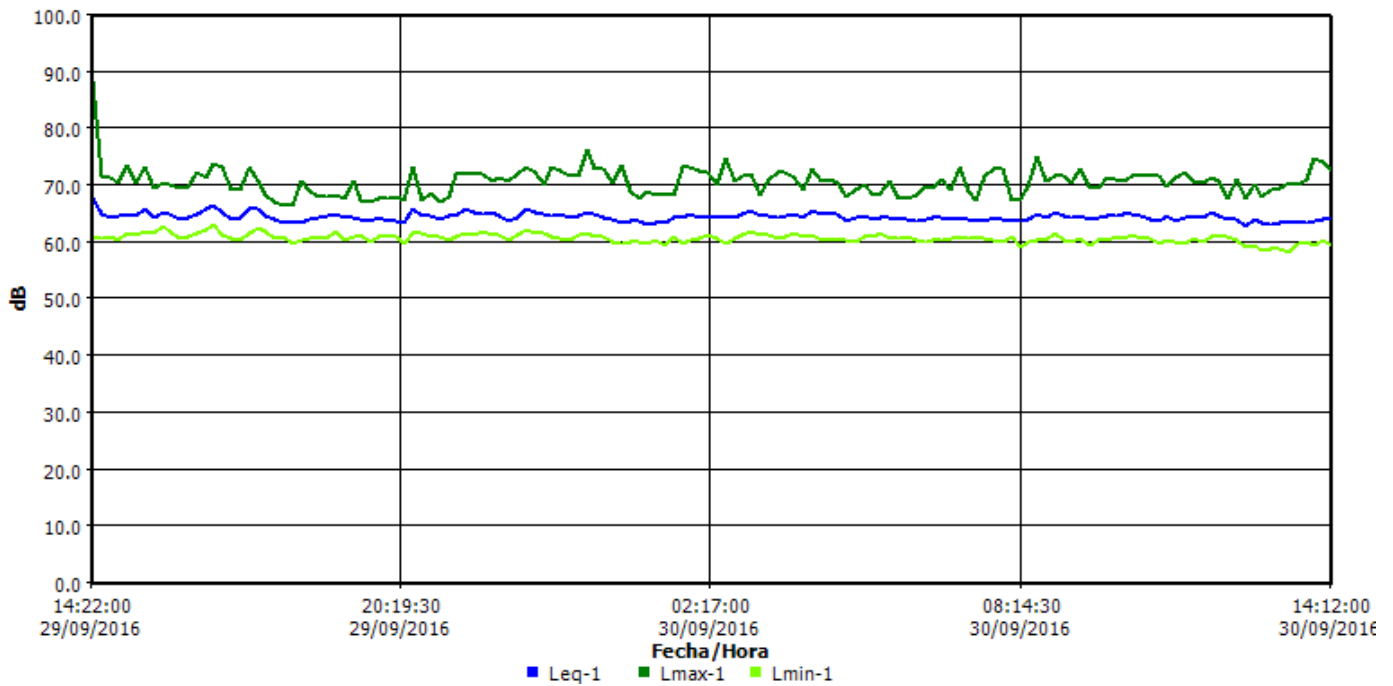
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S244
Hora de inicio Jueves, 29 de Septiembre de 2016 14:12:00
Hora de paro Viernes, 30 de Septiembre de 2016 14:12:00
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	C	Respuesta	1	FAST
Lmin	1	58.3 dB	Lmax	1	88.1 dB
Lpk	1	100.9 dB	Leq	1	64.5 dB

Gráfica de datos de registro



ER-1

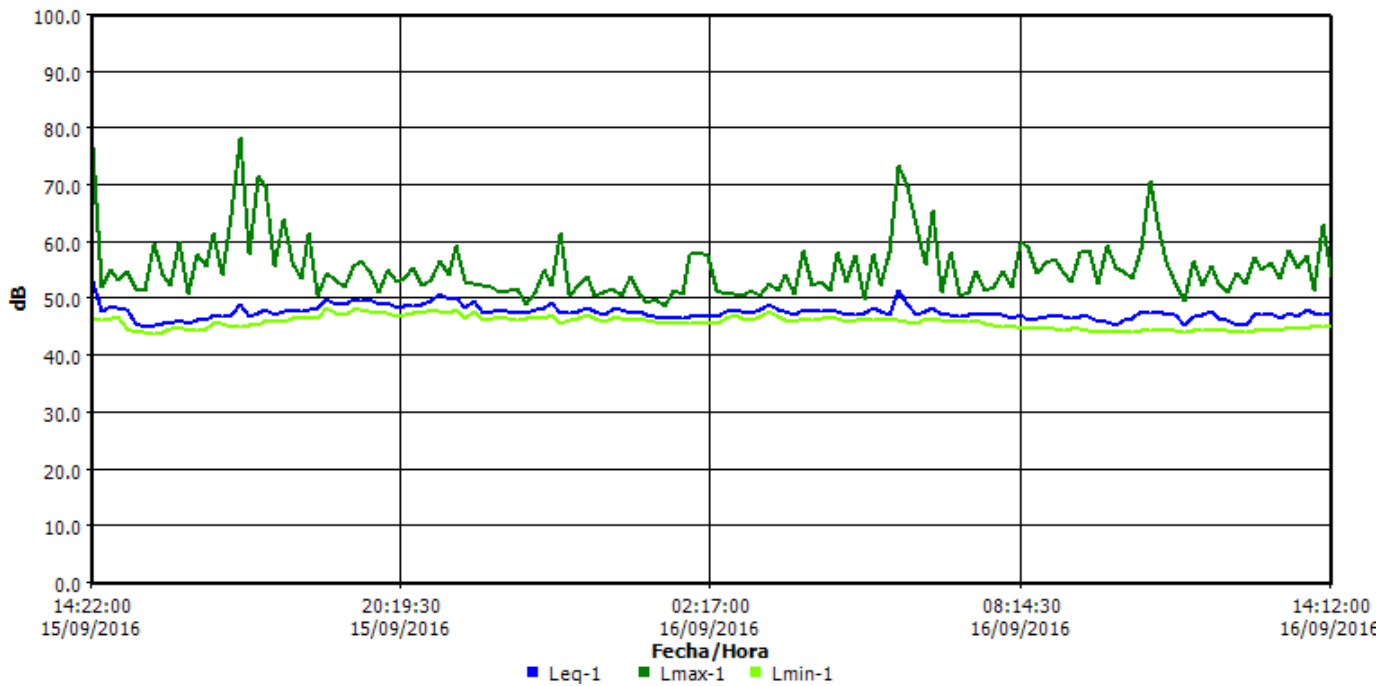
Panel de información

Ubicación Depósito de suelos norte, a inmediaciones de Aldea Los Planes
Nombre ER-1
Sesión padre S035
Hora de inicio Jueves, 15 de Septiembre de 2016 14:12:00
Hora de paro Viernes, 16 de Septiembre de 2016 14:12:00
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 dB	Lmax	1	78.4 dB
Lpk	1	95.2 dB	Leq	1	47.8 dB

Gráfica de datos de registro



ER-7A

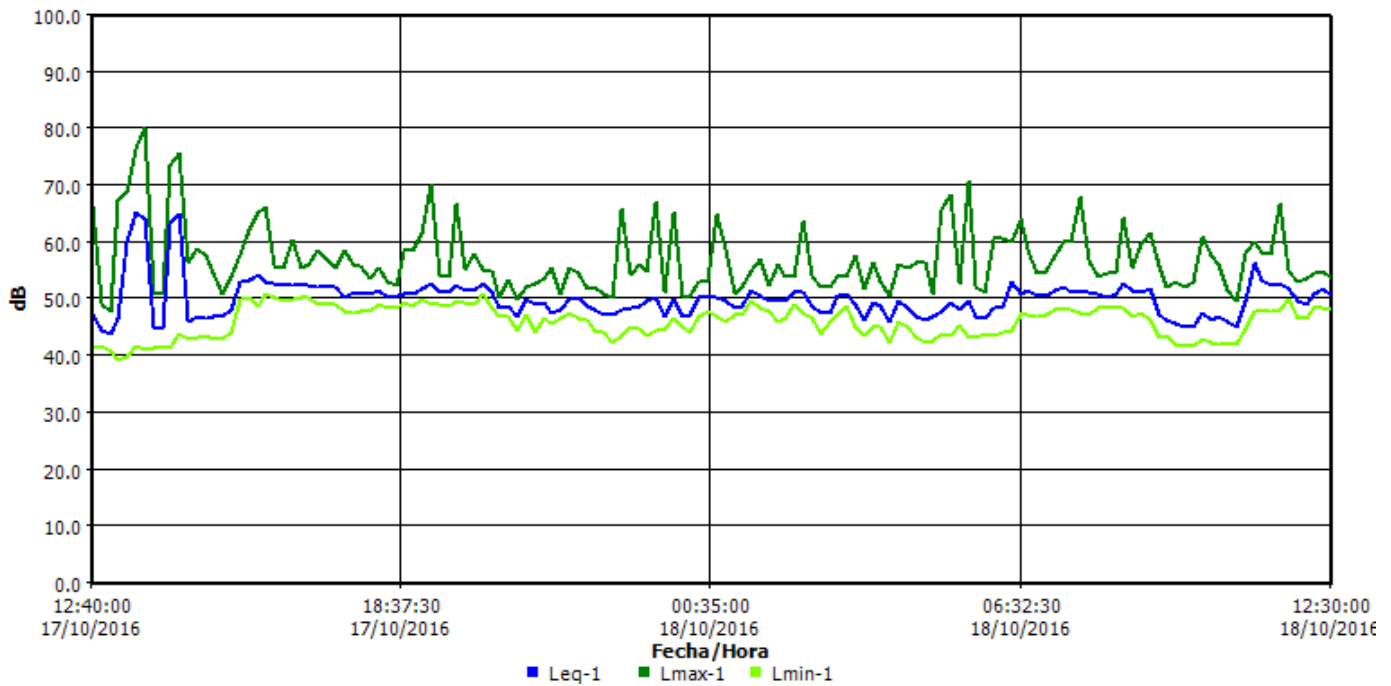
Panel de información

Ubicación Aledaño a Aldea Los Planes
Nombre ER-7A
Sesión padre S166
Hora de inicio Lunes, 17 de Octubre de 2016 12:30:00
Hora de paro Martes, 18 de Octubre de 2016 12:30:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	39.3 dB	Lmax	1	80.2 dB
Lpk	1	102.1 dB	Leq	1	52.7 dB

Gráfica de datos de registro



ER-3

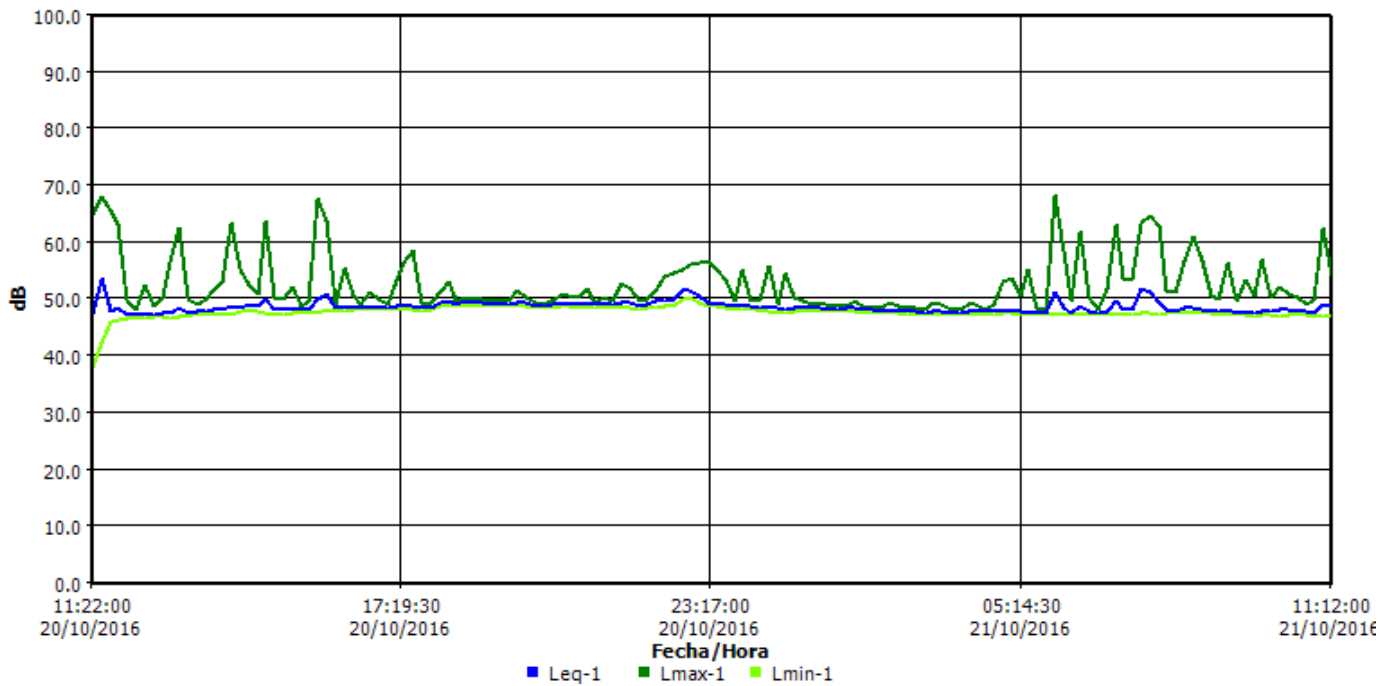
Panel de información

Ubicación Aledaño a Aldea El Fucio
Nombre ER-3
Sesión padre S167
Hora de inicio Jueves, 20 de Octubre de 2016 11:12:00
Hora de paro Viernes, 21 de Octubre de 2016 11:12:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.2 dB	Lmax	1	68.4 dB
Lpk	1	101.1 dB	Leq	1	48.7 dB

Gráfica de datos de registro



ER-2

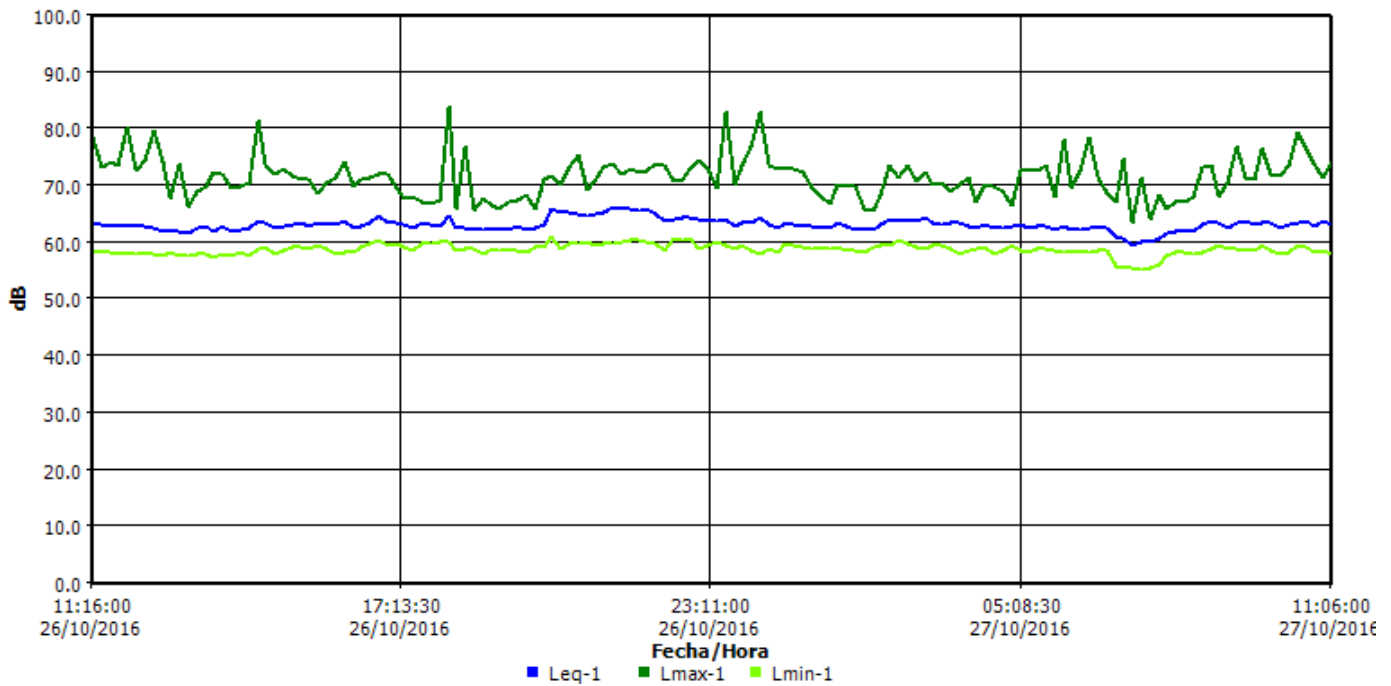
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S250
Hora de inicio Miércoles, 26 de Octubre de 2016 11:06:00
Hora de paro Jueves, 27 de Octubre de 2016 11:06:00
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	C	Respuesta	1	FAST
Lmin	1	55.2 dB	Lmax	1	84 dB
Lpk	1	93.3 dB	Leq	1	63.2 dB

Gráfica de datos de registro



ER-1

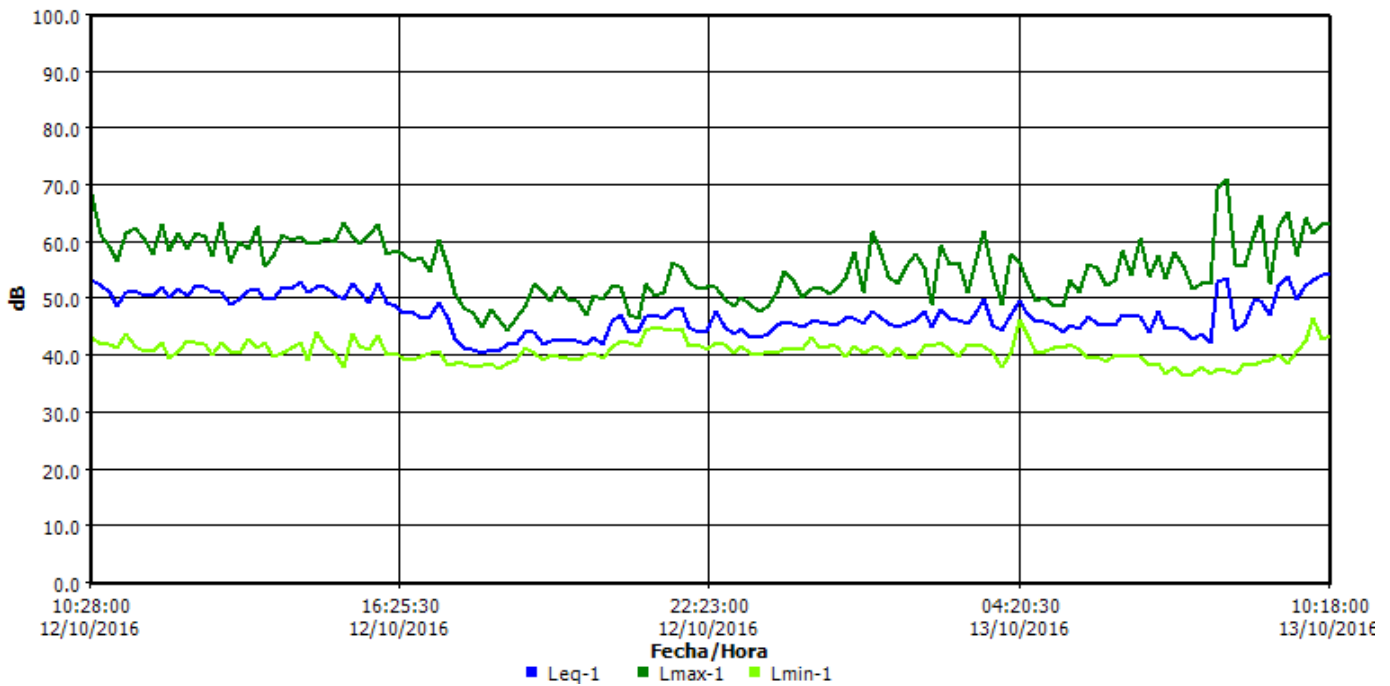
Panel de información

Ubicación Depósito de suelos norte, a inmediaciones de Aldea Los Planes
Nombre ER-1
Sesión padre S164
Hora de inicio Miércoles, 12 de Octubre de 2016 10:18:00
Hora de paro Jueves, 13 de Octubre de 2016 10:18:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	36.6 dB	Lmax	1	71 dB
Lpk	1	94.8 dB	Leq	1	48.6 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 VERIFICACIÓN DE CALIBRACIÓN DE
SONÓMETROS
oct-16**

Certificado Numero: 1935

Características del Equipo

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



Información de la Calibración

Equipo No.:	1	Fecha de Verificación de Calibración:	31/10/2016	m/d/a
Número de Serie :	BGI020002	Vigencia:	30 Días	

Valores Ambientales	
Temperatura °C	21.00
Presión (Pulg. Hg)	24.40
Humedad Relativa (%):	66.00

Lectura de Calibración	114.00	dB
Relectura	114.00	dB

Estado del Equipo: CALIBRADO

Características del Equipo de Calibración

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

Responsables




Luis Rey
 Responsable


Ing. Hasan Zolata
 Supervisor

Falla reportada

Cliente solicita revisión y mantenimiento general.

Observaciones

Ninguna

Diagnostico

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

Trabajos realizados

Mantenimiento de los siguientes componentes:

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

Al finalizar el mantenimiento se efectuaron las siguientes verificaciones:

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



Repuestos utilizados

- Ninguno

Responsables:



Luis Rey
Responsable



Ing. Hasan Zolata
Supervisor

Reporte de sesión

02/11/2016

Información general

Nombre S168_BGI020002_02112016_072903
 Comentarios
 Hora de inicio 28/10/2016 03:41:05 p.m.
 Hora de paro 31/10/2016 02:41:06 p.m.
 Duración: 2.23:00:01
 Tipo de modelo SoundPro DL
 Número de serie BGI020002
 Revisión del firmware del dispositivo R.13F
 Nombre de la compañía
 Descripción
 Ubicación
 Nombre del usuario

Datos de resumen

Descripción	Medidor	Valor	Descripción	Medidor	Valor
Dosis	1	3.9 %	Pdose (1.00:00)	1	1.3 %
Lavg	1	--	Lpk	1	110.1 dB
Leq	1	56.4 dB	Promedio ponderado de tiempo (TWA)	1	65.8 dB
UL, tiempo superior	límite 1	00:00:00	SEL	1	110.4 dB
ProjectedTWA (1.00:00)	1	61.1 dB	Mntime	1	30/10/2016 01:35:50 a.m.
Mxtime	1	31/10/2016 02:40:11 p.m.	PKtime	1	31/10/2016 02:40:10 p.m.
Weighting	1	--	Range Ceiling	1	--
Criterion Level	1	--	ULL	1	--
Dynamic Range	1	--	Exchange Rate	1	--
Response	1	--	Int Threshold	1	--
Alarm Level 1	1	--	AlarmLevel2	1	--
Dosimeter Name	1	--			
Dosis	2	3.8 %	Pdose (1.00:00)	2	0.4 %
Lavg	2	--	Lpk	2	110.1 dB
Leq	2	56.3 dB	Promedio ponderado de tiempo (TWA)	2	65.7 dB

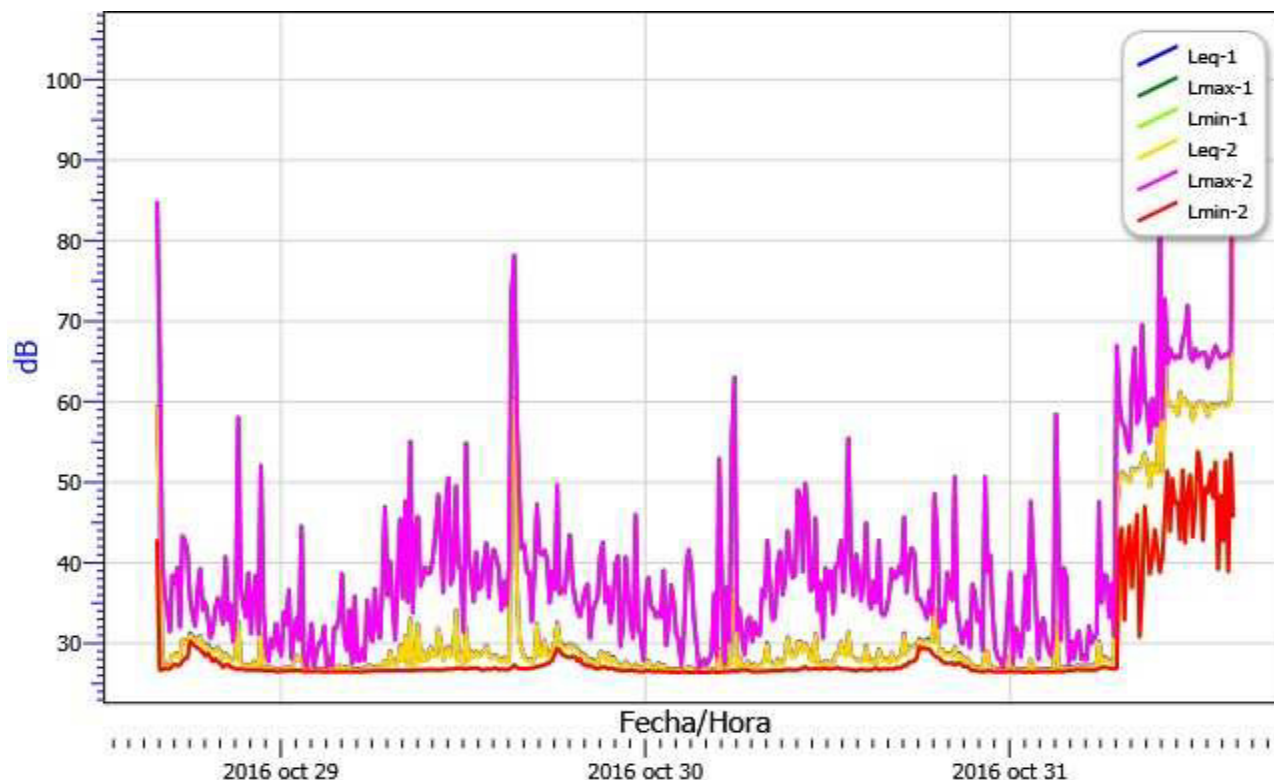
Descripción	Medidor	Valor	Descripción	Medidor	Valor
UL, tiempo superior	límite 2	00:00:00	SEL	2	110.3 dB
ProjectedTWA (1.00:00)	2	56.3 dB	Mntime	2	30/10/2016 01:25:30 a.m.
Mxtime	2	31/10/2016 02:40:11 p.m.	PKtime	2	31/10/2016 02:40:10 p.m.
Ponderación	2	A	Range Ceiling	2	--
Nivel de criterio	2	80 dB	ULL	2	130 dB
Dynamic Range	2	--	Índice de intercambio	2	3 dB
Respuesta	2	SLOW	Umbral de integración	2	100 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	--			

Historial de calibración

Fecha	Acción de calibración	Nivel	Tipo de modelo del calibrador	Número de serie	Fecha de certificación
28/10/2016 12:09:23 p.m.	Calibración	114.0			

Gráfica de datos de registro

S168_BGI020002_02112016_072903: Gráfica de datos de registro - Read Only



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

oct-16

Certificado Numero: 1913

Características del Equipo

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



Descripción:

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

Nota:

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

Información de la Calibración

Equipo No.:	3	Fecha de Verificación de Calibración:	18/10/2016
Número de Serie :	083R	Vigencia:	30 Días

Valores Ambientales	
Temperatura (°C)	20.10
Presión (Pulg.Hg)	24.34
Humedad Relativa (%)	65.00

Parámetro	Lectura Calibración PQ200	Lectura Patrón
Flujo (LPM)	16.70	16.72*
Temperatura Ambiente (°C)	20.52	20.50*
Temperatura Filtro (°C)	20.52	20.50*
Barómetro (Pulg.Hg)	24.35	24.34*

Test de vacio		
SP (cm H ₂ O) ₂	35.00	SP < 33
Pi - Vacio inicial (cm H O)	103.00	ΔP < 5
Pf - Vacio final (cm H O)	102.00	

Estado del Equipo: CALIBRADO

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

Patrón Utilizado

Nombre el Equipo: TriCal Nist
No. Serie 000103-3
Rango de Flujo: 0.1-30 LPM
Rango de Temperatura: -40 a 50 °C
Rango de Presión Barométrica: 400-800 mm Hg
No. Método: RFPS-1298-124
Fecha de Calibración del Patrón Utilizado: 10/05/2016

Responsables:

Luis Rey
Responsable

Ing. Hasan Zolata
Supervisor

Falla reportada

Ciente solicita revisión y mantenimiento general.

Observaciones

Revisar sistema de carga.

Diagnostico

Después de cargar al 100% el equipos, se procedió a correr una prueba de 24 hrs. configurado a 16.7 LPM, encontrando que el equipo no llegó al tiempo programado. Se revisará sistema de carga. Se realizará mantenimiento general de todos sus componentes.

Trabajos realizados

Mantenimiento de los siguientes componentes:

- Bomba de vacio (diaragmas, valvulas, ejes)
- Motor eléctrico
- Sensor de flujo másico
- Conexiones del circuito de vacio
- Sistema mecánico de Porta filtro
- Mantenimiento de tarjeta electrónica.
- Ventilador
- Sensor de temperatura externa y interna
- Barómetro atmosférico
- Pantalla Anti-Radiación

Al finalizar el mantenimiento se efectuaron las siguientes verificaciones:

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

Repuestos utilizados

- Empaque Viton 036.
- Batería 12V17AH.

Responsables:



Luis Rey
Responsable



Ing. Hasan Zolata
Supervisor

BGI PQ200 Air Sampling System

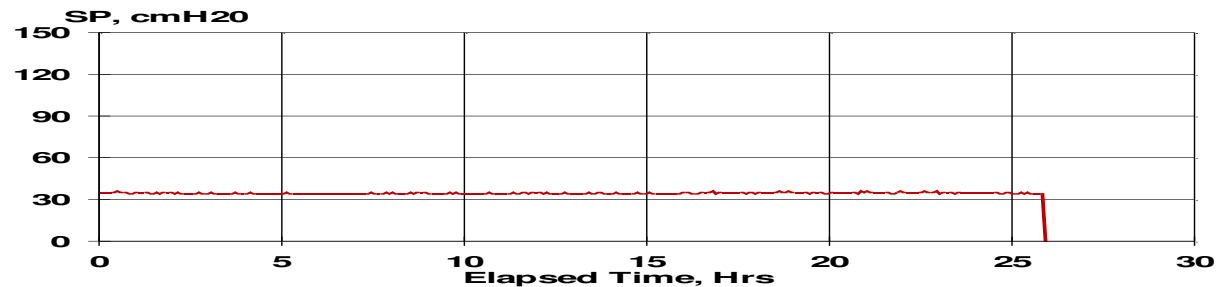
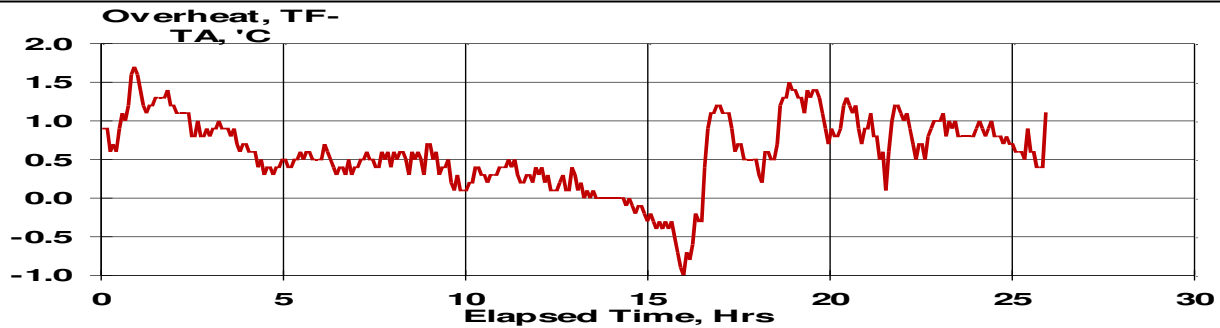
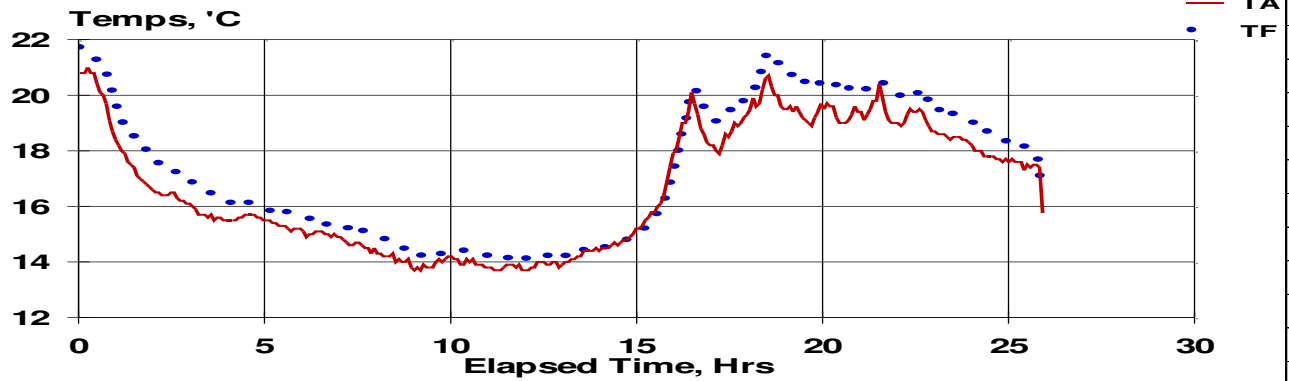
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Job Details:				Job Code: 1			
Job Name:				Site Name: CTA			
Version: 5.62				Station Code: LABEL			
Serial No: 083r				Operators: LREY			
Pump Time: 2688:51				User1:			
Flags:				User2:			

Max	Min	Avg	Units	Timer Information:		Mass Concentration Data:	
BP	621	615	619	mmHg	Date	Time	Filter ID:
TA	21.2	13.5	16.7	°C	dd-mmm	hh:mm:ss	Final Wt: mg
Q	---	---	16.71	Lpm	Start: 16-21-oct	15:50:08	Initial Wt: mg
QCV			0.65	%	Stop: 16-22-oct	17:51:05	Delta Wt: 0.000 mg
Max overheat			25.5	°C	ET: 26:00:00		Total Vol: 26.061 m ³
occured	24-oct 16:23:02						Mass Conc: 0 µg/m ³

Notes 1: BATT nueva

Notes 2:



Hourly Averaged Data							
Date	Start Hour	BP	AmbT	Filt T	Delta T	SP	Flow
yy-dd-mmm	hh:mm:ss	mmHg	°C	°C	°C	cmH2O	aLpm
16-21-oct	15:55:08	618	20.1	21.1	1.1	35	16.72
16-21-oct	16:55:08	618	17.3	18.6	1.3	35	16.71
16-21-oct	17:55:08	619	16.3	17.3	0.9	34	16.70
16-21-oct	18:55:08	619	15.7	16.5	0.8	34	16.71
16-21-oct	19:55:08	620	15.6	16.1	0.5	34	16.71
16-21-oct	20:55:08	620	15.3	15.8	0.5	34	16.71
16-21-oct	21:55:08	620	15.0	15.5	0.4	34	16.72
16-21-oct	22:55:08	620	14.6	15.1	0.5	34	16.72
16-21-oct	23:55:08	619	14.1	14.7	0.5	35	16.72
16-22-oct	00:55:08	619	13.9	14.3	0.3	34	16.72
16-22-oct	01:55:08	619	14.0	14.3	0.3	34	16.73
16-22-oct	02:55:08	619	13.8	14.1	0.3	34	16.72
16-22-oct	03:55:08	619	13.9	14.1	0.2	34	16.71
16-22-oct	04:55:08	619	14.2	14.3	0.1	34	16.71
16-22-oct	05:55:08	620	14.7	14.6	-0.1	34	16.71
16-22-oct	06:55:08	620	15.9	15.5	-0.4	34	16.71
16-22-oct	07:55:08	620	18.9	19.0	0.1	35	16.71
16-22-oct	08:55:08	621	18.5	19.3	0.8	35	16.72
16-22-oct	09:55:08	621	20.0	20.7	0.8	35	16.72
16-22-oct	10:55:08	620	19.3	20.6	1.3	35	16.71
16-22-oct	11:55:08	620	19.4	20.3	1.0	35	16.71
16-22-oct	12:55:08	620	19.5	20.3	0.8	35	16.72
16-22-oct	13:55:08	619	19.2	20.0	0.8	35	16.71
16-22-oct	14:55:08	619	18.5	19.4	0.9	35	16.72
16-22-oct	15:55:08	620	17.9	18.7	0.9	35	16.71
16-22-oct	16:55:08	620	17.5	18.1	0.6	34	16.71

11.5 Informe Original de los Resultados Analíticos obtenidos de muestras de agua del Laboratorio ACZ Laboratories, INC. Correspondiente al Monitoreo de Septiembre de 2016

11.5.1 Muestras de Agua Superficial (SW)

July 08, 2016

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: L31227

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 22, 2016. This project has been assigned to ACZ's project number, L31227. 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 L31227. 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.

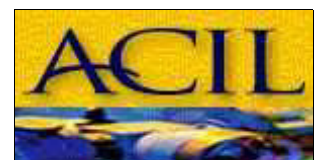
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 07, 2016. 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.

July 08, 2016

Project ID: Escobal

ACZ Project ID: L31227

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 5 miscellaneous samples from Tahoe Resources, Inc. on June 22, 2016. 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 L31227. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with "H" flags (H3, HE), received either after the hold time expired or too close to the hold time.

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L31227-01**
Date Sampled: 06/20/16 09:30
Date Received: 06/22/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 9:01	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 11:43	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/16 13:25	krh
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:24	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:24	spl
Total Hot Plate Digestion	M200.2 ICP-MS								06/28/16 12:12	mfm
Total Hot Plate Digestion	M200.2 ICP								06/28/16 0:20	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L31227-01**
Date Sampled: 06/20/16 09:30
Date Received: 06/22/16
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	06/27/16 23:08	aeb
Aluminum, total	M200.7 ICP	1	1.48			mg/L	0.03	0.2	06/28/16 13:56	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/28/16 12:20	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/29/16 20:05	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0014			mg/L	0.0002	0.001	06/28/16 12:20	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0019			mg/L	0.0002	0.001	06/29/16 20:05	mfm
Barium, dissolved	M200.7 ICP	1	0.101			mg/L	0.003	0.02	06/27/16 23:08	aeb
Barium, total	M200.7 ICP	1	0.110			mg/L	0.003	0.02	06/28/16 13:56	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:08	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:56	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/27/16 23:08	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 13:56	gss
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/27/16 23:08	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:56	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:20	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 20:05	mfm
Calcium, dissolved	M200.7 ICP	1	29.3			mg/L	0.1	0.5	06/27/16 23:08	aeb
Calcium, total	M200.7 ICP	1	28.3			mg/L	0.1	0.5	06/28/16 13:56	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:08	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:56	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:08	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:56	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:08	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:56	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/27/16 23:08	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 13:56	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/27/16 23:08	aeb
Iron, total	M200.7 ICP	1	0.66			mg/L	0.02	0.05	06/28/16 13:56	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:20	mfm
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	06/29/16 20:05	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/27/16 23:08	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 13:56	gss
Magnesium, dissolved	M200.7 ICP	1	3.7			mg/L	0.2	1	06/27/16 23:08	aeb
Magnesium, total	M200.7 ICP	1	3.6			mg/L	0.2	1	06/28/16 13:56	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/27/16 23:08	aeb
Manganese, total	M200.7 ICP	1	0.030			mg/L	0.005	0.03	06/28/16 13:56	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/28/16 14:53	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/08/16 14:36	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/27/16 23:08	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 13:56	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/27/16 23:08	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 13:56	gss
Potassium, dissolved	M200.7 ICP	1	5.1			mg/L	0.2	1	06/27/16 23:08	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L31227-01**
Date Sampled: 06/20/16 09:30
Date Received: 06/22/16
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.1		mg/L	0.2	1	06/28/16 13:56	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/27/16 23:08	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/28/16 13:56	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/28/16 12:20	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/30/16 18:16	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/28/16 12:20	mfm
Silver, total	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	06/29/16 20:05	mfm
Sodium, dissolved	M200.7 ICP	1	8.4		mg/L	0.2	1	06/27/16 23:08	aeb
Sodium, total	M200.7 ICP	1	7.8		mg/L	0.2	1	06/28/16 13:56	gss
Strontium, dissolved	M200.7 ICP	1	0.142		mg/L	0.005	0.03	06/27/16 23:08	aeb
Strontium, total	M200.7 ICP	1	0.136		mg/L	0.005	0.03	06/28/16 13:56	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/28/16 12:20	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 20:05	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/27/16 23:08	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 13:56	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:08	aeb
Titanium, total	M200.7 ICP	1	0.042		mg/L	0.005	0.03	06/28/16 13:56	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/28/16 22:09	mfm
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 20:05	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:08	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/28/16 13:56	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/27/16 23:08	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 13:56	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L31227-01**
Date Sampled: 06/20/16 09:30
Date Received: 06/22/16
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	54.3		*	mg/L	2	20	06/24/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Total Alkalinity		1	54.3		*	mg/L	2	20	06/24/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			9.5			%			07/08/16 0:00	calc
Sum of Anions			1.9			meq/L			07/08/16 0:00	calc
Sum of Cations			2.3			meq/L			07/08/16 0:00	calc
Chemical Oxygen Demand	M410.4	1	13	B	*	mg/L	10	20	06/25/16 13:16	sck
Chloride	SM4500Cl-E	1	7.7		*	mg/L	0.5	2	07/01/16 10:54	spl
Conductivity @25C	SM2510B	1	234		*	umhos/cm	1	10	06/24/16 21:51	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:16	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 15:06	enb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	06/23/16 20:24	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		88			mg/L	0.2	5	07/08/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.90		*	mg/L	0.06	0.3	07/01/16 0:26	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/01/16 14:50	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.8		*	mg/L	0.1	0.5	07/02/16 1:54	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/24/16 0:00	sck
pH measured at		1	23.3		*	C	0.1	0.1	06/24/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.06	0.2	07/08/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.02	0.05	06/29/16 16:25	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.02	0.05	06/22/16 21:25	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	06/29/16 14:52	enb
Residue, Filterable (TDS) @180C	SM2540C	1	216		*	mg/L	10	20	06/24/16 10:50	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	13.0	B	*	mg/L	5	20	06/24/16 15:20	sck
Residue, Total (TS) @ 105C	SM2540B	1	224		*	mg/L	10	20	06/22/16 15:46	sck
Sulfate	D516-02/-07 - Turbidimetric	1	28.1		*	mg/L	1	5	07/05/16 14:09	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 13:51	emk
TDS (calculated)	Calculation		116			mg/L			07/08/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.86						07/08/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L31227-02**
Date Sampled: 06/20/16 08:30
Date Received: 06/22/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 9:16	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 11:51	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/16 13:36	krh
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:33	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:33	spl
Total Hot Plate Digestion	M200.2 ICP								06/28/16 1:01	gss
Total Hot Plate Digestion	M200.2 ICP-MS								06/28/16 12:23	mfm

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L31227-02**
Date Sampled: 06/20/16 08:30
Date Received: 06/22/16
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	06/27/16 23:24	aeb
Aluminum, total	M200.7 ICP	1	0.22			mg/L	0.03	0.2	06/28/16 13:59	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0090			mg/L	0.0004	0.002	06/28/16 12:35	mfm
Antimony, total	M200.8 ICP-MS	1	0.0086			mg/L	0.0004	0.002	06/29/16 20:08	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0085			mg/L	0.0002	0.001	06/28/16 12:35	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0084			mg/L	0.0002	0.001	06/29/16 20:08	mfm
Barium, dissolved	M200.7 ICP	1	0.114			mg/L	0.003	0.02	06/27/16 23:24	aeb
Barium, total	M200.7 ICP	1	0.111			mg/L	0.003	0.02	06/28/16 13:59	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:24	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:59	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/27/16 23:24	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 13:59	gss
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	06/27/16 23:24	aeb
Boron, total	M200.7 ICP	1	0.08			mg/L	0.01	0.05	06/28/16 13:59	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:35	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 20:08	mfm
Calcium, dissolved	M200.7 ICP	1	263			mg/L	0.1	0.5	06/27/16 23:24	aeb
Calcium, total	M200.7 ICP	1	259			mg/L	0.1	0.5	06/28/16 13:59	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:24	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:59	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:24	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:59	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:24	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 13:59	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/27/16 23:24	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 13:59	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/27/16 23:24	aeb
Iron, total	M200.7 ICP	1	0.07			mg/L	0.02	0.05	06/28/16 13:59	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	06/28/16 12:35	mfm
Lead, total	M200.8 ICP-MS	1	0.0018			mg/L	0.0001	0.0005	06/29/16 20:08	mfm
Lithium, dissolved	M200.7 ICP	1	0.056			mg/L	0.008	0.04	06/27/16 23:24	aeb
Lithium, total	M200.7 ICP	1	0.055			mg/L	0.008	0.04	06/28/16 13:59	gss
Magnesium, dissolved	M200.7 ICP	1	16			mg/L	0.2	1	06/27/16 23:24	aeb
Magnesium, total	M200.7 ICP	1	15.6			mg/L	0.2	1	06/28/16 13:59	gss
Manganese, dissolved	M200.7 ICP	1	0.161			mg/L	0.005	0.03	06/27/16 23:24	aeb
Manganese, total	M200.7 ICP	1	0.162			mg/L	0.005	0.03	06/28/16 13:59	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/28/16 15:03	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/08/16 14:38	pta
Molybdenum, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	06/27/16 23:24	aeb
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	06/28/16 13:59	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/27/16 23:24	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 13:59	gss
Potassium, dissolved	M200.7 ICP	1	9.9			mg/L	0.2	1	06/27/16 23:24	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L31227-02**
Date Sampled: 06/20/16 08:30
Date Received: 06/22/16
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	9.7		mg/L	0.2	1	06/28/16 13:59	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/27/16 23:24	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/28/16 13:59	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	06/28/16 12:35	mfm
Selenium, total	M200.8 ICP-MS	1	0.0008		mg/L	0.0001	0.0003	06/30/16 18:19	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/28/16 12:35	mfm
Silver, total	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	06/29/16 20:08	mfm
Sodium, dissolved	M200.7 ICP	1	61		mg/L	0.2	1	06/27/16 23:24	aeb
Sodium, total	M200.7 ICP	1	58.4		mg/L	0.2	1	06/28/16 13:59	gss
Strontium, dissolved	M200.7 ICP	1	2.640		mg/L	0.005	0.03	06/27/16 23:24	aeb
Strontium, total	M200.7 ICP	1	2.600		mg/L	0.005	0.03	06/28/16 13:59	gss
Thallium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	06/28/16 12:35	mfm
Thallium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	06/29/16 20:08	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/27/16 23:24	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 13:59	gss
Titanium, dissolved	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	06/27/16 23:24	aeb
Titanium, total	M200.7 ICP	1	0.014	B	mg/L	0.005	0.03	06/28/16 13:59	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	06/28/16 22:12	mfm
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	06/29/16 20:08	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:24	aeb
Vanadium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	06/28/16 13:59	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/27/16 23:24	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 13:59	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L31227-02**
Date Sampled: 06/20/16 08:30
Date Received: 06/22/16
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	88.7		*	mg/L	2	20	06/24/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Total Alkalinity		1	88.7		*	mg/L	2	20	06/24/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			07/08/16 0:00	calc
Sum of Anions			18			meq/L			07/08/16 0:00	calc
Sum of Cations			18			meq/L			07/08/16 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	06/25/16 13:23	sck
Chloride	SM4500Cl-E	1	55.9		*	mg/L	0.5	2	07/01/16 10:54	spl
Conductivity @25C	SM2510B	1	1440		*	umhos/cm	1	10	06/24/16 22:01	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 11:55	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 14:58	enb
Fluoride	SM4500F-C	1	0.93		*	mg/L	0.05	0.3	06/23/16 20:27	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		723			mg/L	0.2	5	07/08/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.44		*	mg/L	0.02	0.1	07/01/16 0:04	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/01/16 14:52	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	07/02/16 1:55	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/24/16 0:00	sck
pH measured at		1	23.3		*	C	0.1	0.1	06/24/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	07/08/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	06/29/16 16:06	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.02	0.05	06/22/16 21:28	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	06/29/16 14:53	enb
Residue, Filterable (TDS) @180C	SM2540C	1	1240		*	mg/L	10	20	06/24/16 10:53	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/24/16 15:23	sck
Residue, Total (TS) @ 105C	SM2540B	1	1240		*	mg/L	10	20	06/22/16 15:48	sck
Sulfate	D516-02/-07 - Turbidimetric	20	685		*	mg/L	20	100	07/05/16 15:34	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 14:20	emk
TDS (calculated)	Calculation		1150			mg/L			07/08/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.08						07/08/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L31227-03**
Date Sampled: 06/20/16 07:45
Date Received: 06/22/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 9:24	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 11:58	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/16 13:47	krh
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:43	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:43	spl
Total Hot Plate Digestion	M200.2 ICP-MS								06/28/16 12:34	mfm
Total Hot Plate Digestion	M200.2 ICP								06/28/16 1:43	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L31227-03**
Date Sampled: 06/20/16 07:45
Date Received: 06/22/16
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.13	B		mg/L	0.03	0.2	06/27/16 23:27	aeb
Aluminum, total	M200.7 ICP	1	4.69			mg/L	0.03	0.2	06/28/16 14:02	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0004	0.002	06/28/16 12:38	mfm
Antimony, total	M200.8 ICP-MS	1	0.0022			mg/L	0.0004	0.002	06/29/16 20:11	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0071			mg/L	0.0002	0.001	06/28/16 12:38	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0096			mg/L	0.0002	0.001	06/29/16 20:11	mfm
Barium, dissolved	M200.7 ICP	1	0.132			mg/L	0.003	0.02	06/27/16 23:27	aeb
Barium, total	M200.7 ICP	1	0.158			mg/L	0.003	0.02	06/28/16 14:02	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:27	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:02	gss
Bismuth, dissolved	M200.7 ICP	1	0.04	B	*	mg/L	0.04	0.2	06/27/16 23:27	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 14:02	gss
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	06/27/16 23:27	aeb
Boron, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/28/16 14:02	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:38	mfm
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/29/16 20:11	mfm
Calcium, dissolved	M200.7 ICP	1	98.9			mg/L	0.1	0.5	06/27/16 23:27	aeb
Calcium, total	M200.7 ICP	1	92.2			mg/L	0.1	0.5	06/28/16 14:02	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:27	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:02	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:27	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:02	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:27	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:02	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/27/16 23:27	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 14:02	gss
Iron, dissolved	M200.7 ICP	1	0.07			mg/L	0.02	0.05	06/27/16 23:27	aeb
Iron, total	M200.7 ICP	1	2.0			mg/L	0.02	0.05	06/28/16 14:02	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/28/16 12:38	mfm
Lead, total	M200.8 ICP-MS	1	0.0031			mg/L	0.0001	0.0005	06/29/16 20:11	mfm
Lithium, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.008	0.04	06/27/16 23:27	aeb
Lithium, total	M200.7 ICP	1	0.013	B		mg/L	0.008	0.04	06/28/16 14:02	gss
Magnesium, dissolved	M200.7 ICP	1	7.7			mg/L	0.2	1	06/27/16 23:27	aeb
Magnesium, total	M200.7 ICP	1	7.3			mg/L	0.2	1	06/28/16 14:02	gss
Manganese, dissolved	M200.7 ICP	1	0.205			mg/L	0.005	0.03	06/27/16 23:27	aeb
Manganese, total	M200.7 ICP	1	0.262			mg/L	0.005	0.03	06/28/16 14:02	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/28/16 15:05	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/08/16 14:40	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/27/16 23:27	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 14:02	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/27/16 23:27	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 14:02	gss
Potassium, dissolved	M200.7 ICP	1	7.5			mg/L	0.2	1	06/27/16 23:27	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L31227-03**
Date Sampled: 06/20/16 07:45
Date Received: 06/22/16
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	7.7			mg/L	0.2	1	06/28/16 14:02	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/27/16 23:27	aeb
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 14:02	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	06/28/16 12:38	mfm
Selenium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	06/30/16 18:27	mfm
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/28/16 12:38	mfm
Silver, total	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	06/29/16 20:11	mfm
Sodium, dissolved	M200.7 ICP	1	24.8			mg/L	0.2	1	06/27/16 23:27	aeb
Sodium, total	M200.7 ICP	1	22.4			mg/L	0.2	1	06/28/16 14:02	gss
Strontium, dissolved	M200.7 ICP	1	0.791			mg/L	0.005	0.03	06/27/16 23:27	aeb
Strontium, total	M200.7 ICP	1	0.740			mg/L	0.005	0.03	06/28/16 14:02	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:38	mfm
Thallium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/29/16 20:11	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/27/16 23:27	aeb
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	06/28/16 14:02	gss
Titanium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	06/27/16 23:27	aeb
Titanium, total	M200.7 ICP	1	0.111			mg/L	0.005	0.03	06/28/16 14:02	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	06/28/16 22:15	mfm
Uranium, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/29/16 20:11	mfm
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/27/16 23:27	aeb
Vanadium, total	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	06/28/16 14:02	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:27	aeb
Zinc, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 14:02	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L31227-03**

Date Sampled: 06/20/16 07:45

Date Received: 06/22/16

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	77.3		*	mg/L	2	20	06/24/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Total Alkalinity		1	77.3		*	mg/L	2	20	06/24/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.7			%			07/08/16 0:00	calc
Sum of Anions			6.8			meq/L			07/08/16 0:00	calc
Sum of Cations			6.9			meq/L			07/08/16 0:00	calc
Chemical Oxygen Demand	M410.4	1	27		*	mg/L	10	20	06/25/16 13:30	sck
Chloride	SM4500Cl-E	1	22.2		*	mg/L	0.5	2	07/01/16 10:54	spl
Conductivity @25C	SM2510B	1	633		*	umhos/cm	1	10	06/24/16 22:09	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 11:56	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 14:59	enb
Fluoride	SM4500F-C	1	0.35		*	mg/L	0.05	0.3	06/23/16 20:43	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		279			mg/L	0.2	5	07/08/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.12		*	mg/L	0.02	0.1	07/01/16 0:10	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1	0.14	B	*	mg/L	0.05	0.2	07/01/16 14:53	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.3		*	mg/L	0.1	0.5	07/02/16 1:56	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/24/16 0:00	sck
pH measured at		1	23.4		*	C	0.1	0.1	06/24/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.31			mg/L	0.06	0.2	07/08/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.10		*	mg/L	0.02	0.05	06/29/16 16:09	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.02	0.05	06/22/16 21:29	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.16		*	mg/L	0.02	0.05	06/29/16 14:56	enb
Residue, Filterable (TDS) @180C	SM2540C	1	490		*	mg/L	10	20	06/24/16 10:56	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	82.0		*	mg/L	5	20	06/24/16 15:26	sck
Residue, Total (TS) @ 105C	SM2540B	1	568		*	mg/L	10	20	06/22/16 15:50	sck
Sulfate	D516-02/-07 - Turbidimetric	10	221		*	mg/L	10	50	07/05/16 14:22	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 14:49	emk
TDS (calculated)	Calculation		431			mg/L			07/08/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.14						07/08/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L31227-04**
Date Sampled: 06/20/16 07:05
Date Received: 06/22/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 9:32	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 12:06	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/16 13:59	krh
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:52	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 13:52	spl
Total Hot Plate Digestion	M200.2 ICP-MS								06/28/16 13:06	mfm
Total Hot Plate Digestion	M200.2 ICP								06/28/16 2:24	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L31227-04**
Date Sampled: 06/20/16 07:05
Date Received: 06/22/16
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	06/27/16 23:30	aeb
Aluminum, total	M200.7 ICP	1	7.68		*	mg/L	0.03	0.2	06/28/16 14:05	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	06/28/16 12:41	mfm
Antimony, total	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	06/29/16 20:26	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0016			mg/L	0.0002	0.001	06/28/16 12:41	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0036			mg/L	0.0002	0.001	06/29/16 20:26	mfm
Barium, dissolved	M200.7 ICP	1	0.095			mg/L	0.003	0.02	06/27/16 23:30	aeb
Barium, total	M200.7 ICP	1	0.146			mg/L	0.003	0.02	06/28/16 14:05	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:30	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:05	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/27/16 23:30	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 14:05	gss
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/27/16 23:30	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:05	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:41	mfm
Cadmium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/29/16 20:26	mfm
Calcium, dissolved	M200.7 ICP	1	18.1			mg/L	0.1	0.5	06/27/16 23:30	aeb
Calcium, total	M200.7 ICP	1	17.9			mg/L	0.1	0.5	06/28/16 14:05	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:30	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:05	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:30	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:05	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:30	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:05	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/27/16 23:30	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 14:05	gss
Iron, dissolved	M200.7 ICP	1	0.08			mg/L	0.02	0.05	06/27/16 23:30	aeb
Iron, total	M200.7 ICP	1	3.44			mg/L	0.02	0.05	06/28/16 14:05	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	06/28/16 12:41	mfm
Lead, total	M200.8 ICP-MS	1	0.0032			mg/L	0.0001	0.0005	06/29/16 20:26	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/27/16 23:30	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 14:05	gss
Magnesium, dissolved	M200.7 ICP	1	3.2			mg/L	0.2	1	06/27/16 23:30	aeb
Magnesium, total	M200.7 ICP	1	3.3			mg/L	0.2	1	06/28/16 14:05	gss
Manganese, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	06/27/16 23:30	aeb
Manganese, total	M200.7 ICP	1	0.064			mg/L	0.005	0.03	06/28/16 14:05	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/28/16 15:07	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/08/16 14:42	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/27/16 23:30	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 14:05	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/27/16 23:30	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 14:05	gss
Potassium, dissolved	M200.7 ICP	1	4.8			mg/L	0.2	1	06/27/16 23:30	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L31227-04**
Date Sampled: 06/20/16 07:05
Date Received: 06/22/16
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.3		mg/L	0.2	1	06/28/16 14:05	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/27/16 23:30	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/28/16 14:05	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/28/16 12:41	mfm
Selenium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	06/29/16 20:26	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/28/16 12:41	mfm
Silver, total	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	06/29/16 20:26	mfm
Sodium, dissolved	M200.7 ICP	1	8		mg/L	0.2	1	06/27/16 23:30	aeb
Sodium, total	M200.7 ICP	1	7.6		mg/L	0.2	1	06/28/16 14:05	gss
Strontium, dissolved	M200.7 ICP	1	0.124		mg/L	0.005	0.03	06/27/16 23:30	aeb
Strontium, total	M200.7 ICP	1	0.125		mg/L	0.005	0.03	06/28/16 14:05	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/28/16 12:41	mfm
Thallium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	06/29/16 20:26	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/27/16 23:30	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 14:05	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:30	aeb
Titanium, total	M200.7 ICP	1	0.154		mg/L	0.005	0.03	06/28/16 14:05	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/28/16 22:24	mfm
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	06/29/16 20:26	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:30	aeb
Vanadium, total	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	06/28/16 14:05	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/27/16 23:30	aeb
Zinc, total	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	06/28/16 14:05	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW7-E

ACZ Sample ID: **L31227-04**
 Date Sampled: 06/20/16 07:05
 Date Received: 06/22/16
 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	38.4		*	mg/L	2	20	06/24/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Total Alkalinity		1	38.4		*	mg/L	2	20	06/24/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			6.3			%			07/08/16 0:00	calc
Sum of Anions			1.5			meq/L			07/08/16 0:00	calc
Sum of Cations			1.7			meq/L			07/08/16 0:00	calc
Chemical Oxygen Demand	M410.4	1	19	B	*	mg/L	10	20	06/25/16 13:51	sck
Chloride	SM4500Cl-E	1	5.7		*	mg/L	0.5	2	07/01/16 10:54	spl
Conductivity @25C	SM2510B	1	180		*	umhos/cm	1	10	06/24/16 22:27	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:17	enb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 15:00	enb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	06/28/16 13:09	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		58			mg/L	0.2	5	07/08/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.41		*	mg/L	0.02	0.1	07/01/16 0:11	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/01/16 14:55	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	07/02/16 1:57	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/24/16 0:00	sck
pH measured at		1	23.7		*	C	0.1	0.1	06/24/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.06	0.2	07/08/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	06/29/16 16:10	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.02	0.05	06/22/16 21:31	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.11		*	mg/L	0.02	0.05	06/29/16 14:57	enb
Residue, Filterable (TDS) @180C	SM2540C	1	246		*	mg/L	10	20	06/24/16 10:58	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	30.0		*	mg/L	5	20	06/24/16 15:28	sck
Residue, Total (TS) @ 105C	SM2540B	1	282		*	mg/L	10	20	06/22/16 15:52	sck
Sulfate	D516-02/-07 - Turbidimetric	1	27.4		*	mg/L	1	5	07/05/16 14:09	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 14:59	emk
TDS (calculated)	Calculation		91.1			mg/L			07/08/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		2.70						07/08/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L31227-05**
Date Sampled: 06/20/16 12:00
Date Received: 06/22/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 9:40	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 12:14	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/16 14:33	krh
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 14:01	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/28/16 14:01	spl
Total Hot Plate Digestion	M200.2 ICP								06/28/16 3:06	gss
Total Hot Plate Digestion	M200.2 ICP-MS								06/28/16 13:17	mfm

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L31227-05**
Date Sampled: 06/20/16 12:00
Date Received: 06/22/16
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	06/27/16 23:33	aeb
Aluminum, total	M200.7 ICP	1		U	*	mg/L	0.03	0.2	06/28/16 14:08	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/28/16 12:45	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/29/16 20:29	mfm
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	06/28/16 12:45	mfm
Arsenic, total	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	06/29/16 20:29	mfm
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	06/27/16 23:33	aeb
Barium, total	M200.7 ICP	1		U		mg/L	0.003	0.02	06/28/16 14:08	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:33	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:08	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/27/16 23:33	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 14:08	gss
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:33	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:08	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:45	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 20:29	mfm
Calcium, dissolved	M200.7 ICP	1		U		mg/L	0.1	0.5	06/27/16 23:33	aeb
Calcium, total	M200.7 ICP	1		U		mg/L	0.1	0.5	06/28/16 14:08	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:33	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:08	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:33	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:08	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/27/16 23:33	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 14:08	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/27/16 23:33	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 14:08	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/27/16 23:33	aeb
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	06/28/16 14:08	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/28/16 12:45	mfm
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 20:29	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/27/16 23:33	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 14:08	gss
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/27/16 23:33	aeb
Magnesium, total	M200.7 ICP	1		U		mg/L	0.2	1	06/28/16 14:08	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/27/16 23:33	aeb
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	06/28/16 14:08	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/28/16 15:08	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/08/16 14:44	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/27/16 23:33	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 14:08	gss
Nickel, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	06/27/16 23:33	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 14:08	gss
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/27/16 23:33	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L31227-05**
Date Sampled: 06/20/16 12:00
Date Received: 06/22/16
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1		U	mg/L	0.2	1	06/28/16 14:08	gss
Scandium, dissolved	M200.7 ICP	1		U	mg/L	0.1	0.5	06/27/16 23:33	aeb
Scandium, total	M200.7 ICP	1		U	mg/L	0.1	0.5	06/28/16 14:08	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/28/16 12:45	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/29/16 20:29	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/28/16 12:45	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/29/16 20:29	mfm
Sodium, dissolved	M200.7 ICP	1		U	mg/L	0.2	1	06/27/16 23:33	aeb
Sodium, total	M200.7 ICP	1		U	mg/L	0.2	1	06/28/16 14:08	gss
Strontium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:33	aeb
Strontium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/28/16 14:08	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/28/16 12:45	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 20:29	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/27/16 23:33	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 14:08	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:33	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/28/16 14:08	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/28/16 22:33	mfm
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 20:29	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	06/27/16 23:33	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/28/16 14:08	gss
Zinc, dissolved	M200.7 ICP	1	0.02	B	mg/L	0.01	0.05	06/27/16 23:33	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 14:08	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L31227-05**
Date Sampled: 06/20/16 12:00
Date Received: 06/22/16
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	06/24/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Total Alkalinity		1		U	*	mg/L	2	20	06/24/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			07/08/16 0:00	calc
Sum of Anions			N/A			meq/L			07/08/16 0:00	calc
Sum of Cations				U		meq/L			07/08/16 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	06/25/16 13:58	sck
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	07/01/16 10:54	spl
Conductivity @25C	SM2510B	1	1.5	B	*	umhos/cm	1	10	06/24/16 22:35	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 11:58	enb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 15:01	enb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	06/28/16 13:25	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation			U		mg/L	0.2	5	07/08/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	07/01/16 0:12	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/01/16 14:56	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	07/02/16 2:01	pjb
pH (lab)	SM4500H+ B									
pH		1	6.4	H	*	units	0.1	0.1	06/24/16 0:00	sck
pH measured at		1	23.8		*	C	0.1	0.1	06/24/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	07/08/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/29/16 16:11	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/22/16 21:32	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/29/16 14:58	enb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	06/24/16 11:04	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/24/16 15:34	sck
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	06/22/16 15:56	sck
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	07/05/16 14:09	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 15:09	emk
TDS (calculated)	Calculation		0.02			mg/L			07/08/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		n/a						07/08/16 0:00	calc

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31227-01	WG405506	Silver, total	M200.8 ICP-MS	BF	Target analyte in prep / method blank at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG405230	Bicarbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405262	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405589	Chloride	SM4500CI-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405409	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405195	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG405230	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405580	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405608	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405637	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405490	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG405124	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405489	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405225	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405253	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405114	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405678	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.
	WG405174	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31227-02	WG405506	Silver, total	M200.8 ICP-MS	BF	Target analyte in prep / method blank at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG405230	Bicarbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405262	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405589	Chloride	SM4500CI-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405409	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405195	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG405230	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405580	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405608	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405637	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405490	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG405124	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405489	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405225	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405253	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405114	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405678	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.
	WG405174	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31227-03	WG405506	Silver, total	M200.8 ICP-MS	BF	Target analyte in prep / method blank at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG405230	Bicarbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405262	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405589	Chloride	SM4500CI-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405409	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405195	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG405230	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405580	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405608	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405637	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405490	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG405124	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405489	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405225	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405253	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405114	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405678	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.
	WG405174	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31227-04	WG405385	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405506	Silver, total	M200.8 ICP-MS	BF	Target analyte in prep / method blank at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG405230	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.
	WG405262	Chemical Oxygen Demand	M410.4 M410.4	Q6	Sample was received above recommended temperature.
	WG405589	Chloride	SM4500CI-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405409	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405580	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405608	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
WG405637	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.	
		M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).	
WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.	
	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG405490	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG405124	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).	
WG405489	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405225	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405253	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405114	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405678	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.
	WG405174	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31227-05	WG405385	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405506	Silver, total	M200.8 ICP-MS	BF	Target analyte in prep / method blank at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
	WG405230	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.
	WG405262	Chemical Oxygen Demand	M410.4 M410.4	Q6	Sample was received above recommended temperature.
	WG405589	Chloride	SM4500CI-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405409	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405230	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405580	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
	WG405608	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).
	WG405637	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG405230	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405490	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG405124	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.
	WG405489	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).	
WG405225	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG405253	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 concentration of the duplicated sample is too low for accurate evaluation ($<$ 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405114	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405678	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.
	WG405174	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L31227-01**

Date Sampled: 06/20/16 9:30

Date Received: 06/22/16

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG405329

Analyst: mmn

Extract Date: 06/23/16 14:15

Analysis Date: 06/28/16 3:17

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.1	*	mg/L	0.1	0.6
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	81.4		1.1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L31227-01**

Date Sampled: 06/20/16 9:30

Date Received: 06/22/16

Sample Matrix: Surface Water

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

Extract Method:

Workgroup: WG405527

Analyst: id

Extract Date:

Analysis Date: 06/30/16 13:31

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.1	*	mg/L	2.2	11

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L31227-02**

Date Sampled: 06/20/16 8:30

Date Received: 06/22/16

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG405329

Analyst: mmn

Extract Date: 06/23/16 14:18

Analysis Date: 06/28/16 3:44

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	88.5		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L31227-02**

Date Sampled: 06/20/16 8:30

Date Received: 06/22/16

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

Extract Method:

Workgroup: WG405527

Analyst: id

Extract Date:

Analysis Date: 06/30/16 13:48

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.1	*	mg/L	2.2	11

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L31227-03**

Date Sampled: 06/20/16 7:45

Date Received: 06/22/16

Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG405329

Analyst: mmn

Extract Date: 06/23/16 14:21

Analysis Date: 06/28/16 4:11

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	81.3		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L31227-03**

Date Sampled: 06/20/16 7:45

Date Received: 06/22/16

Sample Matrix: Surface Water

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

Extract Method:

Workgroup: WG405527

Analyst: id

Extract Date:

Analysis Date: 06/30/16 14:05

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.1	*	mg/L	2.2	11

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L31227-04**

Date Sampled: 06/20/16 7:05

Date Received: 06/22/16

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG405329

Analyst: mmn

Extract Date: 06/23/16 14:23

Analysis Date: 06/28/16 4:39

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.2		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L31227-04**

Date Sampled: 06/20/16 7:05

Date Received: 06/22/16

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

Extract Method:

Workgroup: WG405527

Analyst: id

Extract Date:

Analysis Date: 06/30/16 14:22

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.1	*	mg/L	2.2	11

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L31227-05**
Date Sampled: 06/20/16 12:00
Date Received: 06/22/16
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405329Analyst: mmn
Extract Date: 06/23/16 14:26
Analysis Date: 06/28/16 5:06

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	87.6		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L31227-05**
Date Sampled: 06/20/16 12:00
Date Received: 06/22/16
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG405527

Analyst: id

Extract Date:

Analysis Date: 06/30/16 14:39

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

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit unless omitted or equal to the PQL (see comment #4) Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

ACZ Project ID: **L31227**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31227-01	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405527	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31227-02	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405527	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31227-03	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405527	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31227-04	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405527	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31227-05	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405527	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L31227**

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

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L31227
 Date Received: 06/22/2016 10:03
 Received By: kmo
 Date Printed: 6/23/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form 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 form 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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
4558	15.7	<=6.0	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: L31227
Date Received: 06/22/2016 10:03
Received By: kmo
Date Printed: 6/23/2016

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. 631227

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard Los Proceres 19 calle 24-69 zona 10
Impresaria Zona Proceres Torre IV oficina 1406
Telephone: (502) 595 5248

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns for # of Containers and analysis results. Includes handwritten 'SW' and checkmarks.

Table with columns for SAMPLE IDENTIFICATION, DATE:TIME, and Matrix. Includes handwritten entries like SW1-E, SW2-E, SW4-E.

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.

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





Laboratories, Inc.

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@samafad.com

Address: Paseo los Pinos 18 calle 24-69 zona 10
Empresarial Zona Paraiso 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@samafad.com

Address: _____
 Telephone: _____

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*Sampler's Signature: _____ *I attest to the authenticity and validity of this sample. I understand that 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 #:	PO#:	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	SAMPLE IDENTIFICATION	DATE-TIME	Matrix	# of Containers	SW	total CN								
<u>Water Quality</u>	<u>Escobal</u>		<input type="checkbox"/>	<u>SW9-E</u>	<u>20/06/16 07:05</u>	<u>SW</u>	<u>10</u>	<u>/</u>	<u>/</u>								
				<u>SW10-E</u>	<u>20/06/16 12:00</u>	<u>SW</u>	<u>10</u>	<u>/</u>	<u>/</u>								
				<u>WW14</u>	<u>20/06/16 03:00-12:00</u>	<u>WW</u>	<u>10</u>	<u>/</u>	<u>/</u>								
				<u>WW9</u>	<u>19/06/16 08:25</u>	<u>WW</u>	<u>1</u>	<u>/</u>	<u>/</u>								
				<u>WW14</u>	<u>20/06/16 03:00-12:00</u>	<u>WW</u>	<u>1</u>	<u>/</u>	<u>/</u>								

COPY

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: Report results of first 5 samples in both COCs.
 *Please Do not include WW14 and WW9.

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

RELINQUISHED BY:	DATE-TIME	RECEIVED BY:	DATE-TIME
<u>[Signature]</u>	<u>15:30</u> <u>20-06-2016</u>	<u>[Signature]</u>	<u>20.6.16 15:30</u>



Guatemala June 20th 2016

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.

July 11, 2016

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: L31248

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 23, 2016. This project has been assigned to ACZ's project number, L31248. 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 L31248. 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.

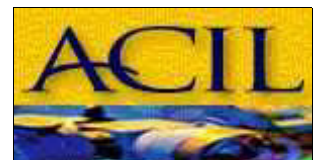
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 10, 2016. 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.

July 11, 2016

Project ID: Escobal

ACZ Project ID: L31248

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 miscellaneous samples from Tahoe Resources, Inc. on June 23, 2016. 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 L31248. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with "H" flags (H3, HE), received either after the hold time expired or too close to the hold time.

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L31248-01**
Date Sampled: 06/21/16 10:25
Date Received: 06/23/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 9:48	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 14:53	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 12:09	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:10	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 10:54	enb
Total Hot Plate Digestion	M200.2 ICP								06/29/16 10:55	gss
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 12:40	mfm

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L31248-01**

Date Sampled: 06/21/16 10:25

Date Received: 06/23/16

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.09	B		mg/L	0.03	0.2	06/28/16 18:50	gss
Aluminum, total	M200.7 ICP	1	2.81		*	mg/L	0.03	0.2	06/30/16 15:36	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	06/30/16 16:42	mfm
Antimony, total	M200.8 ICP-MS	1	0.0005	B	*	mg/L	0.0004	0.002	06/29/16 22:03	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0092			mg/L	0.0002	0.001	06/30/16 9:48	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0104			mg/L	0.0002	0.001	06/29/16 22:03	mfm
Barium, dissolved	M200.7 ICP	1	0.112			mg/L	0.003	0.02	06/29/16 17:06	gss
Barium, total	M200.7 ICP	1	0.140			mg/L	0.003	0.02	06/30/16 15:36	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 18:50	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:36	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 18:50	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 15:36	gss
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/29/16 17:06	gss
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/30/16 15:36	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 9:48	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 22:03	mfm
Calcium, dissolved	M200.7 ICP	1	29		*	mg/L	0.1	0.5	06/28/16 18:50	gss
Calcium, total	M200.7 ICP	1	30.5			mg/L	0.1	0.5	06/30/16 15:36	gss
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 18:50	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:36	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 18:50	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:36	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 18:50	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:36	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 18:50	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 15:36	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/29/16 17:06	gss
Iron, total	M200.7 ICP	1	1.19			mg/L	0.02	0.05	06/30/16 15:36	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 16:42	mfm
Lead, total	M200.8 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	06/29/16 22:03	mfm
Lithium, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.008	0.04	06/28/16 18:50	gss
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:36	gss
Magnesium, dissolved	M200.7 ICP	1	2.6			mg/L	0.2	1	06/28/16 18:50	gss
Magnesium, total	M200.7 ICP	1	2.8			mg/L	0.2	1	06/30/16 15:36	gss
Manganese, dissolved	M200.7 ICP	1	0.091			mg/L	0.005	0.03	06/28/16 18:50	gss
Manganese, total	M200.7 ICP	1	0.130			mg/L	0.005	0.03	06/30/16 15:36	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:33	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:06	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 18:50	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/30/16 15:36	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 18:50	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:36	gss
Potassium, dissolved	M200.7 ICP	1	5			mg/L	0.2	1	06/28/16 18:50	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW3-E

ACZ Sample ID: **L31248-01**

Date Sampled: 06/21/16 10:25

Date Received: 06/23/16

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.4		mg/L	0.2	1	06/30/16 15:36	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/28/16 18:50	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/30/16 15:36	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/05/16 18:03	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/29/16 22:03	mfm
Silver, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.00005	0.0003	06/30/16 9:48	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/29/16 22:03	mfm
Sodium, dissolved	M200.7 ICP	1	10.5		mg/L	0.2	1	06/28/16 18:50	gss
Sodium, total	M200.7 ICP	1	11		mg/L	0.2	1	06/30/16 15:36	gss
Strontium, dissolved	M200.7 ICP	1	0.200		mg/L	0.005	0.03	06/29/16 17:06	gss
Strontium, total	M200.7 ICP	1	0.200		mg/L	0.005	0.03	06/30/16 15:36	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 16:42	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 22:03	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 18:50	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/05/16 16:35	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	06/28/16 18:50	gss
Titanium, total	M200.7 ICP	1	0.071		mg/L	0.005	0.03	06/30/16 15:36	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	06/30/16 16:42	mfm
Uranium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	06/29/16 22:03	mfm
Vanadium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	06/28/16 18:50	gss
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/30/16 15:36	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 18:50	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/30/16 15:36	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L31248-01**
Date Sampled: 06/21/16 10:25
Date Received: 06/23/16
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	82.5		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	82.5		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			07/11/16 0:00	calc
Sum of Anions			2.3			meq/L			07/11/16 0:00	calc
Sum of Cations			2.3			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1	14	B	*	mg/L	10	20	06/25/16 14:12	sck
Chloride	SM4500Cl-E	1	4.1		*	mg/L	0.5	2	07/01/16 12:58	spl
Conductivity @25C	SM2510B	1	235		*	umhos/cm	1	10	06/25/16 0:26	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:01	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 16:19	enb
Fluoride	SM4500F-C	1	0.18	B	*	mg/L	0.05	0.3	06/28/16 14:34	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		83			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.85		*	mg/L	0.02	0.1	07/01/16 22:16	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/07/16 14:21	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	07/08/16 15:56	bsu
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.5		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.02	0.05	06/29/16 17:03	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.02	0.05	06/23/16 20:00	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	06/29/16 18:09	enb
Residue, Filterable (TDS) @180C	SM2540C	1	204		*	mg/L	10	20	06/24/16 13:01	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	18.0	B	*	mg/L	5	20	06/24/16 15:28	sck
Residue, Total (TS) @ 105C	SM2540B	1	222		*	mg/L	10	20	06/24/16 12:38	emk
Sulfate	D516-02/-07 - Turbidimetric	1	24.2		*	mg/L	1	5	07/07/16 10:39	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 15:28	emk
TDS (calculated)	Calculation		126			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.62						07/11/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L31248-02**
Date Sampled: 06/21/16 10:45
Date Received: 06/23/16
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation		-						06/29/16 9:55	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 15:02	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 12:23	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:19	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:02	enb
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 12:51	mfm
Total Hot Plate Digestion	M200.2 ICP								06/29/16 11:13	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L31248-02**

Date Sampled: 06/21/16 10:45

Date Received: 06/23/16

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	06/28/16 18:53	gss
Aluminum, total	M200.7 ICP	1	0.05	B	*	mg/L	0.03	0.2	06/30/16 15:39	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0111			mg/L	0.0004	0.002	06/30/16 9:51	mfm
Antimony, total	M200.8 ICP-MS	1	0.0101			mg/L	0.0004	0.002	06/29/16 22:07	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0090			mg/L	0.0002	0.001	06/30/16 9:51	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0095			mg/L	0.0002	0.001	06/29/16 22:07	mfm
Barium, dissolved	M200.7 ICP	1	0.105			mg/L	0.003	0.02	06/29/16 17:09	gss
Barium, total	M200.7 ICP	1	0.109			mg/L	0.003	0.02	06/30/16 15:39	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 18:53	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:39	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 18:53	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 15:39	gss
Boron, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	06/29/16 17:09	gss
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	06/30/16 15:39	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 9:51	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 22:07	mfm
Calcium, dissolved	M200.7 ICP	1	311		*	mg/L	0.1	0.5	06/28/16 18:53	gss
Calcium, total	M200.7 ICP	1	324			mg/L	0.1	0.5	06/30/16 15:39	gss
Chromium, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/28/16 18:53	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:39	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 18:53	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:39	gss
Copper, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 18:53	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:39	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 18:53	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 15:39	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/29/16 17:09	gss
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	06/30/16 15:39	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/30/16 16:45	mfm
Lead, total	M200.8 ICP-MS	1	0.0011			mg/L	0.0001	0.0005	06/29/16 22:07	mfm
Lithium, dissolved	M200.7 ICP	1	0.075			mg/L	0.008	0.04	06/28/16 18:53	gss
Lithium, total	M200.7 ICP	1	0.067			mg/L	0.008	0.04	06/30/16 15:39	gss
Magnesium, dissolved	M200.7 ICP	1	17.1			mg/L	0.2	1	06/28/16 18:53	gss
Magnesium, total	M200.7 ICP	1	17.8			mg/L	0.2	1	06/30/16 15:39	gss
Manganese, dissolved	M200.7 ICP	1	0.179			mg/L	0.005	0.03	06/28/16 18:53	gss
Manganese, total	M200.7 ICP	1	0.191			mg/L	0.005	0.03	06/30/16 15:39	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:36	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:07	pta
Molybdenum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.02	0.1	06/28/16 18:53	gss
Molybdenum, total	M200.7 ICP	1	0.04	B		mg/L	0.02	0.1	06/30/16 15:39	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 18:53	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:39	gss
Potassium, dissolved	M200.7 ICP	1	11.8			mg/L	0.2	1	06/28/16 18:53	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2A-E

ACZ Sample ID: **L31248-02**

Date Sampled: 06/21/16 10:45

Date Received: 06/23/16

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	12.1		mg/L	0.2	1	06/30/16 15:39	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/28/16 18:53	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/30/16 15:39	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0009		mg/L	0.0001	0.0003	06/30/16 9:51	mfm
Selenium, total	M200.8 ICP-MS	1	0.0009		mg/L	0.0001	0.0003	06/29/16 22:07	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/30/16 9:51	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/29/16 22:07	mfm
Sodium, dissolved	M200.7 ICP	1	71.9		mg/L	0.2	1	06/28/16 18:53	gss
Sodium, total	M200.7 ICP	1	75.1		mg/L	0.2	1	06/30/16 15:39	gss
Strontium, dissolved	M200.7 ICP	1	3.230		mg/L	0.005	0.03	06/29/16 17:09	gss
Strontium, total	M200.7 ICP	1	3.310		mg/L	0.005	0.03	06/30/16 15:39	gss
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	06/30/16 16:45	mfm
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	06/29/16 22:07	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 18:53	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/05/16 16:39	aeb
Titanium, dissolved	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	06/28/16 18:53	gss
Titanium, total	M200.7 ICP	1	0.017	B	mg/L	0.005	0.03	06/30/16 15:39	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	06/30/16 16:45	mfm
Uranium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0005	06/29/16 22:07	mfm
Vanadium, dissolved	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	06/28/16 18:53	gss
Vanadium, total	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	06/30/16 15:39	gss
Zinc, dissolved	M200.7 ICP	1	0.02	B	mg/L	0.01	0.05	06/28/16 18:53	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/30/16 15:39	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L31248-02**

Date Sampled: 06/21/16 10:45

Date Received: 06/23/16

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	68.1		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	68.1		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			07/11/16 0:00	calc
Sum of Anions			21			meq/L			07/11/16 0:00	calc
Sum of Cations			21			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	06/25/16 11:39	sck
Chloride	SM4500Cl-E	1	67		*	mg/L	0.5	2	07/01/16 12:58	spl
Conductivity @25C	SM2510B	1	1700		*	umhos/cm	1	10	06/25/16 0:35	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:01	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 16:20	enb
Fluoride	SM4500F-C	1	1.17		*	mg/L	0.05	0.3	06/28/16 14:37	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		847			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.38		*	mg/L	0.02	0.1	07/01/16 22:17	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/07/16 14:26	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	07/08/16 15:57	bsu
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.4		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	06/29/16 17:04	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/23/16 20:02	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	06/29/16 18:11	enb
Residue, Filterable (TDS) @180C	SM2540C	1	1500		*	mg/L	10	20	06/24/16 13:06	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/24/16 15:34	sck
Residue, Total (TS) @ 105C	SM2540B	1	1520		*	mg/L	10	20	06/24/16 12:42	emk
Sulfate	D516-02/-07 - Turbidimetric	50	860		*	mg/L	50	250	07/07/16 12:02	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 15:37	emk
TDS (calculated)	Calculation		1390			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.08						07/11/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L31248-03**
Date Sampled: 06/21/16 10:20
Date Received: 06/23/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 10:03	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 15:11	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 12:38	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:27	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:10	enb
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 13:02	mfm
Total Hot Plate Digestion	M200.2 ICP								06/29/16 11:32	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L31248-03**

Date Sampled: 06/21/16 10:20

Date Received: 06/23/16

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	06/28/16 19:02	gss
Aluminum, total	M200.7 ICP	1	1.76		*	mg/L	0.03	0.2	06/30/16 15:42	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0039			mg/L	0.0004	0.002	06/30/16 9:54	mfm
Antimony, total	M200.8 ICP-MS	1	0.0038			mg/L	0.0004	0.002	06/29/16 22:10	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0074			mg/L	0.0002	0.001	06/30/16 9:54	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0090			mg/L	0.0002	0.001	06/29/16 22:10	mfm
Barium, dissolved	M200.7 ICP	1	0.151			mg/L	0.003	0.02	06/29/16 17:18	gss
Barium, total	M200.7 ICP	1	0.167			mg/L	0.003	0.02	06/30/16 15:42	gss
Beryllium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:02	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:42	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 19:02	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 15:42	gss
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/29/16 17:18	gss
Boron, total	M200.7 ICP	1	0.06			mg/L	0.01	0.05	06/30/16 15:42	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 9:54	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 22:10	mfm
Calcium, dissolved	M200.7 ICP	1	151		*	mg/L	0.1	0.5	06/28/16 19:02	gss
Calcium, total	M200.7 ICP	1	155			mg/L	0.1	0.5	06/30/16 15:42	gss
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:02	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:42	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:02	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:42	gss
Copper, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:02	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:42	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 19:02	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 15:42	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/29/16 17:18	gss
Iron, total	M200.7 ICP	1	0.97			mg/L	0.02	0.05	06/30/16 15:42	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/30/16 16:48	mfm
Lead, total	M200.8 ICP-MS	1	0.0028			mg/L	0.0001	0.0005	06/29/16 22:10	mfm
Lithium, dissolved	M200.7 ICP	1	0.034	B		mg/L	0.008	0.04	06/28/16 19:02	gss
Lithium, total	M200.7 ICP	1	0.025	B		mg/L	0.008	0.04	06/30/16 15:42	gss
Magnesium, dissolved	M200.7 ICP	1	10.1			mg/L	0.2	1	06/28/16 19:02	gss
Magnesium, total	M200.7 ICP	1	10.4			mg/L	0.2	1	06/30/16 15:42	gss
Manganese, dissolved	M200.7 ICP	1	0.404			mg/L	0.005	0.03	06/28/16 19:02	gss
Manganese, total	M200.7 ICP	1	0.447			mg/L	0.005	0.03	06/30/16 15:42	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:41	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:09	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 19:02	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/30/16 15:42	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 19:02	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:42	gss
Potassium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	06/28/16 19:02	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4A-E

ACZ Sample ID: **L31248-03**

Date Sampled: 06/21/16 10:20

Date Received: 06/23/16

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	9.2		mg/L	0.2	1	06/30/16 15:42	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/28/16 19:02	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/30/16 15:42	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	06/30/16 9:54	mfm
Selenium, total	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	06/29/16 22:10	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/30/16 9:54	mfm
Silver, total	M200.8 ICP-MS	1	0.00006	B	mg/L	0.00005	0.0003	06/29/16 22:10	mfm
Sodium, dissolved	M200.7 ICP	1	36.4		mg/L	0.2	1	06/28/16 19:02	gss
Sodium, total	M200.7 ICP	1	37.4		mg/L	0.2	1	06/30/16 15:42	gss
Strontium, dissolved	M200.7 ICP	1	1.430	*	mg/L	0.005	0.03	06/29/16 17:18	gss
Strontium, total	M200.7 ICP	1	1.400		mg/L	0.005	0.03	06/30/16 15:42	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 16:48	mfm
Thallium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	06/29/16 22:10	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 19:02	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/05/16 16:42	aeb
Titanium, dissolved	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	06/28/16 19:02	gss
Titanium, total	M200.7 ICP	1	0.062		mg/L	0.005	0.03	06/30/16 15:42	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	06/30/16 16:48	mfm
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	06/29/16 22:10	mfm
Vanadium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	06/28/16 19:02	gss
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/30/16 15:42	gss
Zinc, dissolved	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	06/28/16 19:02	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/30/16 15:42	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L31248-03**

Date Sampled: 06/21/16 10:20

Date Received: 06/23/16

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	82.2		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	82.2		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-4.8			%			07/11/16 0:00	calc
Sum of Anions			11			meq/L			07/11/16 0:00	calc
Sum of Cations			10			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	06/25/16 11:51	sck
Chloride	SM4500Cl-E	1	33.7		*	mg/L	0.5	2	07/01/16 12:58	spl
Conductivity @25C	SM2510B	1	944		*	umhos/cm	1	10	06/25/16 0:44	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:02	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 16:21	enb
Fluoride	SM4500F-C	1	0.52		*	mg/L	0.05	0.3	06/28/16 14:40	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		419			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.98		*	mg/L	0.02	0.1	07/01/16 22:18	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1	0.13	B	*	mg/L	0.05	0.2	07/07/16 14:27	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	07/08/16 15:58	bsu
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.4		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	06/29/16 17:05	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.02	0.05	06/23/16 20:05	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.14		*	mg/L	0.02	0.05	06/29/16 18:12	enb
Residue, Filterable (TDS) @180C	SM2540C	1	756		*	mg/L	10	20	06/24/16 13:09	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	40.0		*	mg/L	5	20	06/24/16 15:36	sck
Residue, Total (TS) @ 105C	SM2540B	1	804		*	mg/L	10	20	06/24/16 12:47	emk
Sulfate	D516-02/-07 - Turbidimetric	20	380		*	mg/L	20	100	07/07/16 11:18	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 15:47	emk
TDS (calculated)	Calculation		673			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.12						07/11/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L31248-04**

Date Sampled: 06/21/16 08:15

Date Received: 06/23/16

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 10:11	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 15:20	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 12:52	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:44	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:19	enb
Total Hot Plate Digestion	M200.2 ICP								06/29/16 11:51	gss
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 13:12	mfm

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L31248-04**

Date Sampled: 06/21/16 08:15

Date Received: 06/23/16

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.12	B		mg/L	0.03	0.2	06/28/16 19:11	gss
Aluminum, total	M200.7 ICP	1	1.90		*	mg/L	0.03	0.2	06/30/16 15:52	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/30/16 9:57	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/29/16 22:13	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0002	0.001	06/30/16 9:57	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	06/29/16 22:13	mfm
Barium, dissolved	M200.7 ICP	1	0.041			mg/L	0.003	0.02	06/29/16 17:21	gss
Barium, total	M200.7 ICP	1	0.061			mg/L	0.003	0.02	06/30/16 15:52	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:11	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:52	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 19:11	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 15:52	gss
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/29/16 17:21	gss
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/30/16 15:52	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 9:57	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 22:13	mfm
Calcium, dissolved	M200.7 ICP	1	6.4		*	mg/L	0.1	0.5	06/28/16 19:11	gss
Calcium, total	M200.7 ICP	1	6.6			mg/L	0.1	0.5	06/30/16 15:52	gss
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:11	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:52	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:11	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:52	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:11	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:52	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 19:11	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 15:52	gss
Iron, dissolved	M200.7 ICP	1	0.06			mg/L	0.02	0.05	06/29/16 17:21	gss
Iron, total	M200.7 ICP	1	0.82			mg/L	0.02	0.05	06/30/16 15:52	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/30/16 16:52	mfm
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	06/29/16 22:13	mfm
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	06/28/16 19:11	gss
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:52	gss
Magnesium, dissolved	M200.7 ICP	1	1.3			mg/L	0.2	1	06/28/16 19:11	gss
Magnesium, total	M200.7 ICP	1	1.3			mg/L	0.2	1	06/30/16 15:52	gss
Manganese, dissolved	M200.7 ICP	1	0.021	B		mg/L	0.005	0.03	06/28/16 19:11	gss
Manganese, total	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	06/30/16 15:52	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:43	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:11	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 19:11	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/30/16 15:52	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 19:11	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:52	gss
Potassium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	06/28/16 19:11	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L31248-04**

Date Sampled: 06/21/16 08:15

Date Received: 06/23/16

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3		mg/L	0.2	1	06/30/16 15:52	gss
Scandium, dissolved	M200.7 ICP	1		U	mg/L	0.1	0.5	06/28/16 19:11	gss
Scandium, total	M200.7 ICP	1		U	mg/L	0.1	0.5	06/30/16 15:52	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/30/16 9:57	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/29/16 22:13	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/30/16 9:57	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/29/16 22:13	mfm
Sodium, dissolved	M200.7 ICP	1	4.9		mg/L	0.2	1	06/28/16 19:11	gss
Sodium, total	M200.7 ICP	1	5		mg/L	0.2	1	06/30/16 15:52	gss
Strontium, dissolved	M200.7 ICP	1	0.053		mg/L	0.005	0.03	06/29/16 17:21	gss
Strontium, total	M200.7 ICP	1	0.055		mg/L	0.005	0.03	06/30/16 15:52	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 16:52	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 22:13	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 19:11	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/05/16 16:45	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	06/28/16 19:11	gss
Titanium, total	M200.7 ICP	1	0.043		mg/L	0.005	0.03	06/30/16 15:52	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 16:52	mfm
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 22:13	mfm
Vanadium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	06/28/16 19:11	gss
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/30/16 15:52	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 19:11	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/30/16 15:52	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L31248-04**
Date Sampled: 06/21/16 08:15
Date Received: 06/23/16
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	20.1		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	20.1		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.7			%			07/11/16 0:00	calc
Sum of Anions			0.757			meq/L			07/11/16 0:00	calc
Sum of Cations			0.732			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1	10	B	*	mg/L	10	20	06/25/16 12:04	sck
Chloride	SM4500Cl-E	1	3.1		*	mg/L	0.5	2	07/01/16 12:58	spl
Conductivity @25C	SM2510B	1	83.0		*	umhos/cm	1	10	06/25/16 0:53	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:03	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 16:22	enb
Fluoride	SM4500F-C	1	0.06	B	*	mg/L	0.05	0.3	06/28/16 14:44	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		21			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.62		*	mg/L	0.02	0.1	07/01/16 22:24	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/07/16 14:29	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	07/08/16 15:59	bsu
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.5		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.02	0.05	06/29/16 17:08	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/23/16 20:06	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	06/29/16 18:13	enb
Residue, Filterable (TDS) @180C	SM2540C	1	90		*	mg/L	10	20	06/24/16 13:11	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/24/16 15:39	sck
Residue, Total (TS) @ 105C	SM2540B	1	94		*	mg/L	10	20	06/24/16 12:51	emk
Sulfate	D516-02/-07 - Turbidimetric	1	12.6		*	mg/L	1	5	07/07/16 11:02	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 16:16	emk
TDS (calculated)	Calculation		43.6			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		2.06						07/11/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L31248-05**
Date Sampled: 06/21/16 07:05
Date Received: 06/23/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 10:19	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/28/16 15:30	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 13:06	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 12:01	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:27	enb
Total Hot Plate Digestion	M200.2 ICP								06/29/16 12:09	gss
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 13:23	mfm

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW6-E

ACZ Sample ID: **L31248-05**

Date Sampled: 06/21/16 07:05

Date Received: 06/23/16

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.18	B		mg/L	0.03	0.2	06/28/16 19:14	gss
Aluminum, total	M200.7 ICP	1	3.92		*	mg/L	0.03	0.2	06/30/16 15:55	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/30/16 10:01	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/29/16 22:16	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0011			mg/L	0.0002	0.001	06/30/16 10:01	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0021			mg/L	0.0002	0.001	06/29/16 22:16	mfm
Barium, dissolved	M200.7 ICP	1	0.052			mg/L	0.003	0.02	06/29/16 17:24	gss
Barium, total	M200.7 ICP	1	0.087			mg/L	0.003	0.02	06/30/16 15:55	gss
Beryllium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:14	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:55	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 19:14	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 15:55	gss
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/29/16 17:24	gss
Boron, total	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/30/16 15:55	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 10:01	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 22:16	mfm
Calcium, dissolved	M200.7 ICP	1	8.9		*	mg/L	0.1	0.5	06/28/16 19:14	gss
Calcium, total	M200.7 ICP	1	9.5			mg/L	0.1	0.5	06/30/16 15:55	gss
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:14	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:55	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:14	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:55	gss
Copper, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:14	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:55	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 19:14	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 15:55	gss
Iron, dissolved	M200.7 ICP	1	0.12			mg/L	0.02	0.05	06/29/16 17:24	gss
Iron, total	M200.7 ICP	1	2.03			mg/L	0.02	0.05	06/30/16 15:55	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/30/16 17:01	mfm
Lead, total	M200.8 ICP-MS	1	0.0015			mg/L	0.0001	0.0005	06/29/16 22:16	mfm
Lithium, dissolved	M200.7 ICP	1	0.017	B		mg/L	0.008	0.04	06/28/16 19:14	gss
Lithium, total	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	06/30/16 15:55	gss
Magnesium, dissolved	M200.7 ICP	1	2.2			mg/L	0.2	1	06/28/16 19:14	gss
Magnesium, total	M200.7 ICP	1	2.4			mg/L	0.2	1	06/30/16 15:55	gss
Manganese, dissolved	M200.7 ICP	1	0.037			mg/L	0.005	0.03	06/28/16 19:14	gss
Manganese, total	M200.7 ICP	1	0.085			mg/L	0.005	0.03	06/30/16 15:55	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:45	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:13	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 19:14	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/30/16 15:55	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 19:14	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:55	gss
Potassium, dissolved	M200.7 ICP	1	3.5			mg/L	0.2	1	06/28/16 19:14	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW6-E

ACZ Sample ID: **L31248-05**

Date Sampled: 06/21/16 07:05

Date Received: 06/23/16

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4		mg/L	0.2	1	06/30/16 15:55	gss
Scandium, dissolved	M200.7 ICP	1		U	mg/L	0.1	0.5	06/28/16 19:14	gss
Scandium, total	M200.7 ICP	1		U	mg/L	0.1	0.5	06/30/16 15:55	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/30/16 10:01	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	06/29/16 22:16	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/30/16 10:01	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/29/16 22:16	mfm
Sodium, dissolved	M200.7 ICP	1	7.2		mg/L	0.2	1	06/28/16 19:14	gss
Sodium, total	M200.7 ICP	1	7.3		mg/L	0.2	1	06/30/16 15:55	gss
Strontium, dissolved	M200.7 ICP	1	0.066		mg/L	0.005	0.03	06/29/16 17:24	gss
Strontium, total	M200.7 ICP	1	0.071		mg/L	0.005	0.03	06/30/16 15:55	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 17:01	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 22:16	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 19:14	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/05/16 16:48	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	06/28/16 19:14	gss
Titanium, total	M200.7 ICP	1	0.106		mg/L	0.005	0.03	06/30/16 15:55	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 17:01	mfm
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	06/29/16 22:16	mfm
Vanadium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	06/28/16 19:14	gss
Vanadium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	06/30/16 15:55	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 19:14	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/30/16 15:55	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L31248-05**

Date Sampled: 06/21/16 07:05

Date Received: 06/23/16

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	24.0		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	24.0		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			8.2			%			07/11/16 0:00	calc
Sum of Anions			0.934			meq/L			07/11/16 0:00	calc
Sum of Cations			1.1			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	06/25/16 12:16	sck
Chloride	SM4500Cl-E	1	7.2		*	mg/L	0.5	2	07/01/16 12:58	spl
Conductivity @25C	SM2510B	1	120		*	umhos/cm	1	10	06/25/16 1:02	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:04	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/28/16 16:23	enb
Fluoride	SM4500F-C	1	0.08	B	*	mg/L	0.05	0.3	06/28/16 15:00	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		31			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.25		*	mg/L	0.02	0.1	07/01/16 22:25	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/07/16 14:30	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.6		*	mg/L	0.1	0.5	07/08/16 16:00	bsu
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.6		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	06/29/16 17:10	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.02	0.05	06/23/16 20:07	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.02	0.05	06/29/16 18:14	enb
Residue, Filterable (TDS) @180C	SM2540C	1	130		*	mg/L	10	20	06/24/16 13:14	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	42.0		*	mg/L	5	20	06/24/16 15:41	sck
Residue, Total (TS) @ 105C	SM2540B	1	180		*	mg/L	10	20	06/24/16 12:55	emk
Sulfate	D516-02/-07 - Turbidimetric	1	11.8		*	mg/L	1	5	07/07/16 11:02	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 15:47	emk
TDS (calculated)	Calculation		55.9			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		2.33						07/11/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L31248-06**

Date Sampled: 06/21/16 09:05

Date Received: 06/23/16

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 10:34	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/29/16 10:49	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 13:35	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 12:09	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 11:44	enb
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 13:34	mfm
Total Hot Plate Digestion	M200.2 ICP								06/29/16 12:28	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L31248-06**

Date Sampled: 06/21/16 09:05

Date Received: 06/23/16

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.15	B		mg/L	0.03	0.2	06/28/16 19:17	gss
Aluminum, total	M200.7 ICP	1	1.27		*	mg/L	0.03	0.2	06/30/16 15:58	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	06/30/16 17:10	mfm
Antimony, total	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	06/29/16 22:19	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0039			mg/L	0.0002	0.001	06/30/16 10:16	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0051			mg/L	0.0002	0.001	06/29/16 22:19	mfm
Barium, dissolved	M200.7 ICP	1	0.113			mg/L	0.003	0.02	06/29/16 17:27	gss
Barium, total	M200.7 ICP	1	0.137			mg/L	0.003	0.02	06/30/16 15:58	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:17	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:58	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 19:17	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 15:58	gss
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/29/16 17:27	gss
Boron, total	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/30/16 15:58	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 10:16	mfm
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/29/16 22:19	mfm
Calcium, dissolved	M200.7 ICP	1	42.8		*	mg/L	0.1	0.5	06/28/16 19:17	gss
Calcium, total	M200.7 ICP	1	44.4			mg/L	0.1	0.5	06/30/16 15:58	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:17	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:58	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:17	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:58	gss
Copper, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:17	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 15:58	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 19:17	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 15:58	gss
Iron, dissolved	M200.7 ICP	1	0.17			mg/L	0.02	0.05	06/29/16 17:27	gss
Iron, total	M200.7 ICP	1	1.47			mg/L	0.02	0.05	06/30/16 15:58	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	06/30/16 17:10	mfm
Lead, total	M200.8 ICP-MS	1	0.0035			mg/L	0.0001	0.0005	06/29/16 22:19	mfm
Lithium, dissolved	M200.7 ICP	1	0.018	B		mg/L	0.008	0.04	06/28/16 19:17	gss
Lithium, total	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	06/30/16 15:58	gss
Magnesium, dissolved	M200.7 ICP	1	5.3			mg/L	0.2	1	06/28/16 19:17	gss
Magnesium, total	M200.7 ICP	1	5.5			mg/L	0.2	1	06/30/16 15:58	gss
Manganese, dissolved	M200.7 ICP	1	0.259			mg/L	0.005	0.03	06/28/16 19:17	gss
Manganese, total	M200.7 ICP	1	0.304			mg/L	0.005	0.03	06/30/16 15:58	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:51	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:15	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 19:17	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/30/16 15:58	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 19:17	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 15:58	gss
Potassium, dissolved	M200.7 ICP	1	9.3			mg/L	0.2	1	06/28/16 19:17	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW8-E

ACZ Sample ID: **L31248-06**

Date Sampled: 06/21/16 09:05

Date Received: 06/23/16

Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	9.6			mg/L	0.2	1	06/30/16 15:58	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 19:17	gss
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 15:58	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	06/30/16 17:10	mfm
Selenium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	06/29/16 22:19	mfm
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/30/16 10:16	mfm
Silver, total	M200.8 ICP-MS	1	0.00018	B		mg/L	0.00005	0.0003	06/29/16 22:19	mfm
Sodium, dissolved	M200.7 ICP	1	23.5			mg/L	0.2	1	06/28/16 19:17	gss
Sodium, total	M200.7 ICP	1	24			mg/L	0.2	1	06/30/16 15:58	gss
Strontium, dissolved	M200.7 ICP	1	0.447		*	mg/L	0.005	0.03	06/29/16 17:27	gss
Strontium, total	M200.7 ICP	1	0.448			mg/L	0.005	0.03	06/30/16 15:58	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 17:10	mfm
Thallium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 22:19	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/28/16 19:17	gss
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	07/05/16 16:57	aeb
Titanium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	06/28/16 19:17	gss
Titanium, total	M200.7 ICP	1	0.052			mg/L	0.005	0.03	06/30/16 15:58	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/30/16 17:10	mfm
Uranium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/29/16 22:19	mfm
Vanadium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	06/28/16 19:17	gss
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	06/30/16 15:58	gss
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:17	gss
Zinc, total	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/30/16 15:58	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L31248-06**

Date Sampled: 06/21/16 09:05

Date Received: 06/23/16

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	87.3		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	87.3		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.3			%			07/11/16 0:00	calc
Sum of Anions			3.9			meq/L			07/11/16 0:00	calc
Sum of Cations			4			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1	41		*	mg/L	10	20	06/25/16 12:28	sck
Chloride	SM4500Cl-E	1	16.5		*	mg/L	0.5	2	07/01/16 12:58	spl
Conductivity @25C	SM2510B	1	402		*	umhos/cm	1	10	06/25/16 1:11	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:06	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:32	enb
Fluoride	SM4500F-C	1	0.20	B	*	mg/L	0.05	0.3	06/28/16 15:04	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		129			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.11		*	mg/L	0.02	0.1	07/01/16 22:26	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1	1.18		*	mg/L	0.05	0.2	07/07/16 14:33	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2.8		*	mg/L	0.1	0.5	07/08/16 16:02	bsu
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.7		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		1.05			mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.34		*	mg/L	0.02	0.05	06/29/16 17:11	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.27	H	*	mg/L	0.02	0.05	06/23/16 20:08	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	2	0.58		*	mg/L	0.04	0.1	06/29/16 18:41	enb
Residue, Filterable (TDS) @180C	SM2540C	1	304		*	mg/L	10	20	06/24/16 13:17	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	38.0		*	mg/L	5	20	06/24/16 15:44	sck
Residue, Total (TS) @ 105C	SM2540B	1	330		*	mg/L	10	20	06/24/16 12:59	emk
Sulfate	D516-02/-07 - Turbidimetric	5	80.8		*	mg/L	5	25	07/07/16 11:09	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 15:59	emk
TDS (calculated)	Calculation		234			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.30						07/11/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L31248-07**
Date Sampled: 06/21/16 07:55
Date Received: 06/23/16
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 10:50	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/29/16 11:08	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 14:04	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 12:18	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 12:01	enb
Total Hot Plate Digestion	M200.2 ICP								06/29/16 12:46	gss
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 14:06	mfm

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW9-E

ACZ Sample ID: **L31248-07**

Date Sampled: 06/21/16 07:55

Date Received: 06/23/16

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.24			mg/L	0.03	0.2	06/28/16 19:20	gss
Aluminum, total	M200.7 ICP	1	3.16		*	mg/L	0.03	0.2	06/30/16 16:01	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/30/16 10:19	mfm
Antimony, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	06/29/16 22:35	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	06/30/16 10:19	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0036			mg/L	0.0002	0.001	06/29/16 22:35	mfm
Barium, dissolved	M200.7 ICP	1	0.074			mg/L	0.003	0.02	06/29/16 17:30	gss
Barium, total	M200.7 ICP	1	0.105			mg/L	0.003	0.02	06/30/16 16:01	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:20	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:01	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 19:20	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 16:01	gss
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	06/29/16 17:30	gss
Boron, total	M200.7 ICP	1	0.05			mg/L	0.01	0.05	06/30/16 16:01	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 10:19	mfm
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/29/16 22:35	mfm
Calcium, dissolved	M200.7 ICP	1	20.5			mg/L	0.1	0.5	06/28/16 19:20	gss
Calcium, total	M200.7 ICP	1	21.9			mg/L	0.1	0.5	06/30/16 16:01	gss
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/28/16 19:20	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:01	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:20	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:01	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:20	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:01	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 19:20	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 16:01	gss
Iron, dissolved	M200.7 ICP	1	0.13			mg/L	0.02	0.05	06/29/16 17:30	gss
Iron, total	M200.7 ICP	1	1.86			mg/L	0.02	0.05	06/30/16 16:01	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/30/16 17:13	mfm
Lead, total	M200.8 ICP-MS	1	0.0021			mg/L	0.0001	0.0005	06/29/16 22:35	mfm
Lithium, dissolved	M200.7 ICP	1	0.022	B		mg/L	0.008	0.04	06/28/16 19:20	gss
Lithium, total	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	06/30/16 16:01	gss
Magnesium, dissolved	M200.7 ICP	1	3.7			mg/L	0.2	1	06/28/16 19:20	gss
Magnesium, total	M200.7 ICP	1	3.9			mg/L	0.2	1	06/30/16 16:01	gss
Manganese, dissolved	M200.7 ICP	1	0.055			mg/L	0.005	0.03	06/28/16 19:20	gss
Manganese, total	M200.7 ICP	1	0.124			mg/L	0.005	0.03	06/30/16 16:01	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:53	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:34	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/28/16 19:20	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	06/30/16 16:01	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 19:20	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 16:01	gss
Potassium, dissolved	M200.7 ICP	1	4.9			mg/L	0.2	1	06/28/16 19:20	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW9-E

ACZ Sample ID: **L31248-07**

Date Sampled: 06/21/16 07:55

Date Received: 06/23/16

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.3		mg/L	0.2	1	06/30/16 16:01	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/28/16 19:20	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	06/30/16 16:01	gss
Selenium, dissolved	M200.8 ICP-MS	1		U *	mg/L	0.0001	0.0003	06/30/16 10:19	mfm
Selenium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	06/29/16 22:35	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/30/16 10:19	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/29/16 22:35	mfm
Sodium, dissolved	M200.7 ICP	1	12.5		mg/L	0.2	1	06/28/16 19:20	gss
Sodium, total	M200.7 ICP	1	13		mg/L	0.2	1	06/30/16 16:01	gss
Strontium, dissolved	M200.7 ICP	1	0.172		mg/L	0.005	0.03	06/29/16 17:30	gss
Strontium, total	M200.7 ICP	1	0.175		mg/L	0.005	0.03	06/30/16 16:01	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 17:13	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/29/16 22:35	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 19:20	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/05/16 17:01	aeb
Titanium, dissolved	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	06/28/16 19:20	gss
Titanium, total	M200.7 ICP	1	0.094		mg/L	0.005	0.03	06/30/16 16:01	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	06/30/16 17:13	mfm
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	06/29/16 22:35	mfm
Vanadium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	06/28/16 19:20	gss
Vanadium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	06/30/16 16:01	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 19:20	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/30/16 16:01	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L31248-07**
Date Sampled: 06/21/16 07:55
Date Received: 06/23/16
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	45.3		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	45.3		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.4			%			07/11/16 0:00	calc
Sum of Anions			2.0			meq/L			07/11/16 0:00	calc
Sum of Cations			2.1			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1	15	B	*	mg/L	10	20	06/25/16 12:41	sck
Chloride	SM4500Cl-E	1	12.5		*	mg/L	0.5	2	07/01/16 12:58	spl
Conductivity @25C	SM2510B	1	225		*	umhos/cm	1	10	06/25/16 1:20	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:07	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:34	enb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	06/28/16 15:12	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		66			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2	2.09		*	mg/L	0.04	0.2	07/01/16 22:40	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/07/16 14:36	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.8		*	mg/L	0.1	0.5	07/08/16 16:05	bsu
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.6		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	06/29/16 17:14	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.02	0.05	06/23/16 20:09	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.13		*	mg/L	0.02	0.05	06/29/16 18:38	enb
Residue, Filterable (TDS) @180C	SM2540C	1	194		*	mg/L	10	20	06/24/16 13:19	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	50.0		*	mg/L	5	20	06/24/16 15:47	sck
Residue, Total (TS) @ 105C	SM2540B	1	246		*	mg/L	10	20	06/24/16 13:04	emk
Sulfate	D516-02/-07 - Turbidimetric	1	36.2		*	mg/L	1	5	07/07/16 11:02	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 16:12	emk
TDS (calculated)	Calculation		119			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.63						07/11/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L31248-08**

Date Sampled: 06/21/16 10:45

Date Received: 06/23/16

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/29/16 10:58	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/29/16 11:27	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/05/16 14:18	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 12:26	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/29/16 12:09	enb
Total Hot Plate Digestion	M200.2 ICP-MS								06/29/16 14:17	mfm
Total Hot Plate Digestion	M200.2 ICP								06/29/16 13:05	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW11-E

ACZ Sample ID: **L31248-08**

Date Sampled: 06/21/16 10:45

Date Received: 06/23/16

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.09	B		mg/L	0.03	0.2	06/28/16 19:23	gss
Aluminum, total	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	06/30/16 16:05	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0110			mg/L	0.0004	0.002	06/30/16 10:22	mfm
Antimony, total	M200.8 ICP-MS	1	0.0103			mg/L	0.0004	0.002	06/29/16 22:38	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0088			mg/L	0.0002	0.001	06/30/16 10:22	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0092			mg/L	0.0002	0.001	06/29/16 22:38	mfm
Barium, dissolved	M200.7 ICP	1	0.104			mg/L	0.003	0.02	06/29/16 17:39	gss
Barium, total	M200.7 ICP	1	0.108			mg/L	0.003	0.02	06/30/16 16:05	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:23	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:05	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/28/16 19:23	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/30/16 16:05	gss
Boron, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	06/29/16 17:39	gss
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	06/30/16 16:05	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/30/16 10:22	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/29/16 22:38	mfm
Calcium, dissolved	M200.7 ICP	1	311			mg/L	0.1	0.5	06/28/16 19:23	gss
Calcium, total	M200.7 ICP	1	319			mg/L	0.1	0.5	06/30/16 16:05	gss
Chromium, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/28/16 19:23	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:05	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:23	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:05	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/28/16 19:23	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	06/30/16 16:05	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/28/16 19:23	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/30/16 16:05	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/29/16 17:39	gss
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	06/30/16 16:05	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/30/16 17:16	mfm
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	06/29/16 22:38	mfm
Lithium, dissolved	M200.7 ICP	1	0.075			mg/L	0.008	0.04	06/28/16 19:23	gss
Lithium, total	M200.7 ICP	1	0.066			mg/L	0.008	0.04	06/30/16 16:05	gss
Magnesium, dissolved	M200.7 ICP	1	17.1			mg/L	0.2	1	06/28/16 19:23	gss
Magnesium, total	M200.7 ICP	1	17.7			mg/L	0.2	1	06/30/16 16:05	gss
Manganese, dissolved	M200.7 ICP	1	0.181			mg/L	0.005	0.03	06/28/16 19:23	gss
Manganese, total	M200.7 ICP	1	0.183			mg/L	0.005	0.03	06/30/16 16:05	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 15:55	scp
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/16 11:40	pta
Molybdenum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.02	0.1	06/28/16 19:23	gss
Molybdenum, total	M200.7 ICP	1	0.05	B		mg/L	0.02	0.1	06/30/16 16:05	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/28/16 19:23	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	06/30/16 16:05	gss
Potassium, dissolved	M200.7 ICP	1	11.7			mg/L	0.2	1	06/28/16 19:23	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW11-E

ACZ Sample ID: **L31248-08**

Date Sampled: 06/21/16 10:45

Date Received: 06/23/16

Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	12.1		mg/L	0.2	1	06/30/16 16:05	gss
Scandium, dissolved	M200.7 ICP	1		U	mg/L	0.1	0.5	06/28/16 19:23	gss
Scandium, total	M200.7 ICP	1		U	mg/L	0.1	0.5	06/30/16 16:05	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0008		mg/L	0.0001	0.0003	06/30/16 10:22	mfm
Selenium, total	M200.8 ICP-MS	1	0.0009		mg/L	0.0001	0.0003	06/29/16 22:38	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/30/16 10:22	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	06/29/16 22:38	mfm
Sodium, dissolved	M200.7 ICP	1	72.3		mg/L	0.2	1	06/28/16 19:23	gss
Sodium, total	M200.7 ICP	1	74.5		mg/L	0.2	1	06/30/16 16:05	gss
Strontium, dissolved	M200.7 ICP	1	3.240		mg/L	0.005	0.03	06/29/16 17:39	gss
Strontium, total	M200.7 ICP	1	3.280		mg/L	0.005	0.03	06/30/16 16:05	gss
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	06/30/16 17:16	mfm
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	06/29/16 22:38	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	06/28/16 19:23	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/05/16 17:04	aeb
Titanium, dissolved	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	06/28/16 19:23	gss
Titanium, total	M200.7 ICP	1	0.016	B	mg/L	0.005	0.03	06/30/16 16:05	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	06/30/16 17:16	mfm
Uranium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0005	06/29/16 22:38	mfm
Vanadium, dissolved	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	06/28/16 19:23	gss
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	06/30/16 16:05	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	06/28/16 19:23	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	06/30/16 16:05	gss

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L31248-08**

Date Sampled: 06/21/16 10:45

Date Received: 06/23/16

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	68.3		*	mg/L	2	20	06/25/16 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/25/16 0:00	sck
Total Alkalinity		1	68.3		*	mg/L	2	20	06/25/16 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			07/11/16 0:00	calc
Sum of Anions			21			meq/L			07/11/16 0:00	calc
Sum of Cations			21			meq/L			07/11/16 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	06/25/16 12:53	sck
Chloride	SM4500Cl-E	1	66.9		*	mg/L	0.5	2	07/01/16 12:59	spl
Conductivity @25C	SM2510B	1	1710		*	umhos/cm	1	10	06/25/16 1:29	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:08	enb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/30/16 12:35	enb
Fluoride	SM4500F-C	1	1.17		*	mg/L	0.05	0.3	06/28/16 15:15	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		847			mg/L	0.2	5	07/11/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.38		*	mg/L	0.02	0.1	07/01/16 22:30	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/07/16 14:37	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	07/08/16 16:06	bsu
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/25/16 0:00	sck
pH measured at		1	23.5		*	C	0.1	0.1	06/25/16 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	07/11/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	06/29/16 17:15	enb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/23/16 20:13	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	06/29/16 18:19	enb
Residue, Filterable (TDS) @180C	SM2540C	1	1480		*	mg/L	10	20	06/24/16 13:22	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/24/16 15:49	sck
Residue, Total (TS) @ 105C	SM2540B	1	1520		*	mg/L	10	20	06/24/16 13:08	emk
Sulfate	D516-02/-07 - Turbidimetric	50	860		*	mg/L	50	250	07/07/16 12:02	spl
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/23/16 16:25	emk
TDS (calculated)	Calculation		1390			mg/L			07/11/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.06						07/11/16 0:00	calc

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-01	WG405528	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405507	Antimony, total	M200.8 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405404	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405494	Silver, dissolved	M200.8 ICP-MS	RF	Relative Percent Difference (RPD) for Ag in spiked samples exceeded limit. In the absence of HCl, precipitation of Ag may occur at different rates.
	WG405475	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.
	WG405230	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405262	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405420	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405951	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405212	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	

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ACZ Project ID: **L31248**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405505		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M1	Matrix spike recovery was high, 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.
WG405227		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG405254		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405228		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG405840		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.
WG405174		Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405230		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-02	WG405528	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405404	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405475	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.
	WG405230	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405263	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405420	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405951	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405212	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405505	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M1	Matrix spike recovery was high, 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.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405227	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405254	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405228	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405840	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.
	WG405174	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-03	WG405528	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405404	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405475	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.
	WG405230	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405263	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405420	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405951	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405212	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405505	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M1	Matrix spike recovery was high, 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.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405227	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405254	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405228	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405840	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.
	WG405174	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L31248**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-04	WG405528	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405404	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405475	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.
	WG405230	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405263	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405420	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405951	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405212	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405505	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M1	Matrix spike recovery was high, 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.	
WG405227	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG405254	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405228	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405840	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.
	WG405174	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-05	WG405528	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405404	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405494	Selenium, dissolved	M200.8 ICP-MS	IA	Internal standard recovery exceeded the acceptance limits. Concentration of associated target analyte(s) in the sample is < MDL.
	WG405475	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.
	WG405230	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405263	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405420	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
	WG405951	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405212	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405505	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405227	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG405254	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405228	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405840	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.
	WG405175	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-06	WG405528	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405404	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405475	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.
	WG405230	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405263	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405547	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
	WG405951	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405212	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405505	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405227	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405254	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405228	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG405840	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG405175	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-07	WG405528	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405494	Selenium, dissolved	M200.8 ICP-MS	IA	Internal standard recovery exceeded the acceptance limits. Concentration of associated target analyte(s) in the sample is < MDL.
	WG405475	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.
	WG405230	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405263	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405547	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
	WG405951	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG405230	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405212	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405505	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405227	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405254	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405228	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG405840	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405175	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-08	WG405475	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.
	WG405230	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405263	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405616	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG405230	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405531	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405547	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405364	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405636	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405817	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
	WG405951	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG405230	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405498	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405212	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405505	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405227	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG405254	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405228	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405840	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.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG405175	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405230	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Sample ID: SW3-EACZ Sample ID: **L31248-01**
Date Sampled: 06/21/16 10:25
Date Received: 06/23/16
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405329Analyst: mmn
Extract Date: 06/23/16 14:31
Analysis Date: 06/28/16 6:01

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	85.3		1.03	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L31248-01**
Date Sampled: 06/21/16 10:25
Date Received: 06/23/16
Sample Matrix: Surface Water

Oil & Grease, Total Recoverable

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

Workgroup: **WG405597**
Analyst: ITM
Extract Date:
Analysis Date: 07/01/16 11:22

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.11	*	mg/L	2.2	11.1

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L31248-02**
Date Sampled: 06/21/16 10:45
Date Received: 06/23/16
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405329

Analyst: mmn
Extract Date: 06/23/16 14:34
Analysis Date: 06/28/16 6:56

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.1	*	mg/L	0.1	0.6
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.4		1.1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L31248-02**
Date Sampled: 06/21/16 10:45
Date Received: 06/23/16
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG405597

Analyst: ITM

Extract Date:

Analysis Date: 07/01/16 11:43

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		4.8	B	1.11	*	mg/L	2.2	11.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L31248-03**
Date Sampled: 06/21/16 10:20
Date Received: 06/23/16
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405329Analyst: mmn
Extract Date: 06/23/16 14:37
Analysis Date: 06/28/16 7:23

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.5		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L31248-03**
Date Sampled: 06/21/16 10:20
Date Received: 06/23/16
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG405597

Analyst: ITM

Extract Date:

Analysis Date: 07/01/16 12:03

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.11	*	mg/L	2.2	11.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L31248-04**
Date Sampled: 06/21/16 8:15
Date Received: 06/23/16
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG405329

Analyst: mmn

Extract Date: 06/23/16 14:40

Analysis Date: 06/28/16 7:51

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.3	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.9		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L31248-04**
Date Sampled: 06/21/16 8:15
Date Received: 06/23/16
Sample Matrix: Surface Water

Oil & Grease, Total Recoverable

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

Workgroup: **WG405597**

Analyst: ITM

Extract Date:

Analysis Date: 07/01/16 12:24

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	0.99	*	mg/L	2	9.9

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L31248-05**
Date Sampled: 06/21/16 7:05
Date Received: 06/23/16
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405679Analyst: mmn
Extract Date: 06/28/16 14:15
Analysis Date: 07/01/16 13:37

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	76.3		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L31248-05**
Date Sampled: 06/21/16 7:05
Date Received: 06/23/16
Sample Matrix: Surface Water

Oil & Grease, Total Recoverable

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

Workgroup: WG405597

Analyst: ITM

Extract Date:

Analysis Date: 07/01/16 12:45

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: SW8-EACZ Sample ID: **L31248-06**
Date Sampled: 06/21/16 9:05
Date Received: 06/23/16
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405679Analyst: mmn
Extract Date: 06/28/16 14:20
Analysis Date: 07/01/16 14:04

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	79.2		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L31248-06**
Date Sampled: 06/21/16 9:05
Date Received: 06/23/16
Sample Matrix: *Surface Water*

Oil & Grease, Total Recoverable

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

Workgroup: WG405597

Analyst: ITM

Extract Date:

Analysis Date: 07/01/16 13:05

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		3.6	B	1.11	*	mg/L	2.2	11.1

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L31248-07**
Date Sampled: 06/21/16 7:55
Date Received: 06/23/16
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405679

Analyst: mmn
Extract Date: 06/28/16 14:25
Analysis Date: 07/01/16 14:31

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.1	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.1		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L31248-07**
Date Sampled: 06/21/16 7:55
Date Received: 06/23/16
Sample Matrix: Surface Water

Oil & Grease, Total Recoverable

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

Workgroup: **WG405597**
Analyst: ITM
Extract Date:
Analysis Date: 07/01/16 13:26

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.24	*	mg/L	2.5	12.4

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW11-EACZ Sample ID: **L31248-08**
Date Sampled: 06/21/16 10:45
Date Received: 06/23/16
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405679Analyst: mmn
Extract Date: 06/28/16 14:30
Analysis Date: 07/01/16 14:59

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.1	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L31248-08**
Date Sampled: 06/21/16 10:45
Date Received: 06/23/16
Sample Matrix: Surface Water

Oil & Grease, Total Recoverable

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

Workgroup: WG405597

Analyst: ITM

Extract Date:

Analysis Date: 07/01/16 13:46

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		2.9	B	1.25	*	mg/L	2.5	12.5

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>

ACZ Project ID: **L31248**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31248-01	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31248-02	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31248-03	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31248-04	WG405329	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31248-05	WG405679	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31248-06	WG405679	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31248-07	WG405679	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L31248-08	WG405679	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG405597	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L31248**

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

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L31248
 Date Received: 06/23/2016 09:48
 Received By: kmo
 Date Printed: 6/23/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples? A change was made in the Remarks 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 form 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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
2738	14	<=6.0	15	N/A
4190	12.3	<=6.0	14	N/A
4317	14.4	<=6.0	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.

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L31248
Date Received: 06/23/2016 09:48
Received By: kmo
Date Printed: 6/23/2016

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. *3248*

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@sunrafaci.com.gt

Address: Bulvar los Proccres, 13 calle 24-69 zona 10
Empresarial Zona Pradera Torre IV oficina 1406
Telephone: (502) 59515248

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc.
E-mail: M.Berganza@sunrafaci.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#: *Estobal*
Reporting state for compliance testing:
Check box if samples include NRC licensed material?

Matrix	DATE:TIME	Matrix	# of Containers															
SW3-E	2/06/16 10:25	SW	10	<i>800</i>														
SW2A-E	2/06/16 10:45	SW	10															
SW4A-E	2/06/16 10:20	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 for three COC's please present results in one report.
Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	15:15 27-06-2016	<i>[Signature]</i>	22:16 15:15 6-23-16 09:47

31248 Chain of Custody



Laboratories, Inc. *131248*

CHAIN of CUSTODY

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

Report to:

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

Address: Bulevar Los Proceres 18 calle 24-69 zona 10
Empresarial zona Pradera 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@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 [Signature] **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 #:	PO#:	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers												
<u>water quality</u>	<u>Escobal</u>		<input type="checkbox"/>	<u>SWS-E</u>	<u>21/06/16 08:15</u>	<u>SW</u>	<u>10</u>	<u>SW</u>											
				<u>SW6-E</u>	<u>21/06/16 07:05</u>	<u>SW</u>	<u>10</u>												
				<u>SW8-E</u>	<u>21/06/16 09:05</u>	<u>SW</u>	<u>10</u>												

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.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<u>[Signature]</u>	<u>15:15</u>	<u>[Signature]</u>	<u>21.6.16 15:15</u>
	<u>21.06.2016</u>	<u>[Signature]</u>	<u>623160947</u>



Laboratories, Inc.

631248

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard Los Proceres 18 Calle 24-69 Zona 10
Empresarial, Zona Pradera, Torre IV of: Cima 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@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: 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 for # of Containers and analysis results. Includes handwritten 'SW' and '10'.

SAMPLE IDENTIFICATION DATE:TIME Matrix

Table with columns for Sample ID, Date/Time, and Matrix. Includes handwritten entries: SW9-E, 21/06/16, 07:55, SW; SW11-E, 21/06/16, 10:45, SW.

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 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 June 21st 2016

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.



ECOSISTEMAS
PROYECTOS AMBIENTALES

LABORATORIO AMBIENTAL E INDUSTRIAL

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REG 016 Resultados de Análisis

Ref 1189-16

Pág 1/1

Muestra: 5 muestras de agua

Análisis solicitado por: Ing. Miguel Berganza

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

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 200616

Fecha de ingreso de muestras: 200616

Fecha de análisis: 200616-040716

Fecha de informe: 040716

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)
5144	SW1-E	105	15	< 10	< 25	N.D.	9.2 x 10 ³
5145	SW2-E	10	< 1	< 10	< 25	N.D.	1.6 x 10 ³
5146	SW4-E	308	< 1	< 10	63	N.D.	5.4 x 10 ⁵
5147	SW7-E	630	49	< 10	40	N.D.	3.5 x 10 ³
5148	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 más 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 L.E 006-04*

*** Análisis referido.*

Ing. Oscar Páez
Gerente Técnico

VoBo Ing. Fernando Fuentes
Gerente de Calidad



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PROYECTOS AMBIENTALES

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Ref 1194-16

Pág 1/1

REG 016 Resultados de Análisis

Muestra: 8 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: 210616

Fecha de ingreso de muestras: 210616

Fecha de análisis: 210616-040716

Fecha de informe: 040716

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)
5158	SW2A-E	< 1	< 1	< 10	< 25	N.D.	1.7 x 10 ³
5159	SW3-E	188	20	< 10	< 25	N.D.	9.2 x 10 ³
5160	SW4A-E	104	< 1	< 10	30	N.D.	2.2 x 10 ⁵
5161	SW5-E	103	24	< 10	< 25	N.D.	4.3 x 10 ³
5162	SW6-E	210	42	< 10	< 25	N.D.	2.3 x 10 ³
5163	SW8-E	143	4	18	36	N.D.	9.2 x 10 ⁵
5164	SW9-E	208	25	< 10	30	N.D.	2.4 x 10 ⁵
5165	SW11-E	< 1	< 1	< 10	< 25	N.D.	490

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 más 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

June 22, 2016

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: L30928

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 09, 2016. This project has been assigned to ACZ's project number, L30928. 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 L30928. 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.

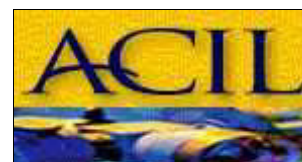
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 22, 2016. 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.

June 22, 2016

Project ID: Escobal

ACZ Project ID: L30928

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 5 ground water samples from Tahoe Resources, Inc. on June 9, 2016. 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 L30928. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with "H" flags (H3, HE), received either after the hold time expired or too close to the hold time.

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L30928-01**

Date Sampled: 06/07/16 09:00

Date Received: 06/09/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/16/16 10:46	enb
Cyanide, WAD	SM4500-CN I- distillation		-						06/15/16 12:34	krh
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/17/16 13:48	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/16 15:35	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/16/16 13:28	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.22			mg/L	0.03	0.2	06/10/16 21:18	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0010	B		mg/L	0.0004	0.002	06/13/16 18:06	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0072			mg/L	0.0002	0.001	06/13/16 18:06	msh
Barium, dissolved	M200.7 ICP	1	0.120			mg/L	0.003	0.02	06/10/16 21:18	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:18	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/10/16 21:18	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:18	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:06	msh
Calcium, dissolved	M200.7 ICP	1	15.1			mg/L	0.1	0.5	06/10/16 21:18	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:18	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:18	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:18	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:18	aeb
Iron, dissolved	M200.7 ICP	1	0.18			mg/L	0.02	0.05	06/10/16 21:18	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	06/13/16 18:06	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:18	aeb
Magnesium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	06/10/16 21:18	aeb
Manganese, dissolved	M200.7 ICP	1	0.070			mg/L	0.005	0.03	06/10/16 21:18	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/16/16 12:20	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/10/16 21:18	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:18	aeb
Potassium, dissolved	M200.7 ICP	1	1.6			mg/L	0.2	1	06/10/16 21:18	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:18	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	06/13/16 18:06	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	06/13/16 18:06	msh
Sodium, dissolved	M200.7 ICP	1	7.4			mg/L	0.2	1	06/10/16 21:18	aeb
Strontium, dissolved	M200.7 ICP	1	0.124			mg/L	0.005	0.03	06/10/16 21:18	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:06	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/10/16 21:18	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:18	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:06	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:18	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:18	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L30928-01**

Date Sampled: 06/07/16 09:00

Date Received: 06/09/16

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	57.7		*	mg/L	2	20	06/10/16 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/10/16 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/10/16 0:00	id
Total Alkalinity		1	57.7		*	mg/L	2	20	06/10/16 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-9.7			%			06/22/16 0:00	calc
Sum of Anions			1.7			meq/L			06/22/16 0:00	calc
Sum of Cations			1.4			meq/L			06/22/16 0:00	calc
Chloride	SM4500Cl-E	1	4.9		*	mg/L	0.5	2	06/21/16 16:02	bsu
Conductivity @25C	SM2510B	1	180		*	umhos/cm	1	10	06/10/16 4:44	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 23:14	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 0:04	pjb
Fluoride	SM4500F-C	1	0.16	B	*	mg/L	0.05	0.3	06/14/16 21:32	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		49			mg/L	0.2	5	06/22/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.18		*	mg/L	0.02	0.1	06/17/16 23:21	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/21/16 12:26	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	06/18/16 2:10	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	06/10/16 0:00	id
pH measured at		1	23.4		*	C	0.1	0.1	06/10/16 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.06	0.2	06/22/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.02	0.05	06/15/16 23:02	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.02	0.05	06/09/16 22:42	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.02	0.05	06/17/16 21:43	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	170		*	mg/L	10	20	06/11/16 12:17	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/13/16 15:46	id
Residue, Total (TS) @105C	SM2540B	1	172		*	mg/L	10	20	06/10/16 16:15	emk
Sulfate	D516-02/-07 - Turbidimetric	1	16.5		*	mg/L	1	5	06/17/16 15:21	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/13/16 10:57	abd
TDS (calculated)	Calculation		84.2			mg/L			06/22/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		2.02						06/22/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-3

ACZ Sample ID: **L30928-02**
 Date Sampled: 06/07/16 10:40
 Date Received: 06/09/16
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/16/16 11:00	enb
Cyanide, WAD	SM4500-CN I- distillation								06/15/16 12:48	krh
Nitrogen, total Kjeldahl	M351.2 - Block Digestor				*				06/17/16 14:06	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/16 15:47	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion				*				06/16/16 13:41	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	06/10/16 21:34	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	06/13/16 18:08	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	06/13/16 18:08	msh
Barium, dissolved	M200.7 ICP	1	0.127			mg/L	0.003	0.02	06/10/16 21:34	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:34	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/10/16 21:34	aeb
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/10/16 21:34	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:08	msh
Calcium, dissolved	M200.7 ICP	1	83.9			mg/L	0.1	0.5	06/10/16 21:34	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:34	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:34	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:34	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:34	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/10/16 21:34	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:08	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:34	aeb
Magnesium, dissolved	M200.7 ICP	1	17.6			mg/L	0.2	1	06/10/16 21:34	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:34	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/16/16 12:22	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/10/16 21:34	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:34	aeb
Potassium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	06/10/16 21:34	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:34	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	06/13/16 18:08	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/13/16 18:08	msh
Sodium, dissolved	M200.7 ICP	1	21.2			mg/L	0.2	1	06/10/16 21:34	aeb
Strontium, dissolved	M200.7 ICP	1	0.410			mg/L	0.005	0.03	06/10/16 21:34	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:08	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/10/16 21:34	aeb
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	06/10/16 21:34	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:08	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:34	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:34	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-3

ACZ Sample ID: **L30928-02**

Date Sampled: 06/07/16 10:40

Date Received: 06/09/16

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	113		*	mg/L	2	20	06/10/16 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/10/16 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/10/16 0:00	id
Total Alkalinity		1	113		*	mg/L	2	20	06/10/16 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-4.2			%			06/22/16 0:00	calc
Sum of Anions			7.4			meq/L			06/22/16 0:00	calc
Sum of Cations			6.8			meq/L			06/22/16 0:00	calc
Chloride	SM4500Cl-E	1	17.2		*	mg/L	0.5	2	06/21/16 16:02	bsu
Conductivity @25C	SM2510B	1	672		*	umhos/cm	1	10	06/10/16 4:53	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5	0.019		*	mg/L	0.003	0.01	06/16/16 23:15	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 0:07	pjb
Fluoride	SM4500F-C	1	0.18	B	*	mg/L	0.05	0.3	06/14/16 21:36	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		282			mg/L	0.2	5	06/22/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	3.51		*	mg/L	0.06	0.3	06/17/16 23:41	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/21/16 12:28	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	06/18/16 2:11	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	06/10/16 0:00	id
pH measured at		1	23.3		*	C	0.1	0.1	06/10/16 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	06/22/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/15/16 22:47	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.02	0.05	06/09/16 22:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/17/16 21:44	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	532		*	mg/L	10	20	06/11/16 12:19	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/13/16 15:47	id
Residue, Total (TS) @105C	SM2540B	1	546		*	mg/L	10	20	06/10/16 16:18	emk
Sulfate	D516-02/-07 - Turbidimetric	20	221		*	mg/L	20	100	06/17/16 15:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/13/16 11:01	abd
TDS (calculated)	Calculation		440			mg/L			06/22/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.21						06/22/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L30928-03**

Date Sampled: 06/07/16 12:00

Date Received: 06/09/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/16/16 11:14	enb
Cyanide, WAD	SM4500-CN I- distillation								06/15/16 13:02	krh
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/17/16 14:24	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/16 15:59	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/16/16 14:06	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	06/10/16 21:37	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/13/16 18:10	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	06/13/16 18:10	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	06/10/16 21:37	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:37	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/10/16 21:37	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:37	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:10	msh
Calcium, dissolved	M200.7 ICP	1		U		mg/L	0.1	0.5	06/10/16 21:37	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:37	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:37	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:37	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:37	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/10/16 21:37	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:10	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:37	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/10/16 21:37	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:37	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/16/16 12:24	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/10/16 21:37	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:37	aeb
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/10/16 21:37	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:37	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/13/16 18:10	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/13/16 18:10	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/10/16 21:37	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:37	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:10	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/10/16 21:37	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:37	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:10	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:37	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:37	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L30928-03**

Date Sampled: 06/07/16 12:00

Date Received: 06/09/16

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	06/10/16 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/10/16 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/10/16 0:00	id
Total Alkalinity		1		U	*	mg/L	2	20	06/10/16 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			06/22/16 0:00	calc
Sum of Anions				U		meq/L			06/22/16 0:00	calc
Sum of Cations				U		meq/L			06/22/16 0:00	calc
Chloride	SM4500Cl-E	1	0.7	B	*	mg/L	0.5	2	06/21/16 16:02	bsu
Conductivity @25C	SM2510B	1	1.6	B	*	umhos/cm	1	10	06/10/16 5:02	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 23:19	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 0:08	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	06/14/16 21:44	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation			U		mg/L	0.2	5	06/22/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/17/16 23:26	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/21/16 12:32	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/18/16 2:12	pjb
pH (lab)	SM4500H+ B									
pH		1	6.5	H	*	units	0.1	0.1	06/10/16 0:00	id
pH measured at		1	23.2		*	C	0.1	0.1	06/10/16 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	06/22/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/15/16 22:49	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/09/16 22:44	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/17/16 21:46	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	06/11/16 12:22	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/13/16 15:49	id
Residue, Total (TS) @105C	SM2540B	1		U	*	mg/L	10	20	06/10/16 16:20	emk
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	06/17/16 15:21	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/13/16 11:05	abd
TDS (calculated)	Calculation		0.7			mg/L			06/22/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		n/a						06/22/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-11

ACZ Sample ID: **L30928-04**

Date Sampled: 06/07/16 10:40

Date Received: 06/09/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/16/16 11:21	enb
Cyanide, WAD	SM4500-CN I- distillation								06/15/16 13:16	krh
Nitrogen, total Kjeldahl	M351.2 - Block Digestor				*				06/17/16 14:42	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/16 16:05	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion				*				06/16/16 14:31	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	06/10/16 21:40	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	06/13/16 18:12	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0026			mg/L	0.0002	0.001	06/13/16 18:12	msh
Barium, dissolved	M200.7 ICP	1	0.128			mg/L	0.003	0.02	06/10/16 21:40	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:40	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/10/16 21:40	aeb
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/10/16 21:40	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:12	msh
Calcium, dissolved	M200.7 ICP	1	84.8			mg/L	0.1	0.5	06/10/16 21:40	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:40	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:40	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:40	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:40	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/10/16 21:40	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:12	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:40	aeb
Magnesium, dissolved	M200.7 ICP	1	17.7			mg/L	0.2	1	06/10/16 21:40	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:40	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/16/16 12:25	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/10/16 21:40	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:40	aeb
Potassium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	06/10/16 21:40	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:40	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	06/13/16 18:12	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/13/16 18:12	msh
Sodium, dissolved	M200.7 ICP	1	21.3			mg/L	0.2	1	06/10/16 21:40	aeb
Strontium, dissolved	M200.7 ICP	1	0.415			mg/L	0.005	0.03	06/10/16 21:40	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:12	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/10/16 21:40	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/10/16 21:40	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/13/16 18:12	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:40	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:40	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-11

ACZ Sample ID: **L30928-04**

Date Sampled: 06/07/16 10:40

Date Received: 06/09/16

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	95.7			mg/L	2	20	06/10/16 0:00	id
Carbonate as CaCO3		1		U		mg/L	2	20	06/10/16 0:00	id
Hydroxide as CaCO3		1		U		mg/L	2	20	06/10/16 0:00	id
Total Alkalinity		1	95.7			mg/L	2	20	06/10/16 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.7			%			06/22/16 0:00	calc
Sum of Anions			7.0			meq/L			06/22/16 0:00	calc
Sum of Cations			6.9			meq/L			06/22/16 0:00	calc
Chloride	SM4500Cl-E	1	16.8		*	mg/L	0.5	2	06/21/16 16:02	bsu
Conductivity @25C	SM2510B	1	646			umhos/cm	1	10	06/10/16 5:10	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 23:20	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 0:08	pjb
Fluoride	SM4500F-C	1	0.18	B		mg/L	0.05	0.3	06/14/16 21:48	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		285			mg/L	0.2	5	06/22/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.49		*	mg/L	0.02	0.1	06/17/16 23:33	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/21/16 12:33	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	06/18/16 2:13	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H		units	0.1	0.1	06/10/16 0:00	id
pH measured at		1	23.2			C	0.1	0.1	06/10/16 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	06/22/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/15/16 22:50	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.02	0.05	06/09/16 22:47	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/17/16 21:48	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	530			mg/L	10	20	06/11/16 12:24	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/13/16 15:51	id
Residue, Total (TS) @105C	SM2540B	1	544			mg/L	10	20	06/10/16 16:23	emk
Sulfate	D516-02/-07 - Turbidimetric	20	220		*	mg/L	20	100	06/17/16 15:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/13/16 11:09	abd
TDS (calculated)	Calculation		429			mg/L			06/22/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.24						06/22/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L30928-05**

Date Sampled: 06/07/16 09:55

Date Received: 06/09/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/16/16 11:28	enb
Cyanide, WAD	SM4500-CN I- distillation								06/15/16 13:30	krh
Nitrogen, total Kjeldahl	M351.2 - Block Digestor				*				06/17/16 15:00	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/16 16:11	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion				*				06/16/16 14:44	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	06/10/16 21:43	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/13/16 18:19	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	06/13/16 18:19	msh
Barium, dissolved	M200.7 ICP	1	0.075			mg/L	0.003	0.02	06/10/16 21:43	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:43	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/10/16 21:43	aeb
Boron, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	06/10/16 21:43	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:19	msh
Calcium, dissolved	M200.7 ICP	1	140			mg/L	0.1	0.5	06/10/16 21:43	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:43	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:43	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:43	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:43	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/10/16 21:43	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:19	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:43	aeb
Magnesium, dissolved	M200.7 ICP	1	23			mg/L	0.2	1	06/10/16 21:43	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:43	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/16/16 12:35	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/10/16 21:43	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/10/16 21:43	aeb
Potassium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	06/10/16 21:43	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/10/16 21:43	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/13/16 18:19	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/13/16 18:19	msh
Sodium, dissolved	M200.7 ICP	1	41.4			mg/L	0.2	1	06/10/16 21:43	aeb
Strontium, dissolved	M200.7 ICP	1	1.090			mg/L	0.005	0.03	06/10/16 21:43	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/13/16 18:19	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/10/16 21:43	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	06/10/16 21:43	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	06/13/16 18:19	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/10/16 21:43	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/10/16 21:43	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L30928-05**

Date Sampled: 06/07/16 09:55

Date Received: 06/09/16

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	140			mg/L	2	20	06/10/16 0:00	id
Carbonate as CaCO3		1		U		mg/L	2	20	06/10/16 0:00	id
Hydroxide as CaCO3		1		U		mg/L	2	20	06/10/16 0:00	id
Total Alkalinity		1	140			mg/L	2	20	06/10/16 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-4.3			%			06/22/16 0:00	calc
Sum of Anions			12			meq/L			06/22/16 0:00	calc
Sum of Cations			11			meq/L			06/22/16 0:00	calc
Chloride	SM4500Cl-E	1	37		*	mg/L	0.5	2	06/21/16 16:18	bsu
Conductivity @25C	SM2510B	1	991			umhos/cm	1	10	06/10/16 5:19	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 23:21	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/16 0:09	pjb
Fluoride	SM4500F-C	1	0.90			mg/L	0.05	0.3	06/14/16 21:51	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		444			mg/L	0.2	5	06/22/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.91		*	mg/L	0.02	0.1	06/17/16 23:34	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/21/16 12:35	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	06/18/16 2:15	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H		units	0.1	0.1	06/10/16 0:00	id
pH measured at		1	23.1			C	0.1	0.1	06/10/16 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.06	0.2	06/22/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	06/15/16 22:53	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.02	0.05	06/09/16 22:49	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.02	0.05	06/17/16 21:49	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	790			mg/L	10	20	06/11/16 12:27	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	06/13/16 15:52	id
Residue, Total (TS) @105C	SM2540B	1	804			mg/L	10	20	06/10/16 16:26	emk
Sulfate	D516-02/-07 - Turbidimetric	20	369		*	mg/L	20	100	06/17/16 15:45	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/13/16 11:13	abd
TDS (calculated)	Calculation		707			mg/L			06/22/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.12						06/22/16 0:00	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L30928-01	WG404506	Silver, dissolved	M200.8 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG404351	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG404989	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG404351	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG404779	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404696	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404556	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404351	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG404862	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404921	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404864	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404351	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG404693	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
			M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
	WG404360	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
	WG404860	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404440	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404499	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404428	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG404848	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike

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Tahoe Resources, Inc.

ACZ Project ID: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG404470	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404351	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L30928-02	WG404784	Nitrogen, total Kjeldahl	M351.2 - Block Digester	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG404724	Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG404351	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG404989	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG404351	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG404779	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404696	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404556	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404351	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG404862	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404921	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404864	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404351	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG404693	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404360	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404860	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404440	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG404499	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG404428	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG404848	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.
	WG404470	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404351	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L30928-03	WG404351	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG404989	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG404351	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG404779	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404696	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404556	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404351	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG404862	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404921	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404864	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404351	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG404693	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404360	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404860	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404440	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG404499	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404428	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG404848	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.	

Tahoe Resources, Inc.

ACZ Project ID: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG404470	Sulfide as S	SM4500S2-D SM4500S2-D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404351	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
L30928-04	WG404784	Nitrogen, total Kjeldahl	M351.2 - Block Digester	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG404724	Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG404989	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404779	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	M2 RA	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404696	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404862	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved M353.2 - H2SO4 preserved	Q5 RA	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory. Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404921	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404864	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404693	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404360	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid M365.1 - Automated Ascorbic Acid	HE RA	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). Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404860	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404499	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404848	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.
	WG404470	Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L30928-05	WG404784	Nitrogen, total Kjeldahl	M351.2 - Block Digester	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG404724	Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG404989	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404779	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	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404696	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404862	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404921	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404864	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404693	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404360	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404860	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404499	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404848	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.
	WG404470	Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-2ACZ Sample ID: **L30928-01**
Date Sampled: 06/07/16 9:00
Date Received: 06/09/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520**Workgroup: **WG404639**
Analyst: itm
Extract Date: 06/13/16 16:54
Analysis Date: 06/15/16 14:21

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	82.4		1.03	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-3

ACZ Sample ID: **L30928-02**
Date Sampled: 06/07/16 10:40
Date Received: 06/09/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG404639
Analyst: itm
Extract Date: 06/13/16 16:55
Analysis Date: 06/15/16 14:48

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.3		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L30928-03**
Date Sampled: 06/07/16 12:00
Date Received: 06/09/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG404639
Analyst: itm
Extract Date: 06/13/16 16:57
Analysis Date: 06/15/16 15:16

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	0.93	*	mg/L	0.09	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85		0.93	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-11ACZ Sample ID: **L30928-04**
Date Sampled: 06/07/16 10:40
Date Received: 06/09/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG404639Analyst: itm
Extract Date: 06/13/16 16:58
Analysis Date: 06/15/16 15:43

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.9		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L30928-05**
Date Sampled: 06/07/16 9:55
Date Received: 06/09/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG404639
Analyst: itm
Extract Date: 06/13/16 17:00
Analysis Date: 06/15/16 16:11

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	77.3		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>

ACZ Project ID: **L30928**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L30928-01	WG404639	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L30928-02	WG404639	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L30928-03	WG404639	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L30928-04	WG404639	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L30928-05	WG404639	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L30928**

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

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L30928
 Date Received: 06/09/2016 10:01
 Received By: kmo
 Date Printed: 6/9/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form 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 form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹		X	

L30928-02 Container B1719394 (YELLOW): Added 2 mls sulfuric acid to the sub-sample to adjust the pH to the appropriate range.

L30928-04 Container B1719414 (YELLOW): Added 2 mls sulfuric acid to the sub-sample to adjust the pH to the appropriate range.

L30928-05 Container B1719423 (YELLOW): Added 2 mls sulfuric acid to the sub-sample to adjust the pH to the appropriate range.

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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L30928
 Date Received: 06/09/2016 10:01
 Received By: kmo
 Date Printed: 6/9/2016

3431	5.8	<=6.0	16	Yes
4278	7.6	<=6.0	20	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.

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. 130928

CHAIN of CUSTODY

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

Report to:

Name: <u>Miguel Berganza</u>	Address: <u>Bulevar los procesos, is calle 24-69 Zona 16</u>
Company: <u>Tahoe Resources Inc</u>	<u>Empresarial, zona pradera, Torre IV Oficinas 1406</u>
E-mail: <u>M.Berganza@santafael.com.gt</u>	Telephone: <u>(502) 5951 5248</u>

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <u>Water Quality</u>	# of Containers	<u>GW+TPH</u>																					
PO#: <u>Escoba</u>																							
Reporting state for compliance testing:																							
Check box if samples include NRC licensed material?																							
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	#																				
<u>GW-2</u>	<u>09:00 07/06/16</u>	<u>GW</u>	<u>8</u>	<input checked="" type="checkbox"/>																			
<u>GW-3</u>	<u>10:40 07/06/16</u>	<u>GW</u>	<u>8</u>	<input checked="" type="checkbox"/>																			
<u>GW-10</u>	<u>12:00 07/06/16</u>	<u>GW</u>	<u>8</u>	<input checked="" type="checkbox"/>																			

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

REMARKS

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
<u>[Signature]</u>	<u>07-06-2016 15:20</u>	<u>[Signature]</u>	<u>07.6.16 15:20</u>
		<u>[Signature]</u>	<u>6-9-16 1001</u>

130928 Chain of Custody



Laboratories, Inc.

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

CHAIN of CUSTODY

Report to:

Name: Miguel Berganza	Address: Boulevard los paises 18 Calle 24-69 Zona 10
Company: Tahoe Resources inc.	Empresarial, Zona Pradera Torre IV oficina 1406
E-mail: MBerganza@santafael.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@santafael.com.gt	Telephone:

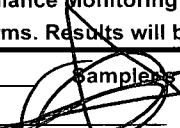
If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES NO

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 Sample Site Information State Zip code Time Zone

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Water Quality

PO#: Escobal

Reporting state for compliance testing:

Check box if samples include NRC licensed material?

4.
5.

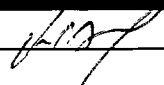

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	GW+TPH										
GW-11	07/06/16 10:40	GW	8	/										
RW-1	07/06/16 09:55	GW	8	/										
WW9	07/06/16 11:05	WW	1	/										

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 all analysis of GW+TPH in the same report.
cyanide result 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
	07/06/2016 15:20	Gomez 	7.6.16 15:20 6-9/16 1601



Guatemala June 7th 2016

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.

June 29, 2016

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: L31099

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 16, 2016. This project has been assigned to ACZ's project number, L31099. 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 L31099. 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.

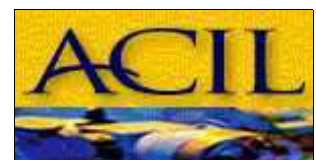
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 29, 2016. 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.

June 29, 2016

Project ID: Escobal

ACZ Project ID: L31099

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 12 ground water samples from Tahoe Resources, Inc. on June 16, 2016. 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 L31099. 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, H1, HE, HC), received either after the hold time expired or too close to the hold time.

Sample Analysis

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

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.
2. For the TPH value flagged with an "N1", there are some non-hydrocarbon acid peaks evident in chromatogram contributing to TPH results.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-21

ACZ Sample ID: **L31099-01**
Date Sampled: 06/14/16 16:30
Date Received: 06/16/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 10:51	enb
Cyanide, WAD	SM4500-CN I- distillation								06/22/16 14:10	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 12:56	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 15:47	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 17:36	enb

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	06/21/16 13:20	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:28	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	06/21/16 1:28	msh
Barium, dissolved	M200.7 ICP	1	0.024			mg/L	0.003	0.02	06/21/16 13:20	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:20	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:20	gss
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	06/21/16 13:20	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:28	msh
Calcium, dissolved	M200.7 ICP	1	69			mg/L	0.1	0.5	06/21/16 13:20	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:20	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:20	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:20	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:20	gss
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	06/21/16 13:20	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:28	msh
Lithium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.008	0.04	06/21/16 13:20	gss
Magnesium, dissolved	M200.7 ICP	1	7.5			mg/L	0.2	1	06/21/16 13:20	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:20	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:25	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:20	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:20	gss
Potassium, dissolved	M200.7 ICP	1	3.8			mg/L	0.2	1	06/21/16 13:20	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:20	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	06/21/16 1:28	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:28	msh
Sodium, dissolved	M200.7 ICP	1	24.7			mg/L	0.2	1	06/21/16 13:20	gss
Strontium, dissolved	M200.7 ICP	1	0.615		*	mg/L	0.005	0.03	06/21/16 13:20	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:28	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 13:20	gss
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/21/16 13:20	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/21/16 1:28	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	06/21/16 13:20	gss
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/21/16 13:20	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-21

ACZ Sample ID: **L31099-01**
 Date Sampled: 06/14/16 16:30
 Date Received: 06/16/16
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	79.8		*	mg/L	2	20	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1	79.8		*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.9			%			06/29/16 0:00	calc
Sum of Anions			5.1			meq/L			06/29/16 0:00	calc
Sum of Cations			5.3			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	13.2		*	mg/L	0.5	2	06/28/16 11:04	krh
Conductivity @25C	SM2510B	1	520		*	umhos/cm	1	10	06/17/16 22:46	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:37	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 15:41	enb
Fluoride	SM4500F-C	1	0.85		*	mg/L	0.05	0.3	06/20/16 12:18	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		203			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.62		*	mg/L	0.02	0.1	06/25/16 15:54	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 9:38	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/28/16 23:26	pjb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.8		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	06/22/16 23:21	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.02	0.05	06/16/16 21:32	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	06/22/16 22:57	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	434		*	mg/L	10	20	06/17/16 13:17	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:43	id
Residue, Total (TS) @ 105C	SM2540B	1	440		*	mg/L	10	20	06/17/16 11:49	sck
Sulfate	D516-02/-07 - Turbidimetric	5	146		*	mg/L	5	25	06/27/16 13:07	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 15:17	emk
TDS (calculated)	Calculation		314			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.38						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-1

ACZ Sample ID: **L31099-02**
Date Sampled: 06/14/16 10:55
Date Received: 06/16/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 10:58	enb
Cyanide, WAD	SM4500-CN I- distillation								06/22/16 15:16	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 13:06	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 15:55	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 17:44	enb

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	06/21/16 13:23	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:31	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0059			mg/L	0.0002	0.001	06/21/16 1:31	msh
Barium, dissolved	M200.7 ICP	1	0.021			mg/L	0.003	0.02	06/21/16 13:23	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:23	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:23	gss
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	06/21/16 13:23	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:31	msh
Calcium, dissolved	M200.7 ICP	1	197			mg/L	0.1	0.5	06/21/16 13:23	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:23	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:23	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:23	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:23	gss
Iron, dissolved	M200.7 ICP	1	3.09		*	mg/L	0.02	0.05	06/21/16 13:23	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:31	msh
Lithium, dissolved	M200.7 ICP	1	0.085			mg/L	0.008	0.04	06/21/16 13:23	gss
Magnesium, dissolved	M200.7 ICP	1	35.5			mg/L	0.2	1	06/21/16 13:23	gss
Manganese, dissolved	M200.7 ICP	1	0.060			mg/L	0.005	0.03	06/21/16 13:23	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:27	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:23	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:23	gss
Potassium, dissolved	M200.7 ICP	1	4.6			mg/L	0.2	1	06/21/16 13:23	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:23	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/21/16 1:31	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:31	msh
Sodium, dissolved	M200.7 ICP	1	46.8			mg/L	0.2	1	06/21/16 13:23	gss
Strontium, dissolved	M200.7 ICP	1	1.850		*	mg/L	0.005	0.03	06/21/16 13:23	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:31	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 13:23	gss
Titanium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	06/21/16 13:23	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	06/21/16 1:31	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:23	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:23	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-1

ACZ Sample ID: **L31099-02**
 Date Sampled: 06/14/16 10:55
 Date Received: 06/16/16
 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	153		*	mg/L	2	20	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1	153		*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			06/29/16 0:00	calc
Sum of Anions			15			meq/L			06/29/16 0:00	calc
Sum of Cations			15			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	40.7		*	mg/L	0.5	2	06/28/16 11:04	krh
Conductivity @25C	SM2510B	1	1210		*	umhos/cm	1	10	06/17/16 22:55	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:38	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 15:41	enb
Fluoride	SM4500F-C	1	2.45		*	mg/L	0.05	0.3	06/20/16 12:21	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		638			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/25/16 15:55	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 9:42	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	06/28/16 23:27	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.6		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/22/16 23:22	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/16/16 21:33	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/22/16 22:58	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	992		*	mg/L	10	20	06/17/16 13:19	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:44	id
Residue, Total (TS) @ 105C	SM2540B	1	1020		*	mg/L	10	20	06/17/16 11:51	sck
Sulfate	D516-02/-07 - Turbidimetric	20	527		*	mg/L	20	100	06/27/16 13:11	krh
Sulfide as S	SM4500S2-D	1	0.16		*	mg/L	0.02	0.1	06/20/16 15:27	emk
TDS (calculated)	Calculation		952			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.04						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-1A

ACZ Sample ID: **L31099-03**

Date Sampled: 06/14/16 05:30

Date Received: 06/16/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 11:06	enb
Cyanide, WAD	SM4500-CN I- distillation								06/22/16 16:23	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 13:15	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 16:03	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 17:52	enb

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.13	B		mg/L	0.03	0.2	06/21/16 13:38	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:33	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0013			mg/L	0.0002	0.001	06/21/16 1:33	msh
Barium, dissolved	M200.7 ICP	1	0.071			mg/L	0.003	0.02	06/21/16 13:38	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:38	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:38	gss
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:38	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:33	msh
Calcium, dissolved	M200.7 ICP	1	7			mg/L	0.1	0.5	06/21/16 13:38	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:38	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:38	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:38	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:38	gss
Iron, dissolved	M200.7 ICP	1	0.10		*	mg/L	0.02	0.05	06/21/16 13:38	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/21/16 1:33	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:38	gss
Magnesium, dissolved	M200.7 ICP	1	2.7			mg/L	0.2	1	06/21/16 13:38	gss
Manganese, dissolved	M200.7 ICP	1	0.068			mg/L	0.005	0.03	06/21/16 13:38	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:29	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:38	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:38	gss
Potassium, dissolved	M200.7 ICP	1	5.6			mg/L	0.2	1	06/21/16 13:38	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:38	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	06/21/16 1:33	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:33	msh
Sodium, dissolved	M200.7 ICP	1	8.3			mg/L	0.2	1	06/21/16 13:38	gss
Strontium, dissolved	M200.7 ICP	1	0.061		*	mg/L	0.005	0.03	06/21/16 13:38	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:33	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 13:38	gss
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/21/16 13:38	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:33	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/21/16 13:38	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:38	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L31099-03**
 Date Sampled: 06/14/16 05:30
 Date Received: 06/16/16
 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	32.1		*	mg/L	2	20	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1	32.1		*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			5.0			%			06/29/16 0:00	calc
Sum of Anions			0.995			meq/L			06/29/16 0:00	calc
Sum of Cations			1.1			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	5.7		*	mg/L	0.5	2	06/28/16 11:04	krh
Conductivity @25C	SM2510B	1	122		*	umhos/cm	1	10	06/17/16 23:03	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:39	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 15:42	enb
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	06/20/16 12:26	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		29			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.14		*	mg/L	0.02	0.1	06/25/16 15:57	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1	0.08	B	*	mg/L	0.05	0.2	06/28/16 9:44	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.9		*	mg/L	0.1	0.5	06/28/16 23:28	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.6		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.37			mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.12		*	mg/L	0.02	0.05	06/22/16 23:26	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.14	H	*	mg/L	0.02	0.05	06/16/16 21:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.16		*	mg/L	0.02	0.05	06/22/16 22:59	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	210		*	mg/L	10	20	06/17/16 13:21	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:46	id
Residue, Total (TS) @ 105C	SM2540B	1	210		*	mg/L	10	20	06/17/16 11:53	sck
Sulfate	D516-02/-07 - Turbidimetric	1	8.9		*	mg/L	1	5	06/27/16 13:02	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 15:38	emk
TDS (calculated)	Calculation		58.3			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		3.60						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-11

ACZ Sample ID: **L31099-04**
Date Sampled: 06/14/16 08:55
Date Received: 06/16/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 11:21	enb
Cyanide, WAD	SM4500-CN I- distillation								06/22/16 17:30	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 13:35	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 16:10	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 13:58	spl

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	06/21/16 13:41	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:35	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0030			mg/L	0.0002	0.001	06/21/16 1:35	msh
Barium, dissolved	M200.7 ICP	1	0.026			mg/L	0.003	0.02	06/21/16 13:41	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:41	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:41	gss
Boron, dissolved	M200.7 ICP	1	0.17			mg/L	0.01	0.05	06/21/16 13:41	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:35	msh
Calcium, dissolved	M200.7 ICP	1	247			mg/L	0.1	0.5	06/21/16 13:41	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:41	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:41	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:41	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:41	gss
Iron, dissolved	M200.7 ICP	1	2.10		*	mg/L	0.02	0.05	06/21/16 13:41	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:35	msh
Lithium, dissolved	M200.7 ICP	1	0.080			mg/L	0.008	0.04	06/21/16 13:41	gss
Magnesium, dissolved	M200.7 ICP	1	36.8			mg/L	0.2	1	06/21/16 13:41	gss
Manganese, dissolved	M200.7 ICP	1	0.027	B		mg/L	0.005	0.03	06/21/16 13:41	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:31	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:41	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:41	gss
Potassium, dissolved	M200.7 ICP	1	4.5			mg/L	0.2	1	06/21/16 13:41	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:41	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/21/16 1:35	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:35	msh
Sodium, dissolved	M200.7 ICP	1	71.2			mg/L	0.2	1	06/21/16 13:41	gss
Strontium, dissolved	M200.7 ICP	1	2.260		*	mg/L	0.005	0.03	06/21/16 13:41	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:35	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 13:41	gss
Titanium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	06/21/16 13:41	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/21/16 1:35	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:41	gss
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/21/16 13:41	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-11

ACZ Sample ID: **L31099-04**
 Date Sampled: 06/14/16 08:55
 Date Received: 06/16/16
 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	125		*	mg/L	2	20	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1	125		*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.7			%			06/29/16 0:00	calc
Sum of Anions			18			meq/L			06/29/16 0:00	calc
Sum of Cations			19			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	61.8		*	mg/L	0.5	2	06/28/16 11:04	krh
Conductivity @25C	SM2510B	1	1560		*	umhos/cm	1	10	06/17/16 23:21	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:41	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 15:43	enb
Fluoride	SM4500F-C	1	2.45		*	mg/L	0.05	0.3	06/20/16 12:35	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		768			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/25/16 15:58	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 9:45	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/28/16 23:31	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.5		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/22/16 23:27	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/16/16 21:35	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/28/16 18:48	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1350		*	mg/L	10	20	06/17/16 13:25	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:48	id
Residue, Total (TS) @ 105C	SM2540B	1	1360		*	mg/L	10	20	06/17/16 11:55	sck
Sulfate	D516-02/-07 - Turbidimetric	20	668		*	mg/L	20	100	06/27/16 13:12	krh
Sulfide as S	SM4500S2-D	1	0.15		*	mg/L	0.02	0.1	06/20/16 15:48	emk
TDS (calculated)	Calculation		1170			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.15						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-7

ACZ Sample ID: **L31099-05**
Date Sampled: 06/14/16 06:50
Date Received: 06/16/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 11:36	enb
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 9:19	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 13:54	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 16:18	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 14:11	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	06/21/16 13:44	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0011	B		mg/L	0.0004	0.002	06/21/16 1:42	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0016			mg/L	0.0002	0.001	06/21/16 1:42	msh
Barium, dissolved	M200.7 ICP	1	0.366			mg/L	0.003	0.02	06/21/16 13:44	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:44	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:44	gss
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:44	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:42	msh
Calcium, dissolved	M200.7 ICP	1	30.9			mg/L	0.1	0.5	06/21/16 13:44	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:44	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:44	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:44	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:44	gss
Iron, dissolved	M200.7 ICP	1	0.17			mg/L	0.02	0.05	06/21/16 13:44	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/21/16 1:42	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:44	gss
Magnesium, dissolved	M200.7 ICP	1	8.7			mg/L	0.2	1	06/21/16 13:44	gss
Manganese, dissolved	M200.7 ICP	1	0.133			mg/L	0.005	0.03	06/21/16 13:44	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:36	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:44	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:44	gss
Potassium, dissolved	M200.7 ICP	1	8.3			mg/L	0.2	1	06/21/16 13:44	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:44	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0014			mg/L	0.0001	0.0003	06/21/16 1:42	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:42	msh
Sodium, dissolved	M200.7 ICP	1	18			mg/L	0.2	1	06/21/16 13:44	gss
Strontium, dissolved	M200.7 ICP	1	0.193			mg/L	0.005	0.03	06/21/16 13:44	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:42	msh
Tin, dissolved	M200.7 ICP	1	0.41			mg/L	0.04	0.2	06/21/16 13:44	gss
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:44	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:42	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:44	gss
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/21/16 13:44	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-7

ACZ Sample ID: **L31099-05**
 Date Sampled: 06/14/16 06:50
 Date Received: 06/16/16
 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	131		*	mg/L	2	20	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1	131		*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.5			%			06/29/16 0:00	calc
Sum of Anions			3.2			meq/L			06/29/16 0:00	calc
Sum of Cations			3.3			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	13.8		*	mg/L	0.5	2	06/28/16 11:04	krh
Conductivity @25C	SM2510B	1	307		*	umhos/cm	1	10	06/17/16 23:29	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:43	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 19:37	pjb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	06/20/16 12:43	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		113			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/25/16 16:03	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 9:47	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.4		*	mg/L	0.1	0.5	06/28/16 23:33	pjb
pH (lab)	SM4500H+ B									
pH		1	7.4	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.5		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/22/16 23:28	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.02	0.05	06/16/16 21:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.11		*	mg/L	0.02	0.05	06/28/16 18:50	pjb
Residue, Filterable (TDS) @180C	SM2540C	5	260		*	mg/L	50	100	06/17/16 13:27	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1	21.0		*	mg/L	5	20	06/17/16 10:49	id
Residue, Total (TS) @ 105C	SM2540B	5	260		*	mg/L	50	100	06/17/16 11:57	sck
Sulfate	D516-02/-07 - Turbidimetric	1	6.9		*	mg/L	1	5	06/27/16 13:02	krh
Sulfide as S	SM4500S2-D	7.5	5.2		*	mg/L	0.2	0.8	06/20/16 16:20	emk
TDS (calculated)	Calculation		167			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.56						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-8

ACZ Sample ID: **L31099-06**

Date Sampled: 06/14/16 08:10

Date Received: 06/16/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 11:44	enb
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 9:38	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 14:04	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 16:26	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 14:24	spl

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	06/21/16 13:47	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	06/21/16 1:44	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0016			mg/L	0.0002	0.001	06/21/16 1:44	msh
Barium, dissolved	M200.7 ICP	1	0.070			mg/L	0.003	0.02	06/21/16 13:47	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:47	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:47	gss
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/21/16 13:47	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:44	msh
Calcium, dissolved	M200.7 ICP	1	89.5			mg/L	0.1	0.5	06/21/16 13:47	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:47	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:47	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:47	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:47	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/21/16 13:47	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:44	msh
Lithium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.008	0.04	06/21/16 13:47	gss
Magnesium, dissolved	M200.7 ICP	1	14			mg/L	0.2	1	06/21/16 13:47	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:47	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:38	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:47	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:47	gss
Potassium, dissolved	M200.7 ICP	1	6			mg/L	0.2	1	06/21/16 13:47	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:47	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	06/21/16 1:44	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:44	msh
Sodium, dissolved	M200.7 ICP	1	22.3			mg/L	0.2	1	06/21/16 13:47	gss
Strontium, dissolved	M200.7 ICP	1	0.325			mg/L	0.005	0.03	06/21/16 13:47	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:44	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 13:47	gss
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	06/21/16 13:47	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/21/16 1:44	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/21/16 13:47	gss
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/21/16 13:47	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-8

ACZ Sample ID: **L31099-06**
 Date Sampled: 06/14/16 08:10
 Date Received: 06/16/16
 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	71.0		*	mg/L	2	20	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1	71.0		*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.3			%			06/29/16 0:00	calc
Sum of Anions			6.5			meq/L			06/29/16 0:00	calc
Sum of Cations			6.8			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	17.8		*	mg/L	0.5	2	06/28/16 11:05	krh
Conductivity @25C	SM2510B	1	631		*	umhos/cm	1	10	06/17/16 23:38	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:44	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 19:39	pjb
Fluoride	SM4500F-C	1	0.15	B	*	mg/L	0.05	0.3	06/20/16 12:58	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		281			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2	4.29		*	mg/L	0.04	0.2	06/25/16 16:24	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 9:48	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/28/16 23:34	pjb
pH (lab)	SM4500H+ B									
pH		1	7.2	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.6		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.02	0.05	06/22/16 23:29	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.02	0.05	06/16/16 21:39	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.02	0.05	06/28/16 18:52	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	542		*	mg/L	10	20	06/17/16 13:29	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:50	id
Residue, Total (TS) @ 105C	SM2540B	1	564		*	mg/L	10	20	06/17/16 11:59	sck
Sulfate	D516-02/-07 - Turbidimetric	10	218		*	mg/L	10	50	06/27/16 13:16	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 16:30	emk
TDS (calculated)	Calculation		411			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.32						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-9

ACZ Sample ID: **L31099-07**
Date Sampled: 06/14/16 11:25
Date Received: 06/16/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 11:52	enb
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 9:48	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 14:14	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 16:34	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 14:31	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	06/21/16 13:50	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:47	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	06/21/16 1:47	msh
Barium, dissolved	M200.7 ICP	1	0.057			mg/L	0.003	0.02	06/21/16 13:50	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:50	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:50	gss
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/21/16 13:50	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:47	msh
Calcium, dissolved	M200.7 ICP	1	43.6			mg/L	0.1	0.5	06/21/16 13:50	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:50	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:50	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:50	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:50	gss
Iron, dissolved	M200.7 ICP	1	6.06			mg/L	0.02	0.05	06/21/16 13:50	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:47	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	06/21/16 13:50	gss
Magnesium, dissolved	M200.7 ICP	1	7.5			mg/L	0.2	1	06/21/16 13:50	gss
Manganese, dissolved	M200.7 ICP	1	0.069			mg/L	0.005	0.03	06/21/16 13:50	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:44	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:50	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:50	gss
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	06/21/16 13:50	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:50	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/21/16 1:47	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:47	msh
Sodium, dissolved	M200.7 ICP	1	26			mg/L	0.2	1	06/21/16 13:50	gss
Strontium, dissolved	M200.7 ICP	1	0.300			mg/L	0.005	0.03	06/21/16 13:50	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:47	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 13:50	gss
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:50	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:47	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:50	gss
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/21/16 13:50	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-9

ACZ Sample ID: **L31099-07**
 Date Sampled: 06/14/16 11:25
 Date Received: 06/16/16
 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	110		*	mg/L	2	20	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1	110		*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			6.0			%			06/29/16 0:00	calc
Sum of Anions			3.9			meq/L			06/29/16 0:00	calc
Sum of Cations			4.4			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	7.6		*	mg/L	0.5	2	06/28/16 11:05	krh
Conductivity @25C	SM2510B	1	391		*	umhos/cm	1	10	06/17/16 23:46	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:46	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 19:40	pjb
Fluoride	SM4500F-C	1	0.50		*	mg/L	0.05	0.3	06/20/16 13:02	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		140			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.03	B	*	mg/L	0.02	0.1	06/25/16 16:06	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 9:51	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	06/28/16 23:37	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.8		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.47			mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.02	0.05	06/22/16 23:30	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.02	0.05	06/16/16 21:41	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.16		*	mg/L	0.02	0.05	06/28/16 18:54	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	320		*	mg/L	10	20	06/17/16 13:31	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:52	id
Residue, Total (TS) @ 105C	SM2540B	1	320		*	mg/L	10	20	06/17/16 12:01	sck
Sulfate	D516-02/-07 - Turbidimetric	5	69.7		*	mg/L	5	25	06/27/16 13:09	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 16:41	emk
TDS (calculated)	Calculation		233			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.37						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-20

ACZ Sample ID: **L31099-08**

Date Sampled: 06/14/16 12:00

Date Received: 06/16/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 11:59	enb
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 10:07	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 14:23	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 16:49	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 14:37	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	06/21/16 13:53	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:54	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	06/21/16 1:54	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	06/21/16 13:53	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:53	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 13:53	gss
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/21/16 13:53	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:54	msh
Calcium, dissolved	M200.7 ICP	1		U		mg/L	0.1	0.5	06/21/16 13:53	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:53	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:53	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:53	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:53	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/21/16 13:53	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:54	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:53	gss
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/21/16 13:53	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:53	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:46	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 13:53	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 13:53	gss
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/21/16 13:53	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 13:53	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/21/16 1:54	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:54	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/21/16 13:53	gss
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:53	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:54	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 13:53	gss
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:53	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:54	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 13:53	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 13:53	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-20

ACZ Sample ID: **L31099-08**
 Date Sampled: 06/14/16 12:00
 Date Received: 06/16/16
 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	06/17/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Total Alkalinity		1		U	*	mg/L	2	20	06/17/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			06/29/16 0:00	calc
Sum of Anions			N/A			meq/L			06/29/16 0:00	calc
Sum of Cations				U		meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	06/28/16 11:05	krh
Conductivity @25C	SM2510B	1	1.4	B	*	umhos/cm	1	10	06/17/16 23:54	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:47	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 19:41	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	06/20/16 13:10	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation			U		mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/25/16 16:07	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 9:54	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	06/28/16 23:39	pjb
pH (lab)	SM4500H+ B									
pH		1	6.3	H	*	units	0.1	0.1	06/17/16 0:00	emk
pH measured at		1	23.8		*	C	0.1	0.1	06/17/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/22/16 23:33	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	06/16/16 21:42	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	06/28/16 18:55	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	10	B	*	mg/L	10	20	06/17/16 13:33	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:53	id
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	06/17/16 12:03	sck
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	06/27/16 13:03	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 14:36	emk
TDS (calculated)	Calculation					mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		n/a						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-3

ACZ Sample ID: **L31099-09**
Date Sampled: 06/14/16 09:25
Date Received: 06/16/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 12:07	enb
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 10:16	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 14:33	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 17:05	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 14:44	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	06/21/16 14:01	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:56	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	06/21/16 1:56	msh
Barium, dissolved	M200.7 ICP	1	0.036			mg/L	0.003	0.02	06/21/16 14:01	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:01	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 14:01	gss
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	06/21/16 14:01	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:56	msh
Calcium, dissolved	M200.7 ICP	1	78.3			mg/L	0.1	0.5	06/21/16 14:01	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:01	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:01	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:01	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:01	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/21/16 14:01	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:56	msh
Lithium, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.008	0.04	06/21/16 14:01	gss
Magnesium, dissolved	M200.7 ICP	1	9.4			mg/L	0.2	1	06/21/16 14:01	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 14:01	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:48	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 14:01	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 14:01	gss
Potassium, dissolved	M200.7 ICP	1	4			mg/L	0.2	1	06/21/16 14:01	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:01	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	06/21/16 1:56	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:56	msh
Sodium, dissolved	M200.7 ICP	1	27.1			mg/L	0.2	1	06/21/16 14:01	gss
Strontium, dissolved	M200.7 ICP	1	0.707			mg/L	0.005	0.03	06/21/16 14:01	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:56	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 14:01	gss
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/21/16 14:01	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/21/16 1:56	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	06/21/16 14:01	gss
Zinc, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	06/21/16 14:01	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-3

ACZ Sample ID: **L31099-09**
 Date Sampled: 06/14/16 09:25
 Date Received: 06/16/16
 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	102		*	mg/L	2	20	06/18/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Total Alkalinity		1	102		*	mg/L	2	20	06/18/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.6			%			06/29/16 0:00	calc
Sum of Anions			6.2			meq/L			06/29/16 0:00	calc
Sum of Cations			6.0			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	16.2		*	mg/L	0.5	2	06/28/16 11:18	krh
Conductivity @25C	SM2510B	1	578		*	umhos/cm	1	10	06/18/16 0:03	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:48	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 19:42	pjb
Fluoride	SM4500F-C	1	0.81		*	mg/L	0.05	0.3	06/21/16 13:01	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		234			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.49		*	mg/L	0.02	0.1	06/25/16 16:09	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 10:13	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	06/28/16 23:40	pjb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	06/18/16 0:00	emk
pH measured at		1	23.6		*	C	0.1	0.1	06/18/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	06/22/16 23:35	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.02	0.05	06/16/16 21:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	06/28/16 18:56	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	490		*	mg/L	10	20	06/17/16 13:35	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:54	id
Residue, Total (TS) @ 105C	SM2540B	1	496		*	mg/L	10	20	06/17/16 12:05	sck
Sulfate	D516-02/-07 - Turbidimetric	5	175		*	mg/L	5	25	06/27/16 13:09	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 14:46	emk
TDS (calculated)	Calculation		374			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.31						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-4

ACZ Sample ID: **L31099-10**

Date Sampled: 06/14/16 10:30

Date Received: 06/16/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/22/16 12:14	enb
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 10:26	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 14:43	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 17:13	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 14:51	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	06/21/16 14:10	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 1:58	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	06/21/16 1:58	msh
Barium, dissolved	M200.7 ICP	1	0.024			mg/L	0.003	0.02	06/21/16 14:10	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:10	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 14:10	gss
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	06/21/16 14:10	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:58	msh
Calcium, dissolved	M200.7 ICP	1	71.8			mg/L	0.1	0.5	06/21/16 14:10	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:10	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:10	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:10	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:10	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/21/16 14:10	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:58	msh
Lithium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.008	0.04	06/21/16 14:10	gss
Magnesium, dissolved	M200.7 ICP	1	7.8			mg/L	0.2	1	06/21/16 14:10	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 14:10	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:50	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 14:10	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 14:10	gss
Potassium, dissolved	M200.7 ICP	1	3.9			mg/L	0.2	1	06/21/16 14:10	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:10	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	06/21/16 1:58	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 1:58	msh
Sodium, dissolved	M200.7 ICP	1	24.6			mg/L	0.2	1	06/21/16 14:10	gss
Strontium, dissolved	M200.7 ICP	1	0.620			mg/L	0.005	0.03	06/21/16 14:10	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 1:58	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 14:10	gss
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/21/16 14:10	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/21/16 1:58	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/21/16 14:10	gss
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	06/21/16 14:10	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-4

ACZ Sample ID: **L31099-10**
 Date Sampled: 06/14/16 10:30
 Date Received: 06/16/16
 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	83.9		*	mg/L	2	20	06/18/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Total Alkalinity		1	83.9		*	mg/L	2	20	06/18/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.9			%			06/29/16 0:00	calc
Sum of Anions			5.2			meq/L			06/29/16 0:00	calc
Sum of Cations			5.4			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	13.2		*	mg/L	0.5	2	06/28/16 11:18	krh
Conductivity @25C	SM2510B	1	521		*	umhos/cm	1	10	06/18/16 0:11	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/22/16 19:49	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 19:43	pjb
Fluoride	SM4500F-C	1	0.90		*	mg/L	0.05	0.3	06/21/16 13:11	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		211			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.59		*	mg/L	0.02	0.1	06/25/16 16:12	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 10:01	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	06/28/16 23:41	pjb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	06/18/16 0:00	emk
pH measured at		1	23.6		*	C	0.1	0.1	06/18/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	06/22/16 23:36	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.09	H	*	mg/L	0.02	0.05	06/16/16 21:45	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	06/28/16 18:59	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	442		*	mg/L	10	20	06/17/16 13:37	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:56	id
Residue, Total (TS) @ 105C	SM2540B	1	442		*	mg/L	10	20	06/17/16 12:07	sck
Sulfate	D516-02/-07 - Turbidimetric	5	146		*	mg/L	5	25	06/27/16 13:42	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 14:56	emk
TDS (calculated)	Calculation		320			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.38						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-5

ACZ Sample ID: **L31099-11**

Date Sampled: 06/14/16 08:25

Date Received: 06/16/16

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/24/16 12:19	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 10:36	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 14:52	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 17:21	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 14:57	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	06/21/16 14:13	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	06/21/16 2:00	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0010			mg/L	0.0002	0.001	06/21/16 2:00	msh
Barium, dissolved	M200.7 ICP	1	0.039			mg/L	0.003	0.02	06/21/16 14:13	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:13	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 14:13	gss
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/21/16 14:13	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 2:00	msh
Calcium, dissolved	M200.7 ICP	1	133			mg/L	0.1	0.5	06/21/16 14:13	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:13	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:13	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:13	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:13	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/21/16 14:13	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 2:00	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 14:13	gss
Magnesium, dissolved	M200.7 ICP	1	17.3			mg/L	0.2	1	06/21/16 14:13	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 14:13	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:52	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 14:13	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 14:13	gss
Potassium, dissolved	M200.7 ICP	1	7.7			mg/L	0.2	1	06/21/16 14:13	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:13	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	06/21/16 2:00	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 2:00	msh
Sodium, dissolved	M200.7 ICP	1	29.5			mg/L	0.2	1	06/21/16 14:13	gss
Strontium, dissolved	M200.7 ICP	1	0.471			mg/L	0.005	0.03	06/21/16 14:13	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 2:00	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 14:13	gss
Titanium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	06/21/16 14:13	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/21/16 2:00	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 14:13	gss
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/21/16 14:13	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-5

ACZ Sample ID: **L31099-11**
 Date Sampled: 06/14/16 08:25
 Date Received: 06/16/16
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	88.6		*	mg/L	2	20	06/18/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Total Alkalinity		1	88.6		*	mg/L	2	20	06/18/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.6			%			06/29/16 0:00	calc
Sum of Anions			9.3			meq/L			06/29/16 0:00	calc
Sum of Cations			9.6			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	22.6		*	mg/L	0.5	2	06/28/16 11:18	krh
Conductivity @25C	SM2510B	1	852		*	umhos/cm	1	10	06/18/16 0:19	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/25/16 16:38	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 20:02	pjb
Fluoride	SM4500F-C	1	0.25	B	*	mg/L	0.05	0.3	06/21/16 13:14	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		403			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	6.32		*	mg/L	0.08	0.4	06/25/16 16:25	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 10:03	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/28/16 23:42	pjb
pH (lab)	SM4500H+ B									
pH		1	7.3	H	*	units	0.1	0.1	06/18/16 0:00	emk
pH measured at		1	23.5		*	C	0.1	0.1	06/18/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	06/22/16 23:40	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.02	0.05	06/16/16 21:47	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	06/28/16 19:00	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	732		*	mg/L	10	20	06/17/16 13:39	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:57	id
Residue, Total (TS) @ 105C	SM2540B	1	732		*	mg/L	10	20	06/17/16 12:11	sck
Sulfate	D516-02/-07 - Turbidimetric	10	326		*	mg/L	10	50	06/27/16 13:49	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 15:06	emk
TDS (calculated)	Calculation		591			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.24						06/29/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-6

ACZ Sample ID: **L31099-12**
Date Sampled: 06/14/16 07:31
Date Received: 06/16/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/24/16 12:38	bce/spl
Cyanide, WAD	SM4500-CN I- distillation								06/24/16 10:45	bce/spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/24/16 15:02	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/21/16 17:28	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/27/16 15:04	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	06/21/16 14:16	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/21/16 2:03	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	06/21/16 2:03	msh
Barium, dissolved	M200.7 ICP	1	0.130			mg/L	0.003	0.02	06/21/16 14:16	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:16	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/21/16 14:16	gss
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	06/21/16 14:16	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 2:03	msh
Calcium, dissolved	M200.7 ICP	1	188			mg/L	0.1	0.5	06/21/16 14:16	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:16	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:16	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/21/16 14:16	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:16	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/21/16 14:16	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 2:03	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 14:16	gss
Magnesium, dissolved	M200.7 ICP	1	22.1			mg/L	0.2	1	06/21/16 14:16	gss
Manganese, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	06/21/16 14:16	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/27/16 13:53	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/21/16 14:16	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/21/16 14:16	gss
Potassium, dissolved	M200.7 ICP	1	9.9			mg/L	0.2	1	06/21/16 14:16	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/21/16 14:16	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0003	06/21/16 2:03	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/21/16 2:03	msh
Sodium, dissolved	M200.7 ICP	1	35.7			mg/L	0.2	1	06/21/16 14:16	gss
Strontium, dissolved	M200.7 ICP	1	0.834			mg/L	0.005	0.03	06/21/16 14:16	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/21/16 2:03	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/21/16 14:16	gss
Titanium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	06/21/16 14:16	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/21/16 2:03	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/21/16 14:16	gss
Zinc, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	06/21/16 14:16	gss

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-6

ACZ Sample ID: **L31099-12**
 Date Sampled: 06/14/16 07:31
 Date Received: 06/16/16
 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	51.0		*	mg/L	2	20	06/18/16 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/18/16 0:00	emk
Total Alkalinity		1	51.0		*	mg/L	2	20	06/18/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			06/29/16 0:00	calc
Sum of Anions			13			meq/L			06/29/16 0:00	calc
Sum of Cations			13			meq/L			06/29/16 0:00	calc
Chloride	SM4500Cl-E	1	41.8		*	mg/L	0.5	2	06/28/16 11:18	krh
Conductivity @25C	SM2510B	1	1130		*	umhos/cm	1	10	06/18/16 0:28	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/25/16 16:40	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/24/16 20:03	pjb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	06/21/16 13:18	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		560			mg/L	0.2	5	06/29/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.35		*	mg/L	0.06	0.3	06/25/16 16:26	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	06/28/16 10:04	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/28/16 23:43	pjb
pH (lab)	SM4500H+ B									
pH		1	7.2	H	*	units	0.1	0.1	06/18/16 0:00	emk
pH measured at		1	23.5		*	C	0.1	0.1	06/18/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.06	0.2	06/29/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	06/22/16 23:41	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.02	0.05	06/16/16 21:48	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	06/28/16 19:01	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1000		*	mg/L	10	20	06/17/16 13:40	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/17/16 10:58	id
Residue, Total (TS) @ 105C	SM2540B	1	1010		*	mg/L	10	20	06/17/16 12:13	sck
Sulfate	D516-02/-07 - Turbidimetric	20	520		*	mg/L	20	100	06/27/16 13:44	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/20/16 15:15	emk
TDS (calculated)	Calculation		850			mg/L			06/29/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.18						06/29/16 0:00	calc

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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: **L31099**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-01	WG404972	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		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.
	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405075	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404901	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405125	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404817		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG405313		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.
WG404908		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404836		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-02	WG404972	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		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.
WG404836		Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG405376		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404836		Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
WG405121		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405075		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404901		Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
WG404836		Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG405270		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405272		Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405431		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404836		pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG405127		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404778		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405125		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404834		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG404802		Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404817		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG405313		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.
WG404908		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404836		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-03	WG404972	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		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.
	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405075	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404901	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405125	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405313	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.
	WG404908	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-04	WG404972	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		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.
	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405075	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404901	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404817		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG405313		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.
WG404908		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404836		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-05	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404901	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405313	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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					or LFB) was acceptable.
	WG404908	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-06	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404901	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405313	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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					or LFB) was acceptable.
	WG404908	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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L31099-07	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404901	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
	WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405313	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte

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					concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG404908	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-08	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404901	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
			M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405431	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG405313	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.	

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			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG404909	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-09	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404982	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.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405313	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.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG404909	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-10	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405121	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404982	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.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405313	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike

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					level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG404909		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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG404836		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-11	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405269	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404982	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.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG405313	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: **L31099**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG404909	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L31099**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-12	WG404836	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405376	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG405269	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405260	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404982	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.
	WG404836	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG405270	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG405272	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	Q6	Sample was received above recommended temperature.
			M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405431	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG405127	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404778	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG405428	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404834	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG404802	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG404817	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG405313	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: **L31099**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG404909	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG404836	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-21ACZ Sample ID: **L31099-01**
Date Sampled: 06/14/16 16:30
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 15:44
Analysis Date: 06/23/16 20:24

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.32	J	0.93	*	mg/L	0.09	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85		0.93	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-1

ACZ Sample ID: **L31099-02**
Date Sampled: 06/14/16 10:55
Date Received: 06/16/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405234

Analyst: mmn
Extract Date: 06/21/16 15:52
Analysis Date: 06/23/16 20:51

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	0.98	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.2		0.98	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-1AACZ Sample ID: **L31099-03**
Date Sampled: 06/14/16 5:30
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 16:00
Analysis Date: 06/23/16 21:18

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	85		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-11ACZ Sample ID: **L31099-04**
Date Sampled: 06/14/16 8:55
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 16:08
Analysis Date: 06/23/16 21:46

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	83.9		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-7ACZ Sample ID: **L31099-05**
Date Sampled: 06/14/16 6:50
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 16:16
Analysis Date: 06/23/16 22:13

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		4.2		0.99	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	1745.6		0.99	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-8

ACZ Sample ID: **L31099-06**
Date Sampled: 06/14/16 8:10
Date Received: 06/16/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405234

Analyst: mmn
Extract Date: 06/21/16 16:24
Analysis Date: 06/23/16 22:40

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	0.99	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.8		0.99	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-9

ACZ Sample ID: **L31099-07**
Date Sampled: 06/14/16 11:25
Date Received: 06/16/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405234

Analyst: mmn
Extract Date: 06/21/16 16:32
Analysis Date: 06/23/16 23:08

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	78		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-20ACZ Sample ID: **L31099-08**
Date Sampled: 06/14/16 12:00
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 16:40
Analysis Date: 06/27/16 11:21

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	0.93	*	mg/L	0.09	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	88.2		0.93	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-3ACZ Sample ID: **L31099-09**
Date Sampled: 06/14/16 9:25
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 16:48
Analysis Date: 06/27/16 11:48

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.4	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	90		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-4

ACZ Sample ID: **L31099-10**
Date Sampled: 06/14/16 10:30
Date Received: 06/16/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405234

Analyst: mmn
Extract Date: 06/21/16 16:56
Analysis Date: 06/27/16 12:15

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.32	J	0.94	*	mg/L	0.09	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	89		0.94	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-5ACZ Sample ID: **L31099-11**
Date Sampled: 06/14/16 8:25
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 17:04
Analysis Date: 06/27/16 12:42

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	91.3		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-6ACZ Sample ID: **L31099-12**
Date Sampled: 06/14/16 7:31
Date Received: 06/16/16
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG405234Analyst: mmn
Extract Date: 06/21/16 17:12
Analysis Date: 06/27/16 13:10

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	92		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>

ACZ Project ID: **L31099**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31099-01	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-02	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-03	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-04	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-05	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		OTP	M8015D GC/FID	SA	Surrogate recovery was outside acceptance limits due to matrix interference.
		TPH C10 to C28	M8015D GC/FID	N1	See Case Narrative.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-06	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-07	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-08	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-09	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-10	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-11	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L31099-12	WG405234	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L31099**

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

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L31099
 Date Received: 06/16/2016 10:22
 Received By: kmo
 Date Printed: 6/16/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples? A change was made in the Remarks 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 form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹ L31099-01 Container B1722369 (YELLOW): Added 2 mls sulfuric acid to the sub-sample to adjust the pH to the appropriate range. L31099-05 Container B1722402 (YELLOW): Added 2 mls sulfuric acid to the sub-sample to adjust the pH to the appropriate range. L31099-08 Container B1722428 (TAN): Added 1 mls 5N sodium hydroxide and 1 mls zinc acetate to the sub-sample to adjust the pH to the appropriate range.		X	
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L31099
 Date Received: 06/16/2016 10:22
 Received By: kmo
 Date Printed: 6/16/2016

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
3639	11.8	<=6.0	15	N/A
3679	13.5	<=6.0	15	N/A
4088	11.8	<=6.0	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.

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. **131099**

CHAIN of CUSTODY

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

Report to:

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

Address: Bulvar los Proceres, 18 calle 24-69 zona 16
Empresarial, zona Pradera, Torre 11, oficina 1105
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@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#: fscobal
Reporting state for compliance testing:
Check box if samples include NRC licensed material?

Matrix	DATE:TIME	Matrix	# of Containers	CAUTION	TOTAL CN										
MW-21	14/06/16 10:30	GW	8	/											
PSA-1	14/06/16 10:55	GW	8	/											
GW-1A	14/06/16 05:30	GW	8	/											
Piveta de proced	14/06/16 09:50	WW	1	/											
MW-11	14-06-16 09:55	GW	8	/											

Matrix	DATE:TIME	Matrix
MW-21	14/06/16 10:30	GW
PSA-1	14/06/16 10:55	GW
GW-1A	14/06/16 05:30	GW
Piveta de proced	14/06/16 09:50	WW
MW-11	14-06-16 09:55	GW

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

REMARKS

Please report all GW^{TPH} samples in one document (of all three coolers of this shipment).

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	14-06-2016 15:20	[Signature]	14.6.16 15:20
		[Signature]	6/6/16 15:20



Laboratories, Inc. **271099**

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: Bulvar los Proceres, 18 Calle 24-69 Zona 10
Company: Tahoe Resources Inc.	Empresarial, Zona Pradera Torre 11 Oficina 1106
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: 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	GW+TPH																				
PO#: Escobar																						
Reporting state for compliance testing:																						
Check box if samples include NRC licensed material?																						
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																				
MW-1	14/06/14 06:50	GW	8	/																		
MW-8	14/06/14 08:10	GW	8	/																		
MW-9	14/06/14 11:25	GW	8	/																		
MW-20	14/06/14 12:00	GW	8	/																		

5.
6.
7.
8.

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

REMARKS

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<u>[Signature]</u>	14-06-2014 15:20	<u>[Signature]</u>	14.6.14 15:20 6/6/14 10:20

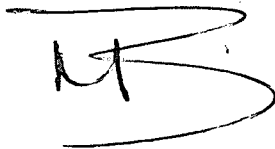
Guatemala June 14th, 2016

To whom it may concern:

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

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

Best regards,

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

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

July 13, 2016

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: L31354

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 30, 2016. This project has been assigned to ACZ's project number, L31354. 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 L31354. 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.

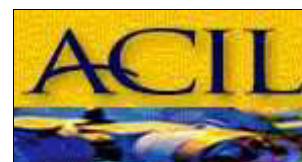
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 12, 2016. 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: **L31354-01**
Date Sampled: 06/27/16 11:20
Date Received: 06/30/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/16 12:08	bce
Cyanide, WAD	SM4500-CN I- distillation								07/06/16 14:20	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/16 2:48	krh
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/05/16 14:46	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/16 16:55	bce

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	07/05/16 18:52	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	07/07/16 11:50	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0125			mg/L	0.0002	0.001	07/07/16 11:50	mfm
Barium, dissolved	M200.7 ICP	1	0.081			mg/L	0.003	0.02	07/05/16 18:52	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:52	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/05/16 18:52	aeb
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	07/05/16 18:52	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/16 11:50	mfm
Calcium, dissolved	M200.7 ICP	1	101		*	mg/L	0.1	0.5	07/05/16 18:52	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:52	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:52	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:52	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/05/16 18:52	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/05/16 18:52	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/16 11:50	mfm
Lithium, dissolved	M200.7 ICP	1	0.141			mg/L	0.008	0.04	07/05/16 18:52	aeb
Magnesium, dissolved	M200.7 ICP	1	6.1			mg/L	0.2	1	07/05/16 18:52	aeb
Manganese, dissolved	M200.7 ICP	1	0.027	B		mg/L	0.005	0.03	07/05/16 18:52	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/11/16 14:36	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/05/16 18:52	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/05/16 18:52	aeb
Potassium, dissolved	M200.7 ICP	1	1.9			mg/L	0.2	1	07/05/16 18:52	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/05/16 18:52	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	07/07/16 11:50	mfm
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	07/07/16 11:50	mfm
Sodium, dissolved	M200.7 ICP	1	81.9			mg/L	0.2	1	07/05/16 18:52	aeb
Strontium, dissolved	M200.7 ICP	1	4.450		*	mg/L	0.005	0.03	07/05/16 18:52	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/16 11:50	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	07/05/16 18:52	aeb
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	07/05/16 18:52	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	07/07/16 11:50	mfm
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/05/16 18:52	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:52	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-SR

ACZ Sample ID: **L31354-01**
Date Sampled: 06/27/16 11:20
Date Received: 06/30/16
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	185			mg/L	2	20	07/01/16 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	07/01/16 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	07/01/16 0:00	emk
Total Alkalinity		1	185			mg/L	2	20	07/01/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.6			%			07/13/16 0:00	calc
Sum of Anions			9.6			meq/L			07/13/16 0:00	calc
Sum of Cations			9.3			meq/L			07/13/16 0:00	calc
Chloride	SM4500Cl-E	1	4.1		*	mg/L	0.5	2	07/10/16 11:26	krh
Conductivity @25C	SM2510B	1	885			umhos/cm	1	10	07/01/16 21:07	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/16 23:06	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/08/16 0:09	pjb
Fluoride	SM4500F-C	1	0.86		*	mg/L	0.05	0.3	07/06/16 16:01	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		277			mg/L	0.2	5	07/13/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.06	B		mg/L	0.02	0.1	07/08/16 23:12	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/11/16 14:37	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	07/12/16 22:57	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H		units	0.1	0.1	07/01/16 0:00	emk
pH measured at		1	23.0			C	0.1	0.1	07/01/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	07/13/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	07/08/16 22:20	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	07/01/16 20:31	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	07/08/16 22:57	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	640			mg/L	10	20	06/30/16 15:02	emk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	07/01/16 12:39	sck
Residue, Total (TS) @ 105C	SM2540B	1	626			mg/L	10	20	07/01/16 17:13	sck
Sulfate	D516-02/-07 - Turbidimetric	10	271		*	mg/L	10	50	07/12/16 15:06	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/30/16 17:38	emk
TDS (calculated)	Calculation		584			mg/L			07/13/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.10						07/13/16 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: HW-1

ACZ Sample ID: **L31354-02**
Date Sampled: 06/27/16 10:35
Date Received: 06/30/16
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/16 12:33	bce
Cyanide, WAD	SM4500-CN I- distillation								07/06/16 14:28	bce
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/16 5:12	krh
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/05/16 14:54	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/16 17:09	bce

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	07/05/16 18:55	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	07/07/16 11:59	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0104			mg/L	0.0002	0.001	07/07/16 11:59	mfm
Barium, dissolved	M200.7 ICP	1	0.076			mg/L	0.003	0.02	07/05/16 18:55	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:55	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/05/16 18:55	aeb
Boron, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	07/05/16 18:55	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/16 11:59	mfm
Calcium, dissolved	M200.7 ICP	1	83.4		*	mg/L	0.1	0.5	07/05/16 18:55	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:55	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:55	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/05/16 18:55	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/05/16 18:55	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/05/16 18:55	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/16 11:59	mfm
Lithium, dissolved	M200.7 ICP	1	0.117			mg/L	0.008	0.04	07/05/16 18:55	aeb
Magnesium, dissolved	M200.7 ICP	1	5.5			mg/L	0.2	1	07/05/16 18:55	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/05/16 18:55	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/11/16 14:38	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/05/16 18:55	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/05/16 18:55	aeb
Potassium, dissolved	M200.7 ICP	1	2.1			mg/L	0.2	1	07/05/16 18:55	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/05/16 18:55	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	07/07/16 11:59	mfm
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	07/07/16 11:59	mfm
Sodium, dissolved	M200.7 ICP	1	68.5			mg/L	0.2	1	07/05/16 18:55	aeb
Strontium, dissolved	M200.7 ICP	1	3.560		*	mg/L	0.005	0.03	07/05/16 18:55	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/16 11:59	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	07/05/16 18:55	aeb
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	07/05/16 18:55	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	07/07/16 11:59	mfm
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/05/16 18:55	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	07/05/16 18:55	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: HW-1

ACZ Sample ID: **L31354-02**
 Date Sampled: 06/27/16 10:35
 Date Received: 06/30/16
 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	144			mg/L	2	20	07/01/16 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	07/01/16 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	07/01/16 0:00	emk
Total Alkalinity		1	144			mg/L	2	20	07/01/16 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.3			%			07/13/16 0:00	calc
Sum of Anions			7.6			meq/L			07/13/16 0:00	calc
Sum of Cations			7.8			meq/L			07/13/16 0:00	calc
Chloride	SM4500Cl-E	1	4.2		*	mg/L	0.5	2	07/10/16 11:26	krh
Conductivity @25C	SM2510B	1	748			umhos/cm	1	10	07/01/16 21:16	emk
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/16 23:08	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/08/16 0:10	pjb
Fluoride	SM4500F-C	1	0.72			mg/L	0.05	0.3	07/06/16 16:15	sck
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		231			mg/L	0.2	5	07/13/16 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.57			mg/L	0.02	0.1	07/08/16 23:17	pjb
Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	1		U	*	mg/L	0.05	0.2	07/11/16 14:39	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	07/12/16 22:58	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H		units	0.1	0.1	07/01/16 0:00	emk
pH measured at		1	23.1			C	0.1	0.1	07/01/16 0:00	emk
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	07/13/16 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	07/08/16 22:21	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.02	0.05	07/01/16 20:33	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	07/08/16 22:59	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	536			mg/L	10	20	07/01/16 11:18	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	07/01/16 12:41	sck
Residue, Total (TS) @ 105C	SM2540B	1	544			mg/L	10	20	07/01/16 17:16	sck
Sulfate	D516-02/-07 - Turbidimetric	10	216		*	mg/L	10	50	07/12/16 15:06	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/30/16 17:43	emk
TDS (calculated)	Calculation		472			mg/L			07/13/16 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.14						07/13/16 0:00	calc



Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L31354**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31354-01	WG405690	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405980	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405895	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405898	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405753	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG406017	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG406158	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405967	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405635	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405969	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405600	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG406129	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.
	WG405575	Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31354**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31354-02	WG405690	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG405980	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405895	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405898	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG406017	Nitrogen, ammonia	M350.1 Auto Salicylate w/gas diffusion	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG406158	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405967	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405635	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405969	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG405600	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG406129	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.
	WG405575	Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-SR

ACZ Sample ID: **L31354-01**
Date Sampled: 06/27/16 11:20
Date Received: 06/30/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405984

Analyst: wfg
Extract Date: 06/30/16 14:46
Analysis Date: 07/08/16 14:53

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	93.1		1.02		%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: HW-1

ACZ Sample ID: **L31354-02**
Date Sampled: 06/27/16 10:35
Date Received: 06/30/16
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG405984

Analyst: wfg
Extract Date: 06/30/16 14:50
Analysis Date: 07/08/16 15:20

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	0.99	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	92		0.99		%	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>

ACZ Project ID: **L31354**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31354-01	WG405984	TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			M8015D GC/FID	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L31354-02	WG405984	TPH C10 to C28	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			M8015D GC/FID	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31354**

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

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L31354
 Date Received: 06/30/2016 09:59
 Received By: ddp
 Date Printed: 6/30/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form 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 form 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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
3949	5.9	<=6.0	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: L31354
Date Received: 06/30/2016 09:59
Received By: ddp
Date Printed: 6/30/2016

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. *C31354*

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: *Billeuay Los Proceres, 12 Calle 24-69 Zona 10*
Empresarial, zona protera, Torre III 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@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: *UF* 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)

SAMPLE IDENTIFICATION				DATE: TIME	Matrix	# of Containers	GW+TPH	total CN							
Quote #: <i>Water Quality</i>															
PO#: <i>Escobal</i>															
Reporting state for compliance testing:															
Check box if samples include NRC licensed material?															
<i>1.</i>	<i>PSA-SR</i>	<i>27/06/14</i>	<i>11:20</i>	<i>GW</i>	<i>8</i>	<i>///</i>									
<i>2.</i>	<i>HW-1</i>	<i>27/06/14</i>	<i>10:35</i>	<i>GW</i>	<i>3</i>	<i>///</i>									
	<i>WW9</i>	<i>27/06/14</i>	<i>06:00-15:00</i>	<i>WW</i>	<i>1</i>	<i>///</i>									
	<i>WW10</i>	<i>27/06/14</i>	<i>12:00</i>	<i>SW</i>	<i>1</i>	<i>///</i>									
	<i>WW11</i>	<i>27/06/14</i>	<i>06:00-15:00</i>	<i>WW</i>	<i>1</i>	<i>///</i>									

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

REMARKS

Please present cyanide results in a different report.

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

RELINQUISHED BY:	DATE: TIME	RECEIVED BY:	DATE: TIME
<i>[Signature]</i>	<i>28.06.2016</i>	<i>[Signature]</i>	<i>28.06.16 10:45</i>
	<i>10:45</i>	<i>[Signature]</i>	<i>6-30/16 0955</i>

31354 Chain of Custody



Guatemala June 28th 2016

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.

REG 016 Resultados de Análisis

Muestras: 5 muestras de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 070616
Fecha de ingreso de muestras: 070616
Fecha de análisis: 070616-170616
Fecha de informe: 170616

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)
5009	GW-2	209	38	N.D.	23
5010	GW-3	14	< 1	N.D.	< 2
5011	GW-10	12	< 1	N.D.	< 2
5012	GW-11	10	< 1	N.D.	23
5013	RW-1	< 1	< 1	N.D.	23

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número más probable.

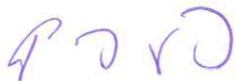
N.D. No detectable. Debajo del límite de detección.

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



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PROYECTOS AMBIENTALES

LABORATORIO AMBIENTAL E INDUSTRIAL

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Ref 1151-16

Pág 1/1

REG 016 Resultados de Análisis

Muestras: 12 muestras de agua

Análisis solicitado por: Ing. Miguel Berganza

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

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 140616

Fecha de ingreso de muestra: 140616

Fecha de análisis: 140616-220616

Fecha del informe: 220616

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)
5076	MW-3	< 1	< 1	N.D.	< 2
5077	MW-4	< 1	< 1	N.D.	< 2
5078	MW-5	< 1	< 1	N.D.	< 2
5079	MW-6	< 1	< 1	N.D.	< 2
5080	MW-7	232	< 1	N.D.	23
5081	MW-8	< 1	< 1	N.D.	< 2
5082	MW-9	< 1	< 1	N.D.	< 2
5083	MW-20	< 1	< 1	N.D.	< 2
5084	MW-21	< 1	< 1	N.D.	< 2
5085	PSA-1	405	< 1	N.D.	< 2
5086	GW-1A	139	< 1	N.D.	240
5087	MW-11	219	< 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 más 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

Ref 1221-16

Pág 1/1

Muestras: 2 muestras de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 270616
Fecha de ingreso de muestras: 280616
Fecha de análisis: 280616-110716
Fecha de informe: 110716

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)
5225	HW-1	< 1	< 1	N.D.	< 2
5226	PSA-SR	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número más probable.

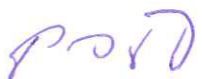
N.D. No detectable. Debajo del límite de detección.

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

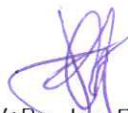
Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

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, Septiembre 2016

July 20, 2016

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: L31366

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 30, 2016. This project has been assigned to ACZ's project number, L31366. 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 L31366. 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.

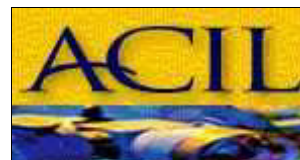
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 19, 2016. 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.

July 20, 2016

Project ID: Escobal

ACZ Project ID: L31366

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 20 sediment samples from Tahoe Resources, Inc. on June 30, 2016. 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 L31366. 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, H1), received either after the hold time expired or too close to the hold time.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-1

ACZ Sample ID: **L31366-01**
Date Sampled: 06/20/16 09:30
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 8:44	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 10:20	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	6590		*	mg/Kg	10	50	07/15/16 6:07	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.6	B	*	mg/Kg	0.2	1	07/12/16 20:35	enb
Arsenic, total (3050)	M6020 ICP-MS	505	8.1			mg/Kg	0.1	0.5	07/12/16 20:35	enb
Barium, total (3050)	M6020 ICP-MS	505	107		*	mg/Kg	0.3	1	07/12/16 20:35	enb
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/12/16 20:00	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.16	B	*	mg/Kg	0.05	0.3	07/12/16 20:35	enb
Calcium, total (3050)	M6010B ICP	101	2500			mg/Kg	10	50	07/12/16 20:00	aeb
Chromium, total (3050)	M6020 ICP-MS	505	1.8			mg/Kg	0.3	1	07/12/16 20:35	enb
Copper, total (3050)	M6020 ICP-MS	505	8			mg/Kg	0.3	1	07/12/16 20:35	enb
Iron, total (3050)	M6010B ICP	101	10100		*	mg/Kg	2	5	07/12/16 20:00	aeb
Lead, total (3050)	M6020 ICP-MS	505	7.63		*	mg/Kg	0.05	0.3	07/12/16 20:35	enb
Magnesium, total (3050)	M6010B ICP	101	1060			mg/Kg	20	100	07/12/16 20:00	aeb
Manganese, total (3050)	M6020 ICP-MS	505	341		*	mg/Kg	0.3	1	07/12/16 20:35	enb
Mercury, total	M7471A CVAA	241	0.11	B	*	mg/Kg	0.05	0.2	07/14/16 11:01	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/12/16 20:00	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3.5			mg/Kg	0.3	2	07/12/16 20:35	enb
Potassium, total (3050)	M6010B ICP	101	1840			mg/Kg	20	100	07/12/16 20:00	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.09	B	*	mg/Kg	0.05	0.1	07/12/16 20:35	enb
Silver, total (3050)	M6020 ICP-MS	505	0.06	B	*	mg/Kg	0.03	0.1	07/12/16 20:35	enb
Zinc, total (3050)	M6020 ICP-MS	505	31		*	mg/Kg	1	3	07/12/16 20:35	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	74.4		*	%	0.1	0.5	07/05/16 16:32	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:30	rbt
Digestion - Hot Plate	M3050B ICP								07/11/16 13:06	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/11/16 13:06	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:30	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-1

ACZ Sample ID: **L31366-01**

Date Sampled: 06/20/16 09:30

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29		U	*	mg/Kg	0.2	0.6	07/02/16 13:09	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	55.7	0.0132		*	%	0.00056	0.00279	07/14/16 14:18	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2

ACZ Sample ID: **L31366-02**
Date Sampled: 06/20/16 08:30
Date Received: 06/30/16
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 9:08	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 10:55	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20400	21100		*	mg/Kg	20	100	07/15/16 6:10	msh
Antimony, total (3050)	M6020 ICP-MS	510	12.5		*	mg/Kg	0.2	1	07/12/16 20:38	enb
Arsenic, total (3050)	M6020 ICP-MS	510	64.3			mg/Kg	0.1	0.5	07/12/16 20:38	enb
Barium, total (3050)	M6020 ICP-MS	510	248		*	mg/Kg	0.3	1	07/12/16 20:38	enb
Boron, total (3050)	M6010B ICP	102	3	B		mg/Kg	1	5	07/12/16 20:03	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	25.60		*	mg/Kg	0.05	0.3	07/12/16 20:38	enb
Calcium, total (3050)	M6010B ICP	102	40600			mg/Kg	10	50	07/12/16 20:03	aeb
Chromium, total (3050)	M6020 ICP-MS	510	13.6			mg/Kg	0.3	1	07/12/16 20:38	enb
Copper, total (3050)	M6020 ICP-MS	510	77.4			mg/Kg	0.3	1	07/12/16 20:38	enb
Iron, total (3050)	M6010B ICP	102	20100		*	mg/Kg	2	5	07/12/16 20:03	aeb
Lead, total (3050)	M6020 ICP-MS	510	1490		*	mg/Kg	0.05	0.3	07/12/16 20:38	enb
Magnesium, total (3050)	M6010B ICP	102	6180			mg/Kg	20	100	07/12/16 20:03	aeb
Manganese, total (3050)	M6020 ICP-MS	20400	2730		*	mg/Kg	10	50	07/15/16 6:10	msh
Mercury, total	M7471A CVAA	557	0.7		*	mg/Kg	0.1	0.6	07/14/16 11:03	pta
Molybdenum, total (3050)	M6010B ICP	102	11			mg/Kg	2	10	07/12/16 20:03	aeb
Nickel, total (3050)	M6020 ICP-MS	510	10.3			mg/Kg	0.3	2	07/12/16 20:38	enb
Potassium, total (3050)	M6010B ICP	102	2720			mg/Kg	20	100	07/12/16 20:03	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.57		*	mg/Kg	0.05	0.1	07/12/16 20:38	enb
Silver, total (3050)	M6020 ICP-MS	20400	94			mg/Kg	1	5	07/15/16 6:10	msh
Zinc, total (3050)	M6020 ICP-MS	510	2070		*	mg/Kg	1	3	07/12/16 20:38	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	29.8		*	%	0.1	0.5	07/05/16 18:38	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:31	rbt
Digestion - Hot Plate	M3050B ICP								07/11/16 14:09	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/11/16 14:09	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:33	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2

ACZ Sample ID: **L31366-02**

Date Sampled: 06/20/16 08:30

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	81.7		U	*	mg/Kg	0.5	2	07/02/16 13:11	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	264	0.0510		*	%	0.00264	0.0132	07/14/16 14:20	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2A

ACZ Sample ID: **L31366-03**
Date Sampled: 06/21/16 10:45
Date Received: 06/30/16
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 9:32	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 11:30	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	51000	30600		*	mg/Kg	50	300	07/15/16 6:13	msh
Antimony, total (3050)	M6020 ICP-MS	510	5.1		*	mg/Kg	0.2	1	07/12/16 20:41	enb
Arsenic, total (3050)	M6020 ICP-MS	510	33.1			mg/Kg	0.1	0.5	07/12/16 20:41	enb
Barium, total (3050)	M6020 ICP-MS	510	302		*	mg/Kg	0.3	1	07/12/16 20:41	enb
Boron, total (3050)	M6010B ICP	102	3	B		mg/Kg	1	5	07/12/16 20:06	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	8.38		*	mg/Kg	0.05	0.3	07/12/16 20:41	enb
Calcium, total (3050)	M6010B ICP	102	17800			mg/Kg	10	50	07/12/16 20:06	aeb
Chromium, total (3050)	M6020 ICP-MS	510	8.7			mg/Kg	0.3	1	07/12/16 20:41	enb
Copper, total (3050)	M6020 ICP-MS	510	53.9			mg/Kg	0.3	1	07/12/16 20:41	enb
Iron, total (3050)	M6010B ICP	102	21100		*	mg/Kg	2	5	07/12/16 20:06	aeb
Lead, total (3050)	M6020 ICP-MS	510	466		*	mg/Kg	0.05	0.3	07/12/16 20:41	enb
Magnesium, total (3050)	M6010B ICP	102	4600			mg/Kg	20	100	07/12/16 20:06	aeb
Manganese, total (3050)	M6020 ICP-MS	51000	2340		*	mg/Kg	30	100	07/15/16 6:13	msh
Mercury, total	M7471A CVAA	339	0.23	B	*	mg/Kg	0.07	0.3	07/14/16 11:05	pta
Molybdenum, total (3050)	M6010B ICP	102		U		mg/Kg	2	10	07/12/16 20:06	aeb
Nickel, total (3050)	M6020 ICP-MS	510	7.2			mg/Kg	0.3	2	07/12/16 20:41	enb
Potassium, total (3050)	M6010B ICP	102	2460			mg/Kg	20	100	07/12/16 20:06	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.34		*	mg/Kg	0.05	0.1	07/12/16 20:41	enb
Silver, total (3050)	M6020 ICP-MS	51000	24			mg/Kg	3	10	07/15/16 6:13	msh
Zinc, total (3050)	M6020 ICP-MS	510	721		*	mg/Kg	1	3	07/12/16 20:41	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	38.8		*	%	0.1	0.5	07/05/16 19:41	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:33	rbt
Digestion - Hot Plate	M3050B ICP								07/11/16 15:11	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/11/16 15:11	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:37	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2A

ACZ Sample ID: **L31366-03**

Date Sampled: 06/21/16 10:45

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	36		U	*	mg/Kg	0.2	0.7	07/02/16 13:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	183	0.0349		*	%	0.00183	0.00915	07/14/16 14:22	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-3

ACZ Sample ID: **L31366-04**

Date Sampled: 06/21/16 10:25

Date Received: 06/30/16

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 9:44	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 11:48	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	5350		*	mg/Kg	10	50	07/15/16 6:16	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.9		*	mg/Kg	0.2	1	07/12/16 20:44	enb
Arsenic, total (3050)	M6020 ICP-MS	505	18.2			mg/Kg	0.1	0.5	07/12/16 20:44	enb
Barium, total (3050)	M6020 ICP-MS	505	174		*	mg/Kg	0.3	1	07/12/16 20:44	enb
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/12/16 20:09	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.18	B	*	mg/Kg	0.05	0.3	07/12/16 20:44	enb
Calcium, total (3050)	M6010B ICP	101	2650			mg/Kg	10	50	07/12/16 20:09	aeb
Chromium, total (3050)	M6020 ICP-MS	505	2.5			mg/Kg	0.3	1	07/12/16 20:44	enb
Copper, total (3050)	M6020 ICP-MS	505	4.3			mg/Kg	0.3	1	07/12/16 20:44	enb
Iron, total (3050)	M6010B ICP	101	12500		*	mg/Kg	2	5	07/12/16 20:09	aeb
Lead, total (3050)	M6020 ICP-MS	505	7.33		*	mg/Kg	0.05	0.3	07/12/16 20:44	enb
Magnesium, total (3050)	M6010B ICP	101	670			mg/Kg	20	100	07/12/16 20:09	aeb
Manganese, total (3050)	M6020 ICP-MS	505	466		*	mg/Kg	0.3	1	07/12/16 20:44	enb
Mercury, total	M7471A CVAA	252	0.15	B	*	mg/Kg	0.05	0.3	07/14/16 11:07	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/12/16 20:09	aeb
Nickel, total (3050)	M6020 ICP-MS	505	1.6	B		mg/Kg	0.3	2	07/12/16 20:44	enb
Potassium, total (3050)	M6010B ICP	101	1590			mg/Kg	20	100	07/12/16 20:09	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B	*	mg/Kg	0.05	0.1	07/12/16 20:44	enb
Silver, total (3050)	M6020 ICP-MS	505	0.06	B	*	mg/Kg	0.03	0.1	07/12/16 20:44	enb
Zinc, total (3050)	M6020 ICP-MS	505	30		*	mg/Kg	1	3	07/12/16 20:44	enb

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	07/05/16 20:44	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:34	rbt
Digestion - Hot Plate	M3050B ICP								07/11/16 16:13	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/11/16 16:13	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:41	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-3

ACZ Sample ID: **L31366-04**

Date Sampled: 06/21/16 10:25

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	32.8		U	*	mg/Kg	0.2	0.7	07/02/16 13:13	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	86.2	0.00830		*	%	0.00086	0.00431	07/14/16 14:23	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4

ACZ Sample ID: **L31366-05**
Date Sampled: 06/20/16 07:45
Date Received: 06/30/16
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 9:56	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 12:05	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	5820		*	mg/Kg	10	50	07/15/16 6:19	msh
Antimony, total (3050)	M6020 ICP-MS	505	3.4		*	mg/Kg	0.2	1	07/12/16 20:48	enb
Arsenic, total (3050)	M6020 ICP-MS	505	17			mg/Kg	0.1	0.5	07/12/16 20:48	enb
Barium, total (3050)	M6020 ICP-MS	505	73.2		*	mg/Kg	0.3	1	07/12/16 20:48	enb
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/12/16 20:18	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.17	B	*	mg/Kg	0.05	0.3	07/12/16 20:48	enb
Calcium, total (3050)	M6010B ICP	101	2000			mg/Kg	10	50	07/12/16 20:18	aeb
Chromium, total (3050)	M6020 ICP-MS	505	3.3			mg/Kg	0.3	1	07/12/16 20:48	enb
Copper, total (3050)	M6020 ICP-MS	505	4.3			mg/Kg	0.3	1	07/12/16 20:48	enb
Iron, total (3050)	M6010B ICP	101	15700		*	mg/Kg	2	5	07/12/16 20:18	aeb
Lead, total (3050)	M6020 ICP-MS	505	8.50		*	mg/Kg	0.05	0.3	07/12/16 20:48	enb
Magnesium, total (3050)	M6010B ICP	101	980			mg/Kg	20	100	07/12/16 20:18	aeb
Manganese, total (3050)	M6020 ICP-MS	505	315		*	mg/Kg	0.3	1	07/12/16 20:48	enb
Mercury, total	M7471A CVAA	215	0.11	B	*	mg/Kg	0.04	0.2	07/14/16 11:14	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/12/16 20:18	aeb
Nickel, total (3050)	M6020 ICP-MS	505	2.3			mg/Kg	0.3	2	07/12/16 20:48	enb
Potassium, total (3050)	M6010B ICP	101	1580			mg/Kg	20	100	07/12/16 20:18	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.07	B	*	mg/Kg	0.05	0.1	07/12/16 20:48	enb
Silver, total (3050)	M6020 ICP-MS	505	0.06	B	*	mg/Kg	0.03	0.1	07/12/16 20:48	enb
Zinc, total (3050)	M6020 ICP-MS	505	36		*	mg/Kg	1	3	07/12/16 20:48	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	75.3		*	%	0.1	0.5	07/05/16 21:47	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:36	rbt
Digestion - Hot Plate	M3050B ICP								07/11/16 19:20	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/11/16 19:20	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:44	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4

ACZ Sample ID: **L31366-05**

Date Sampled: 06/20/16 07:45

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	33.2		U	*	mg/Kg	0.2	0.7	07/02/16 13:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	62	0.00765		*	%	0.00062	0.0031	07/14/16 14:25	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4A

ACZ Sample ID: **L31366-06**
Date Sampled: 06/21/16 10:20
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 10:08	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 12:23	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	6660		*	mg/Kg	10	50	07/15/16 6:32	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.9		*	mg/Kg	0.2	1	07/12/16 20:57	enb
Arsenic, total (3050)	M6020 ICP-MS	505	12			mg/Kg	0.1	0.5	07/12/16 20:57	enb
Barium, total (3050)	M6020 ICP-MS	505	112		*	mg/Kg	0.3	1	07/12/16 20:57	enb
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/12/16 20:27	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.20	B	*	mg/Kg	0.05	0.3	07/12/16 20:57	enb
Calcium, total (3050)	M6010B ICP	101	3180			mg/Kg	10	50	07/12/16 20:27	aeb
Chromium, total (3050)	M6020 ICP-MS	505	2.7			mg/Kg	0.3	1	07/12/16 20:57	enb
Copper, total (3050)	M6020 ICP-MS	505	4.1			mg/Kg	0.3	1	07/12/16 20:57	enb
Iron, total (3050)	M6010B ICP	101	11500		*	mg/Kg	2	5	07/12/16 20:27	aeb
Lead, total (3050)	M6020 ICP-MS	505	10.20		*	mg/Kg	0.05	0.3	07/12/16 20:57	enb
Magnesium, total (3050)	M6010B ICP	101	1040			mg/Kg	20	100	07/12/16 20:27	aeb
Manganese, total (3050)	M6020 ICP-MS	505	395		*	mg/Kg	0.3	1	07/12/16 20:57	enb
Mercury, total	M7471A CVAA	249	0.13	B	*	mg/Kg	0.05	0.2	07/14/16 11:21	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/12/16 20:27	aeb
Nickel, total (3050)	M6020 ICP-MS	505	2.2			mg/Kg	0.3	2	07/12/16 20:57	enb
Potassium, total (3050)	M6010B ICP	101	1650			mg/Kg	20	100	07/12/16 20:27	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B	*	mg/Kg	0.05	0.1	07/12/16 20:57	enb
Silver, total (3050)	M6020 ICP-MS	505	0.10		*	mg/Kg	0.03	0.1	07/12/16 20:57	enb
Zinc, total (3050)	M6020 ICP-MS	505	35		*	mg/Kg	1	3	07/12/16 20:57	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	74.2		*	%	0.1	0.5	07/05/16 22:49	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:37	rbt
Digestion - Hot Plate	M3050B ICP								07/11/16 20:23	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/11/16 20:23	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:48	rbt

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-4AACZ Sample ID: **L31366-06**
Date Sampled: 06/21/16 10:20
Date Received: 06/30/16
Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	31.3		U	*	mg/Kg	0.2	0.6	07/02/16 13:15	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	84.4	0.0136		*	%	0.00084	0.00422	07/14/16 14:26	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-5

ACZ Sample ID: **L31366-07**
Date Sampled: 06/21/16 08:15
Date Received: 06/30/16
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/07/16 13:23	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 12:41	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20200	10500		*	mg/Kg	20	100	07/15/16 6:35	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.7	B	*	mg/Kg	0.2	1	07/12/16 21:00	enb
Arsenic, total (3050)	M6020 ICP-MS	505	6.8			mg/Kg	0.1	0.5	07/12/16 21:00	enb
Barium, total (3050)	M6020 ICP-MS	505	183		*	mg/Kg	0.3	1	07/12/16 21:00	enb
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/12/16 20:30	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.26	B	*	mg/Kg	0.05	0.3	07/12/16 21:00	enb
Calcium, total (3050)	M6010B ICP	101	1490			mg/Kg	10	50	07/12/16 20:30	aeb
Chromium, total (3050)	M6020 ICP-MS	505	3.2			mg/Kg	0.3	1	07/12/16 21:00	enb
Copper, total (3050)	M6020 ICP-MS	505	5.6			mg/Kg	0.3	1	07/12/16 21:00	enb
Iron, total (3050)	M6010B ICP	101	12100		*	mg/Kg	2	5	07/12/16 20:30	aeb
Lead, total (3050)	M6020 ICP-MS	505	7.09		*	mg/Kg	0.05	0.3	07/12/16 21:00	enb
Magnesium, total (3050)	M6010B ICP	101	730			mg/Kg	20	100	07/12/16 20:30	aeb
Manganese, total (3050)	M6020 ICP-MS	505	421		*	mg/Kg	0.3	1	07/12/16 21:00	enb
Mercury, total	M7471A CVAA	250	0.27	B	*	mg/Kg	0.05	0.3	07/14/16 11:23	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/12/16 20:30	aeb
Nickel, total (3050)	M6020 ICP-MS	505	2			mg/Kg	0.3	2	07/12/16 21:00	enb
Potassium, total (3050)	M6010B ICP	101	1550			mg/Kg	20	100	07/12/16 20:30	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B	*	mg/Kg	0.05	0.1	07/12/16 21:00	enb
Silver, total (3050)	M6020 ICP-MS	505	0.06	B	*	mg/Kg	0.03	0.1	07/12/16 21:00	enb
Zinc, total (3050)	M6020 ICP-MS	505	22		*	mg/Kg	1	3	07/12/16 21:00	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	66.7		*	%	0.1	0.5	07/05/16 23:52	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:39	rbt
Digestion - Hot Plate	M3050B ICP								07/11/16 21:25	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/11/16 21:25	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:52	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-5

ACZ Sample ID: **L31366-07**

Date Sampled: 06/21/16 08:15

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	37.4		UH	*	mg/Kg	0.2	0.7	07/08/16 0:39	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	66.4	0.00757		*	%	0.00066	0.00332	07/14/16 14:29	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-6

ACZ Sample ID: **L31366-08**
Date Sampled: 06/21/16 07:05
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 10:32	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 12:58	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	5290		*	mg/Kg	10	50	07/15/16 6:45	msh
Antimony, total (3050)	M6020 ICP-MS	500	0.8	B	*	mg/Kg	0.2	1	07/12/16 21:10	enb
Arsenic, total (3050)	M6020 ICP-MS	500	13.6			mg/Kg	0.1	0.5	07/12/16 21:10	enb
Barium, total (3050)	M6020 ICP-MS	500	65		*	mg/Kg	0.3	1	07/12/16 21:10	enb
Boron, total (3050)	M6010B ICP	100		U		mg/Kg	1	5	07/12/16 20:33	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.16	B	*	mg/Kg	0.05	0.3	07/12/16 21:10	enb
Calcium, total (3050)	M6010B ICP	100	1380			mg/Kg	10	50	07/12/16 20:33	aeb
Chromium, total (3050)	M6020 ICP-MS	500	10.6			mg/Kg	0.3	1	07/12/16 21:10	enb
Copper, total (3050)	M6020 ICP-MS	500	6			mg/Kg	0.3	1	07/12/16 21:10	enb
Iron, total (3050)	M6010B ICP	100	26600		*	mg/Kg	2	5	07/12/16 20:33	aeb
Lead, total (3050)	M6020 ICP-MS	500	4.61		*	mg/Kg	0.05	0.3	07/12/16 21:10	enb
Magnesium, total (3050)	M6010B ICP	100	1320			mg/Kg	20	100	07/12/16 20:33	aeb
Manganese, total (3050)	M6020 ICP-MS	500	387		*	mg/Kg	0.3	1	07/12/16 21:10	enb
Mercury, total	M7471A CVAA	217	0.12	B	*	mg/Kg	0.04	0.2	07/14/16 11:25	pta
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	07/12/16 20:33	aeb
Nickel, total (3050)	M6020 ICP-MS	500	3			mg/Kg	0.3	2	07/12/16 21:10	enb
Potassium, total (3050)	M6010B ICP	100	1160			mg/Kg	20	100	07/12/16 20:33	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.10		*	mg/Kg	0.05	0.1	07/12/16 21:10	enb
Silver, total (3050)	M6020 ICP-MS	500	0.04	B	*	mg/Kg	0.03	0.1	07/12/16 21:10	enb
Zinc, total (3050)	M6020 ICP-MS	500	46		*	mg/Kg	1	3	07/12/16 21:10	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	76.7		*	%	0.1	0.5	07/06/16 0:55	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:41	rbt
Digestion - Hot Plate	M3050B ICP								07/12/16 0:32	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 0:32	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:55	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-6

ACZ Sample ID: **L31366-08**

Date Sampled: 06/21/16 07:05

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	27.7		U	*	mg/Kg	0.2	0.6	07/02/16 13:17	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	72.3	0.0106		*	%	0.00072	0.00362	07/14/16 14:30	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-7

ACZ Sample ID: **L31366-09**
Date Sampled: 06/20/16 07:05
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/07/16 14:41	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 13:16	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	500	4590		*	mg/Kg	0.5	3	07/12/16 21:13	enb
Antimony, total (3050)	M6020 ICP-MS	500	0.4	B	*	mg/Kg	0.2	1	07/12/16 21:13	enb
Arsenic, total (3050)	M6020 ICP-MS	500	4.4			mg/Kg	0.1	0.5	07/12/16 21:13	enb
Barium, total (3050)	M6020 ICP-MS	500	72		*	mg/Kg	0.3	1	07/12/16 21:13	enb
Boron, total (3050)	M6010B ICP	100		U		mg/Kg	1	5	07/12/16 20:36	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.10	B	*	mg/Kg	0.05	0.3	07/12/16 21:13	enb
Calcium, total (3050)	M6010B ICP	100	1170			mg/Kg	10	50	07/12/16 20:36	aeb
Chromium, total (3050)	M6020 ICP-MS	500	1.7			mg/Kg	0.3	1	07/12/16 21:13	enb
Copper, total (3050)	M6020 ICP-MS	500	3.6			mg/Kg	0.3	1	07/12/16 21:13	enb
Iron, total (3050)	M6010B ICP	100	7430		*	mg/Kg	2	5	07/12/16 20:36	aeb
Lead, total (3050)	M6020 ICP-MS	500	6.65		*	mg/Kg	0.05	0.3	07/12/16 21:13	enb
Magnesium, total (3050)	M6010B ICP	100	810			mg/Kg	20	100	07/12/16 20:36	aeb
Manganese, total (3050)	M6020 ICP-MS	500	262		*	mg/Kg	0.3	1	07/12/16 21:13	enb
Mercury, total	M7471A CVAA	249	0.12	B	*	mg/Kg	0.05	0.2	07/14/16 11:27	pta
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	07/12/16 20:36	aeb
Nickel, total (3050)	M6020 ICP-MS	500	1.6	B		mg/Kg	0.3	2	07/12/16 21:13	enb
Potassium, total (3050)	M6010B ICP	100	1820			mg/Kg	20	100	07/12/16 20:36	aeb
Selenium, total (3050)	M6020 ICP-MS	500		U	*	mg/Kg	0.05	0.1	07/12/16 21:13	enb
Silver, total (3050)	M6020 ICP-MS	500	0.05	B	*	mg/Kg	0.03	0.1	07/12/16 21:13	enb
Zinc, total (3050)	M6020 ICP-MS	500	21		*	mg/Kg	1	3	07/12/16 21:13	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	72		*	%	0.1	0.5	07/06/16 1:58	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:42	rbt
Digestion - Hot Plate	M3050B ICP								07/12/16 1:34	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 1:34	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 7:59	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-7

ACZ Sample ID: **L31366-09**

Date Sampled: 06/20/16 07:05

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	34.2		UH	*	mg/Kg	0.2	0.7	07/08/16 0:41	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	86.4	0.00750		*	%	0.00086	0.00432	07/14/16 14:31	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-8

ACZ Sample ID: **L31366-10**
Date Sampled: 06/21/16 09:05
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 10:56	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 13:34	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	4550		*	mg/Kg	10	50	07/15/16 6:48	msh
Antimony, total (3050)	M6020 ICP-MS	505	2.1		*	mg/Kg	0.2	1	07/12/16 21:16	enb
Arsenic, total (3050)	M6020 ICP-MS	505	17.9			mg/Kg	0.1	0.5	07/12/16 21:16	enb
Barium, total (3050)	M6020 ICP-MS	505	80.9		*	mg/Kg	0.3	1	07/12/16 21:16	enb
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/12/16 20:42	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.35		*	mg/Kg	0.05	0.3	07/12/16 21:16	enb
Calcium, total (3050)	M6010B ICP	101	1600			mg/Kg	10	50	07/12/16 20:42	aeb
Chromium, total (3050)	M6020 ICP-MS	505	2.7			mg/Kg	0.3	1	07/12/16 21:16	enb
Copper, total (3050)	M6020 ICP-MS	505	7.8			mg/Kg	0.3	1	07/12/16 21:16	enb
Iron, total (3050)	M6010B ICP	101	9050		*	mg/Kg	2	5	07/12/16 20:42	aeb
Lead, total (3050)	M6020 ICP-MS	505	10.60		*	mg/Kg	0.05	0.3	07/12/16 21:16	enb
Magnesium, total (3050)	M6010B ICP	101	690			mg/Kg	20	100	07/12/16 20:42	aeb
Manganese, total (3050)	M6020 ICP-MS	505	248		*	mg/Kg	0.3	1	07/12/16 21:16	enb
Mercury, total	M7471A CVAA	191	0.13	B	*	mg/Kg	0.04	0.2	07/14/16 11:29	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/12/16 20:42	aeb
Nickel, total (3050)	M6020 ICP-MS	505	1.6	B		mg/Kg	0.3	2	07/12/16 21:16	enb
Potassium, total (3050)	M6010B ICP	101	1410			mg/Kg	20	100	07/12/16 20:42	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B	*	mg/Kg	0.05	0.1	07/12/16 21:16	enb
Silver, total (3050)	M6020 ICP-MS	505	0.37		*	mg/Kg	0.03	0.1	07/12/16 21:16	enb
Zinc, total (3050)	M6020 ICP-MS	505	53		*	mg/Kg	1	3	07/12/16 21:16	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	65.4		*	%	0.1	0.5	07/06/16 3:01	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:44	rbt
Digestion - Hot Plate	M3050B ICP								07/12/16 2:36	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 2:36	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:03	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-8

ACZ Sample ID: **L31366-10**

Date Sampled: 06/21/16 09:05

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	33.1		U	*	mg/Kg	0.2	0.7	07/02/16 13:18	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	107	0.0301		*	%	0.00107	0.00535	07/14/16 14:32	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-GW2

ACZ Sample ID: **L31366-11**
Date Sampled: 06/07/16 09:00
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 11:08	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 13:51	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20400	15000		*	mg/Kg	20	100	07/15/16 6:51	msh
Antimony, total (3050)	M6020 ICP-MS	510	4.6		*	mg/Kg	0.2	1	07/12/16 21:19	enb
Arsenic, total (3050)	M6020 ICP-MS	510	29.1			mg/Kg	0.1	0.5	07/12/16 21:19	enb
Barium, total (3050)	M6020 ICP-MS	510	234		*	mg/Kg	0.3	1	07/12/16 21:19	enb
Boron, total (3050)	M6010B ICP	102		U		mg/Kg	1	5	07/12/16 20:45	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	0.45		*	mg/Kg	0.05	0.3	07/12/16 21:19	enb
Calcium, total (3050)	M6010B ICP	102	3290			mg/Kg	10	50	07/12/16 20:45	aeb
Chromium, total (3050)	M6020 ICP-MS	510	3.1			mg/Kg	0.3	1	07/12/16 21:19	enb
Copper, total (3050)	M6020 ICP-MS	510	18.7			mg/Kg	0.3	1	07/12/16 21:19	enb
Iron, total (3050)	M6010B ICP	102	13700		*	mg/Kg	2	5	07/12/16 20:45	aeb
Lead, total (3050)	M6020 ICP-MS	510	14.20		*	mg/Kg	0.05	0.3	07/12/16 21:19	enb
Magnesium, total (3050)	M6010B ICP	102	1170			mg/Kg	20	100	07/12/16 20:45	aeb
Manganese, total (3050)	M6020 ICP-MS	510	114		*	mg/Kg	0.3	1	07/12/16 21:19	enb
Mercury, total	M7471A CVAA	382		U	*	mg/Kg	0.08	0.4	07/05/16 15:11	pta
Molybdenum, total (3050)	M6010B ICP	102		U		mg/Kg	2	10	07/12/16 20:45	aeb
Nickel, total (3050)	M6020 ICP-MS	510	6.1			mg/Kg	0.3	2	07/12/16 21:19	enb
Potassium, total (3050)	M6010B ICP	102	2160			mg/Kg	20	100	07/12/16 20:45	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.36		*	mg/Kg	0.05	0.1	07/12/16 21:19	enb
Silver, total (3050)	M6020 ICP-MS	510	0.42		*	mg/Kg	0.03	0.1	07/12/16 21:19	enb
Zinc, total (3050)	M6020 ICP-MS	510	50		*	mg/Kg	1	3	07/12/16 21:19	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	31		*	%	0.1	0.5	07/06/16 4:04	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:45	rbt
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 3:39	bcc
Digestion - Hot Plate	M3050B ICP								07/12/16 3:39	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:06	rbt

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-GW2ACZ Sample ID: **L31366-11**
Date Sampled: 06/07/16 09:00
Date Received: 06/30/16
Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	63.3		UH	*	mg/Kg	0.4	1	07/02/16 13:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	258	0.0334	H	*	%	0.00258	0.0129	07/14/16 14:33	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-WW14

ACZ Sample ID: **L31366-12**
Date Sampled: 06/16/16 08:20
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 11:20	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 14:09	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10900	9940		*	mg/Kg	10	50	07/15/16 6:54	msh
Antimony, total (3050)	M6020 ICP-MS	545	12.7		*	mg/Kg	0.2	1	07/12/16 21:22	enb
Arsenic, total (3050)	M6020 ICP-MS	545	15.1			mg/Kg	0.1	0.5	07/12/16 21:22	enb
Barium, total (3050)	M6020 ICP-MS	545	202		*	mg/Kg	0.3	1	07/12/16 21:22	enb
Boron, total (3050)	M6010B ICP	109	68			mg/Kg	1	5	07/12/16 20:48	aeb
Cadmium, total (3050)	M6020 ICP-MS	545	14.10		*	mg/Kg	0.05	0.3	07/12/16 21:22	enb
Calcium, total (3050)	M6010B ICP	109	36400			mg/Kg	10	50	07/12/16 20:48	aeb
Chromium, total (3050)	M6020 ICP-MS	545	17.3			mg/Kg	0.3	1	07/12/16 21:22	enb
Copper, total (3050)	M6020 ICP-MS	545	151			mg/Kg	0.3	1	07/12/16 21:22	enb
Iron, total (3050)	M6010B ICP	109	15100		*	mg/Kg	2	5	07/12/16 20:48	aeb
Lead, total (3050)	M6020 ICP-MS	545	733		*	mg/Kg	0.05	0.3	07/12/16 21:22	enb
Magnesium, total (3050)	M6010B ICP	109	5140			mg/Kg	20	100	07/12/16 20:48	aeb
Manganese, total (3050)	M6020 ICP-MS	545	643		*	mg/Kg	0.3	1	07/12/16 21:22	enb
Mercury, total	M7471A CVAA	2290	1.3	B	*	mg/Kg	0.5	2	07/14/16 11:31	pta
Molybdenum, total (3050)	M6010B ICP	109	22			mg/Kg	2	10	07/12/16 20:48	aeb
Nickel, total (3050)	M6020 ICP-MS	545	18.5			mg/Kg	0.3	2	07/12/16 21:22	enb
Potassium, total (3050)	M6010B ICP	109	2860			mg/Kg	20	100	07/12/16 20:48	aeb
Selenium, total (3050)	M6020 ICP-MS	545	2.97		*	mg/Kg	0.05	0.1	07/12/16 21:22	enb
Silver, total (3050)	M6020 ICP-MS	10900	47.7			mg/Kg	0.5	3	07/15/16 6:54	msh
Zinc, total (3050)	M6020 ICP-MS	545	2120		*	mg/Kg	1	3	07/12/16 21:22	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	8.4		*	%	0.1	0.5	07/06/16 5:07	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:47	rbt
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 4:41	bcc
Digestion - Hot Plate	M3050B ICP								07/12/16 4:41	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:10	rbt

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-WW14ACZ Sample ID: **L31366-12**
Date Sampled: 06/16/16 08:20
Date Received: 06/30/16
Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	185		UH	*	mg/Kg	1	4	07/02/16 13:20	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	7840	1.98		*	%	0.0784	0.392	07/14/16 14:47	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-WW7

ACZ Sample ID: **L31366-13**
Date Sampled: 06/18/16 16:00
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 11:32	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 14:26	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	20200	14400		*	mg/Kg	20	100	07/15/16 6:58	msh
Antimony, total (3050)	M6020 ICP-MS	505	12.5		*	mg/Kg	0.2	1	07/12/16 21:25	enb
Arsenic, total (3050)	M6020 ICP-MS	505	69.3			mg/Kg	0.1	0.5	07/12/16 21:25	enb
Barium, total (3050)	M6020 ICP-MS	505	270		*	mg/Kg	0.3	1	07/12/16 21:25	enb
Boron, total (3050)	M6010B ICP	101	3	B		mg/Kg	1	5	07/12/16 20:51	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	20.70		*	mg/Kg	0.05	0.3	07/12/16 21:25	enb
Calcium, total (3050)	M6010B ICP	101	62100			mg/Kg	10	50	07/12/16 20:51	aeb
Chromium, total (3050)	M6020 ICP-MS	505	13.8			mg/Kg	0.3	1	07/12/16 21:25	enb
Copper, total (3050)	M6020 ICP-MS	505	62.1			mg/Kg	0.3	1	07/12/16 21:25	enb
Iron, total (3050)	M6010B ICP	101	18300		*	mg/Kg	2	5	07/12/16 20:51	aeb
Lead, total (3050)	M6020 ICP-MS	505	1210		*	mg/Kg	0.05	0.3	07/12/16 21:25	enb
Magnesium, total (3050)	M6010B ICP	101	9600			mg/Kg	20	100	07/12/16 20:51	aeb
Manganese, total (3050)	M6020 ICP-MS	20200	3410		*	mg/Kg	10	50	07/15/16 6:58	msh
Mercury, total	M7471A CVAA	335	0.34		*	mg/Kg	0.07	0.3	07/14/16 11:33	pta
Molybdenum, total (3050)	M6010B ICP	101	6	B		mg/Kg	2	10	07/12/16 20:51	aeb
Nickel, total (3050)	M6020 ICP-MS	505	11.1			mg/Kg	0.3	2	07/12/16 21:25	enb
Potassium, total (3050)	M6010B ICP	101	3630			mg/Kg	20	100	07/12/16 20:51	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.28		*	mg/Kg	0.05	0.1	07/12/16 21:25	enb
Silver, total (3050)	M6020 ICP-MS	20200	79			mg/Kg	1	5	07/15/16 6:58	msh
Zinc, total (3050)	M6020 ICP-MS	505	1710		*	mg/Kg	1	3	07/12/16 21:25	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	41.3		*	%	0.1	0.5	07/06/16 6:09	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:49	rbt
Digestion - Hot Plate	M3050B ICP								07/12/16 5:43	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 5:43	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:14	rbt

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-WW7ACZ Sample ID: **L31366-13**

Date Sampled: 06/18/16 16:00

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	33.3		U	*	mg/Kg	0.2	0.7	07/02/16 13:21	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	191	0.0542		*	%	0.00191	0.00955	07/14/16 14:48	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-WW9

ACZ Sample ID: **L31366-14**
Date Sampled: 06/25/16 08:10
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/07/16 16:00	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 14:44	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	51000	27900		*	mg/Kg	50	300	07/15/16 7:07	msh
Antimony, total (3050)	M6020 ICP-MS	510	6.5		*	mg/Kg	0.2	1	07/12/16 21:35	enb
Arsenic, total (3050)	M6020 ICP-MS	510	32			mg/Kg	0.1	0.5	07/12/16 21:35	enb
Barium, total (3050)	M6020 ICP-MS	510	298		*	mg/Kg	0.3	1	07/12/16 21:35	enb
Boron, total (3050)	M6010B ICP	102	2	B		mg/Kg	1	5	07/12/16 20:54	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	7.92		*	mg/Kg	0.05	0.3	07/12/16 21:35	enb
Calcium, total (3050)	M6010B ICP	102	26400			mg/Kg	10	50	07/12/16 20:54	aeb
Chromium, total (3050)	M6020 ICP-MS	510	9.9			mg/Kg	0.3	1	07/12/16 21:35	enb
Copper, total (3050)	M6020 ICP-MS	510	49.8			mg/Kg	0.3	1	07/12/16 21:35	enb
Iron, total (3050)	M6010B ICP	102	21000		*	mg/Kg	2	5	07/12/16 20:54	aeb
Lead, total (3050)	M6020 ICP-MS	510	912		*	mg/Kg	0.05	0.3	07/12/16 21:35	enb
Magnesium, total (3050)	M6010B ICP	102	4690			mg/Kg	20	100	07/12/16 20:54	aeb
Manganese, total (3050)	M6020 ICP-MS	51000	2170		*	mg/Kg	30	100	07/15/16 7:07	msh
Mercury, total	M7471A CVAA	539	0.3	B	*	mg/Kg	0.1	0.5	07/14/16 11:35	pta
Molybdenum, total (3050)	M6010B ICP	102	4	B		mg/Kg	2	10	07/12/16 20:54	aeb
Nickel, total (3050)	M6020 ICP-MS	510	8.3			mg/Kg	0.3	2	07/12/16 21:35	enb
Potassium, total (3050)	M6010B ICP	102	2840			mg/Kg	20	100	07/12/16 20:54	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.41		*	mg/Kg	0.05	0.1	07/12/16 21:35	enb
Silver, total (3050)	M6020 ICP-MS	51000	52			mg/Kg	3	10	07/15/16 7:07	msh
Zinc, total (3050)	M6020 ICP-MS	510	675		*	mg/Kg	1	3	07/12/16 21:35	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	33.6		*	%	0.1	0.5	07/06/16 7:12	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:50	rbt
Digestion - Hot Plate	M3050B ICP								07/12/16 6:46	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 6:46	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:17	rbt

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-WW9ACZ Sample ID: **L31366-14**
Date Sampled: 06/25/16 08:10
Date Received: 06/30/16
Sample Matrix: Sediment

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	50.6		U	*	mg/Kg	0.3	1	07/08/16 0:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	214	0.0409		*	%	0.00214	0.0107	07/14/16 14:49	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: TDS 1

ACZ Sample ID: **L31366-15**
Date Sampled: 06/17/16 13:25
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 11:44	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 15:02	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	7190		*	mg/Kg	50	300	07/15/16 7:10	msh
Antimony, total (3050)	M6020 ICP-MS	500	14.8		*	mg/Kg	0.2	1	07/12/16 21:41	enb
Arsenic, total (3050)	M6020 ICP-MS	500	173			mg/Kg	0.1	0.5	07/12/16 21:41	enb
Barium, total (3050)	M6020 ICP-MS	500	168		*	mg/Kg	0.3	1	07/12/16 21:41	enb
Boron, total (3050)	M6010B ICP	100	2	B		mg/Kg	1	5	07/12/16 21:03	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	14.80		*	mg/Kg	0.05	0.3	07/12/16 21:41	enb
Calcium, total (3050)	M6010B ICP	100	28300			mg/Kg	10	50	07/12/16 21:03	aeb
Chromium, total (3050)	M6020 ICP-MS	500	13.2			mg/Kg	0.3	1	07/12/16 21:41	enb
Copper, total (3050)	M6020 ICP-MS	500	47.2			mg/Kg	0.3	1	07/12/16 21:41	enb
Iron, total (3050)	M6010B ICP	100	19200		*	mg/Kg	2	5	07/12/16 21:03	aeb
Lead, total (3050)	M6020 ICP-MS	500	733		*	mg/Kg	0.05	0.3	07/12/16 21:41	enb
Magnesium, total (3050)	M6010B ICP	100	6160			mg/Kg	20	100	07/12/16 21:03	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	4880		*	mg/Kg	30	100	07/15/16 7:10	msh
Mercury, total	M7471A CVAA	176	0.27		*	mg/Kg	0.04	0.2	07/14/16 11:37	pta
Molybdenum, total (3050)	M6010B ICP	100	8	B		mg/Kg	2	10	07/12/16 21:03	aeb
Nickel, total (3050)	M6020 ICP-MS	500	5.6			mg/Kg	0.3	2	07/12/16 21:41	enb
Potassium, total (3050)	M6010B ICP	100	2600			mg/Kg	20	100	07/12/16 21:03	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.18		*	mg/Kg	0.05	0.1	07/12/16 21:41	enb
Silver, total (3050)	M6020 ICP-MS	50000	68			mg/Kg	3	10	07/15/16 7:10	msh
Zinc, total (3050)	M6020 ICP-MS	500	1300		*	mg/Kg	1	3	07/12/16 21:41	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	90.5		*	%	0.1	0.5	07/06/16 8:15	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:52	rbt
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 7:48	bcc
Digestion - Hot Plate	M3050B ICP								07/12/16 7:48	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:21	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: TDS 1

ACZ Sample ID: **L31366-15**

Date Sampled: 06/17/16 13:25

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	27	3	H	*	mg/Kg	0.2	0.5	07/02/16 13:21	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	106	0.0363		*	%	0.00106	0.0053	07/14/16 14:50	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: TDS 2

ACZ Sample ID: **L31366-16**
Date Sampled: 06/17/16 13:30
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 11:56	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 15:19	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	7190		*	mg/Kg	50	300	07/15/16 7:13	msh
Antimony, total (3050)	M6020 ICP-MS	500	13.5		*	mg/Kg	0.2	1	07/12/16 21:44	enb
Arsenic, total (3050)	M6020 ICP-MS	500	187			mg/Kg	0.1	0.5	07/12/16 21:44	enb
Barium, total (3050)	M6020 ICP-MS	500	178		*	mg/Kg	0.3	1	07/12/16 21:44	enb
Boron, total (3050)	M6010B ICP	100	2	B		mg/Kg	1	5	07/12/16 21:06	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	13.70		*	mg/Kg	0.05	0.3	07/12/16 21:44	enb
Calcium, total (3050)	M6010B ICP	100	31100			mg/Kg	10	50	07/12/16 21:06	aeb
Chromium, total (3050)	M6020 ICP-MS	500	14.6			mg/Kg	0.3	1	07/12/16 21:44	enb
Copper, total (3050)	M6020 ICP-MS	500	49.8			mg/Kg	0.3	1	07/12/16 21:44	enb
Iron, total (3050)	M6010B ICP	100	19100		*	mg/Kg	2	5	07/12/16 21:06	aeb
Lead, total (3050)	M6020 ICP-MS	500	695		*	mg/Kg	0.05	0.3	07/12/16 21:44	enb
Magnesium, total (3050)	M6010B ICP	100	6270			mg/Kg	20	100	07/12/16 21:06	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	5380		*	mg/Kg	30	100	07/15/16 7:13	msh
Mercury, total	M7471A CVAA	206	0.25		*	mg/Kg	0.04	0.2	07/14/16 11:40	pta
Molybdenum, total (3050)	M6010B ICP	100	7	B		mg/Kg	2	10	07/12/16 21:06	aeb
Nickel, total (3050)	M6020 ICP-MS	500	6.4			mg/Kg	0.3	2	07/12/16 21:44	enb
Potassium, total (3050)	M6010B ICP	100	2700			mg/Kg	20	100	07/12/16 21:06	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.22		*	mg/Kg	0.05	0.1	07/12/16 21:44	enb
Silver, total (3050)	M6020 ICP-MS	50000	56			mg/Kg	3	10	07/15/16 7:13	msh
Zinc, total (3050)	M6020 ICP-MS	500	1200		*	mg/Kg	1	3	07/12/16 21:44	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	87.7		*	%	0.1	0.5	07/06/16 9:18	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:53	rbt
Digestion - Hot Plate	M3050B ICP								07/12/16 8:50	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 8:50	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:25	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: TDS 2

ACZ Sample ID: **L31366-16**

Date Sampled: 06/17/16 13:30

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	24.8	0.9	H	*	mg/Kg	0.1	0.5	07/02/16 13:22	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	99.3	0.0406		*	%	0.00099	0.00497	07/14/16 14:52	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: TDS 3

ACZ Sample ID: **L31366-17**
Date Sampled: 06/17/16 13:40
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 12:08	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 15:37	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	7180		*	mg/Kg	50	300	07/15/16 7:16	msh
Antimony, total (3050)	M6020 ICP-MS	500	12.1		*	mg/Kg	0.2	1	07/12/16 21:47	enb
Arsenic, total (3050)	M6020 ICP-MS	500	180			mg/Kg	0.1	0.5	07/12/16 21:47	enb
Barium, total (3050)	M6020 ICP-MS	500	181		*	mg/Kg	0.3	1	07/12/16 21:47	enb
Boron, total (3050)	M6010B ICP	100	2	B		mg/Kg	1	5	07/12/16 21:09	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	14.20		*	mg/Kg	0.05	0.3	07/12/16 21:47	enb
Calcium, total (3050)	M6010B ICP	100	33300			mg/Kg	10	50	07/12/16 21:09	aeb
Chromium, total (3050)	M6020 ICP-MS	500	14.9			mg/Kg	0.3	1	07/12/16 21:47	enb
Copper, total (3050)	M6020 ICP-MS	500	51.7			mg/Kg	0.3	1	07/12/16 21:47	enb
Iron, total (3050)	M6010B ICP	100	18900		*	mg/Kg	2	5	07/12/16 21:09	aeb
Lead, total (3050)	M6020 ICP-MS	500	736		*	mg/Kg	0.05	0.3	07/12/16 21:47	enb
Magnesium, total (3050)	M6010B ICP	100	6450			mg/Kg	20	100	07/12/16 21:09	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	5700		*	mg/Kg	30	100	07/15/16 7:16	msh
Mercury, total	M7471A CVAA	166	0.21		*	mg/Kg	0.03	0.2	07/14/16 11:46	pta
Molybdenum, total (3050)	M6010B ICP	100	6	B		mg/Kg	2	10	07/12/16 21:09	aeb
Nickel, total (3050)	M6020 ICP-MS	500	6.3			mg/Kg	0.3	2	07/12/16 21:47	enb
Potassium, total (3050)	M6010B ICP	100	2500			mg/Kg	20	100	07/12/16 21:09	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.22		*	mg/Kg	0.05	0.1	07/12/16 21:47	enb
Silver, total (3050)	M6020 ICP-MS	50000	52			mg/Kg	3	10	07/15/16 7:16	msh
Zinc, total (3050)	M6020 ICP-MS	500	1240		*	mg/Kg	1	3	07/12/16 21:47	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	85		*	%	0.1	0.5	07/06/16 10:21	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:55	rbt
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 9:52	bcc
Digestion - Hot Plate	M3050B ICP								07/12/16 9:52	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:28	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: TDS 3

ACZ Sample ID: **L31366-17**

Date Sampled: 06/17/16 13:40

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	27.9	2.3	H	*	mg/Kg	0.2	0.6	07/02/16 13:23	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	109	0.0386		*	%	0.00109	0.00545	07/14/16 14:43	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: TDS 4

ACZ Sample ID: **L31366-18**
Date Sampled: 06/17/16 13:35
Date Received: 06/30/16
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 12:21	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 15:54	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	7120		*	mg/Kg	50	300	07/15/16 7:20	msh
Antimony, total (3050)	M6020 ICP-MS	500	14.1		*	mg/Kg	0.2	1	07/12/16 21:50	enb
Arsenic, total (3050)	M6020 ICP-MS	500	197			mg/Kg	0.1	0.5	07/12/16 21:50	enb
Barium, total (3050)	M6020 ICP-MS	500	182		*	mg/Kg	0.3	1	07/12/16 21:50	enb
Boron, total (3050)	M6010B ICP	100	3	B		mg/Kg	1	5	07/12/16 21:12	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	21.20		*	mg/Kg	0.05	0.3	07/12/16 21:50	enb
Calcium, total (3050)	M6010B ICP	100	27700			mg/Kg	10	50	07/12/16 21:12	aeb
Chromium, total (3050)	M6020 ICP-MS	500	15.2			mg/Kg	0.3	1	07/12/16 21:50	enb
Copper, total (3050)	M6020 ICP-MS	500	81.7			mg/Kg	0.3	1	07/12/16 21:50	enb
Iron, total (3050)	M6010B ICP	100	19200		*	mg/Kg	2	5	07/12/16 21:12	aeb
Lead, total (3050)	M6020 ICP-MS	500	805		*	mg/Kg	0.05	0.3	07/12/16 21:50	enb
Magnesium, total (3050)	M6010B ICP	100	6160			mg/Kg	20	100	07/12/16 21:12	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	5200		*	mg/Kg	30	100	07/15/16 7:20	msh
Mercury, total	M7471A CVAA	189	0.35		*	mg/Kg	0.04	0.2	07/14/16 11:48	pta
Molybdenum, total (3050)	M6010B ICP	100	8	B		mg/Kg	2	10	07/12/16 21:12	aeb
Nickel, total (3050)	M6020 ICP-MS	500	6.8			mg/Kg	0.3	2	07/12/16 21:50	enb
Potassium, total (3050)	M6010B ICP	100	2600			mg/Kg	20	100	07/12/16 21:12	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.21		*	mg/Kg	0.05	0.1	07/12/16 21:50	enb
Silver, total (3050)	M6020 ICP-MS	50500	56			mg/Kg	3	10	07/15/16 7:20	msh
Zinc, total (3050)	M6020 ICP-MS	500	1770		*	mg/Kg	1	3	07/12/16 21:50	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	87.1		*	%	0.1	0.5	07/06/16 11:24	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:56	rbt
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 10:55	bcc
Digestion - Hot Plate	M3050B ICP								07/12/16 10:55	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:32	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: TDS 4

ACZ Sample ID: **L31366-18**

Date Sampled: 06/17/16 13:35

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	28.5	0.6	H	*	mg/Kg	0.2	0.6	07/02/16 13:24	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	108	0.0456		*	%	0.00108	0.0054	07/14/16 14:44	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-9

ACZ Sample ID: **L31366-19**
Date Sampled: 06/21/16 07:55
Date Received: 06/30/16
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 12:33	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 16:12	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	7850		*	mg/Kg	10	50	07/15/16 7:23	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.4	B	*	mg/Kg	0.2	1	07/12/16 21:53	enb
Arsenic, total (3050)	M6020 ICP-MS	505	4.8			mg/Kg	0.1	0.5	07/12/16 21:53	enb
Barium, total (3050)	M6020 ICP-MS	505	114		*	mg/Kg	0.3	1	07/12/16 21:53	enb
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/12/16 21:15	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.26	B	*	mg/Kg	0.05	0.3	07/12/16 21:53	enb
Calcium, total (3050)	M6010B ICP	101	1530			mg/Kg	10	50	07/12/16 21:15	aeb
Chromium, total (3050)	M6020 ICP-MS	505	3.1			mg/Kg	0.3	1	07/12/16 21:53	enb
Copper, total (3050)	M6020 ICP-MS	505	6.3			mg/Kg	0.3	1	07/12/16 21:53	enb
Iron, total (3050)	M6010B ICP	101	10200		*	mg/Kg	2	5	07/12/16 21:15	aeb
Lead, total (3050)	M6020 ICP-MS	505	8.59		*	mg/Kg	0.05	0.3	07/12/16 21:53	enb
Magnesium, total (3050)	M6010B ICP	101	910			mg/Kg	20	100	07/12/16 21:15	aeb
Manganese, total (3050)	M6020 ICP-MS	505	325		*	mg/Kg	0.3	1	07/12/16 21:53	enb
Mercury, total	M7471A CVAA	261	0.12	B	*	mg/Kg	0.05	0.3	07/14/16 11:50	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/12/16 21:15	aeb
Nickel, total (3050)	M6020 ICP-MS	505	1.6	B		mg/Kg	0.3	2	07/12/16 21:53	enb
Potassium, total (3050)	M6010B ICP	101	1300			mg/Kg	20	100	07/12/16 21:15	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B	*	mg/Kg	0.05	0.1	07/12/16 21:53	enb
Silver, total (3050)	M6020 ICP-MS	10100		U		mg/Kg	0.5	3	07/15/16 7:23	msh
Zinc, total (3050)	M6020 ICP-MS	505	33		*	mg/Kg	1	3	07/12/16 21:53	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	73		*	%	0.1	0.5	07/06/16 12:27	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 15:58	rbt
Digestion - Hot Plate	M3050B ICP								07/12/16 11:57	bcc
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 11:57	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:36	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-9

ACZ Sample ID: **L31366-19**

Date Sampled: 06/21/16 07:55

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	26.5		U	*	mg/Kg	0.2	0.5	07/02/16 13:25	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	91.3	0.0133		*	%	0.00091	0.00457	07/14/16 14:45	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-11

ACZ Sample ID: **L31366-20**
Date Sampled: 06/21/16 10:45
Date Received: 06/30/16
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/01/16 12:45	enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/13/16 16:30	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	51000	29600		*	mg/Kg	50	300	07/15/16 7:26	msh
Antimony, total (3050)	M6020 ICP-MS	510	4.8		*	mg/Kg	0.2	1	07/12/16 21:56	enb
Arsenic, total (3050)	M6020 ICP-MS	510	33.5			mg/Kg	0.1	0.5	07/12/16 21:56	enb
Barium, total (3050)	M6020 ICP-MS	510	285		*	mg/Kg	0.3	1	07/12/16 21:56	enb
Boron, total (3050)	M6010B ICP	102	1	B		mg/Kg	1	5	07/12/16 21:18	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	8.18		*	mg/Kg	0.05	0.3	07/12/16 21:56	enb
Calcium, total (3050)	M6010B ICP	102	18100			mg/Kg	10	50	07/12/16 21:18	aeb
Chromium, total (3050)	M6020 ICP-MS	510	8.7			mg/Kg	0.3	1	07/12/16 21:56	enb
Copper, total (3050)	M6020 ICP-MS	510	54			mg/Kg	0.3	1	07/12/16 21:56	enb
Iron, total (3050)	M6010B ICP	102	21000		*	mg/Kg	2	5	07/12/16 21:18	aeb
Lead, total (3050)	M6020 ICP-MS	510	457		*	mg/Kg	0.05	0.3	07/12/16 21:56	enb
Magnesium, total (3050)	M6010B ICP	102	4640			mg/Kg	20	100	07/12/16 21:18	aeb
Manganese, total (3050)	M6020 ICP-MS	51000	2320		*	mg/Kg	30	100	07/15/16 7:26	msh
Mercury, total	M7471A CVAA	405	0.28	B	*	mg/Kg	0.08	0.4	07/14/16 11:52	pta
Molybdenum, total (3050)	M6010B ICP	102		U		mg/Kg	2	10	07/12/16 21:18	aeb
Nickel, total (3050)	M6020 ICP-MS	510	7.4			mg/Kg	0.3	2	07/12/16 21:56	enb
Potassium, total (3050)	M6010B ICP	102	2340			mg/Kg	20	100	07/12/16 21:18	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.33		*	mg/Kg	0.05	0.1	07/12/16 21:56	enb
Silver, total (3050)	M6020 ICP-MS	51000	21			mg/Kg	3	10	07/15/16 7:26	msh
Zinc, total (3050)	M6020 ICP-MS	510	715		*	mg/Kg	1	3	07/12/16 21:56	enb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	41.8		*	%	0.1	0.5	07/06/16 13:29	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/05/16 16:00	rbt
Digestion - Hot Plate	M3050B ICP-MS								07/12/16 12:59	bcc
Digestion - Hot Plate	M3050B ICP								07/12/16 12:59	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/07/16 8:39	rbt

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-11

ACZ Sample ID: **L31366-20**

Date Sampled: 06/21/16 10:45

Date Received: 06/30/16

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	39		U	*	mg/Kg	0.2	0.8	07/02/16 13:27	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	231	0.0334		*	%	0.00231	0.0116	07/14/16 14:46	bsu

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: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-01	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		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		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.	
	M6020 ICP-MS		ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
ZH				Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
Silver, total (3050)		M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.	
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-02	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				Zinc, total (3050)	M6020 ICP-MS
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-03	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				Zinc, total (3050)	M6020 ICP-MS
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-04	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			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.
				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.
		Manganese, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.	
			ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
			MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.	
	Silver, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
			M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-05	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
				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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
				M6020 ICP-MS	M3
		Manganese, total (3050)	M6020 ICP-MS		RD
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Silver, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Zinc, total (3050)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-06	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		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		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.	
	M6020 ICP-MS		ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
ZH				Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
Silver, total (3050)		M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.	
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-07	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		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		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.	
	M6020 ICP-MS		ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
MA				Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.	
WG405899	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.	
		M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-08	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
				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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
				M3	The spike recovery value is unusable since 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	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.
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
				M6020 ICP-MS	ZH
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Silver, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
				MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION	
L31366-09	WG406143	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	
		Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.	
			Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
				M6010B ICP	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.
	WG406143	Lead, total (3050)		M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			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	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.	
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.	
	WG406143	Selenium, total (3050)		M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
				M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
WG405899	Cyanide, total		M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.	
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-10	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			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	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Silver, total (3050)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Zinc, total (3050)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

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ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-11	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
				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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
				M6020 ICP-MS	M3
		Manganese, total (3050)	M6020 ICP-MS		RD
				ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG405646	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
				M7471A CVAA	RC
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				M6020 ICP-MS	ZH
		Silver, total (3050)	M6020 ICP-MS		MA
				M6020 ICP-MS	M9012B - Automated Colorimetric
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6		
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG406333	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)		H1	Sample prep or analysis performed past holding time. See case narrative.

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ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-12	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			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	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Zinc, total (3050)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG405642		Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

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ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-13	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				Zinc, total (3050)	M6020 ICP-MS
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-14	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Cadmium, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
Zinc, total (3050)				M6020 ICP-MS	MA
WG405899	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-15	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG405642	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

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ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-16	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			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.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG405642	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-17	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG405642	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-18	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG405642	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-19	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			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	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406153	Mercury, total	M7471A CVA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Zinc, total (3050)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31366-20	WG406325	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.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406143	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406126	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.
			M6010B ICP	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.
	WG406143	Lead, total (3050)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG406325	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	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.
			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.
	WG406153	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG406143	Selenium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
				M6020 ICP-MS	MA
WG405642	Cyanide, total	M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.	
		M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L31366**

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: L31366
 Date Received: 06/30/2016 10:00
 Received By: ddp
 Date Printed: 6/30/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?	X		
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples? A change was made in the ID Line 1+7 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 form 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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA24230	22	<=6.0	15	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: L31366
Date Received: 06/30/2016 10:00
Received By: ddp
Date Printed: 6/30/2016

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.

131366

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard los Proceres 18 calle 7H-69 zona 10
Empresarial Zona Pradera Torre 14 Oficina 406
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 intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: water quality
PO#: Escobal
Reporting state for compliance testing:
Check box if samples include NRC licensed material?

Table with columns for Matrix, # of Containers, and various analysis results. Includes rows for Sed-1 through Sed-8.

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

REMARKS

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

Table for Relinquished By, Date/Time, Received By, Date/Time. Includes signatures and dates like 28.04.2016 and 28.6.16 10:45.

131366 Chain of Custody



Laboratories, Inc. 31366

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: Boulevard Los Proceres 19 calle 24-69 zona 10
Empresarial, zona Pradera, Torre 14 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@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 Qual. FY

PO#: Escobal

Reporting state for compliance testing:

Check box if samples include NRC licensed material?

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	Sed.										
GW-2 SED-GW2	07-06-16 / 09:00	SO	1	✓										
Sed-WW 14	16-06-16 / 08:20	SO	1	✓										
Sed-WW 7	18-06-16 / 16:00	SO	1	✓										
Sed-WW 9	25-06-16 / 08:10	SO	1	✓										
TDS 1	17-06-16 / 13:25	SO	1	✓										
TDS 2	17-06-16 / 13:30	SO	1	✓										
TDS 3	17-06-16 / 13:40	SO	1	✓										
TDS 4	17-06-16 / 13:35	SO	1	✓										

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

REMARKS

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<u>[Signature]</u>	28-06-2016 10:45	<u>[Signature]</u>	28-06-16 10:45 10:30/16/2016



Laboratories, Inc.

31366

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard los Proceres 18 Calle 24-69 zona 10
Empresarial, Zona Pradera, 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@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, Sed. (checked), and multiple empty columns for analyses.

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

REMARKS

Please 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.

3



Guatemala June 27th 2016

QUARANTINE STATEMENT

To whom it may concern:

Minera San Rafael, S.A is sending a case with samples of sediments, which requires quarantine documentation and USDA due its organic content. These samples will be analyzed by ACZ Laboratories Inc. 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

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, Santa Teresa; 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

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.  Osmond Baron	Permit Number P330-13-00153 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:

- a. Soil must be autoclaved at 121 degrees Centigrade (250 degrees Fahrenheit) for a minimum of 30 minutes at 15 psi.
- b. Autoclave tape or other indicators must be placed on each bag or sharps container prior to treatment. The autoclave tape or other indicator on each container must be checked to verify color change before disposal.
- c. The autoclave log must be completed by each user for each autoclave cycle. All parameters must be noted as listed on the log for each autoclave load.
- d. If the autoclave does not attain the minimum time and/or temperature or the autoclave tape does not change color, a notation must be made in the comment section of the autoclave log. The load must then be re-autoclaved after placing new tape on the material. If minimum time and temperature is not attained on the second cycle, users must contact the person responsible for maintaining the unit to initiate repairs. Waste must then be treated at an alternate autoclave facility that is approved by USDA.
- e. Thermometers on the autoclave must be calibrated annually, and a written record must be maintained. This must be done by an authorized autoclave service company during routine servicing.
- f. Every 6 months, you should use a commercially available test indicator kit that uses bacterial spores *Bacillus stearothermophilus* that are rendered unviable at 250 degrees F or 121 degrees C. For the test, ampules of *B. stearothermophilus* are autoclaved along with a load of waste. Upon completion of the cycle, the ampules are incubated for 48 hours and then observed for any sign of growth, which indicates insufficient sterilization.

HYDROCLAVE: Soil must be hydroclaved at 121oC/250oF for a minimum of 30 minutes or 132oC for 15 minutes.

PERMIT CONDITIONS

This permit authorizes the importation of soil from all foreign sources (except countries with sanctions or embargoes by U.S. State Department), and interstate/ domestic movement of soil from Hawaii, the contiguous U.S., the continental U.S., and all U.S. territories only for chemical/ physical analysis in a controlled laboratory environment at the named facility on the permit.

1. This permit is issued only for the named permit holder at the address(s) identified on this permit. This permit cannot be transferred or assigned.
2. The permit holder verifies United States residency by initialing and accepting these permit conditions. If you are not a United States resident, it is unlawful for you to initial or accept these permit conditions because a USDA 525 soil Permit can only be issued to United States residents.
3. The permit holder is solely responsible for ensuring compliance with all statutory requirements and specifically listed permit conditions. Failure to comply with the terms and conditions of this permit is cause for the following: (a) cancellation of this permit, (b) cancellation of other permits issued to the permit holder, (c) seizure and/or destruction of regulated organisms, (d) denial of future permit applications by this permit holder, (e) liability for civil penalties, and (f) criminal prosecution under provisions in the Plant Protection Act.
4. Any alteration, forgery, unauthorized use of this permit and/or associated Federal Forms are subject to civil and criminal penalties including fines and imprisonment.
5. This permit must not be used for the movement or use of plant pathogens listed in the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. If any organism listed as a Select Agent is identified from materials associated with this research, the permit holder is required to notify APHIS, Agricultural Select Agent Program (ASAP) within one business day by phone at 301-851-3300, and within seven (7) days submit APHIS/CDC Form 4 (Report of Identification of a Select Agent or Toxin in a Clinical or Diagnostic Laboratory) to APHIS, ASAP; 4700 River Rd, Unit 2, Riverdale, MD 20737 (see instructions at: http://www.aphis.usda.gov/programs/ag_selectagent/index.shtml). Failure to comply with this requirement is a violation of the Agricultural Bioterrorism Protection Act of 2002.

Permit Number P330-13-00153

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Osmond Baron

DATE

05/22/2013

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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)

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control numbers for this information collection are 0579-0054, 0088, 0129, 0198, 0238, 0257, 0306, 0310. The time required to complete this information collection is estimated to average 1.25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

FORM APPROVED
OMB NUMBER 0579-0054/0088/0129/0198/0238/0257/0306/0310

UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION AND QUARANTINE	COMPLIANCE AGREEMENT
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1. NAME AND MAILING ADDRESS OF PERSON OR FIRM Audrey J. Stover ACZ Laboratories 2773 Downhill Drive Steamboat Springs, CO 80487 Ph: 970-879-6590 Ext. 515 Fax: 815-301-3857 Email: audreys@acz.com	2. LOCATION Same
--	--------------------------------

3. REGULATED ARTICLE(S)

 Non-sterilized Foreign soil; or Foreign & Regulated Domestic soil; or Domestic soil (HI and/or U.S. territories) - ANALYSIS

4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS

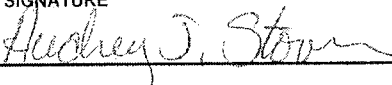
 7 CFR Part 330 and 7 CFR 301

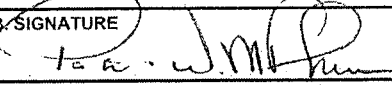
5. I/WE AGREE TO THE FOLLOWING:


I. Transfer and Noncompliance

A. This agreement may be immediately cancelled or revoked for noncompliance.
 B. This compliance agreement is non-transferable.
 C. Any person who knowingly violates the Plant Protection Act (PPA) (7 U.S.C. 7701 et seq.) and/or the Animal Health Protection Act (AHPA) (7 U.S.C. 8301 et. seq.) may be criminally prosecuted and found guilty of a misdemeanor which can result in penalties, a one-year prison term or both. Additionally, any person violating the PPA and/or the AHPA may be assessed civil penalties of up to \$250,000 per violation or twice the gross gain or gross loss for any violation that results in the person deriving pecuniary gain or causing pecuniary loss to another, whichever is greater.

II. Procedures, protocols and limitations established in 'General Stipulations' (attached).

6. SIGNATURE 	7. TITLE President/CEO	8. DATE SIGNED 4-30-13
The affixing of the signatures below will validate this agreement which shall remain in effect until cancelled, but may be revised as necessary or revoked for noncompliance.		9. AGREEMENT NO. SP-13 169
		10. DATE OF AGREEMENT

11. PPQ/CBP OFFICIAL (NAME AND TITLE) Patrick McPherren State Plant Health Director	12. ADDRESS USDA APHIS PPQ 3950 N. Lewiston St. Suite 104 Aurora, CO 80011
13. SIGNATURE 	

14. U.S. GOVERNMENT/STATE AGENCY OFFICIAL (NAME AND TITLE) Mitch Yergert Director, Division of Plant Industry	15. ADDRESS Colorado Department of Agriculture 700 Kipling Suite 4000 Lakewood, CO 80215
16. SIGNATURE 	

PPQ FORM 519 (MAY 2007) Previous editions are obsolete

11.7 Informes Originales de los Resultados Analíticos obtenidos del Efluente en los meses de Agosto a Octubre de 2016

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 22:00 horas (300516)

Alicuota 2: 01:00 horas (310516)

Alicuota 3: 04:00 horas (310516)

Alicuota 4: 07:00 horas (310516)

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

Fechas de muestreo: 300516-310516

Fecha de ingreso de muestra: 310516

Fecha de análisis: 310516-090616

Fecha del informe: 090616

Identificación de la muestra: WW9

Correlativo Ecosistemas: 4938

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	7.50	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	33	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	0.006	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/l	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/l	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/l	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	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	4	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	940	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 más 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 Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 310516
Fecha de ingreso de muestra: 310516
Fecha de análisis: 310516-090616
Fecha del informe: 090616

Identificación de la muestra: WW10

Correlativo Ecosistemas: 4939

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	6.70	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/l	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente ***	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/l	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/l	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	---	---	---
Relación DQO/DBO ₅	---	---	---	---	---
* Sólidos Suspendidos	mg/l	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/l	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/l	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/l	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/l	0.002	N.D.	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/l	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/l	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/l	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/l	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/l	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número más probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/l (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal

de Ecosistemas Proyectos Ambientales.

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** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

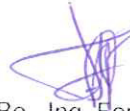
*** Análisis referido.*

**** 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

June 10, 2016

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: L30800

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 03, 2016. This project has been assigned to ACZ's project number, L30800. 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 L30800. 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.

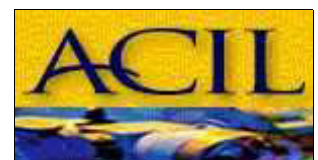
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 10, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L30800-01**

Date Sampled: 05/31/16 07:00

Date Received: 06/03/16

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/08/16 12:39	enb

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	06/09/16 14:38	mss2

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW10

ACZ Sample ID: **L30800-02**

Date Sampled: 05/31/16 07:00

Date Received: 06/03/16

Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/08/16 12:46	enb

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	06/09/16 14:39	mss2



Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L30800**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L30800-01	WG404343	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L30800-02	WG404343	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L30800-03	WG404343	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L30800**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L30800
 Date Received: 06/03/2016 10:24
 Received By: kmo
 Date Printed: 6/3/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form 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 form 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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
4565	17.7	<=6.0	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: L30800
Date Received: 06/03/2016 10:24
Received By: kmo
Date Printed: 6/3/2016

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. / 30800

CHAIN of CUSTODY

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

Report to:

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

Address: Finca Los Proceres, 1a Calle 24-69 zona 10
Empresarial, zona prudente, Torre IV oficina 1406
Telephone: (507) 5951 5748

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT 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, SW, Total CN, and multiple empty columns for analysis results.

1. x
2. x
3. x

Table with columns: SAMPLE IDENTIFICATION, DATE: TIME, Matrix, # of Containers, SW, Total CN.

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 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.



Chain of Custody



ECOSISTEMAS
PROYECTOS AMBIENTALES

LABORATORIO AMBIENTAL E INDUSTRIAL

17 avenida 2-39 zona 4 Mixco | Guatemala | Ofibodegas Zaragoza 2 | Bodega 2

502 + 2437 7224 | 2437 4455

laboratorio@ecosistemas.com.gt | info@ecosistemas.com.gt | www.ecosistemas.com.gt

Ref 1227-16

Pág 1/2

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 06:00 horas

Alicuota 2: 09:00 horas

Alicuota 3: 12:00 horas

Alicuota 4: 15:00 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: 270616

Fecha de ingreso de muestras: 280616

Fecha de análisis: 280616-110716

Fecha de informe: 110716

Identificación de la muestra: WW9

Correlativo Ecosistemas: 5232

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.45	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	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/l	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/l	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	43	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 más probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/l (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

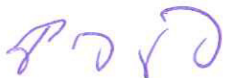
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** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

**** 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 compuesta (según información del cliente)

Alicuota 1: 06:00 horas

Alicuota 2: 09:00horas

Alicuota 3: 12:00 horas

Alicuota 4: 15:00 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: 270616

Fecha de ingreso de muestras: 280616

Fecha de análisis: 280616-110716

Fecha de informe: 110716

Identificación de la muestra: WW11

Correlativo Ecosistemas: 5234

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.37	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/l	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente***	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/l	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/l	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	---	---	---
Relación DQO/DBO ₅	---	---	---	---	---
* Sólidos Suspendidos	mg/l	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/l	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/l	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/l	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/l	0.002	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	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	23	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número más 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

July 08, 2016

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: L31355

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 30, 2016. This project has been assigned to ACZ's project number, L31355. 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 L31355. 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.

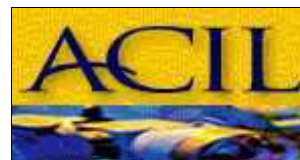
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 07, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L31355-01**

Date Sampled: 06/27/16 15:00

Date Received: 06/30/16

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/16 10:45	bce

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	07/07/16 23:32	pjb

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: WW11ACZ Sample ID: **L31355-03**
Date Sampled: 06/27/16 15:00
Date Received: 06/30/16
Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/16 11:02	bce

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	07/07/16 23:36	pjb

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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: **L31355**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31355-01	WG405897	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L31355-02	WG405897	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L31355-03	WG405897	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31355**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L31355
 Date Received: 06/30/2016 09:59
 Received By: ddp
 Date Printed: 6/30/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form 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 form 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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
3949	5.9	<=6.0	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: L31355
Date Received: 06/30/2016 09:59
Received By: ddp
Date Printed: 6/30/2016

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. *L31355*

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: *Billeuaj Los Proceres 13 Calle 24-69 Zona 10*
Empresarial zona Pradera Torre III 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@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: *UF* 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?

SAMPLE IDENTIFICATION	DATE-TIME	Matrix	# of Containers	GW+TPH	total CN								
<i>PSA-SR</i>	<i>27/06/14 11:20</i>	<i>GW</i>	<i>8</i>	<i>//</i>	<i>//</i>								
<i>HW-1</i>	<i>27/06/14 10:35</i>	<i>GW</i>	<i>8</i>	<i>//</i>	<i>//</i>								
<i>WW9</i>	<i>27/06/14 06:00-15:00</i>	<i>WW</i>	<i>1</i>	<i>//</i>	<i>//</i>								
<i>WW10</i>	<i>27/06/14 12:00</i>	<i>SW</i>	<i>1</i>	<i>//</i>	<i>//</i>								
<i>WW11</i>	<i>27/06/14 06:00-15:00</i>	<i>WW</i>	<i>1</i>	<i>//</i>	<i>//</i>								

COPY

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

REMARKS

please present cyanide results in a different report.

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

RELINQUISHED BY:	DATE-TIME	RECEIVED BY:	DATE-TIME
<i>[Signature]</i>	<i>28.06.2016 10:45</i>	<i>[Signature]</i>	<i>28.6.16 10:45</i>
		<i>[Signature]</i>	<i>6.30.16 09:55</i>

Chain of Custody L31355



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: 110716

Fecha de ingreso de muestras: 110716

Fecha de análisis: 110716-210716

Fecha de informe: 210716

Identificación de la muestra: WW9

Correlativo Ecosistemas: 5382

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	7.51	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	N.D.	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	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	33	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 más 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. Fernando Fuentes
Gerente de Calidad

Luis Fernando Fuentes Méndez
Ingeniero Químico
Colegiado 876

July 18, 2016

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: L31643

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 13, 2016. This project has been assigned to ACZ's project number, L31643. 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 L31643. 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.

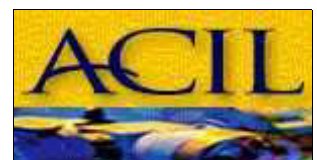
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 17, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L31643-01**

Date Sampled: 07/11/16 12:00

Date Received: 07/13/16

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/15/16 16:36	bce

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5	0.005	B	*	mg/L	0.003	0.01	07/15/16 23:12	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: **L31643**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L31643-01	WG406440	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L31643-02	WG406440	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L31643**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L31643
 Date Received: 07/13/2016 09:25
 Received By: kmo
 Date Printed: 7/13/2016

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form 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 form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form 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 form 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)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
4304	13.7	<=6.0	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: L31643
Date Received: 07/13/2016 09:25
Received By: kmo
Date Printed: 7/13/2016

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.

231643

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: Boulevard Los Proceres 19 calle 24-69 Zona 16
Empresarial, Zona Radera, Torre V 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@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, total cn, SW. Includes handwritten entries for WW9 and WW10.

COPY

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

EMARKS

Please present cyanide results 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.

31643 Chain of Custody