

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 2015

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1 Introducción

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

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

Esto como parte de los compromisos ambientales de Minera San Rafael, S.A. (**la Empresa**) en base a la resolución 549-2012/DIGARN/ODGR/hapc, inciso B, el cual se lee: “La entidad MINERA SAN RAFAEL, SOCIEDAD ANÓNIMA, deberá continuar realizando los monitoreos en base a lo descrito en cada una de las resoluciones citadas en el primer considerando (4590-2008/ELER/CG), (262-2011/ECM/caml), (3061-2011/DIGARN/ECM/beor), llevando su respectivo registro y presentar los resultados de los monitoreos de cada uno de los proyectos de forma trimestral”.

- ❖ Proyecto de Exploración Minera Oasis ante el MARN con base en la resolución 4590-2008/ELER/CG, compromiso número VII; el cual se lee: “llevar un monitoreo mensual de la calidad de aire y niveles de ruido en el Área de Influencia Directa (**AID**) y presentar resultados mensualmente al MARN.”
- ❖ Proyecto de Túneles de Exploración Minera Oasis ante el MARN con base en la resolución 262-2011/ECM/caml, compromiso número XII; el cual se lee: “Continuar con el programa de monitoreo de la calidad del agua y aire, implementado desde 2008.”
- ❖ Proyecto Minero Escobal ante el MARN con base en la resolución 3061-2011/DIGARN/ECM/beor, compromisos número III y número VI; los cuales se leen: “La Empresa deberá de implementar el plan de monitoreo ambiental descrito en capítulo 13 y cumplirá con los límites establecidos por el MARN, además de lineamientos internacionales como Banco Mundial, Corporación Financiera internacional (**CFI**), Agencia de Protección Ambiental de los Estados Unidos (**USEPA**), Organización Mundial de la Salud (**OMS**) y Administración de la Salud y Seguridad Ocupacional (**OSHA**), según el componente que sea monitoreado...” y “Llevar un registro documentado del caudal bombeado de los pozos de abastecimiento y del agua bombeada desde los túneles hacia las piletas, así como de las descargas y los parámetros de descarga...”.

- B.** Resultados de calidad de agua y de calidad de aire, como parte de los compromisos ambientales de la empresa ante el MARN con base en la resolución 3061-2011/DIGARN/ECM/beor, compromisos número XXXI; el cual se lee: “Presentar los informes de monitoreo de la calidad del agua de los cuerpos naturales de agua potencialmente afectados por las actividades del proyecto y de la calidad del aire a este Ministerio en forma anual.”
- C.** Copia de registro documentado del caudal bombeado desde los túneles hacia la planta de tratamiento y de su descarga hacia la Quebrada Escobal, como parte de los compromisos ambientales de la empresa ante el MARN con base en la resolución 3061-2011/DIGARN/ECM/beor, compromisos número VI; el cual se lee: “llevar un registro documentado del caudal bombeado de los pozos de abastecimiento y del agua bombeada desde los túneles hacia las piletas, así como de las descargas y los parámetros de descarga, remitiendo a este Ministerio una copia mensual de estos registros.”

El contenido del presente informe corresponde a la evaluación de los siguientes componentes ambientales:

- Calidad de Aire: Se monitorearon nueve estaciones ubicadas dentro del área de Influencia (**AI**) del proyecto para medir la concentración de material particulado igual o menor a 10 micrómetros (**PM₁₀**), en microgramos por metro cúbico (**µg/m³**). También se monitorearon siete estaciones para medir la concentración de metales en **PM₁₀**, sólidos sedimentables totales (**PST**), y gases de combustión: dióxido de azufre (**SO₂**) y óxidos nitrosos (**NO_x**).
- Calidad de Presión Sonora: Se monitorearon nueve estaciones ubicadas dentro del ID del proyecto, para determinar los niveles de presión sonora, en decibeles escala A (**dBa**) y respuesta lenta.
- Calidad de Agua: Se tomaron muestras en 11 estaciones de agua superficial, 5 estaciones de agua subterránea (manantiales), 2 estación de pozos de producción y 10 estaciones de agua en pozos de monitoreo ubicadas en el AID del proyecto.
- Sedimentos: Se tomaron muestras de sedimentos en las mismas estaciones de agua superficial ubicadas en el AI del proyecto.
- Calidad de Efluente: Se tomaron muestras mensuales en el efluente de la Planta de tratamiento de aguas proveniente de túneles y del agua contenida en la pileta de cumplimiento ambiental; además de mediciones diarias de datos *In Situ* y kit de cianuro de estos mismos puntos. En el anexo 11.2 se presenta una copia de los registros diarios.

- Vibraciones: Se instalaron tres medidores de vibraciones, los cuales registraron la velocidad de partícula durante cada una de las voladuras. En total se registraron 1021 voladuras durante los meses de Agosto a Octubre de 2015.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 31 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 2015.
- Copia de registro documentado del análisis In Situ y kit de Cianuro de efluentes. En el anexo 11.2 se presenta copia de las lecturas diarias de parámetros *In Situ* (pH, temperatura, conductividad y turbidez), así como los resultados obtenidos con el Kit de Cianuro (método colorimétrico) y resultados de muestras enviadas al laboratorio ACZ para la verificación del método colorimétrico, durante los meses de Agosto a Octubre de 2015.

2 Condiciones Ambientales

En el Cuadro 2-1 se describen algunos parámetros meteorológicos en el área del Proyecto y de la Figura 2-1 a la Figura 2-3 se representa la dirección del viento durante Agosto a Octubre de 2015.

Cuadro 2-1: Condiciones meteorológicas, Proyecto Minero Escobal

Temperatura (°C)			Velocidad del viento (km/h)			Ráfagas (km/h)	Humedad relativa (%)			Precipitación (mm)
Max	Min	Media	Max	Min	Media	Max	Max	Min	Media	Total
Agosto 2015										
30.48	14.74	21.97	87.3	0.16	12.66	100.99	98.43	23.75	68.77	80.45
Septiembre 2015										
30.67	15.03	20.48	41.37	0.31	5.11	160.92	100	27.96	83.33	257.81
Octubre 2015										
28.42	12.88	20.69	62.92	0.31	7.36	160.29	100	44.47	82.27	249.21

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

Durante el trimestre se registró una temperatura promedio de entre los 20.48° a los 21.97°C y en el mes de Septiembre se registró la mayor precipitación (257.81 mm). El mes que mayor humedad relativa presentó fue Septiembre y Octubre con 100% y el mes que en promedio presentó la mayor velocidad de vientos fue Agosto con 12.66 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.



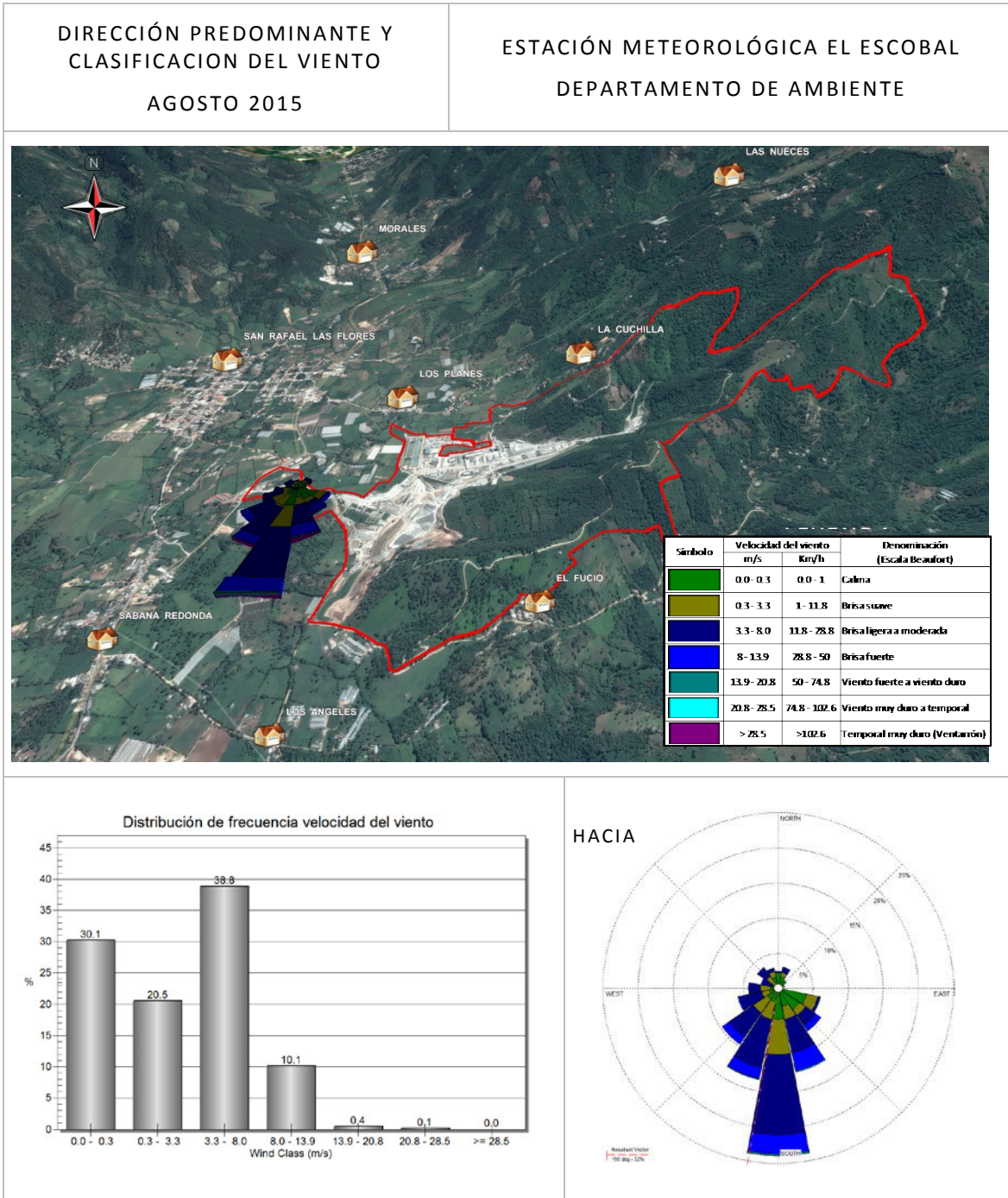
Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa

Fuente: MSR, 2015.

Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 la predominancia de los vientos durante el trimestre fue de norte a sur. En los meses de Septiembre y Octubre el mayor porcentaje de vientos se encontró entre 0 a 1 Km/h, mientras que en Agosto entre los 11 a 29 Km/h.

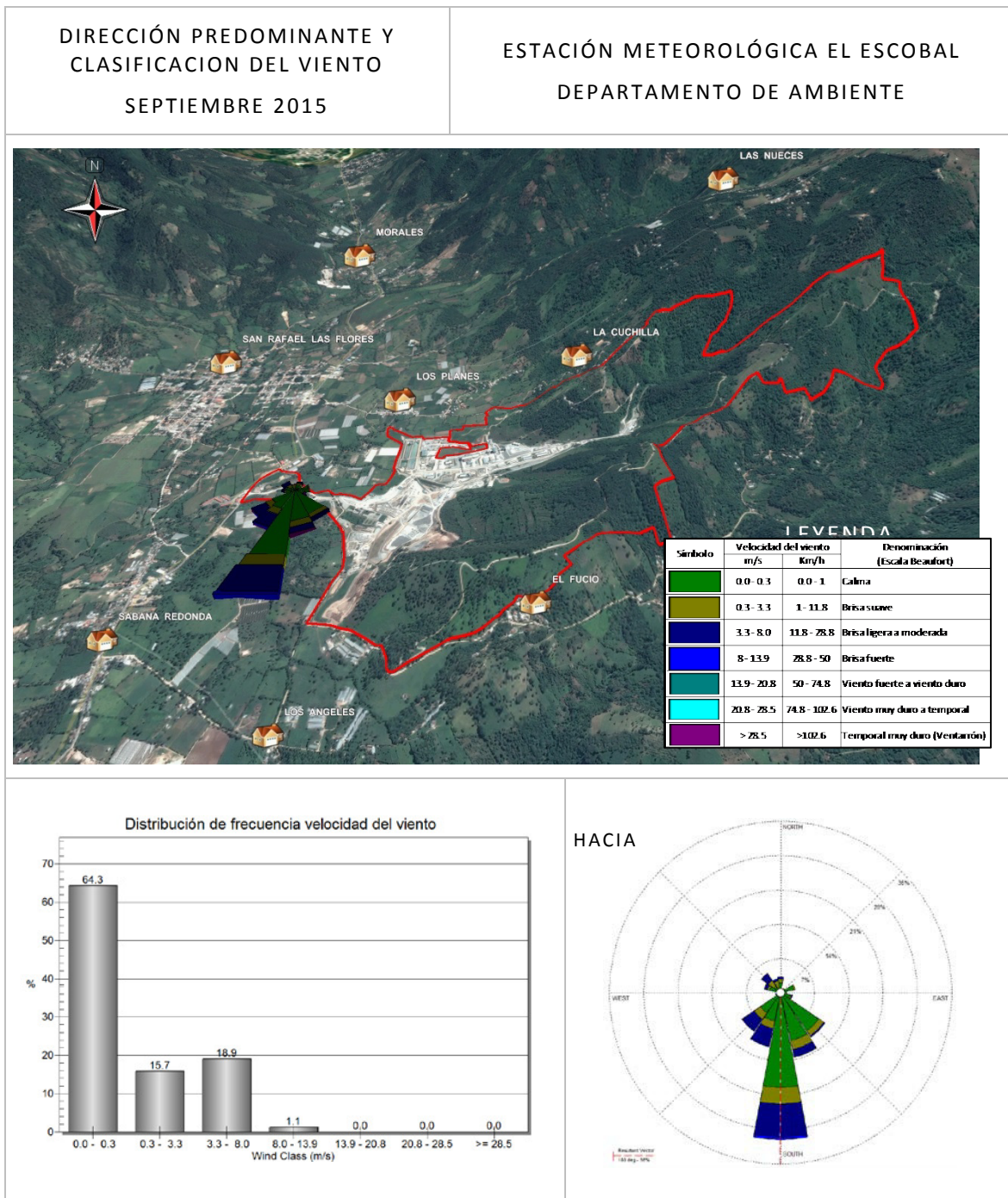
Figura 2-1: Dirección del viento Agosto 2015, Proyecto Minero Escobal

6



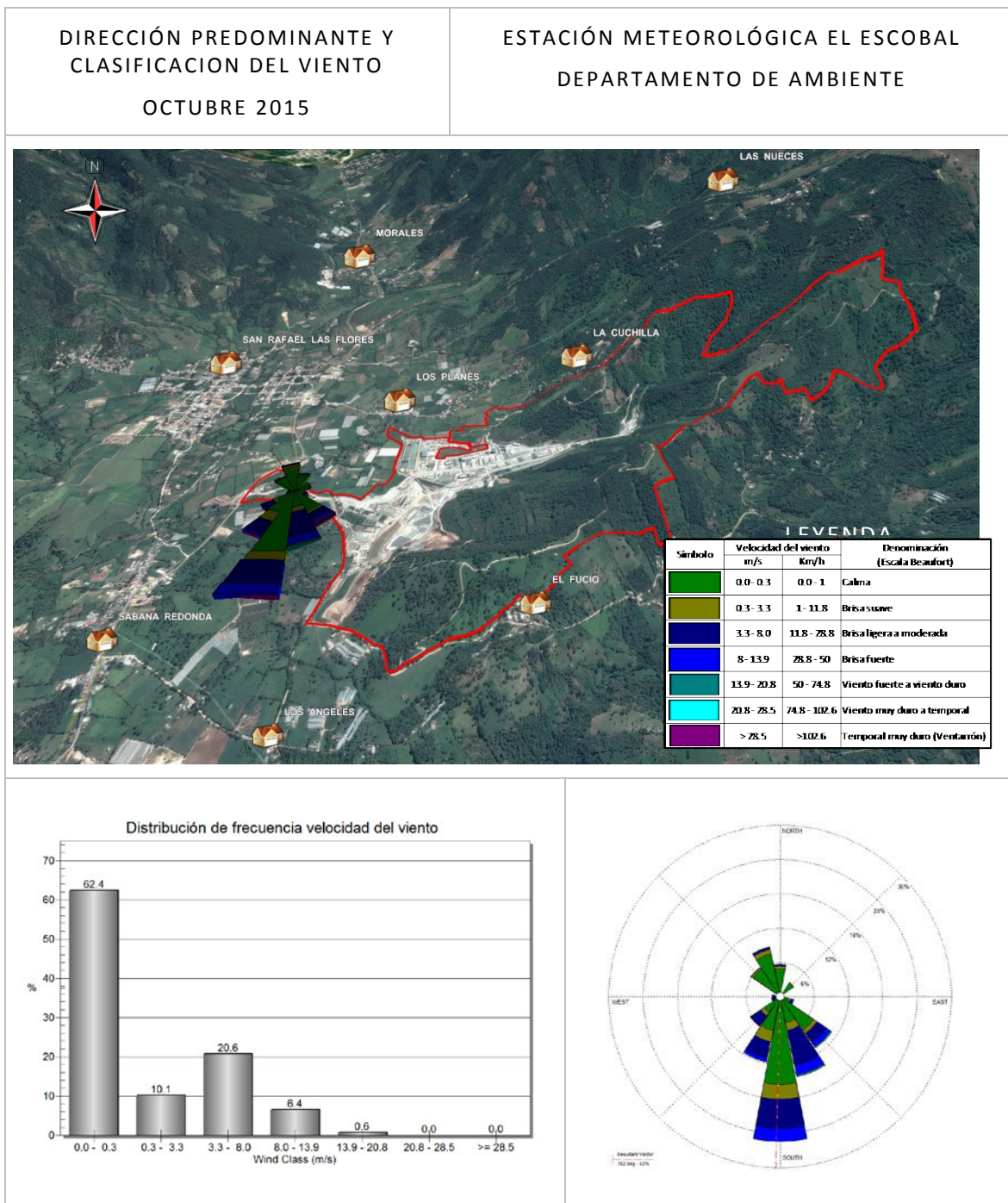
Fuente: MSR, 2015.

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



Fuente: MSR, 2015.

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



Fuente: MSR, 2015.

8

3 Calidad de Aire

3.1 Material Particulado

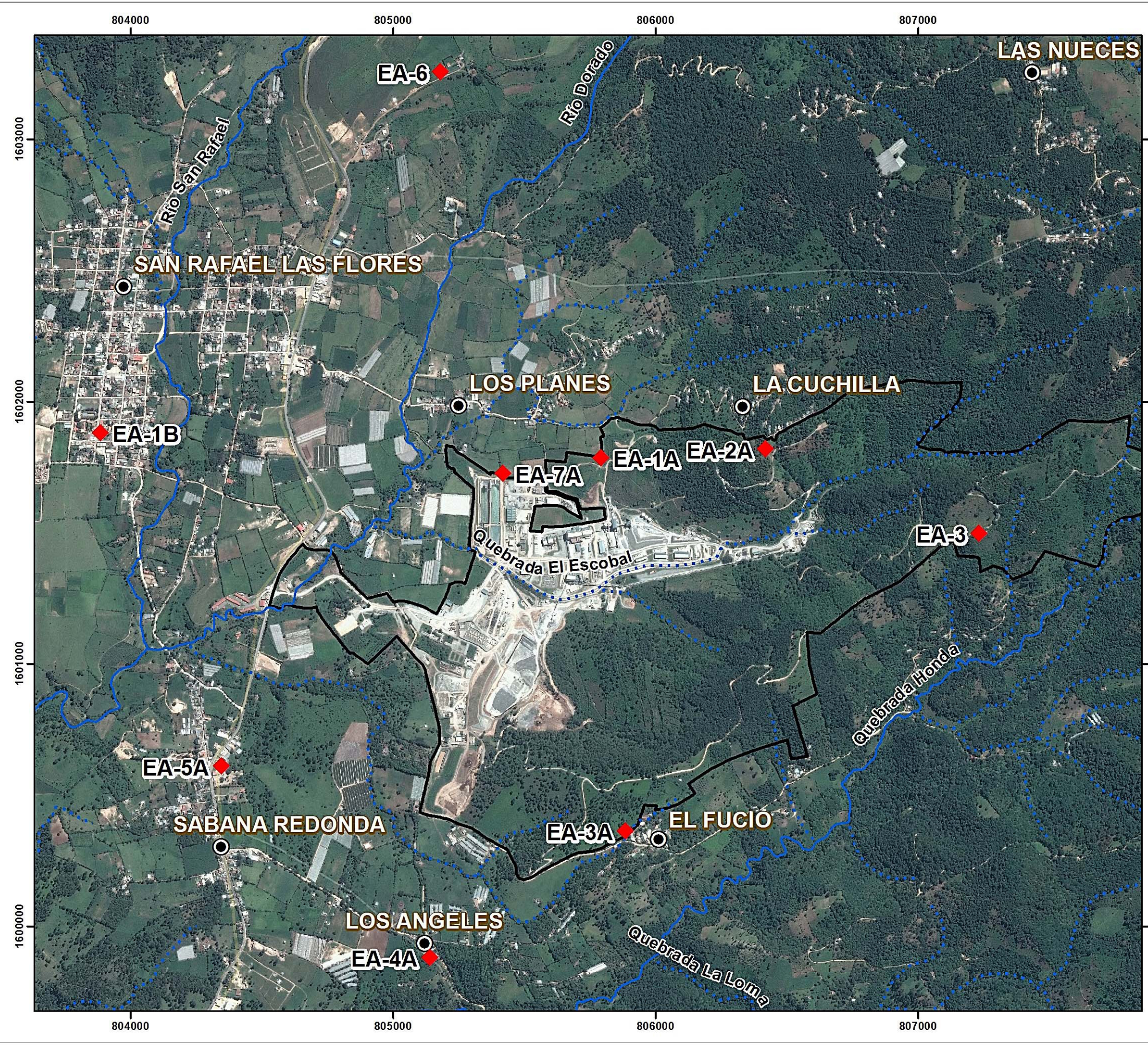
3.1.1 Sitios de Monitoreo

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

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

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

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



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
MATERIAL PARTICULADO (PM10)

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO (PM10)

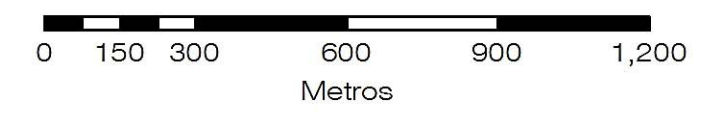
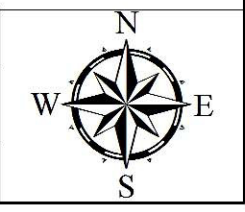
Símbolo	Estación	X	Y
	EA-1A	805791	1601785
	EA-1B	803885	1601881
	EA-2A	806419	1601819
	EA-3	807232	1601498
	EA-3A	805886	1600364
	EA-4A	805140	1599883
	EA-5A	804346	1600611
	EA-6	805181	1603257
	EA-7A	805419	1601726

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

Fecha de Elaboración: Octubre de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:15,000



3.1.2 Metodología

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

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

Parámetros utilizados	
PM ₁₀	Material particulado igual o menor a 10 micrómetros ($\leq 10 \mu\text{m}$).
Procedimiento	
La medición se realiza haciendo pasar un flujo continuo de aire durante 24 ± 1 horas por un filtro de fibra de vidrio que ha sido pesado inicialmente en un laboratorio equipado para realizar el análisis gravimétrico correspondiente; luego de la toma de muestra, el filtro es enviado de nuevo al mismo laboratorio para determinar su peso final. Con los datos obtenidos del muestreo y del análisis gravimétrico, se determina la concentración de PM ₁₀ . El equipo de medición utilizado cumple con las especificaciones de la Agencia de Protección Ambiental de los Estados Unidos (EPA).	
Equipo utilizado	
Nombre	PM ₁₀ Air Sampler
Modelo	PQ 200
Fabricante	BGI INSTRUMENTS
Laboratorio contratado	
Nombre	Laboratorio Ambiental, S.A. Laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados (análisis gravimétrico de filtros) cuentan con validez internacional según OGA-LE 050-12.

Fuente: MSR, 2015.

3.1.3 Resultados

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

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

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

Estación	Norma*	Guías*		Línea Base			Resultados		
	USEPA ¹	Banco Mundial ²	OMS ³	Promedio	Máximo	Mínimo	Ago-15	Sep-15	Oct-15
				(µg/m ³)					
EA-1A	150	150**	50	24.36	89.95	3.67	25.53	9.15	12.06
EA-1B				NR	NR	NR	37.02	NA	NA
EA-2A				21.40	76.20	2.74	22.82	22.59	16.06
EA-3				25.68	78.85	1.25	10.46	13.92	10.42
EA-3A				NR	NR	NR	22.79	NA	NA
EA-4A				103.55	120.40	86.70	24.14	NA	NA
EA-5A				50.73 [¥]	104.80 [¥]	11.80 [¥]	14.43	NA	NA
EA-6				23.05	57.90	1.70	20.41	NA	NA
EA-7A				46.48 [¥]	115.90 [¥]	13.40 [¥]	19.69	10.82	15.39

µg/m³ = microgramos por metro cúbico. NR = cálculo No Realizado por falta de datos de línea base. NA = No Analizado. ¹USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). ²Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. ³Guía de Calidad del Aire, OMS 2005.* Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. ** este valor corresponde al límite provisional 1 dado por esta guía. ¥: Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente. Fuente: MSR, 2015.

Los resultados obtenidos durante los meses de Mayo a Julio 2014 se encontraron entre los 9.15 a 37.02 µg/m³. En Septiembre se registró el menor valor de PM₁₀ en la estación EA-1A (9.15 µg/m³), mientras que en Agosto y Octubre se registró en la estación EA-3 (10.46 y 10.42 µg/m³ respectivamente). El valor más alto de PM₁₀ se registró en la estación EA-1B durante Agosto (37.02 µg/m³), mientras que los valores más altos en Septiembre y Octubre se registraron en las estación EA-2A (22.59 y 16.06 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, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Nota: 1er y 3er trimestre del año se analiza metales totales, 2do y 4to trimestre únicamente mercurio total. El análisis del laboratorio es destructivo, por tanto es imposible analizar metales y mercurio en un mismo filtro. Fuente: MSR, 2015.

3.2.2 Metodología

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

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

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

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

Laboratorio

Nombre	Laboratorio Ambiental S.A. (parte de CTA). Laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados (análisis gravimétrico de filtros) cuentan con validez internacional según OGA-LE 050-12.
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Fuente: MSR, 2015.

3.2.3 Resultados

En el Cuadro 3-6 se presentan los resultados de concentración de mercurio en PM_{10} durante el mes de Agosto de 2015, los resultados de laboratorio del análisis de metales en filtros y los cálculos realizados para determinar el PM_{10} se presentan en el anexo 11.3.2. La concentración de metales registradas durante Agosto de 2015 se encontraron cercanos a los valores registrados durante Agosto 2014 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-15	Línea Base			ago-15	ago-15	Línea Base			ago-15
		2739-0606	Promedio	Máximo	Mínimo	2707-0606	2736-0303	Promedio	Máximo	Mínimo	2737-0404
Aluminio	µg/m ³	0.256	0.23	0.28	<0.34	0.332	N.D.	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		0.500	1.49	2.17	0.8	0.558	0.481	1.23	1.23	1.23	0.697
Bario		0.009	0.01	0.01	<0.02	0.038	0.006	<0.02	<0.02	<0.02	0.006
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		0.525	0.65	1.1	0.2	0.683	0.279	0.78	0.78	0.78	0.308
Cromo		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Cobalto		N.D.				N.D.	N.D.				
Cobre		N.D.				N.D.	N.D.				
Estaño		N.D.				N.D.	N.D.				
Estroncio		N.D.				N.D.	N.D.				
Fósforo		N.D.				N.D.	N.D.				
Hierro		0.282				0.26	0.32				0.2
Magnesio		N.D.	0.11	0.14	<0.17	N.D.	N.D.	<0.33	<0.33	<0.33	N.D.
Manganeso		0.015	0.01	0.01	<0.02	0.025	0.025	0.09	0.09	0.09	0.011
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	0.017	N.D.	<0.05	<0.05	<0.05	N.D.
Potasio		0.462	0.55	0.6	0.5	N.D.	N.D.	0.73	0.73	0.73	0.529
Selenio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Silicio		0.475	0.42	0.53	0.3	0.399	0.399	0.55	0.55	0.55	0.399
Sodio		0.227	0.53	0.6	0.46	0.582	0.168	1.4	1.4	1.4	0.293
Talio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Titanio		0.013	0.02	0.02	0.02	0.014	0.016	0.09	0.09	0.09	0.009
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.				0.051	N.D.				N.D.
Zirconio	N.D.	<0.012	<0.02	<0.004	N.D.	N.D.	<0.01	<0.01	<0.01	N.D.	

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

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-15	Línea Base			ago-15	Línea Base			ago-15
		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	0.657	2.28	4.35	<0.42	0.552
Bario		<0.02	<0.02	<0.02	0.023	0.01	0.01	<0.02	N.D.	0.01	0.01	<0.02	0.007
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	0.188	0.79	1.5	<0.17	0.253	0.28	0.48	<0.17	0.436
Cromo					N.D.				N.D.				N.D.
Cobalto					N.D.				N.D.				N.D.
Cobre					N.D.				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					N.D.				N.D.				N.D.
Hierro		0.18	0.18	0.18	N.D.	0.38	0.45	0.3	N.D.	0.31	0.58	<0.08	N.D.
Magnesio		<0.33	<0.33	<0.33	N.D.	3.05	6.02	<0.17	N.D.	0.23	0.38	<0.17	N.D.
Manganeso		<0.02	<0.02	<0.02	0.007	0.02	0.02	<0.02	0.008	0.02	0.03	<0.02	0.033
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	0.040
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	0.349	0.49	0.58	0.4	0.369	0.43	0.78	<0.17	0.233
Sodio		<0.08	<0.08	<0.08	0.307	0.07	0.1	<0.08	0.333	1.27	2.5	<0.08	0.129
Talio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Titanio		<0.02	<0.02	<0.02	0.007	0.02	0.03	<0.02	0.01	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.				0.038
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, 2015.

3.3 Partículas Sedimentables Totales (PST)

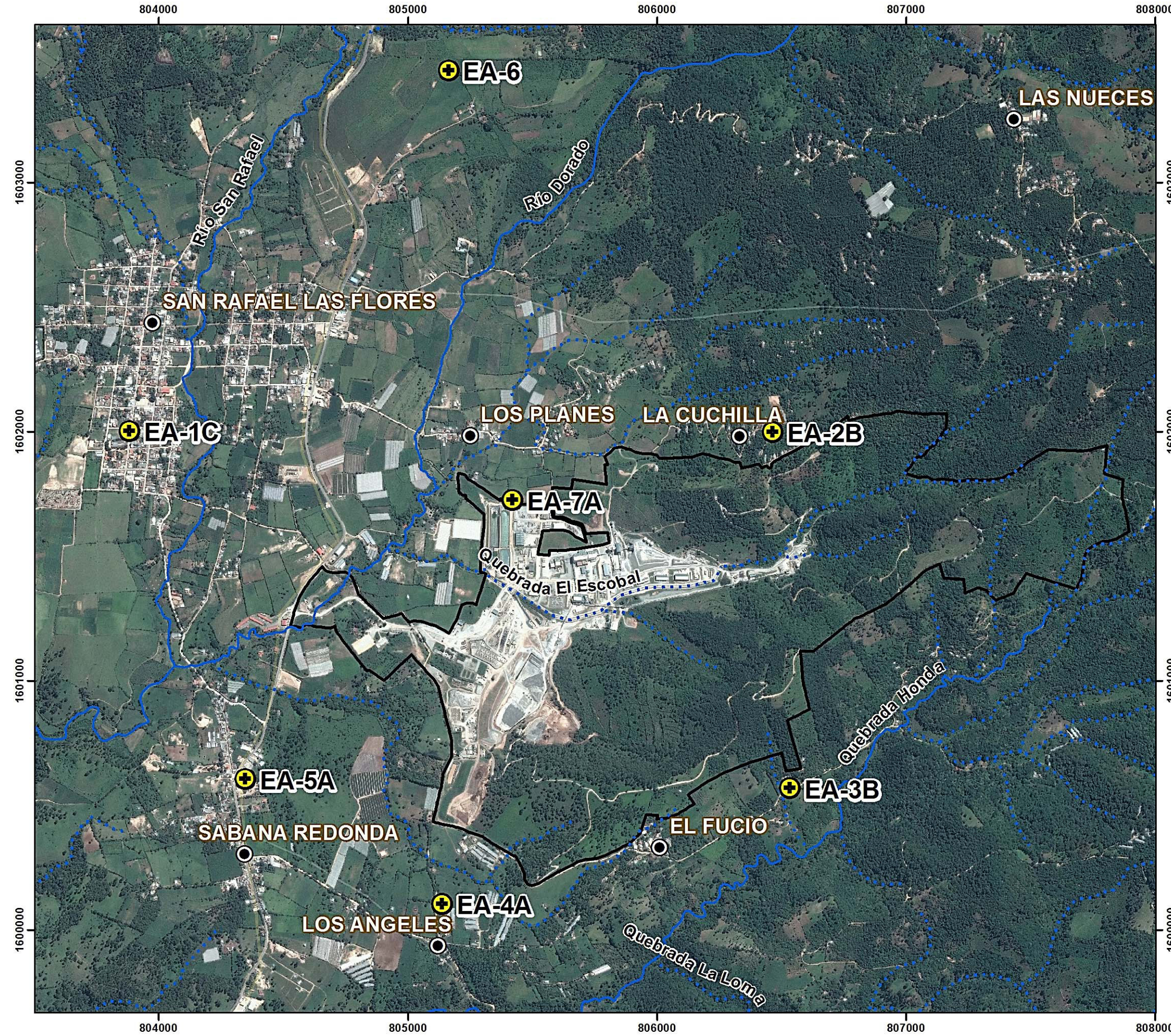
3.3.1 Sitios de Monitoreo

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

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

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

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



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE PARTICULAS SEDIMENTABLES
TOTALES

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

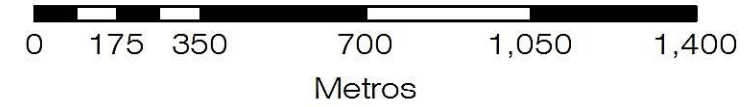
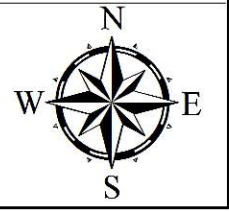
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000



3.3.2 Metodología

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

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

Parámetros utilizados	
PST	Partículas Sedimentables Totales
Procedimiento	
Los muestreos fueron realizados por personal de la empresa Consultoría y Tecnología Ambiental (CTA), siguiendo la metodología ASTM D 1739-98 (re-aprobación 2004). La medición se realiza dejando reposar un recipiente limpio y de dimensiones conocidas en la estación de monitoreo durante un lapso de tiempo de 30 ± 2 días. El recipiente es enviado al laboratorio donde se determina los sólidos insolubles, sólidos solubles y sólidos totales que sedimentaron dentro de dicho recipiente.	
Equipo utilizado	
Nombre	High Altitude Ambient Particulate Sampler
Modelo	Diseño establecido en norma ASTM D 1739-98
Fabricante	CTA

Fuente: MSR, 2015.

3.3.3 Resultados

En el Cuadro 3-9 se presentan los resultados de Partículas Sedimentables Totales (PST) realizado durante Septiembre de 2015. El resumen del informe de resultados presentado por el contratista se presenta en el anexo 11.3.3.

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

Parámetro	Norma	Guías	EA-1C	EA-2B	EA-3B	EA-4A			EA-5A				EA-6	EA-7A	
	USEPA ¹	Banco Mundial ² OMS ³	Sep-15	Sep-15	Sep-15	Línea Base			Muestreo	Línea Base			Muestreo	Sep-15	Sep-15
						Promedio	Mínimo	Máximo	Sep-15	Promedio	Mínimo	Máximo	Sep-15		
	g/(m² x 30 días)														
Sólidos insolubles	ND	ND	3.49	1.90	2.51	6.27	2.60	10.80	4.00	6.50	0.80	16.00	1.00	1.22	1.53
Sólidos solubles			2.02	2.41	2.15	2.12	0.90	2.90	2.41	11.26	2.00	37.00	2.07	2.31	2.88
Sólidos totales			5.51	4.31	4.66	8.37	4.60	13.00	6.40	17.58	3.20	50.00	3.07	3.53	4.41

¹USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). ²Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. ³Guía de Calidad del Aire, OMS 2005. ND: estas normas y guías no establecen un límite para estos parámetros. g/(m² x 30 días)= gramos por metro cuadrado durante 30 días. Fuente: MSR, 2015.

Los valores de PST se encuentran entre 3.07 a 6.40 g/(m² x 30 días), los cuales corresponden a las estaciones EA-5A y EA-4A 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. 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 cercanos a lo encontrado en los anteriores trimestres.

3.4 Gases de Combustión (SO₂ y NO₂)

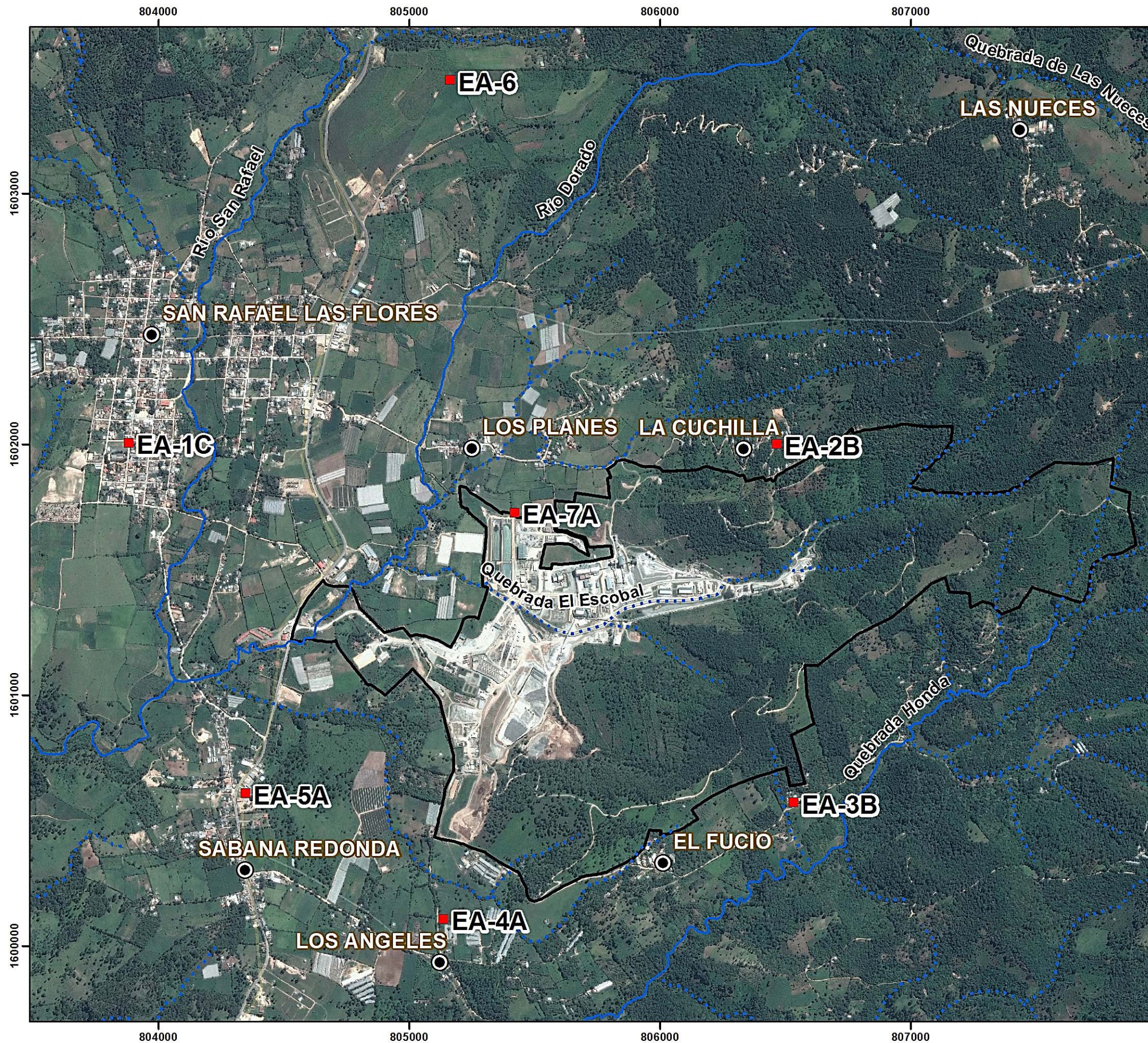
3.4.1 Sitios de Monitoreo

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	
EA-3B	803,887	1,601,801	1,427	Aldea El Fucío	
EA-4A	805,142	1,599,903	1,360	Caserío El Portón de los Ángeles	
EA-5A*	804,352	1,600,408	1,339	Aldea Sabana Redonda, al sur-oeste del proyecto	
EA-6	805,168	1,603,247	1,434	Al norte del Proyecto, ruta a Mataquescuintla	
EA-7A*	805,425	1,601,523	1,320	Noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción Aldea Los Planes	

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



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE GASES DE COMBUSTIÓN

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

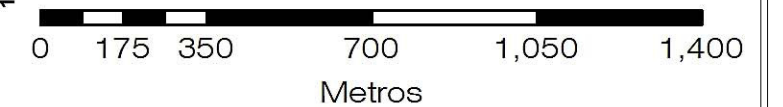
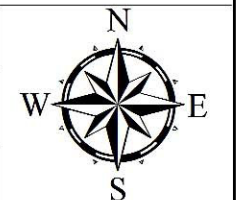
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000



3.4.2 Metodología

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

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

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

Fuente: MSR, 2015.

3.4.3 Resultados

En el Cuadro 3-12 se presentan los resultados de las mediciones de SO₂ y NO₂ realizadas en siete estaciones de monitoreo de Calidad de Aire. El informe de resultados presentado por el contratista se presenta en el anexo 11.3.3.

En las mediciones efectuadas durante este trimestre se obtuvieron valores por debajo del límite de detección del método en todas las estaciones para SO₂ (<13µg/m³). Los valores de NO₂ se encontraron entre 11 µg/m³ (EA-2B y EA-7A) y 24 µg/m³ EA-4A. Todos los valores registrados de SO₂ y de NO₂ son menores a los valores guías establecidos por el Banco Mundial, la OMS, British Columbia y los valores norma establecidos por la USEPA. Lo que indica que las actividades realizadas durante el presente período, no han originado variaciones significativas en los parámetros reportados anteriormente.

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

Parámetro	Norma*	Guías*			EA-1C	EA-2B	EA-3B	EA-4A	EA-5A			EA-6	EA-7A				
	USEPA ¹	Banco Mundial ²	OMS ³	British Columbia ⁴	Sep-15	Sep-15	Sep-15	Sep-15	Línea base**			Muestreo Sep-15	Sep-15	Línea base**			Muestreo Sep-15
									Promedio	Mínimo	Máximo			Promedio	Mínimo	Máximo	
	(µg/m ³)																
SO ₂	370	20	20	160	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
NO ₂	100 [¥]	40 [¥]	40 [¥]	200	22	11	16	24	<9	<9	<9	20	14	<9	<9	<9	11

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

3.5 Niveles de Presión Sonora

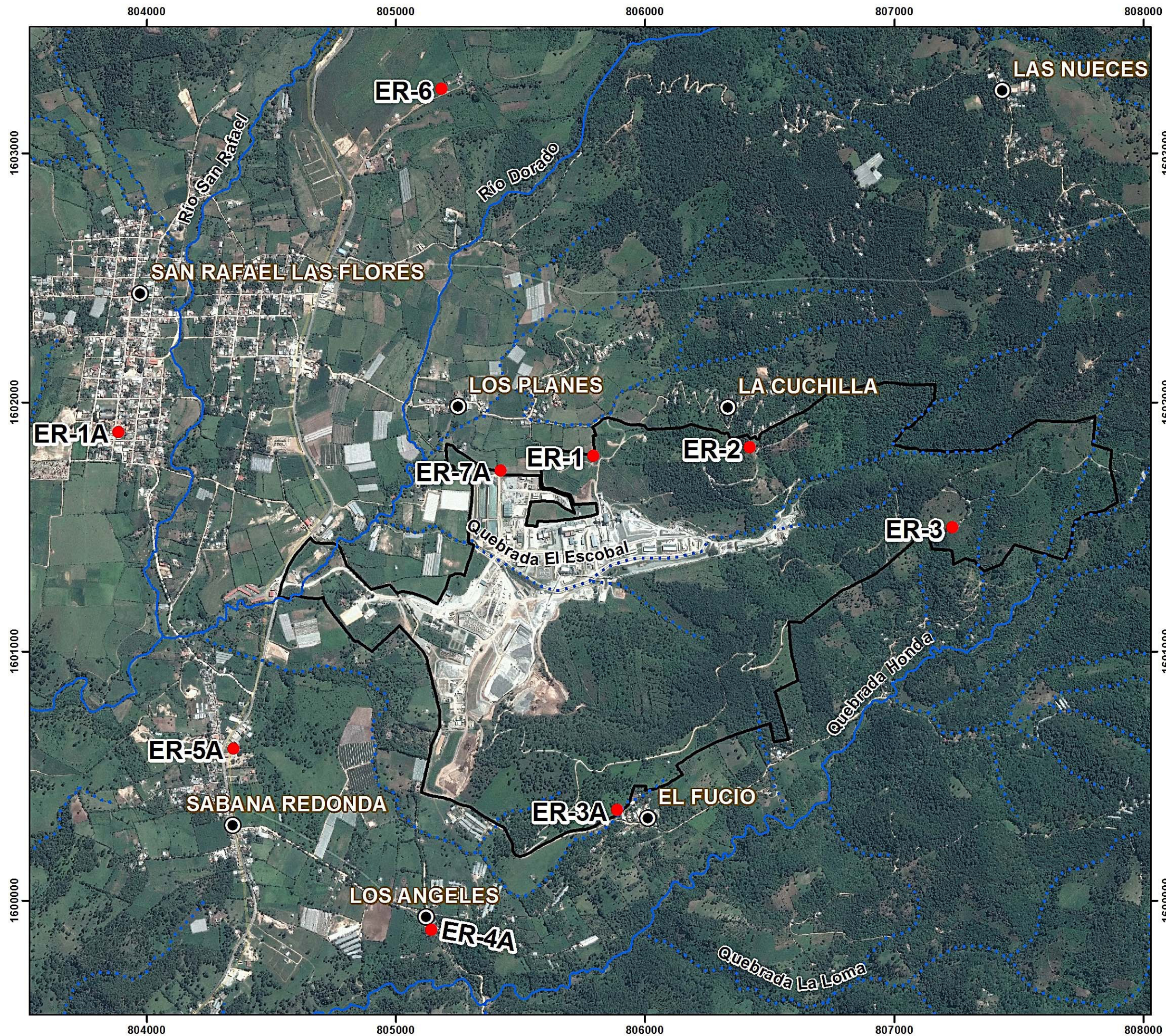
3.5.1 Sitios de Monitoreo

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

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

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

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



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO NIVELES DE PRESIÓN SONORA

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

MINERA SAN RAFAEL
DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

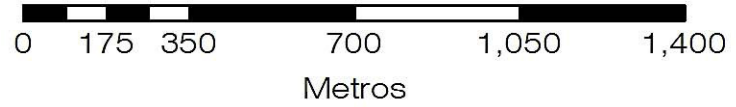
Símbolo	Estación	X	Y
	ER-1	805791	1601785
	ER-1A	803885	1601881
	ER-2	806419	1601819
	ER-3	807232	1601498
	ER-3A	805886	1600364
	ER-4A	805140	1599883
	ER-5A	804346	1600611
	ER-6	805181	1603257
	ER-7A	805419	1601726

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

Fecha de Elaboración: Octubre de 2015

Distancia Horizontal y Vertical de Grilla: 1,000 metros

Escala 1:16,000



3.5.2 Metodología

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

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

Parámetros analizados	
L_{MAX}	Dato máximo durante 24 horas.
L_{MIN}	Dato mínimo durante 24 horas.
L_{EQ}	Promedio ponderado equivalente de datos.
Promedio Diurno	Promedio ponderado equivalente de datos de 07:00 am a 10:00 pm
Promedio Nocturno	Promedio ponderado equivalente de datos de 10:00 pm a 07:00 am
Procedimiento	
La medición del nivel de presión sonora se realiza durante 24 horas, efectuando lecturas de decibeles en escala "A" en respuesta lenta en intervalo de 10 minutos. Los datos obtenidos en las mediciones son crudos y automáticamente grabados en el equipo, los cuales se descargan a una computadora utilizando el programa Quest Professional II. Solamente el promedio diurno y nocturno son calculados por separado.	
Equipo utilizado	
Nombre	Sound Pro
Modelo	SE/DL
Fabricante	Quest Technologies, Inc.

Fuente: MSR, 2015.

3.5.3 Resultados

En el Cuadro 3-15 y en el Cuadro 3-16 se presentan los valores registrados de los niveles de presión sonora (**NPS**) durante los meses de Agosto a Octubre de 2015. Los informes generados por los equipos de medición se presentan en el anexo 11.3.4.

Los resultados obtenidos de NPS en las estaciones muestreadas respecto al parámetro L_{eq} , están dentro del rango de 41.4 dBa y 58.2 dBa, los cuales corresponden a las estaciones ER-6 y ER-2 respectivamente.

La estación ER-6 presentó el menor promedio diurno (41.8 dBa) y la estación ER-3 el menor promedio nocturno (39.2 dBa) de todas las mediciones efectuadas durante el monitoreo; mientras que la estación ER-7A presentó el mayor promedio

diurno (58.7 dBa) y el mayor promedio nocturno (59.4 dBa) se registró en la estación ER-2.

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

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Los promedios diurnos registrados durante los meses de Agosto a Octubre de 2015 estuvieron por debajo de la guía establecida por la OMS y Banco Mundial para zonas residenciales; asimismo por debajo de la norma establecida por la USEPA. A excepción de ER-2, ER-4A y ER-7A en Agosto, Septiembre y Octubre respectivamente. Los promedios nocturnos registrados estuvieron por debajo de la norma establecida por la USEPA (55 dBa), a excepción de la estación ER-2.

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-15	Sep-15	Oct-15	Línea Base			Ago-15	Sep-15	Oct-15				
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo							
			dBA																	
Lmax	NL	NL	NL	NL	89.3	99.5	64.6	76.2	82.2	87.6	86.7	97.8	64.9	81.2	82	77.2				
Lmin					32.5	37.7	27.0	35.5	35.6	34.8	35.2	42.8	26.5	48	47.4	40.5				
Leq					49.9	57.1	41.2	47.2	45.6	45.7	49.4	58.7	39.7	58.2	57.8	49.5				
PD					55	55	55	70	50.5	59.1	39.7	47.2	45.5	46.6	48.8	57.1	39.8	57.4	57.1	49.7
PN					55	50	45	70	47.6	55.7	39.3	47.3	45.7	43.9	46.6	54.5	37.9	59.4	58.9	49.3

Parámetro	Norma*		Guías*		ER-3						ER-7A									
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-15	Sep-15	Oct-15	Línea Base**			Ago-15	Sep-15	Oct-15				
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo							
			dBA																	
Lmax	NL	NL	NL	NL	87.4	100.7	67.2	78.5	79.7	79.8	87.5	89.0	82.1	78.3	85.7	111.5				
Lmin					49.4	56.2	26.9	31.3	43.7	31.2	NR	NR	NR	39.8	40.4	39.2				
Leq					56.8	63.2	39.7	45.2	47.4	41.9	52.8	54.5	50.9	49	49	56.8				
PD					55	55	55	70	56.5	63.1	41.0	49.4	48.4	43	52.1	53.5	50.4	48.9	49.4	58.7
PN					55	50	45	70	57.2	64.0	34.1	52.3	45.4	39.2	49.7	50.9	48.8	49.3	48.6	47.6

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

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

Parámetro	Norma*		Guías*		ER-1A				ER-3A				ER-4A				
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-15	Línea Base			Ago-15	Línea Base			Ago-15	
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
			dBA														
Lmax								84.7					91.4	80.6	78.2	82.1	97.3
Lmin	NL	NL	NL	NL				39.1					37.5	NR	NR	NR	34.4
Leq					NR	NR	NR	52.5	NR	NR	NR		50.6	50.2	49.3	50.9	56.1
PD	55	55	55	70				53.8					49.4	49.5	48.4	50.4	57.5
PN	55	50	45	70				49.2					52.3	48.6	48.2	48.9	52.2

Parámetro	Norma*		Guías*		ER-5A				ER-6			
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Ago-15	Línea Base			Ago-15
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
			dBA									
Lmax					91.6	85.1	92.2	79				77.1
Lmin	NL	NL	NL	NL	NR	NR	NR	39.6				30.9
Leq					65.8	51.6	67.6	53	NR	NR	NR	41.4
PD	55	55	55	70	61.2	50.2	63.8	54.5				41.8
PN	55	50	45	70	62.8	45.9	65.0	47.9				41

*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, 2015.

4 Calidad del Agua

4.1 Sitios de Monitoreo

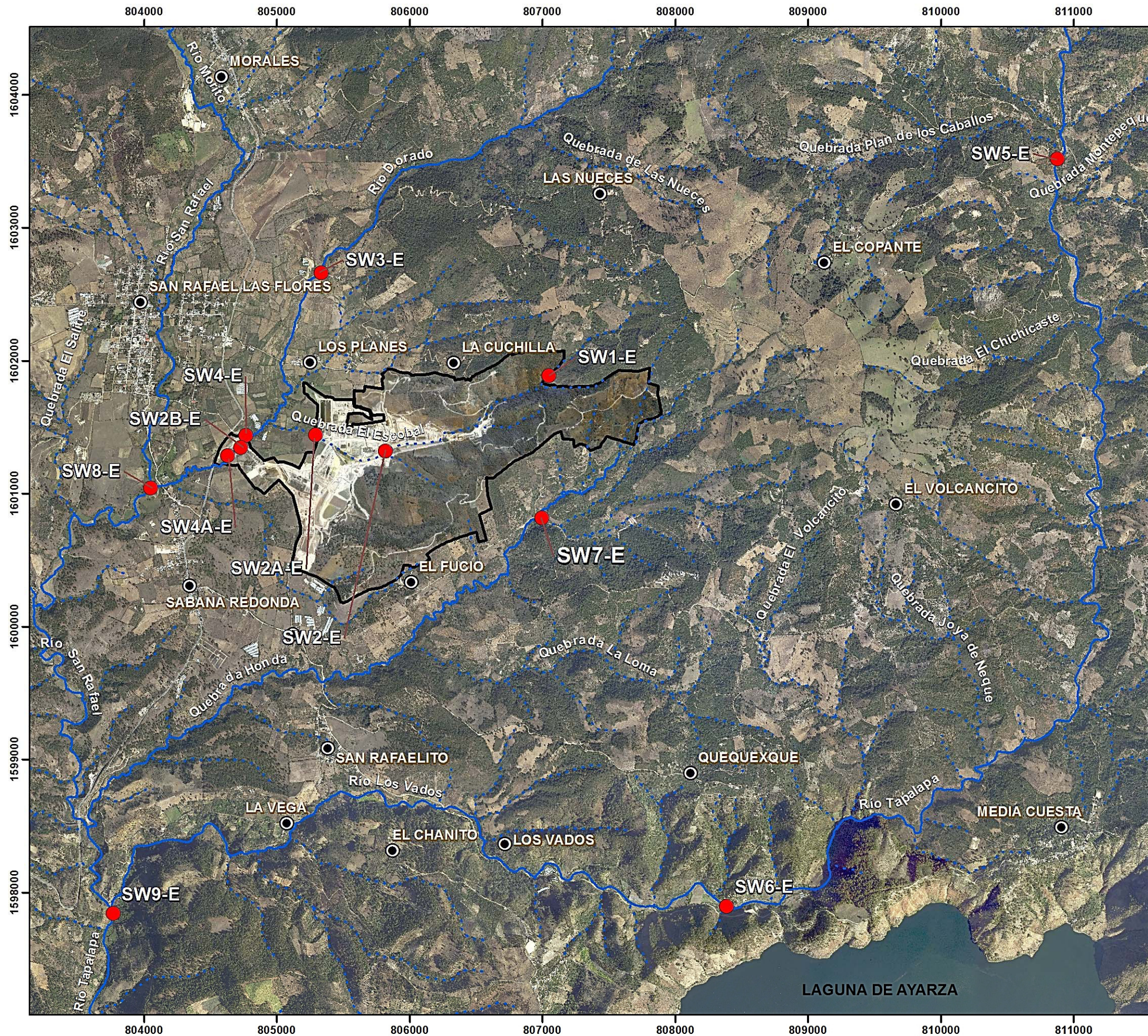
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua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

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

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

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

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



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO AGUA SUPERFICIAL

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

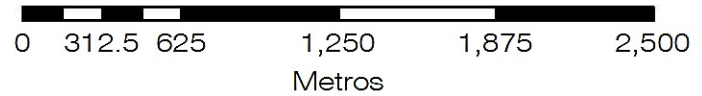
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW6-E	808385	1597892
	SW7-E	806995	1600815
	SW8-E	804048	1601037
	SW9-E	803766	1597838

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

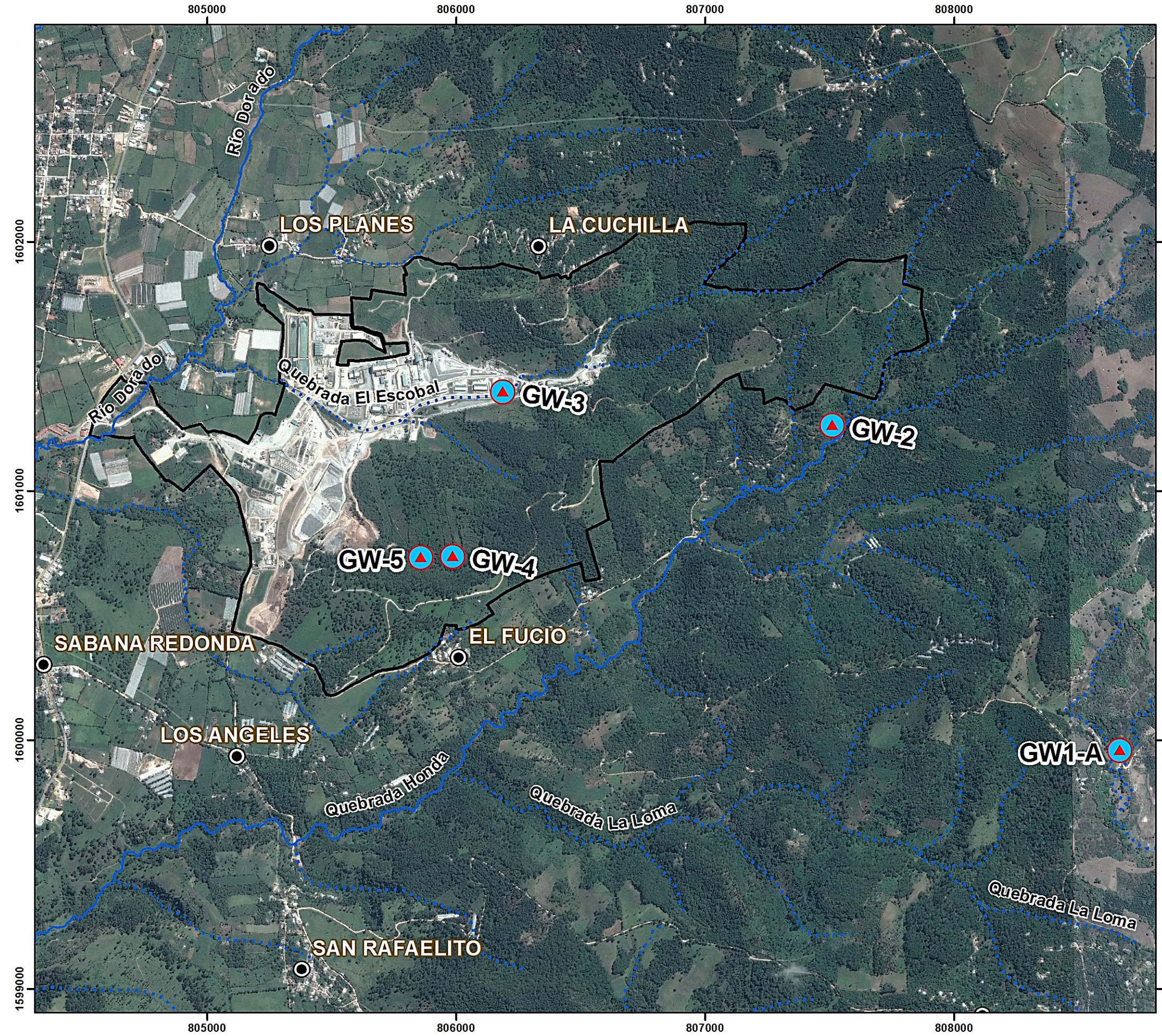
Fecha de Elaboración: Octubre de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:30,000



LAGUNA DE AYARZA



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
CALIDAD DE AGUA SUBTERRÁNEA

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO (POZOS)

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

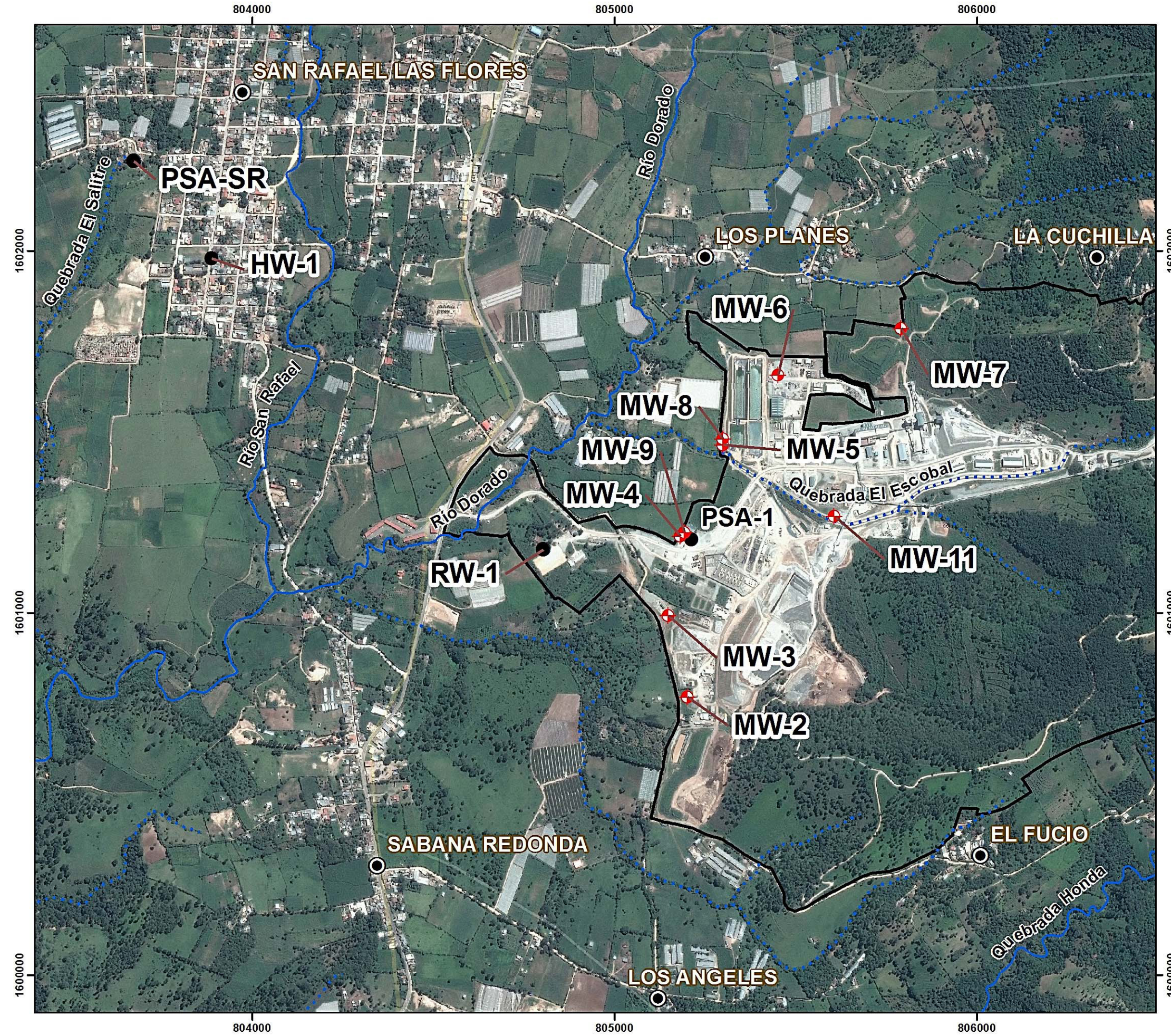
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquescuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2008 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000





MAPA DE LOCALIZACIÓN ESTACIONES (POZOS) DE MONITOREO Y REFERENCIA

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO (POZOS)

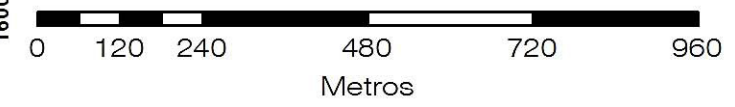
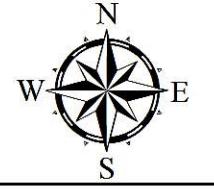
Símbolo	Estación	X	Y	
	MW-2	805201	1600768	
	MW-3	805148	1600993	
	MW-4	805181	1601212	
	MW-5	805299	1601463	
	MW-6	805452	1601657	
	MW-7	805791	1601785	
	MW-8	805298	1601480	
	MW-9	805192	1601222	
	MW-11	805607	1601267	
		RW-1	804803	1601175
		PSA-SR	803672	1602247
HW-1		803888	1601977	
PSA-1		805212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

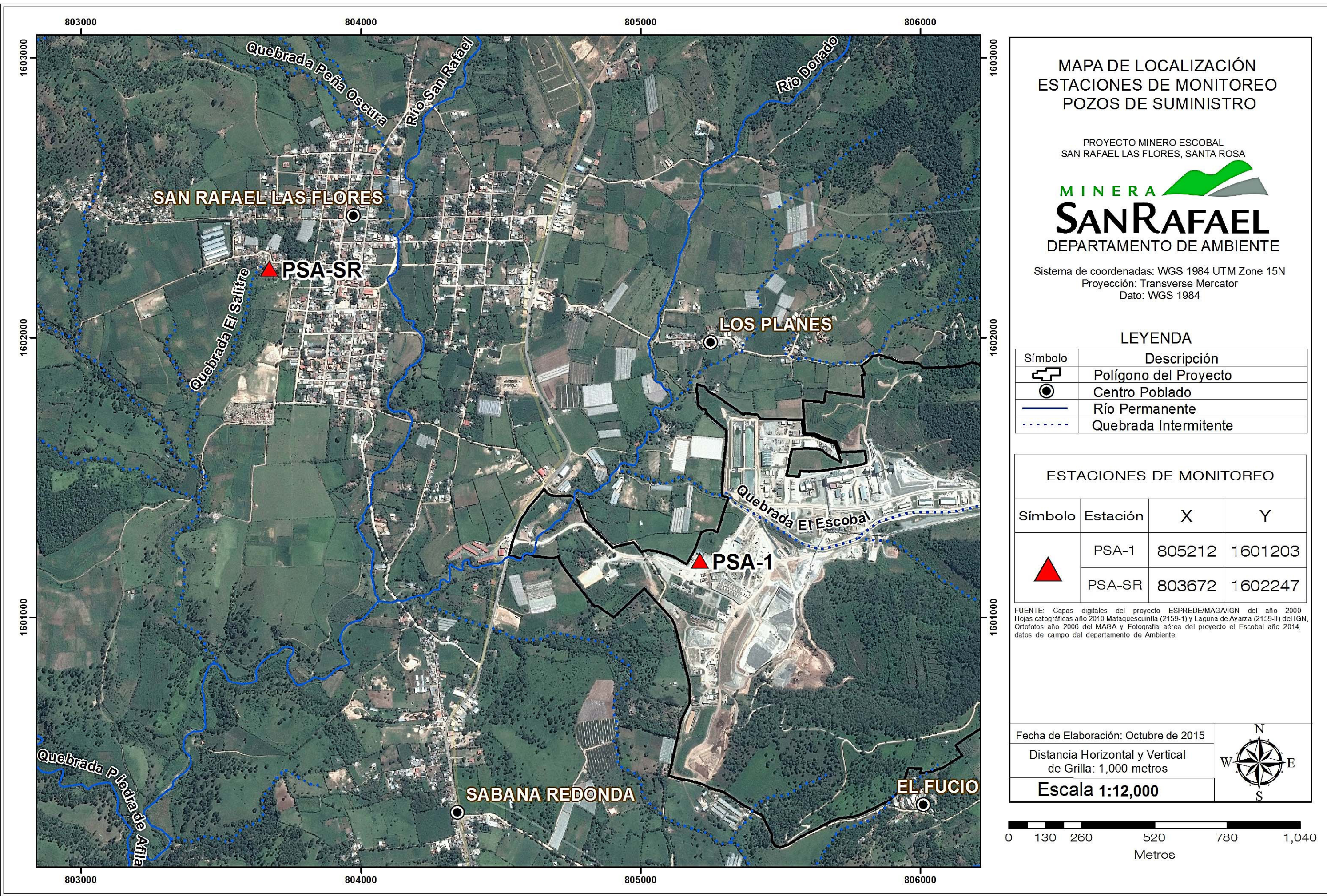
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas cartográficas año 2010 Mataquesuinta (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Octubre de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:11,000





**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
POZOS DE SUMINISTRO**

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO

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

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

Fecha de Elaboración: Octubre de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:12,000



4.2 Metodología

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

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

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

Fuente: MSR, 2015.

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

4.3 Resultados

4.3.1 Control de Calidad

En el monitoreo correspondiente al mes de 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 boro total (SW10), calcio disuelto (SW10, GW10 y MW20), potasio disuelto (MW20), DQO (SW10), amonio (MW20), nitrógeno Kjeldahl (GW10), fósforo disuelto (orto) (GW10), fósforo total (MW20) y sulfatos (SW10). Sin embargo las concentraciones detectadas están muy cerca a los límites de detección del método, por lo que se considera que no hay un aporte significativo de estos elementos en los resultados obtenidos. Todos los demás parámetros analizados por el laboratorio son confiables tanto en manipulación de las muestras como en precisión del análisis.

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

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Cr VI	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO	mg/L	<10	N/A	N/A	<10	<10	N/A	N/A	N/A	N/A
Coliformes Fecales	NMP/100 ml	<2	<2	<2	5.4 x 10 ²	240	<2	<2	<2	<2
Color Aparente	U Pt/Co	<1	<1	<1	7	9	<1	<1	<1	479
Color Real	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	<1	2
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	0.05	0.05	<0.03	<0.03	<0.03	<0.03
Aluminio Total		<0.03	NA	NA	0.07	0.06	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0189	0.019	<0.0004	<0.0004	<0.0004	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0175	0.0178	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.0114	0.0111	0.0021	0.0022	0.0022	0.0016
Arsénico Total		<0.0002	NA	NA	0.0117	0.0112	NA			
Bario Disuelto		<0.003	<0.003	<0.003	0.044	0.044	0.144	0.144	0.034	0.055
Bario Total		<0.003	NA	NA	0.043	0.042	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	0.11	0.12	0.02	<0.01	0.06	0.02
Boro Total		0.01	NA	NA	0.13	0.12	NA			
Cadmio Disuelto		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		<0.0001	NA	NA	<0.0001	0.0001	NA			
Calcio Disuelto		0.2	0.1	0.2	347	348	113	111	76.5	44.9
Calcio Total		<0.1	NA	NA	365	358	NA			
Cromo Disuelto		<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total		<0.01	NA	NA	<0.01	<0.01	NA			
Cobalto Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Total		<0.01	NA	NA	<0.01	<0.01	NA			
Cobre Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total		<0.01	NA	NA	<0.01	<0.01	NA			
Galio Disuelto		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Galio Total		<0.1	NA	NA	<0.1	<0.1	NA			
Hierro Disuelto		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5.32
Hierro Total		<0.02	NA	NA	0.02	0.02	NA			
Plomo Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.0001	0.0002
Plomo Total		<0.0001	NA	NA	0.0017	0.0017	NA			

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Litio Disuelto	mg/L	<0.008	<0.008	<0.008	0.096	0.097	<0.008	<0.008	0.016	0.01
Litio Total		<0.008	NA	NA	0.096	0.094	NA			
Magnesio Disuelto		<0.2	<0.2	<0.2	21.5	21.6	26.4	26.5	9.3	7.8
Magnesio Total		<0.2	NA	NA	22.2	21.8	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.088	0.088	0.009	<0.005	<0.005	0.058
Manganeso Total		<0.005	NA	NA	0.1	0.096	NA			
Mercurio Disuelto		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total		<0.0002	NA	NA	<0.0002	<0.0002	NA			
Molibdeno Disuelto		<0.02	<0.02	<0.02	0.03	0.03	<0.02	<0.02	<0.02	<0.02
Molibdeno Total		<0.02	NA	NA	0.03	0.03	NA			
Níquel Disuelto		<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Níquel Total		<0.008	NA	NA	<0.008	<0.008	NA			
Potasio Disuelto		<0.2	<0.2	0.3	10.4	10.4	11.4	11.4	3.9	4.3
Potasio Total		<0.2	NA	NA	10.9	10.6	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	0.0011	0.0011	0.0005	0.0005	0.0002	<0.001
Selenio Total		<0.0001	NA	NA	0.0011	0.0011	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	0.00006	NA			
Sodio Disuelto		<0.2	<0.2	<0.2	69	68.9	25.8	25.7	26.7	24.7
Sodio Total		<0.2	NA	NA	72.3	70.8	NA			
Estroncio Disuelto		<0.005	<0.005	<0.005	3.85	3.85	0.585	0.585	0.715	0.28
Estroncio Total		<0.005	NA	NA	3.98	3.91	NA			
Talio Disuelto		<0.0001	<0.0001	<0.0001	0.0003	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Talio Total		<0.0001	NA	NA	0.0003	0.0003	NA			
Estaño Disuelto		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Estaño Total		<0.04	NA	NA	<0.04	<0.04	NA			
Titanio Disuelto		<0.005	<0.005	<0.005	0.016	0.016	<0.005	0.006	0.006	<0.005
Titanio Total		<0.005	NA	NA	0.015	0.014	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	0.0005	0.0005	<0.0001	<0.0001	0.0001	<0.0001
Uranio Total		<0.0001	NA	NA	0.0005	0.0006	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	0.005	0.007	<0.005	<0.005	<0.005	<0.005
Vanadio Total		<0.005	NA	NA	<0.005	0.005	NA			
Zinc Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.01
Zinc Total		<0.01	NA		<0.01	<0.01	NA			
Grasas y Aceites		<2	NA		<2.1	<2.1	NA			
DQO		11	NA		<10	<10	NA			
Cloruros		<0.5	<0.5	<0.5	68.6	68.4	26.4	26.6	16.7	7.7
Cianuro Total		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoruros	<0.05	<0.05	<0.05	1.12	1.10	0.13	0.13	0.68	0.55	
Nitratos/Nitritos como N	<0.02	<0.02	<0.02	5.33	5.35	4.89	4.94	2.34	0.04	
Amonio	<0.05	<0.05	0.10	0.12	0.12	<0.05	<0.05	0.08	0.14	
Nitrógeno Kjeldahl (TKN)	<0.1	0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	
Fosfatos	<0.03	<0.03	<0.03	<0.03	0.03	0.06	0.06	0.25	0.5	
Fósforo Disuelto (Orto)	<0.01	0.04	<0.01	0.02	0.03	0.05	0.05	0.12	0.05	
Fósforo Total	<0.01	<0.01	0.01	0.02	0.02	0.02	0.02	0.08	0.18	
STD (TDS)	<10	<10	<10	1580	1580	698	696	476	336	
SST (TSS)	<5	<5	<5	<5	9	<5	<5	<5	9.0	
ST (TS)	<10	<10	<10	1660	1670	766	742	500	348	

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Sulfatos	mg/L	2.2	<1	<1	889	932	335	340	184	81.0
Alcalinidad Total		<2	<2	<2	71.0	71.0	69.8	68.6	81.6	112
Hidrocarburos totales (TPH)		<0.1	NA		<0.1	<0.1	NA			

u.e.: unidades exponenciales. mg/L: miligramos por litro. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. NA: no analizado. Fuente: MSR, 2015.

4.3.2 Agua Superficial

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

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

Las estaciones muestreadas presentaron un pH levemente alcalino (6.92 a 9.16 u.e.). En ninguna de las estaciones se detectaron valores de grasas y aceites, cumpliendo con las guías establecidas por la USEPA para la salud humana, el Banco Mundial y el Acuerdo Gubernativo 236-2006 (**Acuerdo**) para aguas residuales, a excepción de las estaciones SW4-E, SW6-E y SW8-E para los valores de aceites y grasas. Sin embargo todos los valores registrados se encuentran dentro de los límites establecidos durante la línea base. La Demanda Química de Oxígeno (**DQO**) se detectó en las estaciones SW2-E, SW7-E y SW8-E en concentraciones entre 17-26 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 encontrándose por debajo de los valores establecidos por el Acuerdo (100 mg/L), por el Banco Mundial (50 mg/L) y dentro de los valores establecidos durante el levantamiento de línea base.

Los Sulfatos Totales y los Sólidos Disueltos Totales (**TDS**) fueron detectados en la mayoría de las estaciones en concentraciones por debajo de los valores máximos establecidos durante la línea base, a excepción de las estaciones SW2-E y SW2A-E.

La estación SW2A no cuenta con línea base pero se utiliza los valores registrados en la línea base de la estación SW2 como referencia para analizar su comportamiento, ya que las dos estaciones están ubicadas en la quebrada El Escobal aguas abajo y están separadas a escasos 400mts aproximadamente. El Aluminio fue detectado en todas las estaciones en diferentes concentraciones. Sin embargo los datos se encuentran dentro de los límites establecidos durante el levantamiento de la línea base y por debajo de lo establecido por la EPA (0.2 mg/L) El Antimonio fue detectado en ocho estaciones, excepto en SW3-E, SW5-E y SW6-E y se detectó en un rango de concentración de 0.0004 – 0.0194 mg/L, por debajo de los límites máximos establecidos durante la línea base, a excepción de la estación SW2-E.

Las concentraciones de Arsénico Total se encuentran por debajo de los límites establecidos por el Acuerdo (0.1 mg/L). Respecto de las directrices de la USEPA (0.01mg/L) todas las estaciones se encontraron por debajo del valor guía. En ninguna estación de monitoreo de agua superficial fue detectado el Mercurio. Y 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), a excepción de la estación SW1-E donde no se registró concentración de Plomo Total.

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-15	Línea Base			Sep-15	Línea Base			Sep-15	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.509	7.14	8.06	7.54	7.42	6.56	7.87	9.16				8.24	
Temperatura (campo)	°C				17.4	13	19.8	17.7	22.4	20.3	25.6	26.1				27.8	
Conductividad (campo)	µS/cm				277.9	66.3	566.6	310.9	807.3	177.3	1965	1925				1874	
Oxígeno disuelto (campo)					3.6	0.1	6.4	5.64	4.76	3.5	5.8	7.42				7.67	
Cr VI	mg/L							<0.05				<0.05				<0.05	
DBO								<10				<10				<10	
Coliformes Fecales	NMP/100ml							540				23				240	
Color Aparente	U Pt/Co				NR	NR	NR	12	NR	NR	NR	9				9	
Color Real													<1			<1	
Turbidez	NTU							3.17				0.60				2.17	
Aluminio Disuelto	mg/L				0.035	<0.03	0.09	0.03	0.043	<0.03	0.12	0.04				0.05	
Aluminio Total		0.2			5.02	<0.03	35.1	0.06	2.35	0.06	8.77	0.09				0.06	
Antimonio Disuelto					<0.0004	<0.0004	0.0006	0.0015	<0.0004	<0.0004	<0.0004	0.0211				0.019	
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	0.0004	<0.0004	<0.0004	0.0005	0.0194				0.0178	
Arsénico Disuelto					0.00216	0.0005	0.0034	0.003	0.00184	0.0013	0.0024	0.01				0.0111	
Arsénico Total		0.01		0.1	0.00339	0.0015	0.0094	0.0028	0.00266	0.0012	0.0054	0.01				0.0112	
Bario Disuelto					0.1361	0.086	0.207	0.146	0.109	0.088	0.133	0.06				0.044	
Bario Total		1			0.186	0.1	0.434	0.15	0.131	0.096	0.186	0.062				0.042	
Berilio Disuelto					<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01				<0.01	
Berilio Total		0.004			<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01				<0.01	
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	<0.04				<0.04	
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.08	<0.04				<0.04	
Boro Disuelto					<0.01	<0.01	<0.01	<0.01	0.114	<0.01	0.29	0.1				0.12	
Boro Total					<0.01	<0.01	0.02	<0.01	0.11	<0.01	0.28	0.11				0.12	
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		NR	NR	NR	<0.0001
Cadmio Total		0.003		0.1	<0.0001	<0.0001	0.0007	<0.0001	<0.0001	<0.0001	0.0001	<0.0001				0.0001	
Calcio Disuelto					45.2	18.9	74.5	44.1	144.9	20.7	333	350				348	
Calcio Total					45.5	20.9	70.5	46.1	144.6	20.5	331	370				358	
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				0.01	
Cromo Total		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01	
Cobalto Disuelto					<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01	
Cobalto Total					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01	
Cobre Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01	
Cobre Total		1.3		3	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01				<0.01	
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Hierro Disuelto					<0.02	<0.02	0.04	<0.02	0.04	<0.02	0.12	<0.02				<0.02	
Hierro Total		0.3			2.7	<0.02	19.5	0.03	1.3	0.06	5.19	0.03				0.02	
Plomo Disuelto					<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001	0.0002				0.0002	
Plomo Total		0.015		0.4	0.0025	<0.0001	0.0191	<0.0001	0.00088	<0.0001	0.0038	0.0024				0.0017	
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.092				0.097	
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.092				0.094	
Magnesio Disuelto					3.9	2.6	5.3	4.5	15.9	3.2	37.3	20.3				21.6	
Magnesio Total					4.2	2.8	5.2	4.6	15.1	3.6	32.2	21.1				21.8	
Manganeso Disuelto					0.0051	<0.005	0.02	<0.005	0.0195	<0.005	0.07	0.025				0.088	
Manganeso Total		0.4			0.1041	<0.005	0.721	0.006	0.0602	0.007	0.174	0.029				0.096	
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002	
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002	
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	0.04				0.03	

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-15	Línea Base			Sep-15	Línea Base			Sep-15	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	0.03				0.03	
Níquel Disuelto					<0.01	<0.01	0.03	<0.008	0.013	<0.01	0.04	<0.008				<0.008	
Níquel Total		0.61		2	<0.01	<0.01	0.04	<0.008	0.022	<0.01	0.04	<0.008				<0.008	
Potasio Disuelto					4.4	3.5	5.1	4.7	6.1	4.9	7.6	13.6				10.4	
Potasio Total					5.3	3.5	13	4.7	6.3	5.2	7.4	14.1				10.6	
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	0.0012				0.0011	
Selenio Total		0.17			0.0001	<0.0001	0.0003	<0.0001	0.00011	<0.0001	0.0002	0.0012				0.0011	
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	0.00013				0.00006	
Sodio Disuelto					9.81	8.3	11.6	9	40.1	9.4	87.8	77				68.9	
Sodio Total					9.46	7.8	11.8	9.1	39.8	9.4	85.2	79.4				70.8	
Estroncio Disuelto					0.17	0.09	0.26	0.194	1.23	0.1	2.99	3.82				3.85	
Estroncio Total					0.18	0.1	0.25	0.196	1.23	0.11	2.91	3.82				3.91	
Talio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	0.0001	0.0002				0.0003	
Talio Total		0.002			<0.0001	<0.0001	0.0004	<0.0001	0.0001	<0.0001	0.0002	0.0002				0.0003	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.016				0.016	
Titanio Total					0.092	<0.005	0.591	<0.005	0.2715	<0.005	0.171	0.009				0.014	
Uranio Disuelto					0.00013	<0.0001	0.0003	0.0001	0.00028	<0.0001	0.0006	0.0002		NR	NR	NR	0.0005
Uranio Total					0.00038	<0.0001	0.0011	<0.0001	0.00024	<0.0001	0.0005	0.0002				0.0006	
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	0.0065	<0.005	0.015	0.008				0.007	
Vanadio Total					0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	0.01				0.005	
Zinc Disuelto					0.053	<0.01	0.1	<0.01	0.046	<0.02	0.1	<0.01				<0.01	
Zinc Total		7.4		10	0.064	<0.01	0.12	<0.01	0.041	<0.01	0.06	<0.01				<0.01	
Grasas y Aceites			10	10	<2.062	<2.062	<2.248	NA	<2.04	<2.04	<2.04	NA				<2.1	
DQO			125		15.7	<10	40	<10	<2.04	<2.04	<2.04	17				<10	
Cloruros		250			5	4	7	4.1	<2.04	<2.04	<2.04	69.7				68.4	
Cianuro Total		0.14		1	0.004	<0.003	0.015	<0.0003	<0.003	<0.003	<0.003	0.005				<0.003	
Fluoruros		4			0.125	<0.1	0.2	0.14	0.6	0.1	1.2	1.22				1.10	
Nitratos/Nitritos como N					1.61	0.08	4.87	0.27	2.46	0.03	4.9	8.37				5.35	
Amonio					<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	0.15				0.12	
Nitrógeno Kjeldahl (TKN)					3.53	<0.1	25.9	0.2	0.32	<0.1	0.8	0.4				0.1	
Fosfatos					0.185	0.1	0.3	0.19	0.19	0.1	0.4	<0.03				0.03	
Fósforo Disuelto (Orto)					0.06	0.03	0.1	0.08	0.06	0.02	0.13	0.02				0.03	
Fósforo Total			2	10	0.37	0.04	2.51	0.06	0.08	0.03	0.19	0.02				0.02	
STD (TDS)		500			225	170	280	224	754	170	1620	1630				1580	
SST (TSS)			50	100	163.6	<5	780	<5	67	<5	320	6.0				9.0	
ST (TS)					346.3	200	1080	238	850	230	1660	1690				1670	
Sulfatos		250			26.3	10	42	3.3	472.6	14	1600	944				932	
Alcalinidad Total					104	38	161	107	80	44	119	35.9				71.0	
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, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E			
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo			
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.58	7.17	8.17	8.01	7.4	6.56	7.94	7.59				7.74
Temperatura (campo)	°C				19.8	17	24	25.3	21	17.2	24	23.1				24.3
Conductividad (campo)	µS/cm				219.7	80	374.5	319.3	308.9	120	612	1716				1666
Oxígeno disuelto (campo)					3.8	0.1	6.8	6.7	4.2	0.1	7.5	6.14				6.6
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							5.2 x 10 ²				2.4 x 10 ⁴				1.6 x 10 ⁴
Color Aparente	U Pt/Co				NR	NR	NR	27	NR	NR	NR	17				12
Color Real								7				<1				<1
Turbidez	NTU							3.69				2.11				1.64
Aluminio Disuelto					0.061	<0.03	0.15	<0.03	0.03	<0.03	0.1	<0.03				0.04
Aluminio Total		0.2			3.25	<0.03	17.4	0.12	5.72	0.1	36	0.09				0.09
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0147				0.0139
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.0012	0.0005	0.0037	0.0135				0.0138
Arsénico Disuelto					0.00797	0.0041	0.0139	0.0086	0.00541	0.0039	0.0072	0.0079				0.0083
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0093	0.00873	0.0043	0.0326	0.0077				0.0087
Bario Disuelto					0.0915	0.051	0.118	0.143	0.1645	0.08	0.234	0.092				0.088
Bario Total		1			0.12445455	0.098	0.253	0.144	0.2356	0.144	0.567	0.093				0.082
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	0.1				0.1
Boro Total					<0.01	<0.01	0.02	0.02	0.012	<0.01	0.02	0.1				0.11
Cadmio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001
Cadmio Total		0.003		0.1	<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0005	<0.0001				<0.0001
Calcio Disuelto					27.8	11.7	39.9	39.9	37.4	18.5	61.7	303				292
Calcio Total					27.9272727	12.3	38.7	41.4	38.3	17.2	58.9	317				303
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				0.01
Cromo Total		0.1		0.1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01				<0.01
Cobalto Disuelto					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobalto Total					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobre Disuelto					<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Total		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Hierro Disuelto					0.033	<0.02	0.06	0.04	0.032	<0.02	0.15	<0.02				0.02
Hierro Total		0.3			1.9	0.06	10.2	0.23	3.8	0.09	26.5	0.1				0.08
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	0.0001	0.003	<0.0001	0.0198	0.0003				0.0005
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.07				0.069
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.071				0.069
Magnesio Disuelto					2.6	1.3	3.5	3.6	4.2	2.4	7.3	20.1				19.1
Magnesio Total					2.7	1.6	3.5	3.6	4.6	2.5	7.3	20.7				19.7
Manganeso Disuelto					0.07418182	0.01	0.381	0.319	0.116	0.011	0.26	0.26				0.233
Manganeso Total		0.4			0.14745455	0.025	0.403	0.334	0.2844	0.101	1.23	0.265				0.221
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	0.02				0.03

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E			
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo			
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Total	mg/L	0.61		2	0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02	0.02			
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.02	<0.008				
Níquel Total					<0.01	<0.01	0.05	<0.008	0.01	<0.01	0.06	<0.008				
Potasio Disuelto					4.2	3.5	5.5	5.2	5.8	4.2	8.7	11.7				
Potasio Total					4.5	3.6	7	5.2	6.5	4.4	11.7	12				
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0009				
Selenio Total					<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0007				
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				
Plata Total					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	<0.00005				
Sodio Disuelto					12.65	7.7	16.6	14.2	12.44	9	15.6	65.4				
Sodio Total					12.17	7.5	15.4	14.4	12.13	8.6	15.2	66.6				
Estroncio Disuelto					0.19	0.06	0.3	0.245	0.22	0.09	0.36	3.13				
Estroncio Total					0.18818182	0.08	0.3	0.246	0.228	0.11	0.33	3.11				
Talio Disuelto					<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	0.0002				
Talio Total					<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007	0.0002				
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	<0.005	0.016				
Titanio Total					0.071	<0.005	0.307	0.007	0.127	0.005	0.534	0.009				
Uranio Disuelto					<0.0001	<0.0001	0.0002	0.0002	0.00012	<0.0001	0.0004	0.0004				
Uranio Total					0.00019	<0.0001	0.0005	0.0002	0.00027	<0.0001	0.0009	0.0003				
Vanadio Disuelto					<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	<0.005				
Vanadio Total					0.0051	<0.005	0.019	<0.005	0.0085	<0.005	0.04	0.006				
Zinc Disuelto					0.068	<0.01	0.14	<0.01	0.061	0.05	0.14	<0.01				
Zinc Total					7.4	<0.01	1.01	<0.01	0.065	0.01	0.17	<0.01				
Grasas y Aceites						10	10	<2.062	<2.04	<2.326	<2	<2.062	<2.02	<2.084	<2	2.8
DQO						125		10.9	<10	40	<10	16.8	<10	60	<10	<10
Cloruros					250			2.7	2	3	2.9	8.5	4	16	60.8	60.1
Cianuro Total					0.14		1	<0.003	<0.003	0.015	<0.003	<0.003	<0.003	0.014	<0.003	<0.003
Fluoruros					4			<0.003	<0.003	0.015	0.18	0.15	0.1	0.2	0.89	0.87
Nitratos/Nitritos como N								0.59	<0.02	1.51	0.14	4.49	1.96	10.1	7.14	5.61
Amonio								0.05	<0.05	0.21	<0.05	0.059	<0.05	0.15	0.28	0.08
Nitrógeno Kjeldahl (TKN)								0.35	<0.1	0.6	0.2	0.58	0.1	1.3	0.9	0.5
Fosfatos								0.12	0.1	0.4	0.12	0.36	0.1	1.2	0.22	0.22
Fósforo Disuelto (Orto)								0.04	0.02	0.12	0.06	0.12	0.03	0.39	0.07	0.07
Fósforo Total						2	10	0.05	0.02	0.14	0.05	0.17	0.04	0.39	0.09	0.08
STD (TDS)					500			183.636364	140	220	244	233.6	150	350	1420	1370
SST (TSS)						50	100	48	5	340	5.0	115	<5	880	<5	<5
ST (TS)				231.8	140	500	248	378.2	260	1180	1490	1390				
Sulfatos	250			16.9	4	25	<1	27.5	10	57	811	793				
Alcalinidad Total				83	38	118	143	80	45	102	74.1	91.2				
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, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW5-E				SW6-E				SW7-E			
					Río Tapalapa – Aguas arriba				Río Los Vados				Quebrada La Honda			
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.5	7.1	8	8.23	7.4	7.1	7.8	7.83	7.5	6.9	8	6.92
Temperatura (campo)	°C				17.4	14.5	21.5	21.1	19.4	12.2	27.3	19.8	18.7	15	21.3	19.8
Conductividad (campo)	µS/cm				72.1	0.1	160.2	204.2	259	60	948	125.2	216	120	416.2	161.5
Oxígeno disuelto (campo)	mg/L				4	0	8	7.45	4	0	8.3	8.25	3.9	0.1	7.5	5.86
Cr VI								<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml				NR	NR	NR	540	NR	NR	NR	9.2 x 10 ³	NR	NR	NR	700
Color Aparente	U Pt/Co							85				103				62
Color Real						26	23	13								
Turbidez	NTU							12.4				13.2				7.99
Aluminio Disuelto	mg/L				0.055	<0.03	0.14	0.08	0.031	<0.03	0.08	0.14	0.033	<0.03	0.13	<0.03
Aluminio Total		0.2			1.09	<0.03	3.7	1.15	1.89	<0.03	8.1	1.24	3.05	0.1	16.4	0.84
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	0.0008
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	0.0021	0.00382	0.0022	0.0054	0.0037
Arsénico Total		0.01	0.1		0.00177	0.0013	0.0028	0.0018	0.00387	0.0025	0.0074	0.0028	0.00446	0.003	0.0061	0.0042
Bario Disuelto					0.0447	0.023	0.072	0.042	0.0618	0.027	0.136	0.047	0.0946	0.052	0.143	0.09
Bario Total		1			0.0556	0.039	0.069	0.054	0.0806	0.055	0.136	0.053	0.2142	0.088	0.99	0.095
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	0.07	<0.01	<0.01	0.01	<0.01
Boro Total					0.01	<0.01	0.02	0.01	0.379	<0.01	1.93	0.07	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	7.3	15.1	5.4	38.9	10.2	23.1	11.2	38.1	18
Calcio Total					7.73	3.4	13.1	7.5	14.81	5.9	37.5	10.4	23.04	11.5	36.7	18.4
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total		0.1	0.1		0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Total					<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Cobre Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total		1.3	3		<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hierro Disuelto					0.055	0.03	0.09	0.07	0.097	<0.02	0.28	0.14	0.022	<0.02	0.07	0.09
Hierro Total		0.3			0.7	0.16	1.8	0.64	1.3	0.33	4.8	0.72	1.8	0.08	9.5	0.42
Plomo Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0014	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Plomo Total		0.015	0.4		0.0003	<0.0001	0.0012	0.0003	0.0007	<0.0001	0.0028	0.0004	0.0015	<0.0001	0.0083	0.0002
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	0.13	<0.02	0.67	0.019	<0.02	<0.02	<0.02	<0.008
Litio Total					<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.019	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					1.5	0.8	2.5	1.4	3	1.4	7.4	2.1	4.1	2.2	6.4	3.3
Magnesio Total					1.5	0.9	2.5	1.4	3.1	1.8	7.5	1.9	4.3	2.6	6.5	3.2
Manganeso Disuelto					0.025	0.006	0.047	0.025	0.114	<0.005	0.551	0.025	0.032	0.014	0.074	0.105
Manganeso Total		0.4			0.0406	0.014	0.062	0.039	0.1482	0.04	0.543	0.033	0.0981	0.019	0.342	0.112
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-15	Línea Base			Sep-15	Línea Base			Sep-15	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Molibdeno Total	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	
Níquel Disuelto					<0.01	<0.01	0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	
Níquel Total		0.61		2	0.013	<0.01	0.03	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.04	<0.008	
Potasio Disuelto					3	2.5	3.7	2.7	4.1	3.2	7.1	3.1	4.1	3.6	5.4	3.5	
Potasio Total					3	2.2	4.1	2.7	4.2	3.1	7.5	3.1	4.5	3.6	7	3.4	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<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	<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	<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	<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
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	<0.00005
Sodio Disuelto					6.34	3.7	10.8	4.9	32.16	6	135	9.7	11.69	8.7	15.4	8.9	
Sodio Total					5.99	3.4	9.4	4.9	31.11	5.3	124	9.7	11.45	8.3	15.5	8.8	
Estroncio Disuelto					0.06	0.02	0.09	0.063	0.12	0.03	0.33	0.078	0.17	0.07	0.29	0.13	
Estroncio Total					0.057	0.02	0.08	0.065	0.122	0.04	0.35	0.075	0.174	0.09	0.28	0.131	
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
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	<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	<0.04
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	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.006	<0.005	<0.005	0.006	<0.005	<0.005
Titanio Total					0.027	<0.005	0.094	0.028	0.05	<0.005	0.22	0.031	0.069	<0.005	0.325	0.024	
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	<0.0001
Uranio Total					<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	0.00013	<0.0001	0.0005	<0.0001	<0.0001
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.01	<0.005	<0.0005	<0.0005	0.008	<0.005	<0.005
Vanadio Total					<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.005	<0.005	0.0047	<0.0005	0.018	<0.005	<0.005
Zinc Disuelto					0.04	<0.01	0.1	<0.01	<0.1	<0.1	0.4	0.02	0.131	<0.01	0.81	<0.01	<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	<0.01
Grasas y Aceites			10	10	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	2	<2.062	<2.02	<2.084	<2.1	
DQO			125		6.5	<10	20	<10	<10	<10	30	<10	10	<10	40	24	
Cloruros		250			1.8	1	3	1.8	43.9	3	230	8.3	3	5	3	2.9	
Cianuro Total		0.14		1	0.003	<0.003	0.014	<0.003	<0.003	<0.003	0.014	<0.003	<0.003	0.015	<0.003	<0.003	<0.003
Fluoruros		4			<0.1	<0.1	<0.1	0.06	0.11	<0.1	0.3	0.08	<0.1	0.2	0.1	0.12	
Nitratos/Nitritos como N				0.13	0.03	0.42	0.20	0.3	<0.02	1.22	<0.02	<0.1	3.53	0.19	0.22		
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	<0.05	
Nitrógeno Kjeldahl (TKN)				0.21	<0.1	0.4	<0.1	0.2	0.1	0.5	0.2	<0.1	0.7	0.4	0.2		
Fosfatos				0.04	<0.03	0.2	<0.03	0.08	<0.03	0.3	19.1	0.1	0.2	0.09	0.06		
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	0.04		
Fósforo Total		2	10	0.02	<0.01	0.05	0.02	0.04	0.02	0.08	0.03	0.03	0.19	0.19	0.03		
STD (TDS)	500			84	60	110	84	187	90	540	118	140	240	100	156		
SST (TSS)		50	100	9	<5	32	<5	21	<5	105	<5	<5	330	6	5.0		
ST (TS)				97	70	130	96	221	120	550	116	150	610	140	170		
Sulfatos	250			16.5	<10	47	<1	14	<10	23	<1	9	38	19.4	22.9		
Alcalinidad Total				25	13	43	22.7	48	22	108	35.3	30	101	54	53.0		
Hidrocarburos totales (TPH)				<0.1	<0.09	<0.09	<0.1	11.54375	<0.1	92	<0.1	<0.09	<0.1	<0.1	<0.1	<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, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW8-E				SW9-E			
					Aguas debajo de la confluencia del Río San Rafael Y el Río El Dorado				Río Tapalapa, aguas debajo de la confluencia del Río San Rafael Río Los Vados y Quebrada La Honda			
					Línea Base			Sep-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.49	7	9.8	7.47	7.86	7.5	10.7	8.32
Temperatura (campo)	°C				22.1	18.9	25.1	23.8	21.8	19.1	24.2	21.4
Conductividad (campo)	µS/cm				363.7	186.8	807.6	734.2	267.4	121.8	518	450.2
Oxígeno disuelto (campo)					5.14	0.28	7.48	5.62	6.2	0.8	8.5	7.68
Cr VI	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO					15	15	25	12	<10	<10	<10	<10
Coliformes Fecales	NMP/100ml				2x10 ⁶	2x10 ⁴	5x10 ⁶	9.2 x 10 ⁵	9x10 ⁴	1x10 ²	2x10 ⁵	7.0 x10 ²
Color Aparente	U Pt/Co				172	19	351	71	342	29	824	82
Color Real					20	22	36	11	43	10	60	10
Turbidez	NTU				14.15	6.09	22.2	8.78	25.72	4.93	46.5	11.4
Aluminio Disuelto					0.033	<0.03	0.06	0.04	0.087	<0.03	0.22	0.07
Aluminio Total	0.2				2.39	0.04	7.35	0.11	2.96	0.4	8.6	0.49
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0037	0.0006	<0.0004	0.0013	0.0013
Antimonio Total	0.006				0.001	<0.0004	0.0027	0.0039	0.0007	<0.0004	0.0012	0.0012
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0059	0.004	0.0023	0.0057	0.0041
Arsénico Total	0.01			0.1	0.006	0.0041	0.0096	0.0064	0.0042	0.002	0.006	0.0046
Bario Disuelto					0.107	0.074	0.143	0.107	0.094	0.056	0.135	0.085
Bario Total	1				0.136	0.102	0.185	0.112	0.121	0.09	0.154	0.09
Berilio Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total	0.004				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					0.022	<0.01	0.05	0.04	0.043	<0.01	0.09	0.1
Boro Total					0.023	<0.01	0.06	0.05	0.041	<0.01	0.1	0.11
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total	0.003			0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Calcio Disuelto					50.4	17.5	156	94.2	35.7	18.2	78.3	51.8
Calcio Total					52.1	18.6	156	102	36.2	18.5	79.7	53.9
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cromo Total	0.1			0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Total					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Total	1.3			3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hierro Disuelto					0.06	0.02	0.11	0.13	0.09	<0.02	0.17	0.07
Hierro Total	0.3				1.53	0.05	4.36	0.41	1	0.25	2.2	0.49
Plomo Disuelto					0.0001	<0.0001	0.0003	0.0001	0.0002	<0.0001	0.0005	0.0001
Plomo Total	0.015			0.4	0.003	<0.0001	0.0089	0.0005	0.0022	0.0002	0.008	0.0007
Litio Disuelto					<0.02	<0.02	0.04	0.027	<0.02	<0.02	0.04	0.035
Litio Total					<0.02	<0.02	0.04	0.028	<0.02	<0.02	0.04	0.035
Magnesio Disuelto					6.3	3.2	14.7	8.5	6	3.3	9.7	6.5
Magnesio Total					6.6	3.3	14.8	8.9	6.2	3.4	10.1	6.6
Manganeso Disuelto					0.095	0.009	0.118	0.29	0.057	0.023	0.148	0.071
Manganeso Total	0.4				0.1808	0.047	0.349	0.299	0.115	0.043	0.187	0.111
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-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Níquel Total		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Potasio Disuelto					6.5	5.8	7.4	9.7	6	4.5	8.1	5.4
Potasio Total					6.8	6.4	7.8	10	6.1	4.8	8.5	5.4
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto					<0.0001	<0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0002
Selenio Total		0.17			0.00011	<0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0003
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total					<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					18.8	12.3	33.7	35.8	17.6	10.7	26.9	23.2
Sodio Total					18.4	12.9	34.3	37.4	17.4	11	28.5	23.7
Estroncio Disuelto					0.44	0.16	1.5	1.07	0.29	0.14	0.71	0.498
Estroncio Total					0.44	0.16	1.48	1.13	0.295	0.14	0.73	0.513
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	0.009	<0.005	<0.005	0.009	0.009
Titanio Total					0.069	<0.005	0.195	0.012	0.084	0.015	0.237	0.022
Uranio Disuelto					0.00014	<0.0001	0.0003	0.0002	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	<0.005	0.0054	<0.005	0.012	<0.005
Zinc Disuelto					<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.03	<0.01
Zinc Total		7.4		10	0.015	<0.01	0.04	0.01	<0.01	<0.01	0.03	<0.01
Grasas y Aceites			10	10	<2.04	<2.02	<2.062	3.2	<2.02	<2.02	<5	<2
DQO			125		20	<10	40	26	17.8	<10	35	<10
Cloruros		250			10	7	19	25.5	12	6	20	21.4
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	0.35	0.006	<0.003	0.013	0.24
Nitratos/Nitritos como N					3.07	2.01	5.23	2.94	1.97	1.14	3.85	1.25
Amonio					0.24	<0.05	0.58	2.62	0.129	<0.05	0.22	<0.05
Nitrógeno Kjeldahl (TKN)					0.74	<0.1	1.6	3.4	0.57	0.3	0.9	0.3
Fosfatos					0.55	0.3	1	1.36	0.49	0.22	1.3	0.34
Fósforo Disuelto (Orto)					0.18	0.08	0.33	0.13	0.18	0.09	0.49	0.47
Fósforo Total			2	10	0.27	0.12	0.51	0.55	0.25	0.09	0.58	0.14
STD (TDS)		500			312	160	750	348	255	160	440	568
SST (TSS)			50	100	34	<5	102	7.0	73	<5	340	13.0
ST (TS)					362	180	750	358	310	200	450	578
Sulfatos		250			91	22	360	225	60	25	169	124
Alcalinidad Total					79	50	110	105	70	45	90	65.4
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, 2015.

4.3.3 Agua Subterránea

En el Cuadro 4-5 se presentan los resultados de la calidad del agua subterránea (manantiales) y los resultados de laboratorio se presentan en el Anexo 11.5.2. En términos generales los parámetros analizados en las estaciones GW-1A, GW-2, GW-3 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 19.2 y 23.7 °C. La lectura menor de pH se obtuvo en la estación GW-4 (5.91 u.e.) y la mayor en la estación GW-2 (6.97 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). Las concentraciones registradas de Cloruros están por debajo de las guías de la USEPA (250 mg/L).

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

El Cadmio, Cianuro, Berilio, Bismuto, Boro, Cobalto, Cobre, Cromo, Galio, Litio, Cromo hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Talio, Estaño, Plata, Uranio, Vanadio, Cianuro Total no fueron detectados en ninguna de las estaciones. El Selenio fue detectado en las estaciones GW1-A (0.0002 mg/L), GW3 (0.0005 mg/L) y GW4 (0.0006 mg/L) por debajo de la guía de la USEPA (0.17mg/L). El Antimonio fue detectado únicamente en la estación GW2 (0.0008 mg/L) por debajo de la guía dada por la USEPA (0.01 mg/L). El Plomo se registró en 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, a excepción de la estación GW1-A. 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-15	Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Oct-15																
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo																	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.08	6.89	7.26	6.35	6.54	6.01	7.16	6.97	6.54	6.21	7.13	6.74	6.13	6.13	6.13	5.91																
Temperatura de campo	°C				15.2	14.8	15.6	19.2	21.4	19	23.7	23.7	19.4	18.5	21	22.7	18.1	18.1	18.1	20.5																
Conductividad de campo	µS/cm				229.8	223	236.5	530.4	323.4	111.3	500.5	153.8	315.3	236.7	501.1	906.8	147.3	147.3	147.3	112.2																
Oxígeno Disuelto de campo	mg/L				0.1	0.03	0.17	5.03	1.18	0.13	2.35	6.98	0.68	0.03	1.26	4.21	0.14	0.14	0.14	1.67																
Turbidez	NTU							12.1				9.08				0.23				133																
Materia Flotante				Ausente				Ausente								Ausente				Presente																
Color Aparente	u Pt/Co			500	NR	NR	NR	99	NR	NR	NR	64	NR	NR	NR	<1	NR	NR	NR	1105																
Color Real				28																																
Cr (VI)				0.1																				<0.05												
Coliformes Fecales	NMP/100mL			<1x10 ⁴				2.2 x 10 ³				49				<2				23																
Aluminio Disuelto	mg/L	0.2			<0.03	<0.03	<0.03	<0.03	0.075	<0.03	0.24	<0.03	<0.03	<0.03	0.04	<0.03	1.42	1.42	1.42	0.65																
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	0.00078	<0.0004	0.0011	0.0008	0.0004	<0.0004	0.001	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004															
Arsénico Disuelto		0.01	0.1		0.001	0.0008	0.0011	0.0013	0.0156	0.0043	0.0299	0.0045	0.0059	0.0037	0.0115	0.0022	0.0008	0.0008	0.0008	0.0008	0.0004															
Bario Disuelto		1			0.025	0.022	0.028	0.053	0.24	0.125	0.451	0.08	0.186	0.12	0.328	0.144	0.127	0.127	0.127	0.127	0.149															
Berilio Disuelto		0.004			<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.002	<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	<0.04															
Boro Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01															
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001															
Calcio Disuelto					5.7	5.1	6.2	6.1	33.5	9.6	65.3	16.6	31.6	25.7	43.4	111	4.4	4.4	4.4	4.4	4.5															
Cromo Disuelto		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01															
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01															
Cobre Disuelto		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01															
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1															
Hierro Disuelto		0.3			0.02	<0.02	0.03	<0.02	0.103	0.03	0.17	<0.02	0.103	<0.02	0.33	<0.02	0.74	0.74	0.74	0.74	0.45															
Plomo Disuelto		0.015		0.4	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0009	0.0009	0.0009	0.0009	0.0016															
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	<0.02	<0.008															
Magnesio Disuelto					3.1	2.9	3.3	2.5	5.9	1.8	12	2.9	4.9	3.3	8.3	26.5	2.6	2.6	2.6	2.6	2.5															
Manganeso Disuelto		0.05			<0.005	<0.005	<0.005	0.03	0.123	0.02	0.356	0.008	0.057	<0.005	0.133	<0.005	0.069	0.069	0.069	0.069	0.049															
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002															
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<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	<0.01	<0.008															
Potasio Disuelto					7.3	5.9	8.6	5.2	2.9	1.3	4.3	2.6	3.8	2.5	5	11.4	4.6	4.6	4.6	4.6	5.3															
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1															
Selenio Disuelto		0.17			0.0002	<0.0001	0.0003	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	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	<0.00005	<0.00005															
Sodio Disuelto					17.6	16.9	18.2	7.9	13.5	7.2	22	8.1	11.5	9.3	16.4	25.7	10.3	10.3	10.3	10.3	10.5															
Estroncio Disuelto					0.03	0.03	0.03	0.051	0.26	0.08	0.56	0.127	0.2	0.12	0.37	0.585	0.03	0.03	0.03	0.03	0.045															
Talio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.1	<0.0001	<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	<0.1	<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	0.042	0.014															
Uranio Disuelto				<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	0.0003																
Vanadio Disuelto				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.006	0.006	0.006	<0.005																
Zinc Disuelto	7.4		10	<0.01	<0.01	<0.01	0.06	<0.1	<0.1	0.1	<0.01	0.94	<0.01	3.47	<0.01	0.1	0.1	0.1	0.1	<0.01																
Cloruros	250			15	14	16	3.8	4	2	7	2.2	5	3	6	26.6	4	4	4	4	3.3																

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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-15	Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Oct-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Cianuro Total	mg/L	0.14		1	0.008	<0.003	0.014	<0.003	0.004	<0.003	0.012	<0.003	0.0046	<0.003	0.014	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoruros					<0.1	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	0.16	0.15	0.1	0.2	0.13	<0.1	<0.1	<0.1	0.08
Nitratos/Nitritos como N					2.19	1.9	2.48	1.85	0.74	0.14	1.1	0.1	1.19	0.05	3.16	4.94	0.07	0.07	0.07	1.47
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	1.35
Nitrógeno Kjeldahl (TKN)					0.7	0.3	1.1	0.3	0.63	0.2	0.9	0.2	0.46	<0.05	1.2	<0.1	0.3	0.3	0.3	0.9
Fosfatos					0.2	0.1	0.2	0.25	0.4	0.1	0.7	0.09	0.3	0.1	0.5	0.06	0.09	0.09	0.09	0.16
Fósforo Total			2	10	0.1	0.02	0.17	0.09	0.18	0.09	0.27	0.04	0.1	0.05	0.15	0.02	0.03	0.03	0.03	0.07
STD (TDS)		500			190	190	190	162	223	130	350	128	213	190	260	696	170	170	170	468
SST (TSS)			50	100	6.5	6	7	<5	7.7	6	9	8	39	5	105	<5	206	206	206	<5
ST (TS)					200	180	220	176	237.5	140	380	148	217.5	170	270	742	360	360	360	518
Sulfatos		250			12.5	11	14	4.3	43	7	90	12.5	30	16	71	340	7	7	7	22.2
Alcalinidad Total					31	31	31	35.9	0.18	0.09	0.27	58.9	83	71	97	68.6	35	35	35	26.1

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, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2			Sep-15	MW-3			Sep-15	MW-4			Sep-15	MW-5			Sep-15															
					Línea Base				Línea Base				Línea Base				Línea Base																		
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo																
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	6.56	6.37	6.77	NA	6.44	6.34	6.49	6.54	6.32	6.23	6.41	6.57	6.19	6.04	6.34	6.29															
Temperatura de campo	°C				24.4	23.4	25.1		24.1	23.7	24.5	26.2	23.3	22.2	24.4	25.5	23.4	23	24.6	25.5															
Conductividad de campo	µS/cm				427.5	211.9	1001.3		803.9	741.6	829.1	593.1	916.9	872.1	944.8	576.1	469.7	401.4	494.1	1275															
Oxígeno Disuelto de campo	mg/L				0.75	0.3	1.21		0.65	0.11	1.44	4.78	0.97	0.48	1.93	5.05	0.82	0.19	1.77	3.57															
Turbidez	NTU				NR	NR	NR		2.87	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	3.10														
Materia flotante	Visual			Ausente					Ausente												Ausente	Ausente													
Color Aparente	u Pt/Co			500					<1												<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Color Real				0.1					<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	
Cr (VI)	mg/L			0.1					<2												<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Coliformes Fecales	NMP/100mL			<1x10 ⁴					<0.03												<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	<0.03
Aluminio Disuelto	mg/L	0.2			<0.0004	<0.0004	<0.0004		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004														
Antimonio Disuelto		0.01			0.0011	0.0008	0.0014		0.0023	0.0021	0.0027	0.0023	0.0023	0.0021	0.0028	0.0023	0.0013	0.001	0.0016	0.0008															
Arsénico Disuelto		0.01		0.1	0.03	0.024	0.039		0.036	0.032	0.041	0.034	0.042	0.038	0.047	0.026	0.162	0.157	0.166	0.043															
Bario Disuelto		1			<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															
Berilio Disuelto		0.004			<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														
Bismuto Disuelto					0.014	<0.01	0.04		0.06	0.05	0.07	0.05	0.078	0.06	0.09	0.06	0.015	<0.01	0.03	0.05															
Boro 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															
Cadmio Disuelto					20.6	9.4	48.7		80.3	76.4	83.3	75.5	100	93	107	74.6	40.8	39.2	42.2	208															
Calcio 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															
Cromo 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															
Cobalto Disuelto					<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01															
Cobre Disuelto		1.3		3	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01															
Cobres 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															
Galio Disuelto					<0.02	<0.02	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02															
Hierro Disuelto		0.3			<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															
Plomo Disuelto		0.015		0.4	<0.02	<0.02	<0.02		<0.02	<0.02	0.02	0.016	<0.02	<0.02	0.02	0.017	<0.02	<0.02	<0.02	0.008															
Litio Disuelto					3.5	2.4	6.1		10.3	10.1	10.7	9.2	11.3	10.9	11.6	8	7.3	6.8	7.6	27.1															
Magnesio Disuelto					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															
Manganeso Disuelto		0.05			<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															
Mercurio Disuelto		0.002		0.01	<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															
Molibdeno Disuelto					<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															
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	3.8	4.7	4.5	5.2	3.9	6	5.5	6.5	9.1																
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																
Selenio Disuelto		0.17			0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0003	0.0002	0.0004	0.0003	0.0004	0.0005															
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005																
Sodio Disuelto					22	17.4	33.6	29.5	28.2	30.9	26.6	32.3	30.4	35.8	25.4	16.9	15.6	19.1	38.4																
Estroncio Disuelto					0.18	0.07	0.46	0.74	0.71	0.77	0.72	0.89	0.84	0.98	0.689	0.27	0.26	0.29	0.728																
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																

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5				
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Estaño Disuelto	mg/L				<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.012
Uranio Disuelto					0.00016	<0.0001	0.0005		0.0002	0.0002	0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0001	0.00033	0.0001	0.001	0.001	0.0005
Vanadio Disuelto					0.0059	<0.005	0.008		0.0055	<0.005	0.009	0.008	0.006	<0.005	0.009	0.005	<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	0.04	<0.01	<0.01	0.1	0.01	<0.01	<0.01	0.1	0.1	0.03
Cloruros		250			12	3	28		16	16	17	16.5	20	19	21	15.4	9	8	9	9	39.9
Cianuro Total		0.14		1	0.0039	<0.003	0.011		0.005	<0.003	0.014	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	0.015	<0.003
Fluoruros					0.35	0.2	0.7		0.8	0.8	0.8	0.70	0.8	0.8	0.8	0.84	0.18	0.1	0.2	0.2	0.20
Nitratos/Nitritos como N					2.48	2.04	2.93		2.2	2.08	2.26	2.36	2.13	1.98	2.32	2.46	3.32	3	3.57	3.57	4.83
Amonio					<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	0.13	<0.05	<0.05	<0.05	<0.05	0.13
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	0.3	<0.1
Fosfatos					0.233	0.21	0.27		0.315	0.27	0.37	0.25	0.248	0.24	0.27	0.22	0.203	0.15	0.24	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	0.07	0.06	0.05	0.07	0.07	0.04
STD (TDS)		500			253	190	360		470	460	480	1120	553	540	560	922	305	290	320	320	1060
SST (TSS)			50	100	345.8	137	584		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	8.0
ST (TS)					597.5	350	810		487.5	450	510	504	555	520	580	486	325	280	350	350	1110
Sulfatos		250			28.5	4	97		166	162	169	178	212.5	210	220	172	72.3	64	76	76	555
Alcalinidad Total					64	56	80		84	82	86	82.1	85	83	88	85.6	66	61	68	68	78.8

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, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	6.22	6.17	6.25	6.16	6.38	6.14	6.98	6.1	6.16	6.07	6.29	6.22	7.15	6.9	7.4	6.83
Temperatura de campo	°C				22.3	21.6	22.8	25.4	22.4	22	23.1	24.5	23.3	23.2	23.4	24.9	27.5	25.9	29	27.4
Conductividad de campo	µS/cm				538.2	342.9	752.6	797.1	299.6	285.9	323.8	405.7	426.8	424.6	428.1	714.7	1595	1569	1621	429.8
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	4.17	0.61	0.25	1.19	4.01	0.72	0.16	1.45	4.00	0.38	0.35	0.41	3.2
Turbidez	NTU				NR	NR	NR	1.15	NR	NR	NR	5.16	NR	NR	NR	5.61	NR	NR	NR	3.99
Materia flotante	Visual		Ausente	Ausente				Ausente												
Color Aparente	u Pt/Co		500	<1				<1												
Color Real			<1	<1				<1												
Cr (VI)	mg/L		0.1	<0.05				<0.05												
Coliformes Fecales	NMP/100mL		<1x10 ⁴	<2				240												
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	<0.03
Antimonio Disuelto		0.01		0.00045	<0.0004	0.0012	<0.0004	0.00063	0.0005	0.0008	0.0008	0.001	0.0009	0.0011	0.0007	<0.0004	<0.0004	<0.0004	<0.0004	
Arsénico Disuelto		0.01	0.1	0.0028	0.0024	0.0032	0.0025	0.0034	0.0029	0.0041	0.0022	0.0021	0.0019	0.0024	0.0014	0.003	0.0007	0.0052	0.0016	
Bario Disuelto		1		0.198	0.134	0.281	0.11	0.156	0.129	0.176	0.451	0.125	0.122	0.129	0.076	0.031	0.028	0.034	0.055	
Berilio Disuelto		0.004		<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.01	<0.002	<0.01	<0.01	
Bismuto Disuelto				<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Boro Disuelto				<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.02	0.09	0.08	0.1	0.02
Cadmio Disuelto		0.003	0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcio Disuelto				52.5	35.1	71.9	110	16.7	13.9	19.6	32.3	34.6	32.5	36.3	91.5	185.5	170	201	44.9	
Cromo Disuelto		0.1	0.1	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.1	<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	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	
Galio Disuelto				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Hierro Disuelto		0.3		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	5.52	1.53	9.51	5.32	
Plomo Disuelto		0.015	0.4	<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	
Litio Disuelto				<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.01	0.07	0.07	0.07	0.01	
Magnesio Disuelto				7.5	4.9	10.5	13.9	4.8	4.6	5	9.9	6.4	6.3	6.7	14.4	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	0.03	0.019	0.012	0.029	<0.005	0.203	0.149	0.257	0.058	
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	7.2	6.2	5.4	6.8	8.8	4.8	4.6	5.1	5.7	4.8	4.6	5	4.3	
Escandio Disuelto				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Selenio Disuelto		0.17		0.0005	0.0004	0.0005	0.0003	0.0002	0.0001	0.0002	<0.0001	0.0004	0.0003	0.0006	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	
Plata Disuelta				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	
Sodio Disuelto				14	12.3	17	22.3	19.1	15.4	27.5	18.5	15.2	15	15.6	21.2	45.1	44.7	45.4	24.7	
Estroncio Disuelto				0.26	0.18	0.35	0.495	0.1	0.09	0.11	0.227	0.22	0.21	0.23	0.347	1.64	1.58	1.69	0.328	
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	

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Estaño Disuelto	mg/L				<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	0.008	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.008	<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	0.11	0.034	<0.01	0.1	0.37	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01	0.01
Cloruros		250			11	6	17	20.3	11	9	12	14.3	6	6	6	20.3	37	36	37	7.7
Cianuro Total		0.14		1	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.007	<0.003	0.012	<0.003
Fluoruros					0.18	0.1	0.2	0.13	0.13	0.1	0.2	0.10	0.17	0.1	0.2	0.14	2.55	2.5	2.6	0.55
Nitratos/Nitritos como N					5.08	4.42	6.15	5.65	4.75	4.08	5.24	1.23	2.76	2.63	2.83	3.93	<0.02	<0.02	<0.02	0.04
Amonio					<0.05	<0.05	<0.05	0.10	<0.05	<0.05	<0.05	0.13	<0.05	<0.05	<0.05	0.12	<0.05	<0.05	<0.05	0.14
Nitrógeno Kjeldahl (TKN)					<0.1	<0.1	0.2	<0.1	0.21	<0.1	0.4	0.2	0.09	<0.1	0.2	<0.1	0.23	<0.1	0.4	<0.1
Fosfatos					0.173	0.15	0.21	0.12	0.113	0.09	0.18	0.09	0.23	0.21	0.24	0.16	<0.03	<0.03	<0.03	0.5
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	0.06	<0.01	<0.01	0.02	0.18
STD (TDS)		500			340	260	440	632	233	220	250	304	277	270	290	564	905	890	920	336
SST (TSS)			50	100	<5	<5	<5	<5	19.75	7	45	6.0	9	6	14	31.0	27	25	29	9.0
ST (TS)					345	240	450	644	260	230	280	338	300	290	310	608	940	910	970	348
Sulfatos		250			85.3	33	153	276	19.3	17	23	61.4	54.7	54	55	251	440	440	440	81.0
Alcalinidad Total					65	62	68	78.0	48	41	60	86.7	68	66	70	71.5	147	136	157	112

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, 2015.

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

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1				
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Oct-15	Línea Base			Sep-15	Línea Base			Sep-15	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.05	7.05	7.05	7.16	7.45	7.45	7.45	7.48				7.53				6.64				7.39	
Temperatura de campo	°C				30.4	30.4	30.4	32.3	27.8	27.8	27.8	26.9				27.7				23.7				32.4	
Conductividad de campo	µS/cm				2.243	2.243	2.243	1571	663.9	663.9	663.9	1061				854.8				1245				1345	
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	2.69	0.05	0.05	0.05	2.69				7.52				3.98				4.41	
Turbidez	NTU							32.3				1.61				0.97				2.13				1.17	
Materia flotante	Visual			Ausente				Ausente				NA							Ausente					Ausente	
Color Aparente	u Pt/Co			500	NR	NR	NR	102	NR	NR	NR	<1				NA				22				245	
Color Real	u Pt/Co							<1				<1								10				<1	
Cr (VI)	mg/L			0.1				<0.05				<0.05								<0.05				<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2								23				<2	
Aluminio Disuelto	mg/L	0.2			<0.03	<0.03	<0.03	<0.03	0.06	0.06	0.06	<0.03				<0.03				<0.03				<0.03	
Antimonio Disuelto		0.01			0.001	0.001	0.001	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004				<0.0004				<0.0004				<0.0004
Arsénico Disuelto		0.01		0.1	0.0022	0.0022	0.0022	0.0029	0.0136	0.0136	0.0136	0.0128				0.0102					0.0007				0.0056
Bario Disuelto		1			0.033	0.033	0.033	0.026	0.125	0.125	0.125	0.087				0.092					0.081				0.018
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	0.17	0.07	0.07	0.07	0.12				0.09					0.07				0.11
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001					<0.0001				<0.0001
Calcio Disuelto					271	271	271	237	47.5	47.5	47.5	106	NR	NR	NR	81.5	NR	NR	NR	173	NR	NR	NR	NR	187
Cromo Disuelto		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01					<0.01				<0.01
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01					<0.01				<0.01
Cobre Disuelto		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01					<0.01				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1					<0.1				<0.1
Hierro Disuelto		0.3			0.21	0.21	0.21	1.02	0.05	0.05	0.05	<0.02				<0.02					<0.02				1.24
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	0.081	0.08	0.08	0.08	0.15				0.113					<0.008				0.087
Magnesio Disuelto					41.3	41.3	41.3	35.8	4.1	4.1	4.1	6.5				5.8					30.3				34.2
Manganeso Disuelto		0.05			0.044	0.044	0.044	0.015	0.03	0.03	0.03	0.026				0.007					2.58				0.044
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	4.3	2.5	2.5	2.5	2.2				2.8					10.1				4.3
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1					<0.1				<0.1
Selenio Disuelto		0.17			0.0006	0.0006	0.0006	0.0001	<0.0001	<0.0001	<0.0001	<0.0001				0.0002					<0.0001				0.0003
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	67	55.2	55.2	55.2	83.3				64					44.2				43
Estroncio Disuelto					2.23	2.23	2.23	2.24	1.33	1.33	1.33	4.73				3.46					1.22				1.78
Talio Disuelto					0.0002	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001					0.0001				<0.0001

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11			PSA-SR				HW-1				RW-1				PSA-1				
					Línea Base			Sep-15	Línea Base			Sep-15	Línea Base			Oct-15	Línea Base			Sep-15	Línea Base			Sep-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Estaño Disuelto	mg/L				<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	0.014	<0.005	<0.005	<0.005	0.007				0.01				<0.005				0.011
Uranio Disuelto					0.0007	0.0007	0.0007	0.0005	0.0002	0.0002	0.0002	0.0003				0.0002				0.0013				0.0006
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	0.005	0.005	0.005	<0.005				<0.005				<0.005				<0.005
Zinc Disuelto		7.4		10	0.04	0.04	0.04	0.03	0.12	0.12	0.12	<0.01				0.03				<0.01				<0.01
Cloruros		250			68	68	68	61.6	32	32	32	4.8				5.2				46.9				42.3
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	2.54	0.7	0.7	0.7	0.87				0.64				0.09				2.49
Nitratos/Nitritos como N					0.19	0.19	0.19	<0.02	<0.02	<0.02	<0.02	0.08				1.11				0.22				<0.02
Amonio					<0.05	<0.05	<0.05	0.09	0.06	0.06	0.06	0.09		NR	NR	NR	11			<0.05				0.05
Nitrógeno Kjeldahl (TKN)					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1				0.2				<0.1
Fosfatos					0.03	0.03	0.03	<0.03	0.06	0.06	0.06	<0.03				0.09				0.09				<0.03
Fósforo Total				2	10	0.06	0.06	0.06	<0.01	0.02	0.02	0.02	<0.01				0.03			0.03				0.01
STD (TDS)		500				1370	1370	1370	1260	320	320	320	622				516			910				996
SST (TSS)				50	100	145	145	145	<5	<5	<5	<5	<5				<5			<5				<5
ST (TS)						1000	1000	1000	1270	300	300	300	646				526			972				1030
Sulfatos		250				700	700	700	671	45	45	45	287				222			491				537
Alcalinidad Total						133	133	133	135	186	186	186	188				141			126				159

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, 2015.

En el Cuadro 4-6 se presentan los resultados de la calidad del agua subterránea (Pozos de Monitoreo, Producción y Artesanal) correspondientes al mes de 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 6.1 a 7.53 u.e. y la temperatura en el rango de 24.5 a 32.4 °C. Las concentraciones registradas de Cloruros y Fluoruros están por debajo de las directrices de la USEPA (250 mg/L).

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

Se reportaron valores de Sólidos Suspendidos Totales (**SST**) en los pozos MW5, MW7, MW8 y MW9, los cuales se encuentran debajo de las guías establecidas por el Banco Mundial y el Acuerdo (50 y 100 mg/L respectivamente) y dentro de los rangos establecidos en la línea base.

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

El Antimonio se detectó en los pozos MW7 y MW8, en concentraciones por debajo de la guía establecida por la USEPA (0.01 mg/L) 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 MW-9 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

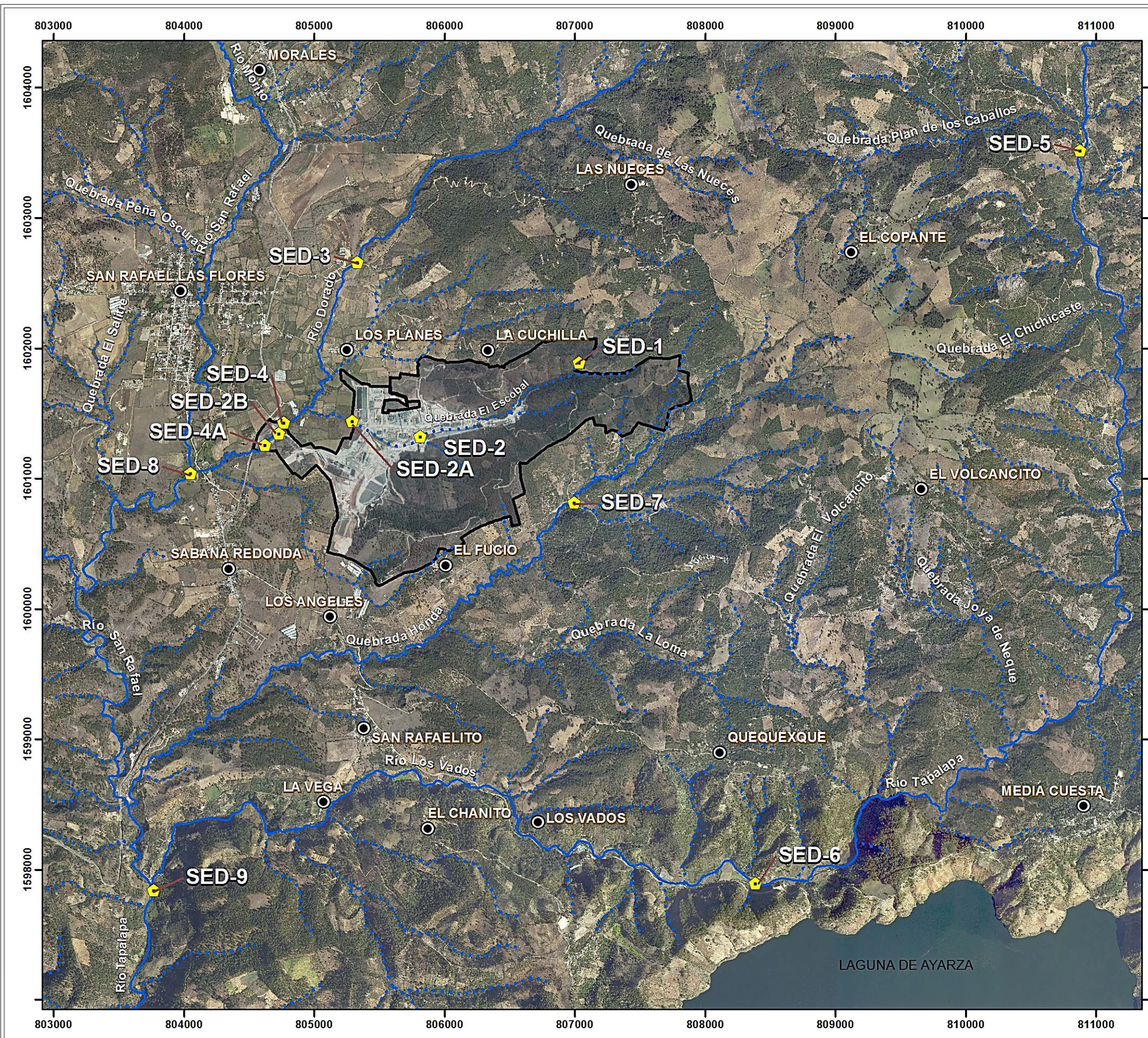
5.1 Sitios de Monitoreo

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, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2015.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO DE SEDIMENTOS

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



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

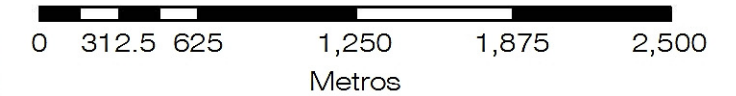
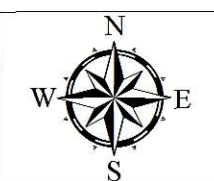
Símbolo	Estación	X	Y
	SED-1	807047	1601885
	SED-2	805805	1601367
	SED-2A	805289	1601433
	SED-2B	804728	1601341
	SED-3	805331	1602656
	SED-4	804775	1601431
	SED-4A	804623	1601255
	SED-5	810876	1603516
	SED-6	808385	1597892
	SED-7	806995	1600815
	SED-8	804048	1601037
	SED-9	803766	1597838

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas 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 2015

Distancia Horizontal y Vertical de Grilla: 1,000 metros

Escala 1:30,000



5.2 Metodología

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

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

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

Fuente: MSR, 2015.

5.3 Resultados

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

El porcentaje de fósforo total se encuentra en el rango de 0.00759% (SED-5) a 0.0351% (SED-2). No se detectó cianuro en ninguna de las estaciones muestreadas.

El mercurio solo se detectó en las estaciones SED-2 SED-2A, SED-3 y SED-5 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. A excepción del valor de plomo en la estación SED-2A. 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-15	Sep-15	Sep-15	Sep-15	Sep-15	Sep-15
Arsénico Total	mg/Kg**	50	17.1	29.3	44	7.3	10.9	19.6
Cadmio Total	mg/Kg**	50	0.17	1.13	9.18	0.22	0.37	0.74
Cromo Total	mg/Kg**	1500	2.1	4.2	9	1.5	4	6.3
Plomo Total	mg/Kg**	500	11.6	53.3	826	17	11.7	32.2
Mercurio Total	mg/Kg**	25	<0.04	0.09	0.18	0.05	<0.05	<0.04
Cianuro Total	mg/Kg**		<0.1	<0.1	<0.2	<0.1	<0.2	<0.1
Fósforo Total	%		0.0242	0.0351	0.0286	0.0139	0.00819	0.024

Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7	SED-8	SED-9
		Aplicación al suelo	Sep-15	Sep-15	Sep-15	Sep-15	Sep-15
Arsénico Total	mg/Kg**	50	13.1	13.2	9.7	6.1	4.4
Cadmio Total	mg/Kg**	50	0.35	0.14	0.67	0.22	0.16
Cromo Total	mg/Kg**	1500	4.6	3.9	8.2	1.2	1.6
Plomo Total	mg/Kg**	500	10	4.95	9.86	12.5	4.97
Mercurio Total	mg/Kg**	25	0.1	<0.05	<0.04	<0.05	<0.06
Cianuro Total	mg/Kg**		<0.2	<0.1	<0.1	<0.2	<0.1
Fósforo Total	%		0.00759	0.0138	0.0189	0.0314	0.010

mg/Kg: miligramo por kilogramo. ** mg/kg de materia seca a 104°C. %: porcentaje. *LMP para suelos con pH < 7 unidades, en los suelos que posean pH>7 se podrán disponer lodos hasta un 50% mayor de los valores presentados como LMP. Fuente: MSR, 2015.

6 Calidad de Efluentes

6.1 Sitios de Monitoreo

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

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

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

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

805000 806000

1602000

1602000



1601000

1601000

805000 806000

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

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIÓN DE MONITOREO

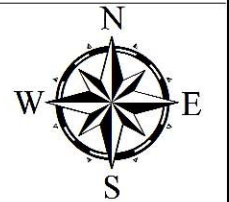
Símbolo	Estación	X	Y
	WW9	805461	1601314

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

Fecha de Elaboración: Octubre de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:8,000



6.2 Metodología

En el Cuadro 6-2 se describe el procedimiento y equipo utilizado para la toma de muestras de agua.

Cuadro 6-2: Procedimiento y equipo utilizado para medir parámetros *in situ* de muestras de agua residual, Proyecto Minero Escobal

Parámetros analizados	
<i>In Situ</i>	pH y temperatura
Laboratorio	Metales pesados Totales y Disueltos, Aceites y Grasas, DQO, DBO, Coliformes totales, Color, Sólidos Disueltos, Sólidos Sedimentables, Cianuro Total.
Procedimiento	
Basado en el procedimiento de toma de muestra dado por Water Management Consultants y el laboratorio ACZ para el análisis de Cianuro y en el procedimiento dado por <i>Standard Methods for the Examination of Water and Wastewater, part 1060 B</i> para los demás parámetros.	
Equipo utilizado	
Nombre	Automuestreador
Modelo	6712 Full-size con módulo integrado 701 para medición continua de pH y temperatura.
Fabricante	ISCO

Fuente: MSR, 2015.

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

6.3 Resultados

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

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

Mes	Unidades	LMP Acuerdo 236-2006	Agosto	Septiembre	Octubre		
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11	WW9
No. Reporte Lab.			1665-15	1858-15	2026-15	2025-15	2024-15
Grasas y Aceites	mg/L	10	<5	<5	<5	<5	<5
Materia Flotante	NL	Ausente	ausente	ausente	ausente	ausente	ausente
DBO	mg/L	200	< 10	< 10	< 10	< 10	< 10
DQO		< 25	< 25	< 25	< 25	< 25	
SST (TSS)		100	< 10	< 10	< 10	< 10	< 10
Sólidos Sedimentables		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrógeno Total		20	<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	0.01	0.008
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	0.007	0.004
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	2	< 1	9
Color Real	< 1			< 1	< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	< 2	< 2	94	240	49

*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, 2015.

Para la preparación de blancos analíticos de los parámetros fisicoquímicos y metales se utilizó agua desmineralizada y para los parámetros microbiológicos se utilizó agua salvavidas embotellada. Se detectó color aparente (Septiembre) y coliformes fecales (Octubre). Sin embargo los valores se encuentran cercanos al límite de detección, por lo que los parámetros analizados por los dos laboratorios son confiables en manipulación de las muestras y precisión del análisis.

En el Cuadro 6-4 se pueden observar los resultados de la calidad del efluente de la planta de tratamiento del Proyecto Minero Escobal. Los resultados de laboratorio se presentan en el Anexo 11.7.

Los valores de pH se encontraron en el rango de 7.32 a 7.81 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					31/08/2015	28/09/2015	22/10/2015
ID Muestra					WW9	WW9	WW9
No. Reporte Lab.					1664-15	1857-15	2024-15
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.44	7.81	7.32
Temperatura de campo	°C		+/- 3		26.1	27.6	27.6
Temperatura. Quebrada El Escobal					31.1	28.5	22.7
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	0.009	0.008
Cadmio		0.1	0.05		<0.02	<0.02	<0.02
Cobre		3	0.3	0.3	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	0.1		<0.05	<0.05	<0.05
Cianuro Total*		1	1		<0.03	<0.03	0.004
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	<0.05	<0.01	<0.01
Color Aparente		u Pt/Co	500			23	10
Color Real					7	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 ⁴	400		23	7.0 x 10 ²	49

u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. *: análisis efectuados en laboratorio ACZ. Fuente: MSR, 2015.

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7 Vibraciones

7.1 Sitios de Monitoreo

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

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

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

Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Fuente: MSR, 2015.



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

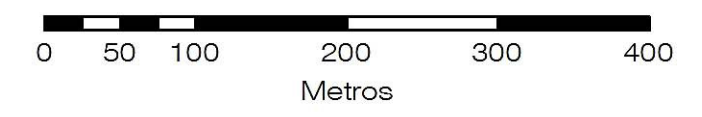
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 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 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:5,000



7.2 Metodología

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

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

PARAMETROS ANALIZADOS	
Velocidad	Velocidad de partícula
PROCEDIMIENTO	
Se registraron todas las voladuras realizadas en ambos portales durante los meses de agosto a octubre de 2015. Y se enlistan las velocidades de partículas registrados por los equipos de vibraciones.	
EQUIPO UTILIZADO	
Equipo	eXPeak Seismograph modelo eXAD-8
Fabricante	Physical Measurement Technologies, Inc.

Fuente: MSR, 2015.

7.3 Resultados

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

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

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1240-C/F.E.	1	05:30AM	<1.3
	1190-6680	1	05:35AM	<1.3
	1265-6860	1	05:40AM	<1.3
	1340-C/F.E.	1	05:45AM	<1.3
	1430-7380	1	05:50AM	<1.3
	1215-6480	1	05:30PM	<1.3
	1240-C/F.E,	1	05:35PM	<1.3
	1290-6450	1	05:40PM	<1.3
	1290-6950	1	05:45PM	<1.3
	1190-6640	2	05:30AM	<1.3
	1265-6950	2	05:35AM	<1.3
	1265-6610	2	05:40AM	<1.3
	1355-C/F.O.	2	05:45AM	<1.3
	1365-6680	2	05:50AM	<1.3
	1290-6950	2	05:55AM	<1.3
	1240-C/F.O.	2	05:30PM	<1.3
	1460-RAMPA	2	05:35PM	<1.3
	1430-RAMPA	2	05:40PM	<1.3
	1290-6810	3	05:30AM	<1.3
	1290-6450	3	05:35AM	<1.3
	1190-6620	3	05:40AM	<1.3
	1265-6950	3	05:45AM	<1.3
	1430-RAMPA	3	05:30PM	<1.3
	1430-C/F.O.	3	05:35PM	<1.3
	1190-6480	3	05:40PM	<1.3
1265-6330	3	05:45PM	<1.3	
1215-6520	3	05:50PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1430-C/F.E.	4	05:30AM	<1.3
	1290-6610	4	05:35AM	<1.3
	1240-6800	4	05:40AM	<1.3
	1240-C/F.O.	4	05:45AM	<1.3
	1455-C/F.E.	4	05:30PM	<1.3
	1455-C/F.O.	4	05:35PM	<1.3
	1290-6490	4	05:40PM	<1.3
	1240-6730	4	05:45PM	<1.3
	1240-6770	4	05:50PM	<1.3
	1290-6650	5	05:30AM	<1.3
	1355-C/F.O.	5	05:35AM	<1.3
	1340-RMUK	5	05:40AM	<1.3
	1190-SERVICIOS	5	05:45AM	<1.3
	1215-6800	5	05:50AM	<1.3
	1265-6910	5	05:55AM	<1.3
	1365-6640	5	06:00:AM	<1.3
	1465-RMUK	5	05:30PM	<1.3
	1290-6950	5	05:35PM	<1.3
	1290-6450	5	05:40PM	<1.3
	1265-6330	5	05:45PM	<1.3
	1265-6950	5	05:50PM	<1.3
	1365-6720	5	05:55PM	<1.3
	1240-6730	6	05:30PM	<1.3
	1365-C/F.E.	6	05:35PM	<1.3
	1430-C/F.O.	6	05:40PM	<1.3
	1430-RAMPA	6	05:45PM	<1.3
	1290-6490	6	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1365-6680	7	05:30AM	<1.3
	1455-C/F.E.	7	05:35AM	<1.3
	1430-7380	7	05:40AM	<1.3
	1240-C/F.O.	7	05:45AM	<1.3
	1240-6420	7	05:50AM	<1.3
	1215-6880	7	05:55AM	<1.3
	1365-6640	7	06:00:AM	<1.3
	1190-6640	7	05:30PM	<1.3
	1190-6660	7	05:35PM	<1.3
	1190-6680	7	05:40PM	<1.3
	1455-C/F.O.	7	05:45PM	<1.3
	1465-RMUK	7	05:50PM	<1.3
	1355RMUK	8	05:30AM	<1.3
	1430-RAMPA	8	05:35AM	<1.3
	1290-6950	8	05:40AM	<1.3
	1240-C/F.E	8	05:45AM	<1.3
	1190-6840	8	05:50AM	<1.3
	1265-6870	8	05:55AM	<1.3
	1265-6590	8	05:30PM	<1.3
	1265-6950	8	05:35PM	<1.3
	1265-6700	8	05:40PM	<1.3
	1430-RAMPA	8	05:45PM	<1.3
	1290-6450	8	05:50PM	<1.3
	1365-6640	8	05:55PM	<1.3
	1455-C/F.O.	9	05:30AM	<1.3
	1455-7360	9	05:35AM	<1.3
	1365-C/F.E.	9	05:40AM	<1.3
	1265-6710	9	05:45AM	<1.3
	1265-6950	9	05:50AM	<1.3
	1215-6840	9	05:55AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1365-6640	9	06:00:AM	<1.3
	1355-C/F.O.	9	05:30PM	<1.3
	1430-C/F.O.	9	05:35PM	<1.3
	1465-RMUK	9	05:40PM	<1.3
	1215-6480	9	05:45PM	<1.3
	1215-6800	9	05:50PM	<1.3
	1265-6710	10	05:30AM	<1.3
	1265-6590	10	05:35AM	<1.3
	1430-RAMPA	10	05:40AM	<1.3
	1430-7380	10	05:45AM	<1.3
	1430-C/F.E.	10	05:50AM	<1.3
	1455-C/F.E.	10	05:30PM	<1.3
	1365-6680	10	05:35PM	<1.3
	1240-6800	10	05:40PM	<1.3
	1240-C/F.E.	10	05:45PM	<1.3
	1455-7440	11	05:30AM	<1.3
	1315-6650	11	05:35AM	<1.3
	1240-C/F.E.	11	05:40AM	<1.3
	1290-6450	11	05:30PM	<1.3
	1290-6950	11	05:35PM	<1.3
	1215-SERVICIO	11	05:40PM	<1.3
	1190-6840	11	05:45PM	<1.3
	1290-6330	11	05:50PM	<1.3
	1465-RMUK	11	05:55PM	<1.3
	1430-C/F.O.	13	05:30AM	<1.3
	1430-7380	13	05:35AM	<1.3
	1455-7360	13	05:40AM	<1.3
	1265-6870	13	05:45AM	<1.3
	1240-6400	13	05:50AM	<1.3
	1215-6800	13	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1215-6840	13	05:35PM	<1.3
	1190-6840	13	05:40PM	<1.3
	1460-RAMPA	13	05:45PM	<1.3
	1465-RMUK	13	05:50PM	<1.3
	1315-6650	13	05:55PM	<1.3
	1315-6650	14	05:30AM	<1.3
	1430-RAMPA	14	05:35AM	<1.3
	1430-SUB. EST. ELECT.	14	05:40AM	<1.3
	1265-6710	14	05:45AM	<1.3
	1190-6890	14	05:30PM	<1.3
	1215-6480	14	05:35PM	<1.3
	1215-6560	14	05:40PM	<1.3
	1455-C/F.E.	14	05:45PM	<1.3
	1430-C/F.E.	14	05:50PM	<1.3
	1290-6330	14	05:55PM	<1.3
	1365-C/F.O.	15	05:30AM	<1.3
	1290-6950	15	05:35AM	<1.3
	1290-6710	15	05:40AM	<1.3
	1265-6590	15	05:45AM	<1.3
	1265-6950	15	05:50AM	<1.3
	1240-6800	15	05:55AM	<1.3
	1215-SERVICIO	15	05:30PM	<1.3
	1215-6840	15	05:35PM	<1.3
	1455-7440	15	05:40PM	<1.3
	1460-RAMPA	15	05:45PM	<1.3
	1365-C/F.O.	15	05:50PM	<1.3
	1290-6740	15	05:55PM	<1.3
	1215-6840	16	05:30AM	<1.3
	1215-6800	16	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1430-C/F.E.	16	05:40AM	<1.3
	1290-6710	16	05:45AM	<1.3
	1240-6770	16	05:30PM	<1.3
	1290-6950	16	05:35PM	<1.3
	1365-6660	16	05:40PM	<1.3
	1430-7380	16	05:45PM	<1.3
	1265-6590	17	05:30AM	<1.3
	1265-6710	17	05:35AM	<1.3
	1240-6800	17	05:40AM	<1.3
	1215-SERVICIO	17	05:45AM	<1.3
	1290-6710	17	05:50AM	<1.3
	1365-6600	17	05:55AM	<1.3
	1365-6660	17	06:00:AM	<1.3
	1430-C/F.O.	17	06:05AM	<1.3
	1430-RAMPA	17	05:30PM	<1.3
	1455-C/F.O.	17	05:35PM	<1.3
	1455-7360	17	05:40PM	<1.3
	1215-6840	17	05:45PM	<1.3
	1265-6710	17	05:50PM	<1.3
	1265-6870	17	05:55PM	<1.3
	1340-6760	17	06:00PM	<1.3
	1455-C/F.O.	18	05:30AM	<1.3
	1215-6840	18	05:35AM	<1.3
	1190-6560	18	05:40AM	<1.3
	1365-6660	18	05:45AM	<1.3
	1455-7440	18	05:30PM	<1.3
	1265-6630	18	05:35PM	<1.3
	1265-6950	18	05:40PM	<1.3
	1290-6610	18	05:45PM	<1.3
	1190-6700	18	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1190-6860	19	05:30AM	<1.3
	1240-6400	19	05:35AM	<1.3
	1265-6710	19	05:40AM	<1.3
	1290-6710	19	05:45AM	<1.3
	1455-C/F.O.	19	05:50AM	<1.3
	1455-7360	19	05:55AM	<1.3
	1430-RAMPA	19	05:30PM	<1.3
	1460-RAMPA	19	05:35PM	<1.3
	1215-6860	19	05:40PM	<1.3
	1215-6820	19	05:45PM	<1.3
	1190-SERVICIO	19	05:50PM	<1.3
	1265-6870	20	05:30AM	<1.3
	1265-6950	20	05:35AM	<1.3
	1215-SERVICIOS	20	05:40AM	<1.3
	1240-6800	20	05:45AM	<1.3
	1430-RAMPA	20	05:50AM	<1.3
	1430-C/F.E.	20	05:55AM	<1.3
	1315-6720	20	06:00:AM	<1.3
	1265-6590	20	05:30PM	<1.3
	1265-6630	20	05:35PM	<1.3
	1190-6820	20	05:40PM	<1.3
	1340-6650	20	05:45PM	<1.3
	1265-C/F.E.	20	05:50PM	<1.3
	1365-6940	20	05:55PM	<1.3
	1340-6760	20	06:00PM	<1.3
	1215-6820	21	05:30AM	<1.3
	1215-6800	21	05:35AM	<1.3
	1215-6840	21	05:40AM	<1.3
	1265-6710	21	05:45AM	<1.3
	1365-C/F.O.	21	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1430-RAMPA	21	05:55AM	<1.3
	1290-6710	21	06:00:AM	<1.3
	1340-6680	21	05:30PM	<1.3
	1215-6480	21	05:35PM	<1.3
	1215-6560	21	05:40PM	<1.3
	1455-C/F.E.	21	05:45PM	<1.3
	1455-7040	21	05:50PM	<1.3
	1430-SUB, ESTACION ELEC.	21	05:55PM	<1.3
	1190-6820	21	06:00PM	<1.3
	1365-6660	21	06:00PM	<1.3
	1365-6600	21	06:05PM	<1.3
	1265-6630	22	05:30AM	<1.3
	1190-6560	22	05:35AM	<1.3
	1365-6540	22	05:40AM	<1.3
	1430-RAMPA	22	05:45AM	<1.3
	1455-7360	22	05:50AM	<1.3
	1290-6490	22	05:55AM	<1.3
	1430-C/F.E.	22	06:00:AM	<1.3
	1430-SUB, EST, ELEC.	22	06:05AM	<1.3
	1340-6420	22	05:30PM	<1.3
	1430-7400	22	05:35PM	<1.3
	1365-C/F.E.	22	05:40PM	<1.3
	1240-6800	22	05:45PM	<1.3
	1265-6590	22	05:50PM	<1.3
	1290-6490	22	05:55PM	<1.3
	1455-C/F.E.	23	05:30AM	<1.3
	1430-SUB.EST.ELEC.	23	05:35AM	<1.3
	1190-6800	23	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1190-6820	23	05:45AM	<1.3
	1265-6870	23	05:50AM	<1.3
	1290-6780	23	05:55AM	<1.3
	1265-6710	23	05:30PM	<1.3
	1215-SERVICIOS	23	05:35PM	<1.3
	1455-C/F.E.	23	05:40PM	<1.3
	1365-6600	23	05:45PM	<1.3
	1365-6660	23	05:50PM	<1.3
	1315-6760	23	05:55PM	<1.3
	1265-6590	24	05:30AM	<1.3
	1265-6570	24	05:35AM	<1.3
	1455-7460	24	05:40AM	<1.3
	1290-6770	24	05:45AM	<1.3
	1365-6680	24	05:50AM	<1.3
	1365-C/F.E.	24	05:30PM	<1.3
	1215-6840	24	05:35PM	<1.3
	1455-C/F.E.	24	05:40PM	<1.3
	1455-7440	24	05:45PM	<1.3
	1315-6610	24	05:50PM	<1.3
	1190-6860	25	05:30AM	<1.3
	1190-6820	25	05:35AM	<1.3
	1290-6650	25	05:40AM	<1.3
	1455-7360	25	05:45AM	<1.3
	1455-7380	25	05:50AM	<1.3
	1365-6600	25	05:55AM	<1.3
	1265-6680	25	06:00:AM	<1.3
	1265-6710	25	05:30PM	<1.3
	1215-6860	25	05:35PM	<1.3
	1215-servicios	25	05:40PM	<1.3
	1355-C/F.E.	25	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1455-C/F.O.	25	05:50PM	<1.3
	1430-RAMPA	25	05:55PM	<1.3
	1265-6590	26	05:30AM	<1.3
	1240-6820	26	05:35AM	<1.3
	1430-7400	26	05:40AM	<1.3
	1365-6660	26	05:45AM	<1.3
	1430-RAMPA	26	05:50AM	<1.3
	1355-C/F.O.	26	05:55AM	<1.3
	1430-SUB, EST.	26	05:30PM	<1.3
	1430-7380	26	05:35PM	<1.3
	1290-6710	26	05:40PM	<1.3
	1230-SUM.	26	05:45PM	<1.3
	1430-7360	26	05:50PM	<1.3
	1455-7360	28	05:30AM	<1.3
	1215-servicios	28	05:35AM	<1.3
	1215-6840	28	05:40AM	<1.3
	1215-6860	28	05:45AM	<1.3
	1365-6580	28	05:50AM	<1.3
	1455-7380	28	05:30PM	<1.3
	1455-7400	28	05:35PM	<1.3
	1290-6770	28	05:40PM	<1.3
	1215-taller	28	05:45PM	<1.3
	1315-6820	28	05:50PM	<1.3
	1315-6610	28	05:55PM	<1.3
	1265-6710	28	06:00PM	<1.3
	1365-C/F.E.	29	05:30AM	<1.3
	1455-7450	29	05:35AM	<1.3
	1430-7360	29	05:40AM	<1.3
	1430-1405	29	05:45AM	<1.3
	1215-6820	29	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1365-6680	29	05:55AM	<1.3
	1265-6590	29	05:30PM	<1.3
	1230-SUM	29	05:35PM	<1.3
	1240-C/F.E.	29	05:40PM	<1.3
	1190-6820	29	05:45PM	<1.3
	1430-RAMPA	29	05:50PM	<1.3
	1355-C/F.O.	29	05:55PM	<1.3
	1430-7380	29	06:00PM	<1.3
	1455-7360	30	05:30AM	<1.3
	1365-6600	30	05:35AM	<1.3
	1430-7400	30	05:40AM	<1.3
	1290-6770	30	05:45AM	<1.3
	1265-6630	30	05:50AM	<1.3
	1215-6840	30	05:55AM	<1.3
	1290-6950	30	06:00:AM	<1.3
	1455-7380	30	05:30PM	<1.3
	1430-SUB. EST.	30	05:35PM	<1.3
	1365-6940	30	05:40PM	<1.3
	1290-6710	30	05:45PM	<1.3
	1290-6650	30	05:50PM	<1.3
	1240-6800	30	05:55PM	<1.3
	1290-6710	31	05:30AM	<1.3
	1240-6800	31	05:35AM	<1.3
	1240-C.F.E.	31	05:40AM	<1.3
	1365-6660	31	05:45AM	<1.3
	1455-7400	31	05:50AM	<1.3
	1340-6820	31	05:30PM	<1.3
	1430-7360	31	05:35PM	<1.3
	1355-C.F.O.	31	05:40PM	<1.3
	1215-6860	31	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Agosto	1265-6590	31	05:50PM	<1.3
Septiembre	1290-6710	1	05:30AM	<1.3
	1430-6400	1	05:35AM	<1.3
	1340-6820	1	05:40AM	<1.3
	1290-6550	1	05:30PM	<1.3
	1290-6770	1	05:35PM	<1.3
	1265-6590	1	05:40PM	<1.3
	1405-ACCESO	1	05:45PM	<1.3
	1455-7380	1	05:50PM	<1.3
	1215-6480	2	05:30AM	<1.3
	1215-6820	2	05:35AM	<1.3
	1355-C.F.O.	2	05:40AM	<1.3
	1365-6600	2	05:45AM	<1.3
	1455-7380	2	05:50AM	<1.3
	1340-6820	2	05:55AM	<1.3
	1430-7380	2	05:30PM	<1.3
	1430-7360	2	05:35PM	<1.3
	1455-7400	2	05:40PM	<1.3
	1265-6330	2	05:45PM	<1.3
	1265-6710	2	05:50PM	<1.3
	1215-SERVICIOS	2	05:55PM	<1.3
	1430-RAMPA	2	06:00PM	<1.3
	1390-6800	2	06:00PM	<1.3
	1455-7400	3	05:30AM	<1.3
	1455-7380	3	05:35AM	<1.3
	1430-7400	3	05:40AM	<1.3
	1240-6670	3	05:45AM	<1.3
	1215-6840	3	05:50AM	<1.3
	1340-6820	3	05:55AM	<1.3
	1365-C.F.E.	3	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1455-7360	3	05:35PM	<1.3
	1430-RAMPA	3	05:40PM	<1.3
	1290-6710	3	05:45PM	<1.3
	1240-6630	3	05:50PM	<1.3
	1215-6360	3	05:55PM	<1.3
	1315-6650	3	06:00PM	<1.3
	1230-SUM	4	05:30AM	<1.3
	1265-6710	4	05:35AM	<1.3
	1215-6820	4	05:40AM	<1.3
	1365-66690	4	05:45AM	<1.3
	1355-C.F.O.	4	05:50AM	<1.3
	1265-6900	4	05:30PM	<1.3
	1240-6540	4	05:35PM	<1.3
	1265-6630	4	05:40PM	<1.3
	1430-7360	4	05:45PM	<1.3
	1430-7380	4	05:50PM	<1.3
	1365-c.f.e.o.	4	05:55PM	<1.3
	1315-6650	4	06:00PM	<1.3
	1265-6630	5	05:30AM	<1.3
	1265-6390	5	05:35AM	<1.3
	1190-6820	5	05:40AM	<1.3
	155-7380	5	05:45AM	<1.3
	1365-6940	5	05:50AM	<1.3
	1455-7360	5	05:55AM	<1.3
	1315-6650	5	06:00:AM	<1.3
	1340-6820	5	06:05AM	<1.3
	1290-6710	5	05:30PM	<1.3
	1265-6630	5	05:35PM	<1.3
1355-C.F.O.	5	05:40PM	<1.3	
1455-7400	5	05:45PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1430-7380	6	05:30AM	<1.3
	1215-6840	6	05:35AM	<1.3
	1240-6590	6	05:40AM	<1.3
	1365-6580	6	05:45AM	<1.3
	1430-RAMPA	6	05:50AM	<1.3
	1215-6800	6	05:55AM	<1.3
	1190-6800	6	05:30PM	<1.3
	1430-7400	6	05:35PM	<1.3
	1365-C.F.E.E.	6	05:40PM	<1.3
	1240-6670	6	05:45PM	<1.3
	1430-VENTILACION	8	05:30AM	<1.3
	1405-ACC	8	05:35AM	<1.3
	1315-C.F.O.	8	05:40AM	<1.3
	1430-7400	8	05:45AM	<1.3
	1290-6590	8	05:50AM	<1.3
	1290-6710	8	05:55AM	<1.3
	1240-6590	8	06:00:AM	<1.3
	1190-6760	8	06:05AM	<1.3
	1405-acc	8	05:30PM	<1.3
	1365-6660	8	05:35PM	<1.3
	1455-7360	8	05:40PM	<1.3
	1240-6670	8	05:45PM	<1.3
	1240-6630	8	05:50PM	<1.3
	1315-6650	8	05:55PM	<1.3
	1265-6630	9	05:30AM	<1.3
	1430-RAMPA	9	05:35AM	<1.3
	1365-6940	9	05:40AM	<1.3
	1215-6860	9	05:45AM	<1.3
1315-6650	9	05:50AM	<1.3	
1265-6710	9	05:30PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1265-6590	9	05:35PM	<1.3
	1215-TALLER	9	05:40PM	<1.3
	1430-7380	9	05:45PM	<1.3
	1455-7400	9	05:50PM	<1.3
	1215-6520	9	05:55PM	<1.3
	1240-6630	10	05:30AM	<1.3
	1190-6820	10	05:35AM	<1.3
	1265-6710	10	05:40AM	<1.3
	1430-7380	10	05:45AM	<1.3
	1365-C.F.O.E.	10	05:50AM	<1.3
	1455-7400	10	05:55AM	<1.3
	1215-6800	10	06:00:AM	<1.3
	1290-6770	10	05:30PM	<1.3
	1215-6820	10	05:35PM	<1.3
	1430-7360	10	05:40PM	<1.3
	1455-7360	10	05:45PM	<1.3
	1455-7380	10	05:50PM	<1.3
	1240-6590	11	05:30AM	<1.3
	1240-6670	11	05:35AM	<1.3
	1290-6590	11	05:40AM	<1.3
	1365-6600	11	05:45AM	<1.3
	1355-C/F.O.	11	05:50AM	<1.3
	1430-7360	11	05:55AM	<1.3
	1230-SUM	11	05:30PM	<1.3
	1365-6660	11	05:35PM	<1.3
	1365-6800	11	05:40PM	<1.3
	1430-RAMPA	11	05:45PM	<1.3
	1290-6710	11	05:50PM	<1.3
	1405-RAMPA	12	05:30AM	<1.3
	1430-7380	12	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1430-7400	12	05:40AM	<1.3
	1240-6630	12	05:45AM	<1.3
	1215-6820	12	05:50AM	<1.3
	1190-6820	12	05:55AM	<1.3
	1455-7400	12	05:30PM	<1.3
	1455-C/F.O.	12	05:35PM	<1.3
	1215-6860	12	05:40PM	<1.3
	1265-6630	12	05:45PM	<1.3
	1315-6590	12	05:50PM	<1.3
	1240-6670	13	05:30AM	<1.3
	1290-6710	13	05:35AM	<1.3
	1290-6590	13	05:40AM	<1.3
	1340-VENTILACION	13	05:45AM	<1.3
	1455-7400	13	05:50AM	<1.3
	1355-C/F.O.	13	05:55AM	<1.3
	1365-6600	13	05:30PM	<1.3
	1230-SUMIDERO	13	05:35PM	<1.3
	1290-6630	13	05:40PM	<1.3
	1240-6700	13	05:45PM	<1.3
	1365-C/F.E.	13	05:50PM	<1.3
	1430-C/F.E.	13	05:55PM	<1.3
	1290-6610	14	05:30AM	<1.3
	1240-6590	14	05:35AM	<1.3
	1430-7380	14	05:40AM	<1.3
	1355-SUB.EST.	14	05:45AM	<1.3
	1265-6730	14	05:50AM	<1.3
	1240-6700	14	05:55AM	<1.3
	1340-VENTILACION	14	06:00AM	<1.3
	1365-6580	14	5:30AM	<1.3
	1430-7400	14	5:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1240-6770	14	5:40AM	<1.3
	1290-6650	14	5:45AM	<1.3
	1240-6670	14	5:50AM	<1.3
	1215-6860	14	5:55AM	<1.3
	1215-6520	14	6:00AM	<1.3
	1290-6610	15	05:30AM	<1.3
	1240-6590	15	05:35AM	<1.3
	1430-7380	15	05:40AM	<1.3
	1355-SUB.EST.	15	05:45AM	<1.3
	1265-6730	15	05:50AM	<1.3
	1240-6700	15	05:55AM	<1.3
	1340-VENTILACION	15	06:00AM	<1.3
	1365-6580	15	05:30PM	<1.3
	1430-7400	15	05:35PM	<1.3
	1240-6770	15	05:40PM	<1.3
	1290-6650	15	05:45PM	<1.3
	1240-6670	15	05:50PM	<1.3
	1215-6860	15	05:55PM	<1.3
	1215-6520	15	6:00PM	<1.3
	1455-7360	16	05:30AM	<1.3
	1455-C.F.O.	16	05:35AM	<1.3
	1430-C.F.E.	16	05:40AM	<1.3
	1315-6860	16	05:45AM	<1.3
	1230-SUMIDERO	16	05:50AM	<1.3
	1290-6770	16	05:55AM	<1.3
	1215-6800	16	06:00AM	<1.3
	1290-6680	16	06:05AM	<1.3
	1290-6590	16	05:30PM	<1.3
	1215-SERVICIO	16	05:35PM	<1.3
	1240-6330	16	05:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1405-RAMPA	16	05:45PM	<1.3
	1455-C.F.O.	16	05:50PM	<1.3
	1365-6600	16	05:55PM	<1.3
	1365-C/F.E.	17	05:30AM	<1.3
	1365-C/F.O.	17	05:35AM	<1.3
	1455-7360	17	05:40AM	<1.3
	1315-6540	17	05:45AM	<1.3
	1240-6590	17	05:50AM	<1.3
	1240-6670	17	05:55AM	<1.3
	1265-6730	17	06:00AM	<1.3
	1215-6860	17	05:30PM	<1.3
	1215-6820	17	05:35PM	<1.3
	1265-6710	17	05:40PM	<1.3
	1290-6630	17	05:45PM	<1.3
	1365-6940	17	05:50PM	<1.3
	1430-VENTILACION	17	05:55PM	<1.3
	1430-7400	17	06:00PM	<1.3
	1215-VENTILACION	18	05:30AM	<1.3
	1230-SUMIDERO	18	05:35AM	<1.3
	1190-6820	18	05:40AM	<1.3
	1455-7400	18	05:45AM	<1.3
	1455-7420	18	05:50AM	<1.3
	1290-6720	18	05:55AM	<1.3
	1290-6630	18	06:00AM	<1.3
	1315-6590	18	05:30PM	<1.3
	1290-6590	18	05:35PM	<1.3
	1290-6710	18	05:40PM	<1.3
	1240-6630	18	05:45PM	<1.3
	1365-6600	18	05:50PM	<1.3
	1405-RAMPA	18	05:55PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1290-6720	19	05:30AM	<1.3
	1455-4380	19	05:35AM	<1.3
	1290-6590	19	05:40AM	<1.3
	1215-6860	19	05:45AM	<1.3
	1430-7400	19	05:50AM	<1.3
	1430-C/F.E.	19	05:55AM	<1.3
	1405-ACCESO	19	06:00AM	<1.3
	1290-6670	19	05:30PM	<1.3
	1215-6820	19	05:35PM	<1.3
	1355-VENTILACION	19	05:40PM	<1.3
	1365-6820	19	05:45PM	<1.3
	1240-6700	19	05:50PM	<1.3
	1430-RAMPA	20	05:30AM	<1.3
	1340-VENTILACION	20	05:35AM	<1.3
	1355-SUB ESTACION	20	05:40AM	<1.3
	1315-6540	20	05:45AM	<1.3
	1290-6630	20	05:50AM	<1.3
	1215-6840	20	05:55AM	<1.3
	1240-6670	20	05:30PM	<1.3
	1290-6590	20	05:35PM	<1.3
	1240-6590	20	05:40PM	<1.3
	1365-6600	20	05:45PM	<1.3
	1455-7360	20	05:50PM	<1.3
	1215-6820	21	05:30AM	<1.3
	1215-6860	21	05:35AM	<1.3
	1365-6600	21	05:40AM	<1.3
	1455-7380	21	05:45AM	<1.3
	1430-C.F.E.	21	05:50AM	<1.3
1355-SUB-EST.	21	05:30PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1455-7400	21	05:35PM	<1.3
	1315-6590	21	05:40PM	<1.3
	1365-C.F.E.	21	05:45PM	<1.3
	1365-6440	21	05:50PM	<1.3
	1290-6670	21	05:55PM	<1.3
	1190-6820	22	05:30AM	<1.3
	1240-6590	22	05:35AM	<1.3
	1455-7360	22	05:40AM	<1.3
	1355-SUB.E.ST.	22	05:45AM	<1.3
	1405-RAMPA	22	05:50AM	<1.3
	1240-C.F.E.	22	05:30PM	<1.3
	1240-6820	22	05:35PM	<1.3
	1290-6590	22	05:40PM	<1.3
	1365-6600	22	05:45PM	<1.3
	1365-C.F.O..	22	05:50PM	<1.3
	1430-7400	22	05:55PM	<1.3
	1215-6840	22	06:00PM	<1.3
	1240-6630	23	05:30AM	<1.3
	1240-6670	23	05:35AM	<1.3
	1290-6630	23	05:40AM	<1.3
	1290-6590	23	05:45AM	<1.3
	1455-7420	23	05:50AM	<1.3
	1430-C.F.E.	23	05:55AM	<1.3
	1315-6620	23	06:00AM	<1.3
	1455-7460	23	06:05AM	<1.3
	1215-6840	23	06:10AM	<1.3
	1230-SUMIDERO	23	05:30PM	<1.3
	1215-SERVICIO	23	05:35PM	<1.3
	1290-6770	23	05:40PM	<1.3
	1290-6670	23	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1340- VENTILACION	23	05:50PM	<1.3
	1430-7400	23	05:55PM	<1.3
	1215-6840	23	06:00PM	<1.3
	1365-6660	23	06:05PM	<1.3
	1240-6800	24	05:30AM	<1.3
	1290-6770	24	05:35AM	<1.3
	1355-ACCESO	24	05:40AM	<1.3
	1340-VENTILACION	24	05:45AM	<1.3
	1215-6820	24	05:50AM	<1.3
	1215-6840	24	05:55AM	<1.3
	1365-6660	24	06:00AM	<1.3
	1405-RAMPA	24	05:30PM	<1.3
	1365-6820	24	05:35PM	<1.3
	1365-C.F.E.	24	05:40PM	<1.3
	1315-6590	24	05:45PM	<1.3
	1365-6660	24	05:50PM	<1.3
	1215-6840	24	05:55PM	<1.3
	1405-RAMPA	25	05:30AM	<1.3
	1455-C,F,O.	25	05:35AM	<1.3
	1340-6660	25	05:40AM	<1.3
	1365-6660	25	05:45AM	<1.3
	1215-6860	25	05:50AM	<1.3
	1215-6670	25	05:55AM	<1.3
	1190-6860	25	06:00AM	<1.3
	1455-7400	25	05:30PM	<1.3
	1430-7420	25	05:35PM	<1.3
	1290-6590	25	05:40PM	<1.3
	1290-6630	25	05:45PM	<1.3
	1265-6760	25	05:50PM	<1.3
	1240-6670	26	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1240-6800	26	05:35AM	<1.3
	1240-6820	26	05:40AM	<1.3
	1240-C.F.E.	26	05:45AM	<1.3
	1405-ACC.	26	05:50AM	<1.3
	1340-VENTILACION	26	05:55AM	<1.3
	1365-C.F.O.	26	06:00AM	<1.3
	1615-6590	26	05:30PM	<1.3
	1290-6670	26	05:35PM	<1.3
	1240-6630	26	05:40PM	<1.3
	1455-7420	26	05:45PM	<1.3
	1365-6580	26	05:50PM	<1.3
	1365-c.f.o.	26	05:55PM	<1.3
	1265-6670	26	06:00PM	<1.3
	1365-6660	26	06:05PM	<1.3
	1430-7420	27	05:30AM	<1.3
	1455-7380	27	05:35AM	<1.3
	1290-6770	27	05:40AM	<1.3
	1240-6590	27	05:45AM	<1.3
	1315-6670	27	05:50AM	<1.3
	1315-6660	27	05:55AM	<1.3
	1265-6770	27	06:00AM	<1.3
	1405-RAMPA	27	05:30PM	<1.3
	1365-6820	27	05:35PM	<1.3
	1290-6590	27	05:40PM	<1.3
	1290-6630	27	05:45PM	<1.3
	1365-6660	27	05:50PM	<1.3
	1215-6820	27	05:55PM	<1.3
	1365-6660	28	05:30AM	<1.3
	1290-6670	28	05:35AM	<1.3
	1315-6690	28	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1340-6600	28	05:45AM	<1.3
	1455-C.F.O.	28	05:50AM	<1.3
	1365-C.F.E.O.	28	05:55AM	<1.3
	1215-SERVICIOS	28	05:30PM	<1.3
	1455-7460	28	05:35PM	<1.3
	1240-6520	28	05:40PM	<1.3
	1355-ACCESO	28	05:45PM	<1.3
	1355-SUB, EST,	28	05:50PM	<1.3
	1315-6330	28	05:55PM	<1.3
	1290-6630	28	06:00PM	<1.3
	1240-6630	29	05:30AM	<1.3
	1190-6820	29	05:35AM	<1.3
	1290-6670	29	05:40AM	<1.3
	1365-c.f.e.	29	05:45AM	<1.3
	1340-VENTILACION	29	05:50AM	<1.3
	1290-6590	29	05:30PM	<1.3
	1240-c.f.e.	29	05:35PM	<1.3
	1240-6820	29	05:40PM	<1.3
	1455-7420	29	05:45PM	<1.3
	1365-6820	29	05:50PM	<1.3
	1240-6520	29	05:55PM	<1.3
	1290-6630	29	06:00PM	<1.3
	1365-6660	29	06:05PM	<1.3
	1290-6590	30	05:30AM	<1.3
	1290-6770	30	05:35AM	<1.3
	1230-SERVICIO	30	05:40AM	<1.3
	1430-RAMPA	30	05:45AM	<1.3
	1365-6940	30	05:50AM	<1.3
	1365-6580	30	05:55AM	<1.3
	1365-6660	30	06:00AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Septiembre	1240-6670	30	05:30PM	<1.3
	1240-6590	30	05:35PM	<1.3
	1455-C.F.O.	30	05:40PM	<1.3
	1230-SUM	30	05:45PM	<1.3
	1215-6840	30	05:50PM	<1.3
	1430-7420	1	05:30AM	<1.3
Octubre	1315-6590	1	05:35AM	<1.3
	1290-6590	1	05:40AM	<1.3
	1290-6670	1	05:45AM	<1.3
	1240-6630	1	05:50AM	<1.3
	1190-6820	1	05:55AM	<1.3
	1455-7420	1	06:00AM	<1.3
	1455-7400	1	05:30PM	<1.3
	1430-7420	1	05:35PM	<1.3
	1290-6630	1	05:40PM	<1.3
	1290-6670	1	05:45PM	<1.3
	1240-6520	1	05:50PM	<1.3
	1290-6630	2	05:30AM	<1.3
	1290-6760	2	05:35AM	<1.3
	1290-6590	2	05:40AM	<1.3
	1240-6630	2	05:45AM	<1.3
	1405-RAMPA	2	05:50AM	<1.3
	1365-6820	2	05:55AM	<1.3
	1365-C.F.E.	2	06:00AM	<1.3
	1240-6520	2	06:05AM	<1.3
	1355-VENTILACION	2	05:30PM	<1.3
	1315-6630	2	05:35PM	<1.3
	1190-SERV.	2	05:40PM	<1.3
	1265-6590	2	05:45PM	<1.3
	1355-SUB.E.ST.	2	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1455-7380.	3	05:30AM	<1.3
	1455-7400	3	05:35AM	<1.3
	1430-7420	3	05:40AM	<1.3
	1315-6860	3	05:45AM	<1.3
	1290-6630	3	05:50AM	<1.3
	1290-6670	3	05:30PM	<1.3
	1230-SUM.	3	05:35PM	<1.3
	1355-ACC.	3	05:40PM	<1.3
	1455-7420	4	05:30AM	<1.3
	1315-6630	4	05:35AM	<1.3
	1365-6940	4	05:40AM	<1.3
	1290-6670	4	05:45AM	<1.3
	1290-6630	4	05:50AM	<1.3
	1240-6820	4	05:30PM	<1.3
	1240-6800	4	05:35PM	<1.3
	1340-6820	4	05:40PM	<1.3
	1240-C.F.E.	4	05:45PM	<1.3
	1340-VENT.	4	05:50PM	<1.3
	1240-6520	4	05:55PM	<1.3
	1405-RAMPA	4	06:00PM	<1.3
	1365-C.F.E.	5	05:30AM	<1.3
	1240-6820	5	05:35AM	<1.3
	1215-TALLER	5	05:40AM	<1.3
	1315-6860	5	05:45AM	<1.3
	1365-6620	5	05:30PM	<1.3
	1355-ACC.	5	05:35PM	<1.3
	1340-6820	5	05:40PM	<1.3
	1315-6590	5	05:45PM	<1.3
1290-6630	5	05:50PM	<1.3	
1315-6860	5	05:55PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1240-6800	6	05:30AM	<1.3
	1240-6820	6	05:35AM	<1.3
	1455-7420	6	05:40AM	<1.3
	1430-7420	6	05:45AM	<1.3
	1290-6630	6	05:30PM	<1.3
	1290-6670	6	05:35PM	<1.3
	1315-6670	6	05:40PM	<1.3
	1355-VENTILACION	6	05:45PM	<1.3
	1405-RAMPA	6	05:50PM	<1.3
	1315-6590	7	05:30AM	<1.3
	1315-6770	7	05:35AM	<1.3
	1240-6630	7	05:40AM	<1.3
	1405-RAMPA	7	05:45AM	<1.3
	1365-6940	7	05:50AM	<1.3
	1460-RAMPA	7	05:55AM	<1.3
	1240-6520	7	06:00AM	<1.3
	1240-6590	7	05:30PM	<1.3
	1290-6630	7	05:35PM	<1.3
	1315-6630	7	05:40PM	<1.3
	1355-acc.	7	05:45PM	<1.3
	1365-6920	7	05:50PM	<1.3
	1455-c.f.e.	7	05:55PM	<1.3
	1365-6720	8	05:30AM	<1.3
	1365-6920	8	05:35AM	<1.3
	1405.ACC.	8	05:40AM	<1.3
	1240-C.F.E.	8	05:45AM	<1.3
	1240-6820	8	05:50AM	<1.3
	1365-6600	8	05:55AM	<1.3
	1430-7420	8	06:00AM	<1.3
	1365-6620	8	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-C.F.E.	8	05:35PM	<1.3
	1355-VENT.	8	05:40PM	<1.3
	1405.ACC.	8	05:45PM	<1.3
	1240-6670	8	05:50PM	<1.3
	1290-6670	8	05:55PM	<1.3
	1315-6670	8	06:00PM	<1.3
	1355-ACC	9	05:30AM	<1.3
	1240-ACC	9	05:35AM	<1.3
	1240-C.F.E.	9	05:40AM	<1.3
	1355-VENT.	9	05:45AM	<1.3
	1430-7420	9	05:50AM	<1.3
	1265-6630	9	05:30PM	<1.3
	1240-6630	9	05:35PM	<1.3
	1455-7400	9	05:40PM	<1.3
	1155-7420	9	05:45PM	<1.3
	1405-RAMPA	9	05:50PM	<1.3
	1365-6940	10	05:30AM	<1.3
	1265-6670	10	05:35AM	<1.3
	1290-6670	10	05:40AM	<1.3
	1240-6770	10	05:45AM	<1.3
	1460-RAMPA	10	05:50AM	<1.3
	1365-6720	10	05:30PM	<1.3
	1405-RAMPA	10	05:35PM	<1.3
	1365-6920	10	05:40PM	<1.3
	1240-6800	10	05:45PM	<1.3
	1240-6590	10	05:50PM	<1.3
	1430-C.F.E.O.	11	05:30AM	<1.3
	1315-6590	11	05:35AM	<1.3
	1240-6820	11	05:40AM	<1.3
	1315-6670	11	05:45AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1240-6670	11	05:30PM	<1.3
	1315-6770	11	05:35PM	<1.3
	1290-6540	11	05:40PM	<1.3
	1355-ACC	11	05:45PM	<1.3
	1290-6770	11	05:50PM	<1.3
	1365-C.F.E.O.	11	05:55PM	<1.3
	1455-7420	11	06:00PM	<1.3
	1240-6800	12	05:30AM	<1.3
	1315-6770	12	05:35AM	<1.3
	1365-6720	12	05:40AM	<1.3
	1315-6670	12	05:45AM	<1.3
	1430-c.f.o.	12	05:30PM	<1.3
	1365-6920	12	05:35PM	<1.3
	1355-VENT	12	05:40PM	<1.3
	1240-6740	12	05:45PM	<1.3
	1355-RMUK	12	05:50PM	<1.3
	1215-6860	12	06:00PM	<1.3
	1290-6670	13	05:30AM	<1.3
	1315-6770	13	05:35AM	<1.3
	1405-RAMPA	13	05:40AM	<1.3
	1365-6920	13	05:45AM	<1.3
	1240-6630	13	05:50AM	<1.3
	1215-6860	13	05:55AM	<1.3
	Frentes	13	05:30PM	<1.3
	1240-6670	13	05:35PM	<1.3
	1455-7420	13	05:40PM	<1.3
	1215-6860	13	05:45PM	<1.3
	1240-6820	13	05:50PM	<1.3
	1355-VENT.	14	05:30AM	<1.3
	1365-6720	14	05:35AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1240-6670	14	05:40AM	<1.3
	1315-6670	14	05:45AM	<1.3
	1315-6540	14	05:50AM	<1.3
	1315-6860	14	05:55AM	<1.3
	1405-RAMPA	14	06:00AM	<1.3
	1240-C.F.E.	14	05:30PM	<1.3
	1240-6740	14	05:35PM	<1.3
	1240-6590	14	05:40PM	<1.3
	1405-ACC	14	05:45PM	<1.3
	1365-6940	14	05:50PM	<1.3
	1215-6860	14	05:55PM	<1.3
	1455-RMUK	14	06:00PM	<1.3
	1240-6820	15	05:30AM	<1.3
	1240-6800	15	05:35AM	<1.3
	1455-7420	15	05:40AM	<1.3
	1365-6920	15	05:45AM	<1.3
	1365-6700	15	05:50AM	<1.3
	1340-6580	15	05:30PM	<1.3
	1365-6980	15	05:35PM	<1.3
	1240-6630	15	05:40PM	<1.3
	1315-6860	15	05:45PM	<1.3
	1315-6590	15	05:50PM	<1.3
	1290-6670	16	05:30AM	<1.3
	1290-6590	16	05:35AM	<1.3
	1315-6770	16	05:40AM	<1.3
	13645-6940	16	05:45AM	<1.3
	1365-C.F.E..O.	16	05:50AM	<1.3
	1365-6480	16	05:55AM	<1.3
	1290-6630	16	06:00AM	<1.3
	1315-6590	16	06:05AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-6720	16	05:30PM	<1.3
	1355-ACC	16	05:35PM	<1.3
	1365-C.F.E.	16	05:40PM	<1.3
	1240-6590	16	05:45PM	<1.3
	1240-6740	16	05:50PM	<1.3
	1290-6630	16	05:55PM	<1.3
	1290-6590	16	06:00PM	<1.3
	1240-6820	17	05:30AM	<1.3
	1315-6770	17	05:35AM	<1.3
	1365-6920	17	05:40AM	<1.3
	1355-ACC	17	05:45AM	<1.3
	1290-6590	17	05:50AM	<1.3
	1240-6840	17	05:30PM	<1.3
	1240-6630	17	05:35PM	<1.3
	1405-RAMPA	17	05:40PM	<1.3
	1365-6700	17	05:45PM	<1.3
	1365-6480	18	05:50PM	<1.3
	1365-6720	18	05:35AM	<1.3
	1455-7420	18	05:40AM	<1.3
	1290-6590	18	05:45AM	<1.3
	1405-RAMPA	18	05:50AM	<1.3
	1290-6670	18	05:30PM	<1.3
	1290-6730	18	05:35PM	<1.3
	1430-C.F.O.	18	05:40PM	<1.3
	1355-VENT,	18	05:45PM	<1.3
	1290-6710	18	05:50PM	<1.3
	1365-6920	19	05:30AM	<1.3
	1240-6740	19	05:35AM	<1.3
	1315-6770	19	05:40AM	<1.3
	1405-RAMPA	19	05:45AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1290-6590	19	05:50AM	<1.3
	1355-ACC	19	05:30PM	<1.3
	1365-6700	19	05:35PM	<1.3
	1405-SUM	19	05:40PM	<1.3
	1240-6800	19	05:45PM	<1.3
	1240-6590	19	05:50PM	<1.3
	1290-6710	19	05:55PM	<1.3
	1290-6730	20	05:30AM	<1.3
	1290-6630	20	05:35AM	<1.3
	1315-6670	20	05:40AM	<1.3
	1240-6820	20	05:45AM	<1.3
	1315-6590	20	05:30PM	<1.3
	1290-6670	20	05:35PM	<1.3
	1355-ACC	20	05:40PM	<1.3
	1290-6710	20	05:45PM	<1.3
	1405-RAMPA	21	05:30AM	<1.3
	1365-6700	21	05:35AM	<1.3
	1240-C.F.E.	21	05:40AM	<1.3
	1290-6710	21	05:45AM	<1.3
	1365-c.f.e.e	21	05:30PM	<1.3
	1315-6770	21	05:35PM	<1.3
	1430-7420	21	05:40PM	<1.3
	1365-6720	22	05:30AM	<1.3
	1365-6480	22	05:35AM	<1.3
	1355-CENTI	22	05:40AM	<1.3
	1315-6590	22	05:45AM	<1.3
	1290-6670	22	05:50AM	<1.3
	1315-6770	22	05:30PM	<1.3
	1240-6740	22	05:35PM	<1.3
	1380-RAMPA	22	05:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1355-RAMPA	22	05:45PM	<1.3
	1430-C.F.E.O.	22	05:50PM	<1.3
	1315-6540	22	05:55PM	<1.3
	1240-6800	23	05:30AM	<1.3
	1240-6840	23	05:35AM	<1.3
	1340-6860	23	05:40AM	<1.3
	1365-6620	23	05:45AM	<1.3
	1405-rampa	23	05:50AM	<1.3
	1240-6820	23	05:55AM	<1.3
	1240-6590	23	05:30PM	<1.3
	1315-6770	23	05:35PM	<1.3
	1365-6920	23	05:40PM	<1.3
	1430-7420	23	05:45PM	<1.3
	1365-6960	23	05:50PM	<1.3
	1290-6670	24	05:30AM	<1.3
	1355-RMUK	24	05:35AM	<1.3
	1340-6440	24	05:40AM	<1.3
	1215-6820	24	05:45AM	<1.3
	1405-SERVICIOS	24	05:30PM	<1.3
	1430-7420	24	05:35PM	<1.3
	1265-6700	24	05:40PM	<1.3
	1240-6750	24	05:45PM	<1.3
	1315-6670	24	05:50PM	<1.3
	1215-6820	24	05:55PM	<1.3
	1315-6540	24	06:00PM	<1.3
	1315-6700	25	05:30AM	<1.3
	1365-C/F,E,	25	05:35AM	<1.3
	1405-RAMPA	25	05:40AM	<1.3
	1365-6480	25	05:45AM	<1.3
	1315-6540	25	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1315-6590	25	05:55PM	<1.3
	1405-ACC	25	06:00PM	<1.3
	1355-1380	25	06:05PM	<1.3
	1290-6730	26	05:30AM	<1.3
	1290-6630	26	05:35AM	<1.3
	1355-VENT	26	05:40AM	<1.3
	1340-6540	26	05:45AM	<1.3
	1340-6540	26	05:50AM	<1.3
	1340-6940	26	05:55AM	<1.3
	1315-6630	26	06:00AM	<1.3
	1315-6540	26	06:05AM	<1.3
	1365-6620	26	05:30PM	<1.3
	1365-6420	26	05:35PM	<1.3
	1365-6920	26	05:40PM	<1.3
	1340-6620	26	05:45PM	<1.3
	1315-6670	26	05:50PM	<1.3
	1215-6820	26	05:55PM	<1.3
	1315-6540	26	06:00PM	<1.3
	1380-rampa	27	05:30AM	<1.3
	1315-6630	27	05:35AM	<1.3
	1315-6670	27	05:40AM	<1.3
	1340-6580	27	05:45AM	<1.3
	1240-6820	27	05:30PM	<1.3
	1290-6670	27	05:35PM	<1.3
	1405-rampa	27	05:40PM	<1.3
	1365-6700	27	05:45PM	<1.3
	1340-6540	27	05:50PM	<1.3
	1215-6820	27	05:55PM	<1.3
	1290-6630	27	06:00PM	<1.3
	1315-6720	28	05:30AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1405-RAMPA	28	05:35AM	<1.3
	1215-6820	28	05:40AM	<1.3
	1240-6840	28	05:30PM	<1.3
	1315-6770	28	05:35PM	<1.3
	1240-C.F.E.	28	05:40PM	<1.3
	1430-7400	28	05:45PM	<1.3
	1430-C.F.O.	28	05:50PM	<1.3
	1365-6920	28	05:55PM	<1.3
	1365-C.F.E..O.	29	05:30AM	<1.3
	1315-6670	29	05:35AM	<1.3
	1290-6730	29	05:40AM	<1.3
	1365-C.F.E..O.	29	05:45AM	<1.3
	1365-69601	29	05:50AM	<1.3
	1315-6540	29	05:55AM	<1.3
	1355-RMUK	29	05:30PM	<1.3
	1340-VAY PAS	29	05:35PM	<1.3
	1405-ACC	29	05:40PM	<1.3
	1315-6630	29	05:45PM	<1.3
	1290-6670	29	05:50PM	<1.3
	1265-6730	29	05:55PM	<1.3
	1290-6630	29	06:00PM	<1.3
	1215-6820	29	06:05PM	<1.3
	1215-SERV,	30	05:30AM	<1.3
	1365-VENT.	30	05:35AM	<1.3
	1430-7420	30	05:40AM	<1.3
	1340-6520	30	05:45AM	<1.3
	1240-6820	30	05:30PM	<1.3
	1265-6670	30	05:35PM	<1.3
	1405-RAMPA	30	05:40PM	<1.3
	1405-SUM	30	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1290-6420	30	05:50PM	<1.3
	1365-6820	30	05:55PM	<1.3
	1315-6630	31	05:30AM	<1.3
	1315-6670	31	05:35AM	<1.3
	1380-RAMPA	31	05:40AM	<1.3
	1405-RAMPA	31	05:45AM	<1.3
	1340-6860	31	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Octubre	1365-6720	31	05:35PM	<1.3
	1315-6710	31	05:40PM	<1.3
	1290-6630	31	05:45PM	<1.3
	1290-6670	31	05:50PM	<1.3

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

8 Geoquímica de Roca Estéril

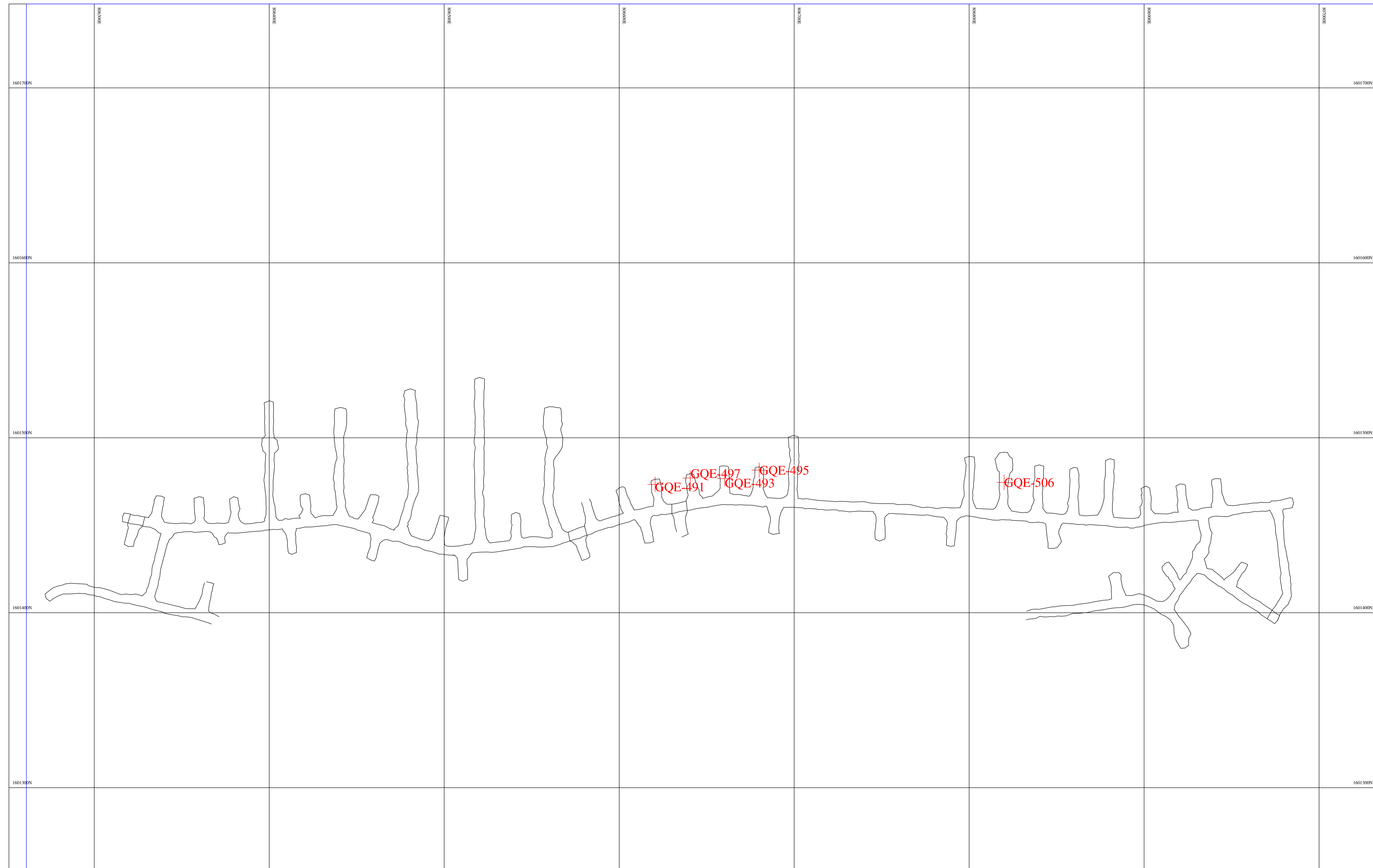
8.1 Sitios de Monitoreo

En el Cuadro 8-1 se enlistan las muestras analizadas de material extraído de los túneles del proyecto, rampa oeste y rampa este, durante los meses de Agosto a Octubre de 2015. La ubicación de la extracción de las muestras se presenta en la Figura 8-1, Figura 8-2, Figura 8-3, Figura 8-4, Figura 8-5, Figura 8-6, Figura 8-7 y Figura 8-8.

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

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-491	1190-6620-EC	806620.5	1601473.4	1197
GQE-492	1240-6420-OC	806419.5	1601437.8	1242
GQE-493	1190-6660-EC	806660.3	1601476.7	1195
GQE-494	1455-7420-ZE	807420.5	1601606.5	1452
GQE-495	1190-6680-EC	806680	1601481.5	1194
GQE-496	1460-Rampa-ZE	807498	1601577	1468
GQE-497	1190-6640-EC	806640.6	1601477	1193
GQE-498	1240-CFTO-OC	806388	1601426.8	1243
GQE-499	1355-CFTO-ZE	807235	1601472	1354
GQE-500	1455-7380-ZE	807380	1601599	1453
GQE-501	1430-7380-ZE	807380	1601596.5	1432
GQE-502	1430-CFTE-ZE	807412	1601587	1432
GQE-503	1430-RAMP-ZE	807504	1601571.5	1404
GQE-504	1430-7360-ZE	807360	1601599	1432
GQE-505	1240-6800-EC	806800	1601430	1243
GQE-506	1190-6820-EC	8066820	1601474.5	1192
GQE-507	1240-6820-EC	806820	1601427	1242
GQE-508	1455-7360-ZE	807360	1601595.5	1453
GQE-509	1430-7400-ZE	807401	1601599.5	1433
GQE-510	1365-CFTE-OC	806465	1601387	1368
GQE-511	1365-6940-EC	806941	1601400	1368
GQE-512	1365-CFTO-EC	806550	1601365	1368
GQE-513	1365-6580-EC	806578	1601365.5	1368
GQE-514	1430-7420-ZE	807418	1601602.5	1433
GQE-515	1455-7440-ZE	807440	1601618	1452
GQE-516	1455-7460-ZE	807460	1601522	1454
GQE-517	1455-CFTO-ZE	807331.25	1601580	1454
GQE-518	1365-6720-EC	806720	1601375	1368
GQE-519	1365-6620-EC	806620	1601372	1369
GQE-520	1405-RAMP-ZE	807542.5	1601546	1403
GQE-521	1405-RAMP-ZE	807501	1601515	1388

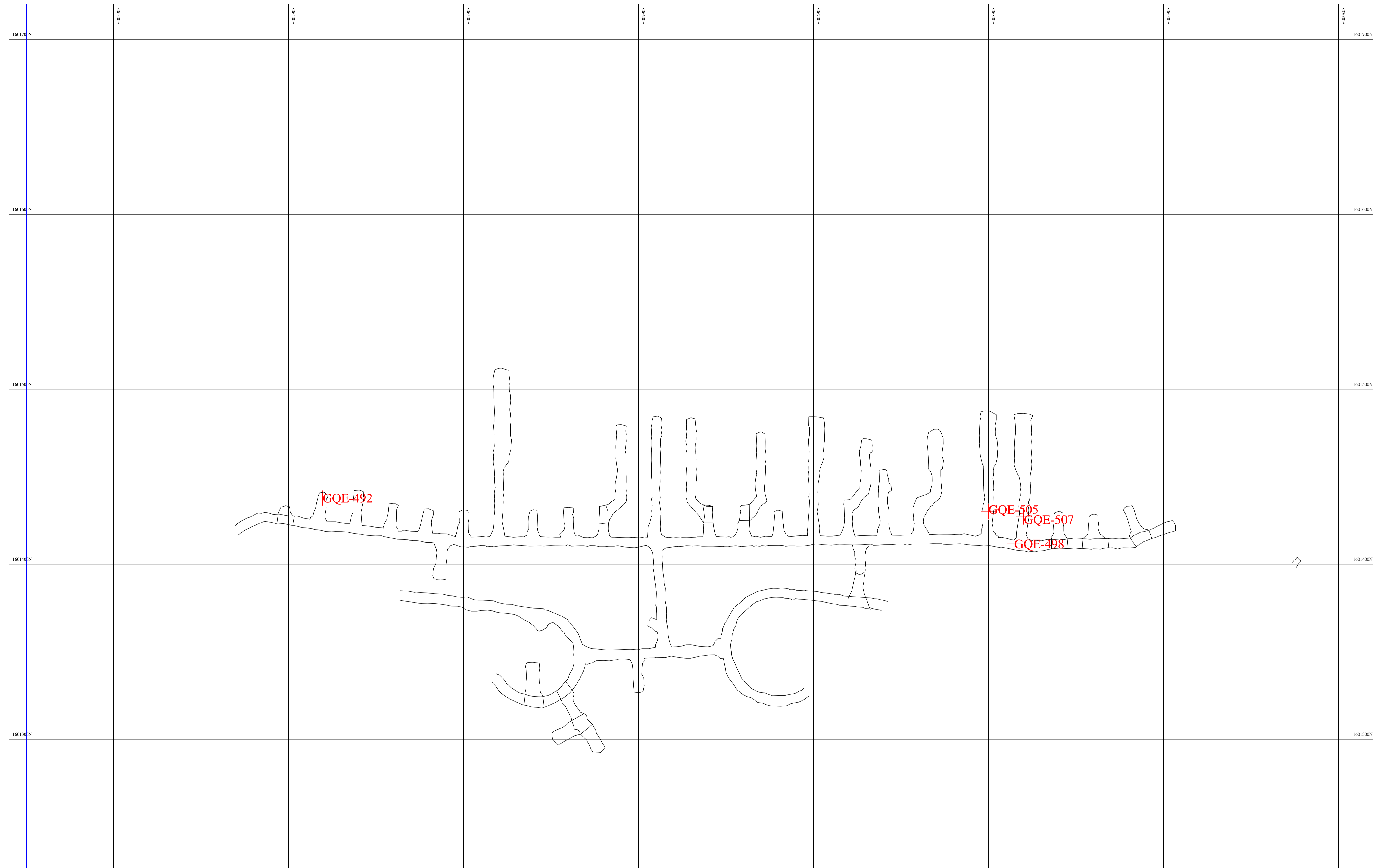
Fuente: MSR, 2015.



Plano ARD Nivel 1190

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

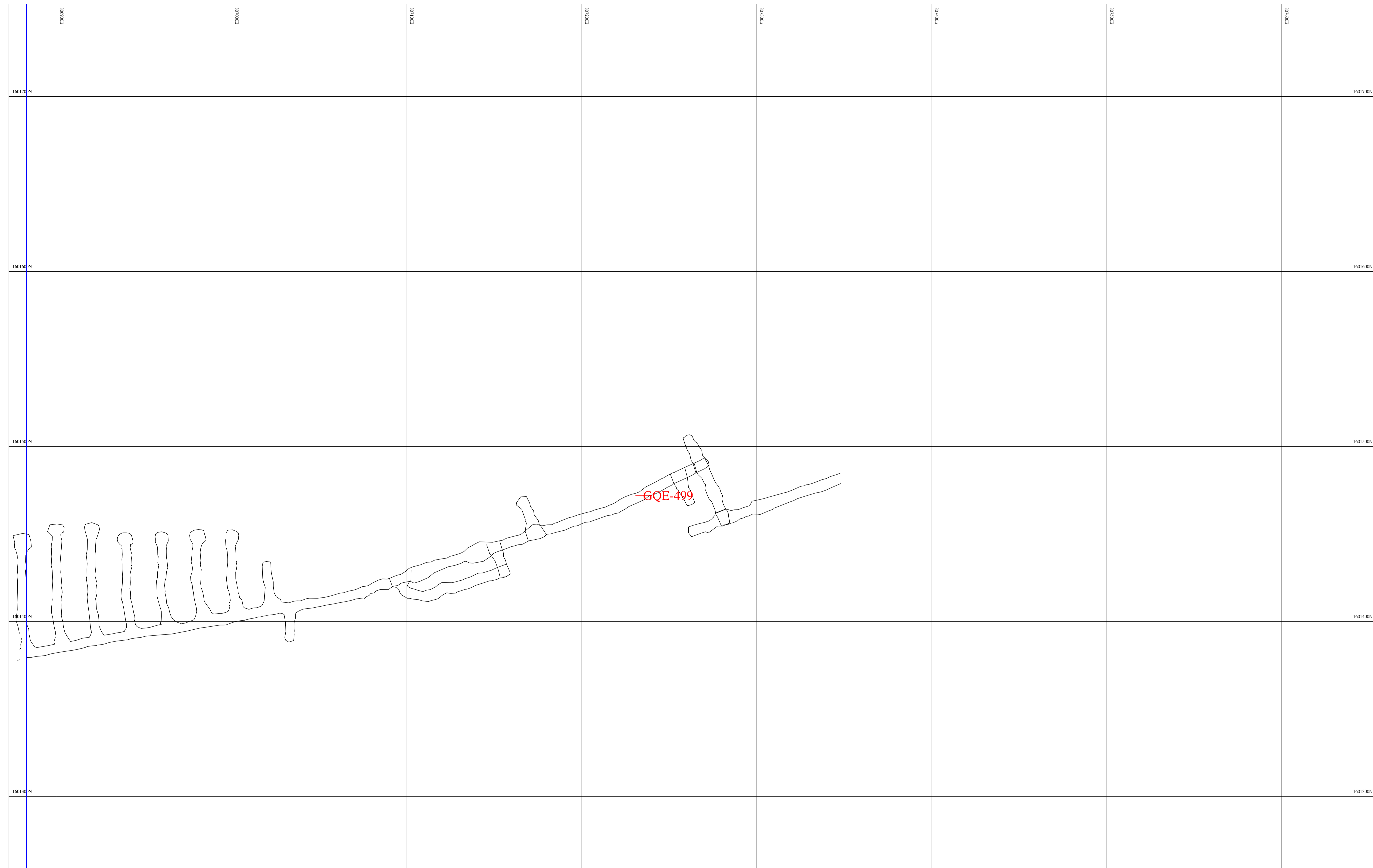
agosto-octubre_2015



Plano ARD Nivel 1240

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

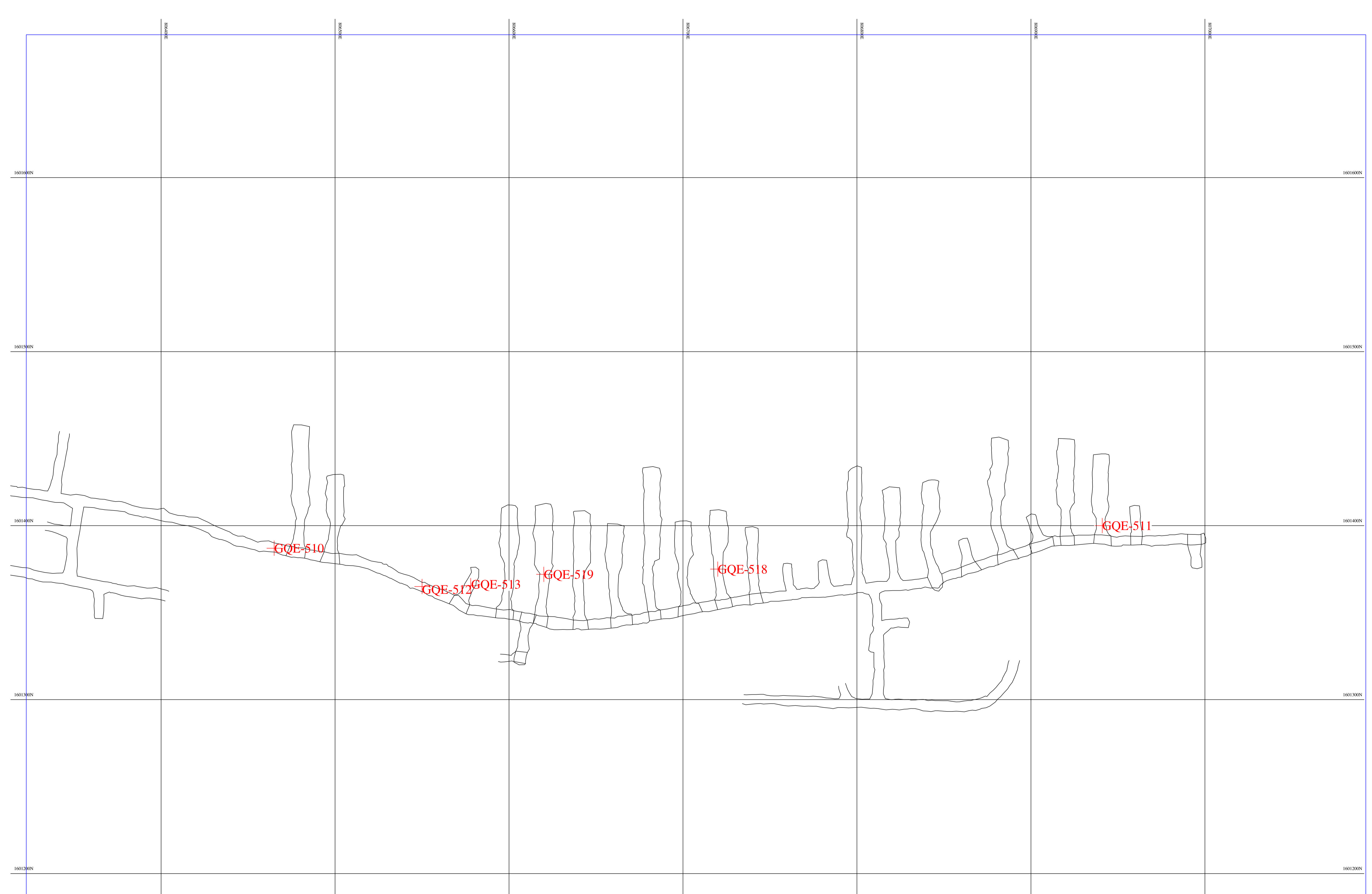
agosto-octubre_2015_01



Plano ARD Nivel 1355

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

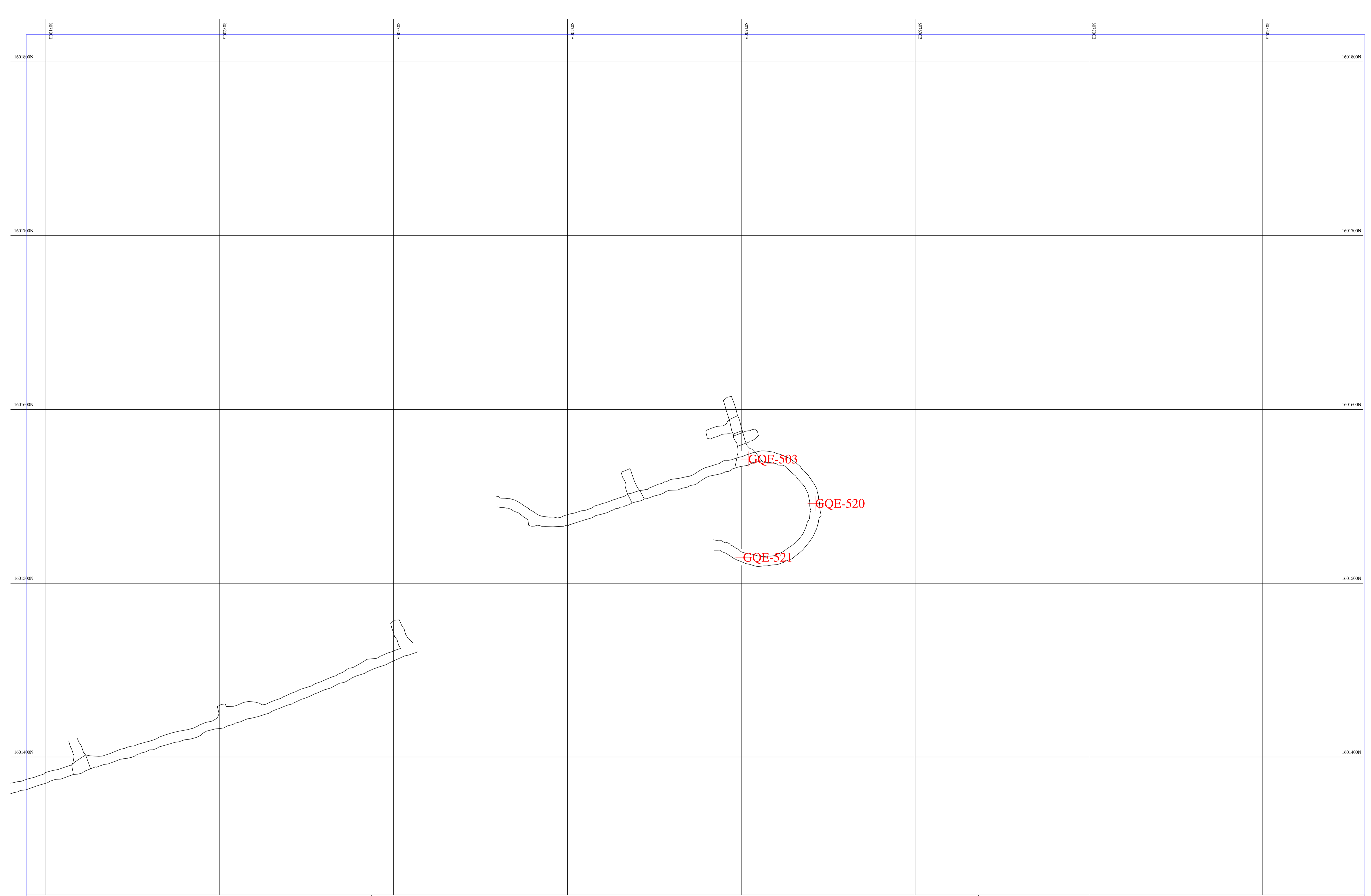
agosto-octubre_2015_02



Plano ARD Nivel 1365

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

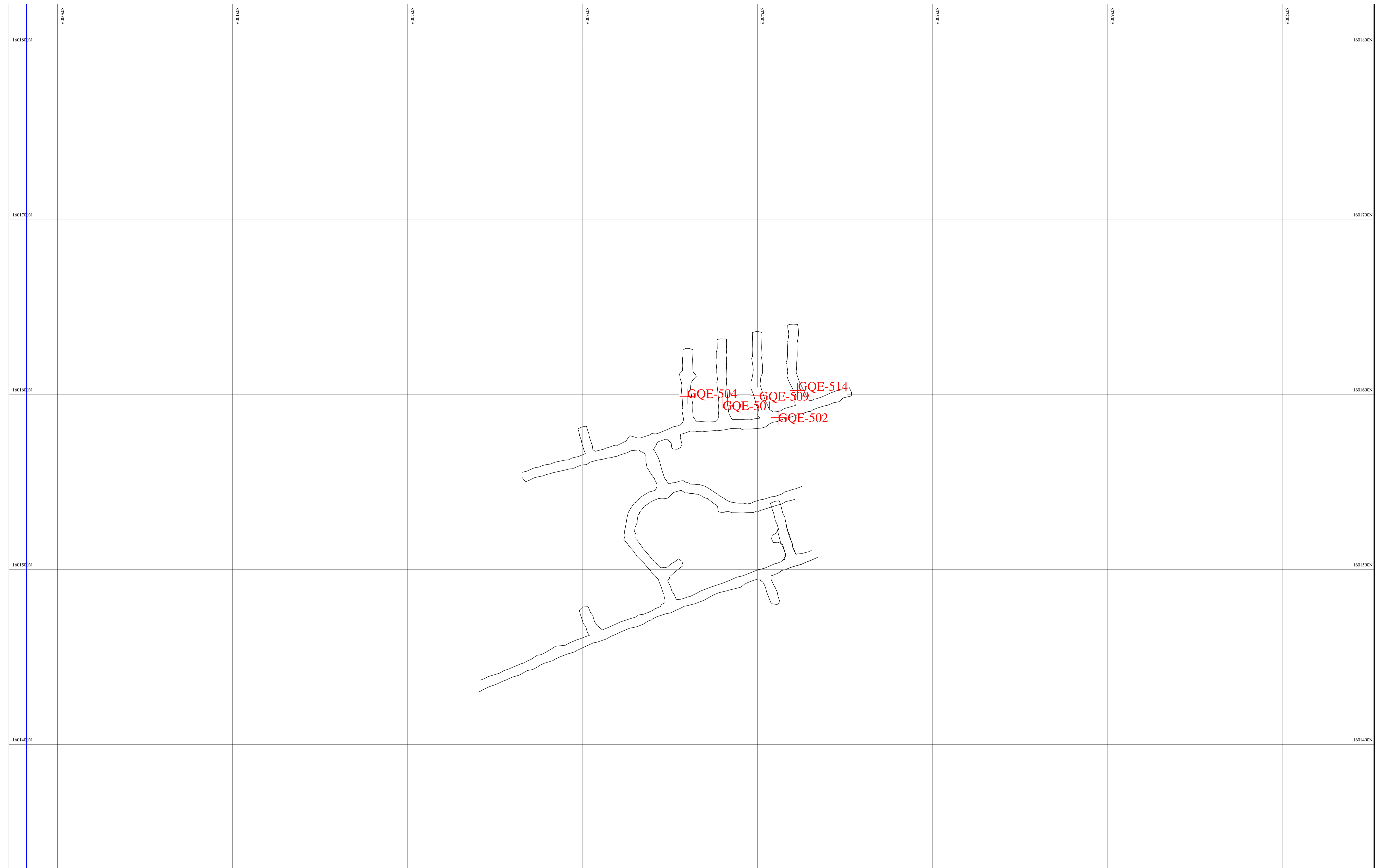
05_102015_ard_str



Plano ARD Rampa Nivel 1405 ZE

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

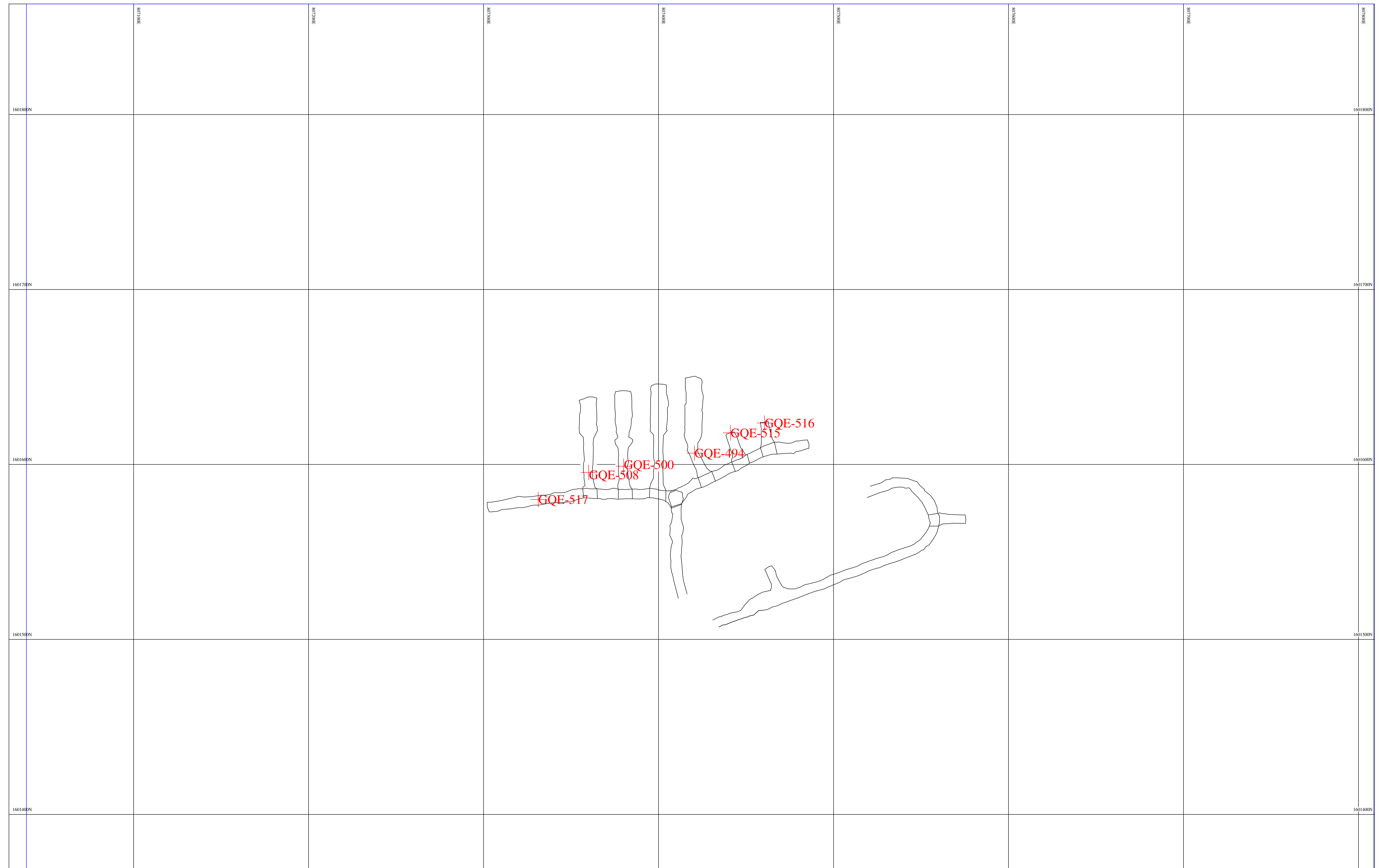
05_102015_arc_str_01



Plano ARD Nivel 1430

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

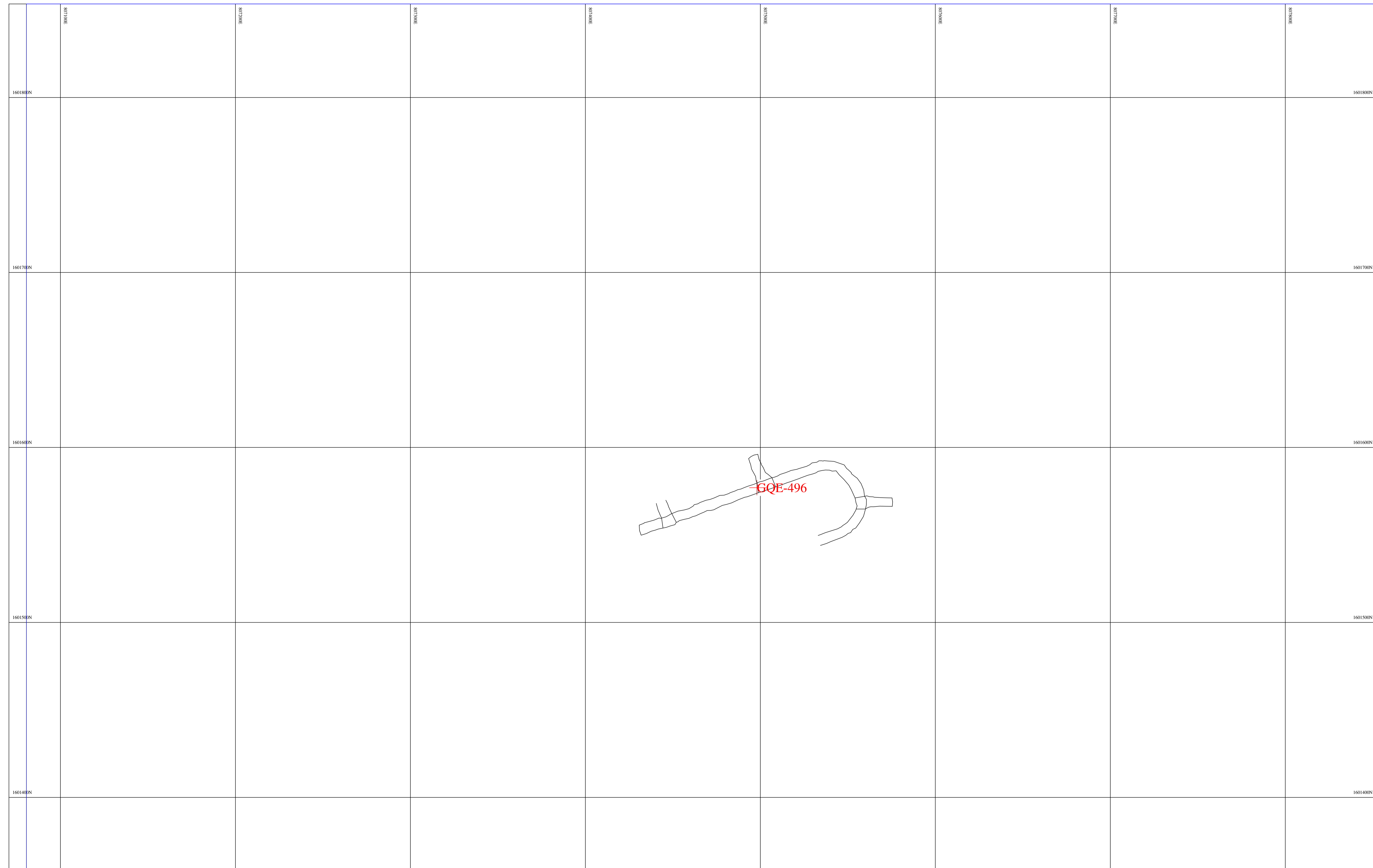
agosto-octubre_2015_03



Plano ARD Nivel 1455

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

agosto-octubre_2015_04



Plano ARD Nivel 1480

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

agosto-octubre_2015_05

8.2 Metodología

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

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

Parámetros analizados	
pH	pH en pasta.
Procedimiento	
Basados en el método ASTM D4972-01(2007) Standard Test Method for pH of Soils. Se determinó el pH en suspensión de Roca-Agua 1:1 p/v: esto se logró tomando 50 gramos de roca pulverizada y agregándole 50 ml de agua desmineralizada, se agita por 10 minutos y se deja reposar por 10 minutos más, luego se hace lectura directa de pH sobre la suspensión con la ayuda de un potenciómetro previamente calibrado.	
Equipo utilizado	
Nombre	Potenciómetro pH & EC
Modelo	H-series H170G
Fabricante	HACH

Fuente: MSR, 2015.

8.3 Resultados

Los resultados de pH en pasta se presentan en el Cuadro 8-3. Los valores de pH se encontraron en el rango de 8.36 a 9.34 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-491	01/08/2015	06/08/2015	8.83	20.3
GQE-492	01/08/2015	06/08/2015	9.34	20.3
GQE-493	01/08/2015	06/08/2015	8.67	20.8
GQE-494	03/08/2015	06/08/2015	8.68	22.2
GQE-495	05/08/2015	06/08/2015	8.89	21.3
GQE-496	05/08/2015	06/08/2015	9.09	22.5
GQE-497	10/08/2015	17/08/2015	8.77	20.1
GQE-498	10/08/2015	17/08/2015	9.13	20.3

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-499	13/08/2015	17/08/2015	9.01	20.9
GQE-500	15/08/2015	17/08/2015	8.9	21.4
GQE-501	16/08/2015	17/08/2015	8.88	20.9
GQE-502	16/08/2015	17/08/2015	8.7	20.2
GQE-503	16/08/2015	17/08/2015	9.13	20
GQE-504	28/08/2015	18/09/2015	8.95	17.7
GQE-505	03/09/2015	18/09/2015	8.99	15.9
GQE-506	10/09/2015	18/09/2015	8.84	15.6
GQE-507	29/09/2015	06/10/2015	8.65	22.9
GQE-508	03/10/2015	06/10/2015	8.64	23.2
GQE-509	03/10/2015	06/10/2015	8.58	24.0
GQE-510	05/10/2015	06/10/2015	8.76	24.0
GQE-511	05/10/2015	06/10/2015	8.83	22.5
GQE-512	05/10/2015	06/10/2015	8.97	22.6
GQE-513	05/10/2015	06/10/2015	9.1	22.7
GQE-514	05/10/2015	06/10/2015	8.87	22.6
GQE-515	10/10/2015	15/10/2015	8.66	22.4
GQE-516	10/10/2015	15/10/2015	8.68	20.3
GQE-517	10/10/2015	15/10/2015	8.48	21.5
GQE-518	10/10/2015	15/10/2015	8.36	20.7
GQE-519	10/10/2015	15/10/2015	8.58	20.4
GQE-520	10/10/2015	15/10/2015	9.15	20.8
GQE-521	28/10/2015	08/11/2015	8.7	21.5

Fuente: MSR, 2015.

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 2015 se muestra en el Cuadro 9-1. Se hicieron monitoreos mediante el uso de dosímetros portables y posteriormente se realizan comparaciones con la norma OSHA. Los resultados muestran que se está dentro de parámetros aceptables OSHA en los puntos evaluados. Se debe considerar que el parámetro Leq está acumulado para periodo de 10.6 para operaciones en mina subterránea y 12 horas para operaciones en superficie, lo que implica una mayor dosis recibida por efecto de acumulación. Sin embargo los datos se encuentran dentro de parámetros aceptables; lo que indica que si con 24 horas de exposición es aceptable, al estar expuesto a un periodo menor se cumple con las normas establecidas.

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

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Superficie Planta de Proceso - TRITURADORA		2015		
Mes	Agosto	Septiembre	Octubre	
Fecha	13/08/15	17/09/15	06/10/15	
Hora Inicio	6:32	6:56	6:47	
Duración	11h	10:37h	11h	
Lmax dBA	143	143,5	143,8	
Lmin dBA	93,8	60,9	60,7	
Prom. Diurno dBA	95,2	100,1	89,5	
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	
Leq (Normal sin uso de EPP)	87	87	87	
Duración de Referencia OSHA	12h	12h	12h	
Leq (Normal sin uso de EPP)	95,2	100,1	89,5	
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	80,7	85,6	75	
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	

Superficie Planta de Proceso - FILTROS		2015		
Mes	Agosto	Septiembre	Octubre	
Fecha	13/08/15	17/09/15	27/10/15	
Hora Inicio	6:32	7:00	6:55	
Duración	11h	11h	10h	
Lmax dBA	137,6	87,2	134,6	
Lmin dBA	89,4	86	61,4	
Prom. Diurno dBA	90,8	86,6	87,8	
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	
Leq (Normal sin uso de EPP)	87	87	87	
Duración de Referencia OSHA	12h	12h	12h	
Leq (Normal sin uso de EPP)	90,8	86,6	87,8	
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	76,3	72,1	73,3	
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	

Puesto de Operador de Jumbo		2015		
Mes	Agosto	Septiembre	Octubre	
Fecha	11/08/15	09/09/15	12/10/15	
Hora Inicio	7:17	7:10	6:41	
Duración	10h	11h	11h	
Lmax dBA	139,3	143,9	134,6	
Lmin dBA	60,7	61	60,9	
Prom. Diurno dBA	99,8	92	99,8	
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	
Leq (Normal sin uso de EPP)	87	87	87	
Duración de Referencia OSHA	12h	12h	12h	
Leq (Normal sin uso de EPP)	99,8	92	99,8	
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	85,3	77,5	85,3	
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	

Superficie Planta de Proceso - MOLINO		2015		
Mes	Agosto	Septiembre	Octubre	
Fecha	04/08/15	10/09/15	27/10/15	
Hora Inicio	7:03	6:42	6:57	
Duración	11h	12h	10h	
Lmax dBA	139,1	143,4	134,2	
Lmin dBA	93,4	60,8	60,7	
Prom. Diurno dBA	94,8	103,8	87,9	
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	
Leq (Normal sin uso de EPP)	87	87	87	
Duración de Referencia OSHA	12h	12h	12h	
Leq (Normal sin uso de EPP)	94,8	103,8	87,9	
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	80,3	89,3	73,4	
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	No Aceptable	Aceptable	

Puesto de Operador de Scoop		2015		
Mes	Agosto	Septiembre	Octubre	
Fecha	06/08/15	16/09/15	30/10/15	
Hora Inicio	6:43	6:43	6:32	
Duración	11h	11h	11h	
Lmax dBA	134,5	137,3	136,1	
Lmin dBA	60,8	60,8	60,6	
Prom. Diurno dBA	102,1	99,08	101,3	
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	
Leq (Normal sin uso de EPP)	87	87	87	
Duración de Referencia OSHA	12h	12h	12h	
Leq (Normal sin uso de EPP)	102,1	99,08	101,3	
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	87,6	84,58	86,8	
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	No Aceptable	

Puesto de Operador de Boltec		2015		
Mes	Agosto	Septiembre	Octubre	
Fecha	06/08/15	09/09/15	08/10/15	
Hora Inicio	6:44	7:10	6:48	
Duración	11h	11h	11h	
Lmax dBA	135,7	138,9	143,9	
Lmin dBA	60,8	60,6	60,6	
Prom. Diurno dBA	94,1	95,7	96	
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	
Leq (Normal sin uso de EPP)	87	87	87	
Duración de Referencia OSHA	12h	12h	12h	
Leq (Normal sin uso de EPP)	94,1	95,7	96	
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	79,6	81,2	81,5	
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	

Fuente: MSR, 2015.

9.2 Mediciones de Partículas Respirables

Los resultados se muestran en el Cuadro 9-2 y corresponden al área de interior mina y planta de proceso. En este trimestre los resultados fueron satisfactorios y se está dentro de parámetros aceptables, en algunos casos de manera normal y otros después de la aplicación del factor de compensación por homologación de EPP, por lo tanto se está dentro de rango y en ningún momento se excede el límite normal, que es el parámetro que refiere el fabricante para el respirador usado en las áreas de monitoreo, marca 3M código 7502 y filtro 3M código 60926 P100 homologación NIOSH.

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

Superficie Planta de Proceso - TRITURACION						2015				
Trimestre						XV				
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					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	31/08/2015	18/09/2015
Hora Inicio							7:00	7:00	7:00	
Duración							11 h	11 h	11 h	
OSHA Fracción Respirable PM ₄	mg/m³	5	16667	150	150	50	0,154	0,01	0,006	
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,433	0,013	0,006	

Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (ajustando con la norma OSHA) del respirador mismo, ajuste recomendado por el fabricante, estamos dentro de parámetros, es decir que si comparamos aún la norma para fracción respirable con el resultado de Polvo Total, estamos mas que seguros de estar dentro de norma.

Superficie Planta de Proceso - MOLINO						2015				
Trimestre						XV				
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					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	31/08/2015	18/09/2015
Hora Inicio							7:00	7:00	7:00	
Duración							11 h	11 h	11 h	
OSHA Fracción Respirable PM ₄	mg/m³	5	16667	150	150	50	0,008	0,02	0,016	
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,004	0,05	0,042	

Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (ajustando con la norma OSHA) del respirador mismo, ajuste recomendado por el fabricante, estamos dentro de parámetros, es decir que si comparamos aún la norma para fracción respirable con el resultado de Polvo Total, estamos mas que seguros de estar dentro de norma.

Superficie Planta de Proceso - FILTROS						2015				
Trimestre						XV				
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					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	31/08/2015	18/09/2015
Hora Inicio							7:00	7:00	7:00	
Duración							11 h	11 h	11 h	
OSHA Fracción Respirable PM ₄	mg/m³	5	16667	150	150	50	0,006	0,03	0,033	
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,017	0,07	0,049	

Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (ajustando con la norma OSHA) del respirador mismo, ajuste recomendado por el fabricante, estamos dentro de parámetros, es decir que si comparamos aún la norma para fracción respirable con el resultado de Polvo Total, estamos mas que seguros de estar dentro de norma.

Interior Mina General - REZAGA						2015				
Trimestre						XV				
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					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	18/08/2015	25/09/2015
Hora Inicio							7:00	7:00	7:00	
Duración							11 h	11 h	11 h	
OSHA Fracción Respirable PM ₄	mg/m³	5	16667	150	150	50	0,496	0,326	0,702	
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,65	0,385	0,899	

Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (ajustando con la norma OSHA) del respirador mismo, ajuste recomendado por el fabricante, estamos dentro de parámetros, es decir que si comparamos aún la norma para fracción respirable con el resultado de Polvo Total, estamos mas que seguros de estar dentro de norma.

Interior Mina General - LANZADO						2015				
Trimestre						XV				
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					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	18/08/2015	25/09/2015
Hora Inicio							7:00	7:00	7:00	
Duración							11 h	11 h	11 h	
OSHA Fracción Respirable PM ₄	mg/m³	5	16667	150	150	50	2,53	0,276	5,37	
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	6,05	0,451	11	

Nota: OSHA Fracción respirable no fue tomado en esta ocasión, sin embargo sea con el uso de EPP o sin el uso de el (ajustando con la norma OSHA) del respirador mismo, ajuste recomendado por el fabricante, estamos dentro de parámetros, es decir que si comparamos aún la norma para fracción respirable con el resultado de Polvo Total, estamos mas que seguros de estar dentro de norma.

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Fuente: MSR, 2014.

9.3 Mediciones de Gas

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

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

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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-15	1215 6480 O.C	Ninguna	Medición posterior a voladura	0	0	19:25	Nocturno	Marvin López
	1290 6450 O.C	Ninguna	Medición posterior a voladura	0	0	19:10		
	1290 6950 E.C	Ninguna	Medición posterior a voladura	0	0	19:10		
	1340 6640 E.C		Movimiento tubería	2	0	21:00		
	1190 6640 E.C		Fortificación	8	0	1:00		
	1390 ACCS ZE		Orden y limpieza	0	0	2:30		
	1400 Sum ZE		Orden y limpieza	0	0	3:45		
01-sep-15	1265-6590.OC	Ninguna	Medición posterior a voladura	32	0	19:20	Nocturno	Jose Carrillo
	1290-6770.EC	Ninguna	Medición posterior a voladura	15	0	19:35		
	1290-6950.EC	Ninguna	Medición posterior a voladura	17	0	19:30		
	1405-ACCS.ZE	Ninguna	Medición posterior a voladura	7	0	19:40		
	1455-7380.ZE	Ninguna	Medición posterior a voladura	20	0	19:45		
	1190-6820.EC	RB-06	Fortificación	12	0	0:20		
	1190-6800.EC	LM-55	Sondeo	9	0	2:30		
01-oct-15	1240 6670 EC	Ninguna	Medición posterior a voladura	12	0	21:10	Nocturno	Ludyn Lima
	1265 6710 EC	Ninguna	Medición posterior a voladura	0	0	19:59		
	1290 6630 EC	Ninguna	Medición posterior a voladura	11	0	19:51		
	1455 7400 ZE	Ninguna	Medición posterior a voladura	49	0	19:36		
	1365 6620 EC	Ninguna	Medición posterior a voladura	9	0	19:44		
	1240 6520 OC	Ninguna	Medición posterior a voladura	44	0	21:08		
	1215 6520 OC	Ninguna	Medición posterior a voladura	32	0	21:17		

Fuente: MSR, 2015.

10 Conclusiones

10.1 Mediciones del aire en el ambiente

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

10.2 Mediciones del agua, sedimentos y efluentes en el ambiente

- 2) Del control de calidad (blancos de campo) realizado a los dos laboratorios subcontratados (Laboratorio Ecosistemas Proyectos Ambientales S.A. y ACZ Laboratories, Inc.) para el análisis de agua superficial y efluentes, se obtuvieron resultados confiables tanto en la manipulación de las muestras como en los resultados de los análisis.
- 3) El agua superficial (**SW**), subterránea (**GW**) y los pozos de monitoreo (**MW**) presentaron un pH alcalino y dentro del rango establecido por la USEPA para la salud humana. No se detectó mercurio en ninguna categoría de agua (SW, GW y MW). Se registraron sólidos suspendidos totales en SW, GW y MW y los resultados encontrados están por debajo de lo establecido por las guías del banco mundial (50 mg/L). Se detectaron cloruros en SW, GW y MW, todos los valores por debajo de lo sugerido por la USEPA (250 mg/L). Se detectó arsénico en todas las categorías de agua (SW, GW y MW) y todos los resultados se encontraron por debajo de los establecido por la USEPA (0.01 mg/L) y dentro del rango registrado durante el establecimiento de la línea base. El plomo se detectó en SW, GW y MW en concentraciones por debajo de lo sugerido por la USEPA y por debajo del rango de lo establecido durante la línea base.
- 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 2015.

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

- 5) Las vibraciones generadas por las voladuras registradas se encuentran por debajo de los límites de detección del equipo (1.3 mm/s); el cual incluso es

menor al límite a partir del cual, las vibraciones inducidas por voladuras (50.8 mm/s), pueden ocasionar daños según la norma establecida por United States Bureau of Mines.

- 6) Las lecturas de pH en pasta obtenidas de las muestras de material extraídas de mina subterránea fueron alcalinas, lo que indica que no hay indicios de un potencial de generación ácida dentro los túneles.
- 7) Los resultados obtenidos en los niveles de presión sonora para ambientes laborales, indican que se está por debajo de los límites de nivel de sonido ponderado "A" acorde a OSHA para 24 horas (82-83 dBA) y los resultados de partículas respirables en las estaciones de monitoreo, cumplen con el rango de aceptación que el fabricante establece basado en el equipo marca 3M código 7502 y filtro 3M código 60926 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 2015																															
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
LECTURA FLUJÓMETRO (m³)																															
Portal Este (tubería 6")	11506.1	12362.4	13311.8	14100.3	14594.1	16157.8	16552.7	16630	16766.4	16940.8	17032.3	17153.5	17216.1	17708.8	17870.1	18054	18590.1	19218.8	19405.7	19530.7	19630.3	19810.5	19897.1	19979.9	20233.2	20686.4	20936.2	21325.7	21798	22333.8	22865.7
Total Este (tubería 8")	5384.77	5477.35	5477.35	5695.05	5809.65	5840.34	5842.95	5844.91	5846.44	5852.86	5858.39	6017.08	7441.34	8517.68	9853.9	10834.4	12130.2	13047.4	14924.2	16818.7	18705.6	20501.7	21126.6	21142.7	21145.2	21162	21163.9	21416.7	22275.4	22700.3	22722
Portal Oeste (tubería 6")	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	220994	221001	221008	221017	221022	221034	221039	221044	221048	221052	221054	221058	221063	221070	221078	221084	221090	221097
Portal Oeste (tubería 8")	51651.2	55498.4	54424.6	63432.3	67236.2	71424.9	75285.1	79153.4	83200.3	87214	91230.8	95206.5	99450.7	102258	104585	106971	109372	111771	114159	116369	118735	120989	123523	125310	127135	129465	131587	133978	136373	138711	139225
Clarificador	3527477	3531992	3535950	3540133	3544447	3547825	3552375	3556348	3560476	3563753	3567692	3571618	3575640	3579368	3584268	3587538	3590880	3594068	3597293	3601926	3606657	3608553	3610173	3611946	3614227	3616929	3617761	3618971	3620895	3622917	3624676
VOLUMEN BOMBEO (m³)																															
Portal Este (tubería 6")	895	856	949	789	494	1564	395	77	136	174	92	121	63	493	161	184	536	629	187	125	100	180	87	83	253	453	250	390	472	536	532
Total Este (tubería 8")	550	93	0	218	115	31	3	2	2	6	6	159	1424	1076	1336	981	1296	917	1877	1895	1887	1796	625	16	3	17	2	253	859	425	22
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	220994	7	7	9	5	12	5	5	4	4	2	4	5	7	8	6	6	7
Portal Oeste (tubería 8")	4290	3847	-1074	9008	3804	4189	3860	3868	4047	4014	4017	3976	4244	2807	2327	2386	2401	2399	2388	2210	2366	2254	2534	1787	1825	2330	2122	2391	2395	2338	514
Clarificador	3350	4515	3958	4183	4314	3378	4550	3973	4128	3277	3939	3926	4022	3728	4900	3270	3342	3188	3225	4633	4731	1896	1620	1773	2281	2702	832	1210	1924	2022	1759
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	164	157	174	145	91	287	72	14	25	32	17	22	11	90	30	34	98	115	34	23	18	33	16	15	46	83	46	71	87	98	98
Total Este (tubería 8")	101	17	0	40	21	6	0	0	0	1	1	29	261	197	245	180	238	168	344	347	346	329	115	3	0	3	0	46	157	78	4
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	40516	1	1	2	1	2	1	1	1	0	1	1	1	1	1	1	1	1
Portal Oeste (tubería 8")	787	705	727	727	697	768	708	709	742	736	736	729	778	515	427	437	440	440	438	405	434	413	465	328	335	427	389	438	439	429	94
Clarificador	614	828	726	767	791	619	834	728	757	601	722	720	737	683	898	600	613	584	591	849	867	348	297	325	418	495	153	222	353	371	322

m³: metro cúbico. Gpm: galones por minuto. Celeste: Flujómetro presentó fallos al registrar el volumen acumulado, y éste fue menor al día previo. El cálculo del caudal para el 3 y 4 de Agosto se realizó con base al volumen acumulado del 4 de Agosto. Rojo: Lectura del flujómetro presentó una medición incoherente. Fuente: MSR, 2015.

Septiembre 2015																														
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
LECTURA FLUJÓMETRO (m³)																														
Portal Este (tubería 6")	23262.7	23305.2	23567.2	23905.3	24282.2	24614.4	24831.8	25106.1	25223.1	25363.2	25712.9	26157.2	26289.9	26593.7	26850.9	26965.2	27143.2	27164.3	27298	27462.1	27707.1	27922.7	28071.8	28379.1	28874.8	29588.8	30086.8	30394.3	30900.5	31474.2
Total Este (tubería 8")	22977.2	23897.6	25062.2	26093.6	27365.2	28438.1	29095.2	29910	29984.6	29984.6	29985.1	30519.4	31462	31990.4	33197.9	34235.4	35383.6	36328.6	37346.5	38229.3	39515.5	40793.8	42060.4	43330.5	44211.8	44268.3	44318	44483.5	44658.4	44849.7
Portal Oeste (tubería 6")	221103	221109	221117	221126	221135	221142	221150	221160	221213	221213	221213	221218	221226	221233	221238	221252	221252	221252	221252	221258	222435	223856	225209	226530	228139	229915	231394	233005	234675	236284
Portal Oeste (tubería 8")	140744	143035	145215	147532	149852	151784	153986	154730	154730	154730	154730	156088	157757	160166	162439	162506	162506	162506	162506	164174	166127	168237	170383	172516	174849	176895	178663	180876	182980	185265
Clarificador	3626445	3627994	3630602	3632929	3635425	3637391	3639622	3641795	3643341	3645439	3647751	3649686	3651838	3653989	3655686	3657348	3659022	3660562	3662566	3664088	3665308	3667877	3669744	3671041	3673784	3675762	3677509	3679349	3681580	3683744
VOLUMEN BOMBEO (m³)																														
Portal Este (tubería 6")	397	43	262	338	377	332	217	274	117	140	350	444	133	304	257	114	178	21	134	164	245	216	149	307	496	714	498	308	506	574
Total Este (tubería 8")	255	920	1165	1031	1272	1073	657	815	75	0	1	534	943	528	1208	1038	1148	945	1018	883	1286	1278	1267	1270	881	57	50	166	175	191
Portal Oeste (tubería 6")	6	6	8	9	9	7	8	10	53	0	0	5	8	7	5	14	0	0	0	6	1177	1421	1353	1321	1609	1776	1479	1611	1670	1609
Portal Oeste (tubería 8")	1519	2291	2180	2317	2320	1932	2202	744	0	0	0	1358	1669	2409	2273	67	0	0	0	1668	1953	2110	2146	2133	2333	2046	1768	2213	2104	2285
Clarificador	1769	1549	2608	2327	2496	1966	2231	2173	1546	2098	2312	1935	2152	2151	1697	1662	1674	1540	2004	1522	1220	2569	1867	1297	2743	1978	1747	1840	2231	2164
CAUDAL PROYECTADO (gpm)																														
Portal Este (tubería 6")	73	8	48	62	69	61	40	50	21	26	64	81	24	56	47	21	33	4	25	30	45	40	27	56	91	131	91	56	93	105
Total Este (tubería 8")	47	169	214	189	233	197	120	149	14	0	0	98	173	97	221	190	211	173	187	162	236	234	232	233	162	10	9	30	32	35
Portal Oeste (tubería 6")	1	1	1	2	2	1	1	2	10	0	0	1	1	1	1	3	0	0	0	1	216	261	248	242	295	326	271	295	306	295
Portal Oeste (tubería 8")	278	420	400	425	425	354	404	136	0	0	0	249	306	442	417	12	0	0	0	306	358	387	393	391	428	375	324	406	386	419
Clarificador	324	284	478	427	458	360	409	398	283	385	424	355	395	394	311	305	307	282	367	279	224	471	342	238	503	363	320	337	409	397

m³: metro cúbico. Gpm: galones por minuto. Fuente: MSR, 2015.

Octubre 2015																															
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
LECTURA FLUJÓMETRO (m³)																															
Portal Este (tubería 6")	32099.8	32359.5	32585.8	32872.7	33208.7	33483.8	33852.5	34199.3	34907.2	35676.5	36279.6	37038.4	37447.9	38646.4	39632.7	40647.1	41596.7	41670.3	41777.6	42391.5	42931.9	43170.9	43296.9	43333.8	43353.5	43353.5	43357.5	43430.1	43470.3	43525	43553.3
Total Este (tubería 8")	44997	45466.8	46071.8	46659.4	47211.3	47806.9	47892.8	47892.8	47892.8	47896.4	47896.8	47896.8	47896.9	47902.1	47980.8	48000.5	48029.5	49311	50408.3	50803.6	51041.6	51336.5	51750.2	51759.3	52691.1	53344.7	53854.9	54032.9	54079.7	54494.6	54838.6
Portal Oeste (tubería 6")	238159	239754	241533	242858	244365	245966	247696	249457	251091	252203	253305	253305	253715	255115	256483	257872	258982	260280	261627	263087	264550	266529	267432	268983	270370	271935	273483	274453	275807	277297	278985
Portal Oeste (tubería 8")	187308	189447	191792	193933	195928	198074	198657	198657	198657	198830	198830	198830	199628	201780	203836	205998	208170	210055	212057	214112	215910	218341	219193	219193	220648	222814	224788	226747	228690	230665	232721
Clarificador	3686054	3687856	3689533	3691292	3693000	3694572	3696139	3698150	3700072	3702341	3704481	3706394	3708419	3710248	3711958	3713256	3714425	3716072	3717600	3719098	3720822	3722382	3723570	3725145	3726531	3728299	3729928	3731623	3732904	3733965	3738180
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	626	260	226	287	336	275	369	347	708	769	603	759	410	1199	986	1014	950	74	107	614	540	239	126	37	20	0	4	73	40	55	28
Total Este (tubería 8")	147	470	605	588	552	596	86	0	0	4	0	0	0	5	79	20	29	1282	1097	395	238	295	414	9	932	654	510	178	47	415	344
Portal Oeste (tubería 6")	1875	1595	1779	1325	1507	1601	1730	1761	1634	1112	1102	0	410	1400	1368	1389	1110	1298	1347	1460	1463	1979	903	1551	1387	1565	1548	970	1354	1490	1688
Portal Oeste (tubería 8")	2043	2139	2345	2141	1995	2146	583	0	0	173	0	0	798	2152	2056	2162	2172	1885	2002	2055	1798	2431	852	0	1455	2166	1974	1959	1943	1975	2056
Clarificador	2310	1802	1677	1759	1708	1572	1567	2011	1922	2269	2140	1913	2025	1829	1710	1298	1169	1647	1528	1498	1724	1560	1188	1575	1386	1768	1629	1695	1281	1061	4215
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	115	48	41	53	62	50	68	64	130	141	111	139	75	220	181	186	174	13	20	113	99	44	23	7	4	0	1	13	7	10	5
Total Este (tubería 8")	27	86	111	108	101	109	16	0	0	1	0	0	0	1	14	4	5	235	201	72	44	54	76	2	171	120	94	33	9	76	63
Portal Oeste (tubería 6")	344	292	326	243	276	294	317	323	300	204	202	0	75	257	251	255	204	238	247	268	268	363	166	284	254	287	284	178	248	273	309
Portal Oeste (tubería 8")	375	392	430	393	366	393	107	0	0	32	0	0	146	395	377	396	398	346	367	377	330	446	156	0	267	397	362	359	356	362	377
Clarificador	424	330	307	322	313	288	287	369	352	416	392	351	371	335	314	238	214	302	280	275	316	286	218	289	254	324	299	311	235	195	773

m³: metro cúbico. Gpm: galones por minuto. Fuente: MSR, 2015.

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

Agosto 2015																																
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Efluente Planta de Tratamiento Agua de Túneles (WW9)																																
pH	u.e.	6.99	7.52	7.53	7.55	7.67	7.87	7.85	7.75	7.67	7.53	7.62	7.69	7.49	7.70	7.58	7.66	7.39	7.55	7.53	7.57	7.24	Sin descarga	7.22	7.26	7.31	7.44	7.44	7.24	7.31	7.37	7.30
Temperatura	°C	26.3	26.1	28.7	28	25.5	28.3	27.5	26.3	28.7	26.9	26.7	27.1	28.1	28.3	27.2	27.2	27.3	27	26.4	28.2	27.4		22.8	25.4	25.9	26.7	27.3	26.4	26.8	26.4	27
Conductividad	µS/cm	1770	1626	1713	1892	1754	1745	1844	1803	1765	2030	2109	2152	1969	1763	2048	2087	1786	1778	1848	1843	2191		2185	1929	2140	2119	2053	1967	1901	2010	1741
Turbidez	NTU	9.5	3.75	11.2	11.1	4.67	28.3	27.7	3.39	8.86	7.14	4.94	7.39	6.24	10.5	21.2	7.42	8.79	8.86	6.2	7.56	6.4		10.8	6.84	4.13	7.89	11.2	6.67	6.6	4.12	15.2
kit CN	mg/L	0.001	0.006	0.003	0.001	0.001	0.000	0.000	0.005	0.002	0.006	0.000	0.000	0.000	0.001	0.002	0.001	0.002	0.004	0.000	0.005	0.000		0.001	0.002	0.003	0.000	0.002	0.003	0.000	0.002	0.004
CN Total		NA	NA	0.006	NA	NA	0.007	NA	NA	0.009	NA	NA	NA	NA	<0.003	NA	0.006	0.004	NA	NA	<0.003	NA	0.006	NA	NA	NA	NA	<0.003	NA	NA	NA	
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	9.86	9.48	9.55	9.58	9.66	9.35	9.25	8.84	8.83	8.65	8.73	7.69	7.96	8.17	7.92	7.98	8.25	8.47	9.19	9.39	9.06	8.94	Pileta sin agua	7.62	7.84	8.73	9.16				
Temperatura	°C	22.4	22.7	26.4	24.3	22.7	23.6	24.4	20.4	20.7	20.9	20.8	20	20.2	19.8	20.3	20.9	20.7	21.9	23.2	24.1	23.2	21.6		21.6	21.6	20.9	22.1				
Conductividad	µS/cm	1074	1077	1035	1049	1053	1090	1047	1422	1077	1312	1592	1632	551.4	347.6	194.8	288.2	227.2	137	135.9	126.6	251.6	250.9		81.22	120.7	141.4	137.4				
Turbidez	NTU	10.3	10.5	11.8	10.3	12.4	12.3	15.8	12.9	12.9	12.4	12.6	33	20.2	21.9	40.2	15.8	14	22.6	22.1	28.5	28.4	24.8		42.5	27.5	19.4	14.8				
Kit CN	mg/L	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.001	0.000	0.000		0.000	0.000	0.000	0.000				
CN Total		NA	NA	NA	0.005	NA	0.005	NA	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	NA	NA	<0.003	NA			

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

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		Septiembre 2015																													
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Efluente Planta de Tratamiento Agua de Túneles (WW9)																															
pH	u.e.	7.41	7.41	7.48	7.49	7.4	7.49	7.58	Sin descarga	7.36	6.88	7.37	7.39	7.86	7.49	7.49	7.56	7.53	7.73	7.7	7.72	6.3	7.53	8.52	7.45	7.43	8.29	7.41	7.81	9.17	7.66
Temperatura	°C	27.3	27	27.6	26.5	27.3	26.5	29.1		26.5	28.9	26.8	26.8	27.2	26.9	27.4	26.8	27.1	26.7	27.3	27.2	28.4	27	26.4	26.5	26	22.9	26.8	27.6	26.8	26.5
Conductividad	µS/cm	2088	1942	1946	1955	2046	1951	1961		1975	2303	2322	1893	1951	1916	2059	2013	2004	2006	1982	2119	2068	2016	1990	1969	1946	1578	1984	2672	2053	1852
Turbidez	NTU	11.5	8.74	4.2	5.89	5.58	4.45	8.76		6.86	8.29	4.15	4.91	6	9.14	8.21	5.98	27.1	6.13	4.33	8.44	4.35	6.39	9.24	3.29	4.97	4.23	4.12	3.8	9.57	5.53
kit CN	mg/L	0.000	0.000	0.004	0.003	0.003	0.006	0.003		0.004	0.007	0.000	0.002	0.003	0.002	0.001	0.006	0.006	0.002	0.001	0.000	0.010	0.006	0.005	0.003	0.005	0.005	0.007	0.008	0.000	0.017
CN Total		NA	NA	NA	0.004	NA	<0.003	NA		NA	<0.003	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	0.004	NA	NA	NA	NA	NA	NA	NA	0.006	NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																															
pH	u.e.	8.71	8.65	8.15	8.34	8.21	8.13	8.13	9.03	9.17	8.81	7.72	7.96	9.21	8.92	8.9	8.87	8.96	9.03	9.14	8.81	8.9	8.83	7.73	7.98	8.05	8.29	8.55	8.71	8.4	8.45
Temperatura	°C	21.7	23.1	22.1	22.6	22.2	24.7	23.3	22.8	22.7	23.3	23	24.4	23.8	24.5	23.3	23.5	23.4	22.7	23.4	23.2	23.1	22.2	22.3	23.4	21.7	22.9	23.1	23.6	23.5	22.6
Conductividad	µS/cm	239.3	156.4	228.1	90.85	221.6	183	562.4	103.9	110.1	656.3	261.8	593.1	272.2	216.7	108.6	200.2	134.9	348	130.8	122.3	174.1	443.8	1394	1571	1582	1578	1668	1722	1399	1281
Turbidez	NTU	14	9.32	63.8	40.4	35.5	27.9	25.1	27.5	27.3	31	29	27.1	26.8	25.4	22.1	20.3	13.4	11	9.34	19.7	13.8	15.7	6.5	3.84	6.15	4.23	5.76	6.07	29.9	31.6
Kit CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.003	0.001	0.009	0.000	0.000	0.000	0.006
CN Total		NA	NA	NA	<0.003	NA	NA	0.003	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	<0.003	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, 2015.

		Octubre 2015																														
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Efluente Planta de Tratamiento Agua de Túneles (WW9)																																
pH	u.e.	6.94	7.32	7.42	7.49	7.64	7.97	7.69	7.5	7.61	7.76	7.65	8.41	7.4	7.6	7.43	7.61	7.13	7.86	7.7	7.7	7.6	7.34	7.38	7.17	7.25	7.43	7.64	7.83	7.22	6.6	6.78
Temperatura	°C	27.1	27	26.8	25.2	27.6	26	25.8	26.5	26.4	26.2	26.4	23.3	26.9	26.9	26.9	26.7	25.9	24.7	22.1	24.8	26.8	27.3	26.1	28.2	25.1	27.1	27.5	25.8	27	26.8	28
Conductividad	µS/cm	2273	2175	2564	1847	1842	2082	1918	1919	1962	2041	2898	2224	1807	2082	1881	2043	1896	1824	1882	1868	1835	2178	1613	1956	1968	1970	1956	1959	2023	2035	1949
Turbidez	NTU	2.34	5.77	8.48	8.72	3.54	2.71	1.37	2.86	4.33	4.02	2.09	2.57	7.48	5.22	6.6	4.58	2.16	4.43	6.86	5.2	6.89	3.78	9.76	6.46	1.93	5.19	4.3	2.15	6.44	3.57	2.27
kit CN	mg/L	0.006	0.007	0.004	0.000	0.001	0.000	0.001	0.003	0.003	0.003	0.001	0.002	0.002	0.000	0.004	0.005	0.006	0.004	0.006	0.007	0.007	0.007	0.005	0.007	0.007	0.008	0.006	0.008	0.008	0.006	0.011
CN Total		0.003	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	0.009	NA	NA	0.004	NA	NA	NA	0.007	NA	NA	NA	0.004	NA	NA	0.008	NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																
pH	u.e.	8.47	8.51	8.5	8.02	7.72	7.91	8.14	8.26	8.45	8.64	8.8	8.98	8.99	9.35	9.25	9.29	9.27	9.02	6.24	8.4	8.37	7.76	8.18	8.22	8.34	8.19	8.23	8.58	8.49	8.46	8.48
Temperatura	°C	22.7	23.7	24.4	23.8	24.8	23.7	22.2	23	22.7	22.6	21.9	22.3	21.9	22.5	22.9	22.2	21.6	22	21.5	21.5	21.8	23	23.3	24.9	25.5	23.9	23.6	23.1	24.1	23.9	24.8
Conductividad	µS/cm	1435	1407	1308	1325	1262	1061	1049	1052	967.8	961.5	1016	1251	1219	1144	991	925.3	1071	1057	168.3	805.1	803.5	873	932.2	1090	857.4	1638	794.8	789.6	802.3	795.4	792.2
Turbidez	NTU	19.9	16.1	15.4	18.8	15.9	17.9	17	13.4	14.1	12.3	11.9	13	12.4	12.6	12.7	13.2	13.9	12.1	21.3	47.9	45.1	15	9.83	7.82	18.2	6.85	6	12.1	4.18	5.31	2.54
kit CN	mg/L	0.000	0.003	0.000	0.004	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.001	0.000	0.000	0.005	0.004	0.003	0.001	0.000	0.000	0.000	0.009	0.003	0.001	0.001	0.000
CN Total		NA	NA	NA	NA	0.009	NA	NA	NA	NA	NA	NA	0.007	NA	NA	NA	0.008	NA	NA	NA	NA	NA	0.008	NA	0.004	NA	NA	NA	NA	NA	<0.003	NA

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

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

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

11.3 Resultados crudos de calidad de aire

11.3.1 Material Particulado (PM₁₀)

BGI PQ200 Air Sampling System

Downloaded August 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	651	645	649	mmHg
TA	29.5	18.4	22.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-Aug-15	15:20:00
Stop:	12-Aug-15	15:20:00

Mass Concentration Data:

Filter ID:	2734-0101
Final Wt:	146.530 mg
Initial Wt:	146.000 mg
Delta Wt:	0.530 mg
Total Vol:	20.76 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 25.53 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded August 2015

Job Details:

Job Name: EA-1B
Version: PQ200
Serial No: 1.00
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	648	651	mmHg
TA	31.5	17.2	22.3	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	20-Aug-15	15:05:00
Stop:	21-Aug-15	15:05:00

Mass Concentration Data:

Filter ID:	2739-0606
Final Wt:	145.400 mg
Initial Wt:	144.630 mg
Delta Wt:	0.770 mg
Total Vol:	20.80 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 37.02 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded August 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	642	629	633	mmHg
TA	31.3	17.8	23.1	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	5-Aug-15	08:27:00
Stop:	6-Aug-15	08:27:00

Mass Concentration Data:

Filter ID:	2707-0606
Final Wt:	144.020 mg
Initial Wt:	143.560 mg
Delta Wt:	0.460 mg
Total Vol:	20.16 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 22.82 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 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	628	624	626	mmHg
TA	30.0	15.8	21.1	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	14-Aug-15	11:57:00
Stop:	15-Aug-15	11:57:00

Mass Concentration Data:

Filter ID:	2735-0202
Final Wt:	147.010 mg
Initial Wt:	146.800 mg
Delta Wt:	0.210 mg
Total Vol:	20.07 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 10.46 µg/m³

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

Notes 2: Minera San Rafael, S.A.

BGI PQ200 Air Sampling System

Downloaded August 2015

Job Details:

Job Name: EA-3A
Version: PQ200
Serial No: 1.00
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	644	645	mmHg
TA	32.2	16.6	22.1	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	14-Aug-15	12:43:00
Stop:	15-Aug-15	12:43:00

Mass Concentration Data:

Filter ID:	2736-0303
Final Wt:	150.300 mg
Initial Wt:	149.830 mg
Delta Wt:	0.470 mg
Total Vol:	20.62 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 22.79 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 2015

Job Details:

Job Name: EA-4A
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	652	646	650	mmHg
TA	32.4	16.6	23.1	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	18-Aug-15	14:31:00
Stop:	19-Aug-15	14:31:00

Mass Concentration Data:

Filter ID:	2737-0404
Final Wt:	145.940 mg
Initial Wt:	145.440 mg
Delta Wt:	0.500 mg
Total Vol:	20.71 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 24.14 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 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	654	649	652	mmHg
TA	30.0	15.3	22.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	18-Aug-15	14:50:00
Stop:	19-Aug-15	14:50:00

Mass Concentration Data:

Filter ID:	2738-0505
Final Wt:	147.270 mg
Initial Wt:	146.970 mg
Delta Wt:	0.300 mg
Total Vol:	20.80 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 14.43 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 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	645	641	643	mmHg
TA	30.3	17.2	21.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	20-Aug-15	11:47:00
Stop:	21-Aug-15	11:47:00

Mass Concentration Data:

Filter ID:	2740-0707
Final Wt:	148.440 mg
Initial Wt:	148.020 mg
Delta Wt:	0.420 mg
Total Vol:	20.58 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 20.41 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 2015

Job Details:

Job Name: EA-7A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	653	647	651	mmHg
TA	29.5	18.5	22.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-Aug-15	14:57:00
Stop:	12-Aug-15	14:57:00

Mass Concentration Data:

Filter ID:	2709-0808
Final Wt:	147.780 mg
Initial Wt:	147.370 mg
Delta Wt:	0.410 mg
Total Vol:	20.82 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 19.69 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Reporte Analítico RA-15-11396

Cliente: Minera San Rafael

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

Proyecto: 178-055 (El Escobal)

Análisis de muestras: Septiembre, 07 al 09 de 2015.

Emisión de reporte: Septiembre, 09 de 2015

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

Análisis: Gravimetría en filtros.

Método analítico: 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM₁₀ in the Atmosphere. **Acreditado ISO 17025**

No.	Identificación de la muestra	Código de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2734-0101	0.14600	0.14653
2	EA-1B	2739-0606	0.14463	0.14540
3	EA-2A	2707-0606	0.14356	0.14402
4	EA-3	2735-0202	0.14680	0.14701
5	EA-3A	2736-0303	0.14983	0.15030
6	EA-4A	2737-0404	0.14544	0.14594
7	EA-5A	2738-0505	0.14697	0.14727
8	EA-6	2740-0707	0.14802	0.14844
9	EA-7A	2709-0808	0.14737	0.14778
10	EA-10	2769-0707	0.15469	0.15470

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11371, RA-15-11383 y RA-15-11395

Reporte Analítico RA-15-11396

Anexos:

Anexo 1. Cadena de Custodia R-02-000497.

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

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

Lic. Eddy Mendoza
Director de Laboratorio

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Sept., 09/15	E.M.	Sept., 09/15	E.M.	Sept., /15	01

BGI PQ200 Air Sampling System

Downloaded September 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	650	644	648	mmHg
TA	26.3	17.4	28.0	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	22-Sep-15	15:08:00
Stop:	23-Sep-15	15:08:00

Mass Concentration Data:

Filter ID:	2765-0303
Final Wt:	145.150 mg
Initial Wt:	144.930 mg
Delta Wt:	0.220 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 9.15 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded September 2015

Job Details:

Job Name: EA-2A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	635	632	633	mmHg
TA	28.0	17.6	20.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Sep-15	10:40:00
Stop:	17-Sep-15	10:40:00

Mass Concentration Data:

Filter ID:	2763-0101
Final Wt:	152.210 mg
Initial Wt:	151.760 mg
Delta Wt:	0.450 mg
Total Vol:	19.92 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 22.59 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded September 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	628	625	626	mmHg
TA	28.6	16.8	20.5	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Sep-15	11:45:00
Stop:	17-Sep-15	11:45:00

Mass Concentration Data:

Filter ID:	2764-0202
Final Wt:	144.350 mg
Initial Wt:	144.070 mg
Delta Wt:	0.280 mg
Total Vol:	20.11 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 13.92 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded September 2015

Job Details:

Job Name: EA-7A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	651	646	649	mmHg
TA	26.0	18.1	20.2	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	22-Sep-15	14:35:00
Stop:	23-Sep-15	14:35:00

Mass Concentration Data:

Filter ID:	2766-0404
Final Wt:	146.720 mg
Initial Wt:	146.460 mg
Delta Wt:	0.260 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 10.82 µg/m³

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

Reporte Analítico RA-15-11413

Cliente:	Minera San Rafael
Dirección:	Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto:	178-055 (El Escobal)
Análisis de muestras:	Septiembre, 07 al 08 de 2015
Emisión de reporte:	Septiembre, 09 de 2015
Tipo de muestra:	Filtros de cuarzo utilizados para colección de material particulado en aire.
Análisis:	Gravimetría en filtros.
Método analítico:	40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM ₁₀ in the Atmosphere. Acreditado ISO 17025

No.	Identificación de la muestra	Código de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2765-0303	0.14493	0.14515
2	EA-2A	2763-0101	0.15176	0.15221
3	EA-3	2764-0202	0.14407	0.14435
4	EA-7A	2766-0404	0.14646	0.14672
5	EA-8	2767-0505	0.14665	0.14715
6	EA-10	2768-0686	0.14873	0.14862

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11395

Reporte Analítico RA-15-11413



Anexos:

Anexo 1. Cadena de Custodia R-02-000499.

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

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

Lic. Eddy Mendoza
Director de Laboratorio
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Oct., 09/15	J.J.	Oct., 12/15	E.M.	Oct., 12/15	01

BGI PQ200 Air Sampling System

Downloaded October 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	650	645	648	mmHg
TA	27.8	18.0	21.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	14-Oct-15	15:25:00
Stop:	15-Oct-15	15:25:00

Mass Concentration Data:

Filter ID:	2780-0101
Final Wt:	146.380 mg
Initial Wt:	146.090 mg
Delta Wt:	0.290 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 12.06 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded October 2015

Job Details:

Job Name: EA-2A
Version: PQ200
Serial No: 1.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	632	624	626	mmHg
TA	27.7	16.0	19.5	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	26-Oct-15	11:05:00
Stop:	27-Oct-15	11:05:00

Mass Concentration Data:

Filter ID:	2784-0505
Final Wt:	151.350 mg
Initial Wt:	151.030 mg
Delta Wt:	0.320 mg
Total Vol:	19.92 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 16.06 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded October 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	628	621	625	mmHg
TA	25.0	16.9	19.3	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	20-Oct-15	15:30:00
Stop:	21-Oct-15	15:30:00

Mass Concentration Data:

Filter ID:	2782-0303
Final Wt:	147.400 mg
Initial Wt:	147.190 mg
Delta Wt:	0.210 mg
Total Vol:	20.16 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 10.42 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded October 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	651	646	649	mmHg
TA	28.5	19.3	22.6	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	14-Oct-15	14:55:00
Stop:	15-Oct-15	14:55:00

Mass Concentration Data:

Filter ID:	2781-0202
Final Wt:	150.270 mg
Initial Wt:	149.900 mg
Delta Wt:	0.370 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 15.39 µg/m³

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

Reporte Analítico RA-15-11427

Cliente: Minera San Rafael

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

Proyecto: 178-055 (El Escobal)

Análisis de muestras: Noviembre, 06 al 09 de 2015

Emisión de reporte: Noviembre, 10 de 2015

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

Análisis: Gravimetría en filtros.

Método analítico: 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM₁₀ in the Atmosphere. **Acreditado ISO 17025**

No.	Identificación de la muestra	Código de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2780-0101	0.14609	0.14638
2	EA-2A	2784-0505	0.15103	0.15135
3	EA-3	2782-0303	0.14719	0.14740
4	EA-7A	2781-0202	0.14990	0.15027
5	EA-8	2785-0606	0.14605	0.14662
6	EA-10	2786-0707	0.15093	0.15094
7	EA-2A	2783-0404	0.14951	0.14985

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11410

Reporte Analítico RA-15-11427



Anexos:

Anexo 1. Cadena de Custodia R-02-000500.

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

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

Lic. Eddy Mendoza
Director de Laboratorio
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Nov., 10/15	J.J.	Oct., 10/15	E.M.	Oct., 11/15	01

CADENA DE CUSTODIA

Laboratorio Ambiental, S.A.
Tronco 1, Sector E, Lote 14 El Encinal, zona 7 de Mixco, Guatemala, Guatemala.
Teléfono: 24318187, Fax 24318108 ext. 102
www.laboratorio-ambiental.com



Información General			
Empresa	Minera San Rafael		
Contacto	Ing. Miguel Berganza		
Dirección	20 y 24-va Blvd. Los Próceros, Empresarial Zona Prodepa, Torre IV Of. 1406, Z-10.		
Ciudad	GT	País	GT
Teléfono	59515248	Fax	-
e-mail	M.Berganza@sanrafael.com.gt		

Información para el Reporte	
Word	<input checked="" type="checkbox"/> Reportar a: Miguel Berganza
PDF	<input type="checkbox"/> Proyecto: Mina El Encinal
Excel	<input checked="" type="checkbox"/> Orden de Trabajo ¹ :
Impresión	<input type="checkbox"/> Dirección: /
Otro	<input type="checkbox"/>
Observaciones	

Plazo de entrega de Reporte (PER) ²	
PER Regular:	<input checked="" type="checkbox"/> 6 a 8 días Laborales
PER agilizado: (previa aprobación vía e-mail)	<input type="checkbox"/> 48 a 72 horas
	<input type="checkbox"/> 72 a 96 horas
Otro:	

Cadena de Custodia No.	
R-02-	000500
Pág. 1 de 1	

- Instrucciones:**
Completar la información solicitada con letra legible.
1. Para uso exclusivo de Laboratorio Ambiental dejar en blanco
2. Marque con una "x" sobre las opciones que desee sean tomadas en consideración.
3. Colocar el número de recipientes que correspondan a la descripción del encabezado.

No.	Identificación de las Muestra	Identificación laboratorio ¹	Fecha del muestreo	No. Total recipiente	Descripción recipiente ³			Tipo de Matriz ²						Preservante ³		Parámetros a analizar ²												Observaciones						
					Vidrio	Porta filtros	Plástico	Agua	Aire	Filtros	Macroinvertebrados	Peaces	Fauna y Flora	Otros	Frijo	HNO3	H2SO4	HCl	NaOH	Etanol	Otro	Físico-químico de Agua							Filtros	Aire	Biología			
1	EA-1A	2780-0101	14/10/15	1	✓																													Favor devolver filtro.
2	EA-2A	2784-0505	26/10/15	1	✓																												" "	
3	EA-3	2782-0303	29/10/15	1	✓																												" "	
4	EA-7A	2781-0202	14/10/15	1	✓																												" "	
5	EA-B	2785-0606	30/10/15	1	✓																												" "	
6	EA-10	2786-0707	28/10/15	1	✓																												" "	
7	EA-2A	2783-0404	21/10/15	1	✓																												Favor devolver filtro.	
8																																		
9																																		
10																																		
11																																		
12																																		
13																																		
14																																		
15																																		
16																																		
17																																		
18																																		
19																																		
Ingreso	Material Entregado por/Firma	Erik von Quadenow		Fecha	3/11/15		Hora	-														Para Uso Exclusivo del laboratorio ¹												
	Material Recibido por/Firma	Leuis Rosado JR		Fecha	06/11/15		Hora	09:00		Estado de las muestras	Bueno <input checked="" type="checkbox"/>		Malo <input type="checkbox"/>		(especificar en observaciones)																			
Egreso	Material Entregado por/Firma			Fecha			Hora			Temperatura de muestras:	No Aplica		pH: No Aplica																					
	Material Recibido por/Firma			Fecha			Hora			Observaciones:																								

Nota: F=fluoruros; Cl=cloruros; SO4²⁻=sulfatos; NO3⁻=nitratos; NO2⁻=nitritos; Mg=magnesio; K=potasio; Ca=calcio; Na = sodio; Si = silicio; Hg = mercurio; C = carbono. TOC = carbón orgánico total; Id.Tax. = identificación taxonómica. HNO3 = ácido nítrico; H2SO4 = ácido sulfúrico; HCl = ácido clorhídrico. Agregar % de la solución de etanol empleada para preservar o "x" G" si se utiliza en solución con glicerina.

11.3.2 Informe de Metales en PM₁₀

Reporte Analítico RA-15-11397

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-058 (El Escobal)
Análisis de muestras: Septiembre, 18 de 2015
Emisión del reporte: Septiembre, 30 de 2015

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

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

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

*Parámetros	LDM (µg)	Estación							
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A	EA-10
Código de filtro		2739-0606	2707-0606	2736-0303	2737-0404	2738-0505	2740-0707	2709-0808	2769-0707
Aluminio (Al)	5.0	6.1	6.9	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Antimonio (Sb)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsénico (As)	0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
Azufre (S)	2.5	15.8	15.5	13.9	18.4	17.0	16.9	12.9	3.9
Bario (Ba)	0.10	0.21	0.78	0.13	0.12	0.45	< 0.10	0.12	< 0.10
Berilio (Be)	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Bismuto (Bi)	0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
Boro (B)	0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
Cadmio (Cd)	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Calcio (Ca)	5.0	18.6	20.3	11.9	12.5	9.7	11.1	13.2	6.1
Cromo (Cr)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cobalto (Co)	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cobre (Cu)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Estaño (Sn)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Estroncio (Sr)	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fósforo (P)	2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Hierro (Fe)	5.0	6.7	8.5	7.6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Reporte Analítico RA-15-11397

*Parámetros	LDM (µg)	Estación							
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A	EA-10
Código de filtro		2739-0606	2707-0606	2736-0303	2737-0404	2738-0505	2740-0707	2709-0808	2769-0707
Magnesio (Mg)	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Manganeso (Mn)	0.10	0.36	0.53	0.53	0.22	0.13	0.15	0.54	< 0.10
Molibdeno (Mo)	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Níquel (Ni)	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Plata (Ag)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Plomo (Pb)	0.30	< 0.30	0.36	< 0.30	< 0.30	< 0.30	< 0.30	0.65	< 0.30
Potasio (K)	10.0	11.0	< 10.0	< 10.0	11.0	< 10.0	< 10.0	< 10.0	< 10.0
Selenio (Se)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Silicio (Si)	1.0	23.8	20.8	20.8	20.8	19.2	19.8	16.3	12.5
Sodio (Na)	5.0	11.0	17.7	9.1	11.7	11.5	12.2	7.7	5.6
Talio (Tl)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanio (Ti)	0.10	0.32	0.29	0.33	0.18	0.13	0.20	0.23	< 0.10
Uranio (U)	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Vanadio (V)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Zinc (Zn)	0.50	< 0.50	1.07	< 0.50	< 0.50	< 0.50	< 0.50	0.62	< 0.50
Zirconio (Zr)	0.50	< 0.50	< 0.50	< 0.50	< 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.

Reporte Analítico RA-15-11397

Anexos:

Anexo 1. Cadena de Custodia R-02-000497

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

Lic. Eddy Mendoza
Director de Laboratorio
Colegiado: 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Sept., 21/15	D.S./E.M.	Sept., 24/15	E.M	Sept., 30/15	01

11.3.3 Informe sobre PST y Gases de Combustión.



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

Septiembre 2015

San Rafael Las Flores, Santa Rosa, Guatemala

Octubre de 2015

Este resumen presenta los resultados del monitoreo de calidad del aire realizado para el proyecto minero El Escobal (**el Proyecto**). El monitoreo fue realizado por Consultoría y Tecnología Ambiental, S.A. (**CTA**) del 7 al 10 de Septiembre de 2015 para gases de combustión y del 7 de Septiembre al 6 de Octubre para PST, en San Rafael Las Flores, Santa Rosa, donde se ubica el Proyecto. El propósito del monitoreo fue determinar la calidad de aire ambiental en comunidades aledañas mediante la medición de la concentración de:

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

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

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

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

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

Cuadro 2: Metodologías utilizadas para SO₂, NO₂ y PST

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

Fuente: CTA, 2015.

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

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

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en Septiembre de 2015; y en el Cuadro 4 se presentan los resultados de la medición de PST (realizada del 10 Septiembre de 2015 al 6 de Octubre de 2015).

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

Estaciones de Muestreo	LDM ¹	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guías del Banco
SO₂	13.0	<13	<13	<13	<13	<13	<13	<13	20 µg/m ³
NO₂	9.0	22	11	16	24	20	14	11	*40µg/m ³

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

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

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

Cuadro 4: Resultados de la medición de PST

Estaciones de Muestreo	Unidad	LDM	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía de BC
Sólidos Insolubles	g/(m ² x 30 días)	0.0019	3.49	1.90	2.51	4.00	1.00	1.22	1.53	
Sólidos Solubles	g/(m ² x 30 días)	0.017	2.02	2.41	2.15	2.41	2.07	2.31	2.88	
Sólidos Totales	g/(m ² x 30 días)	0.019	5.51	4.31	4.66	6.40	3.07	3.53	4.41	
Sólidos Totales	mg/(dm² X día)	0.0063	1.84	1.44	1.55	2.13	1.02	1.18	1.47	*2.9

g: gramos. m²: metro cuadrado. mg: miligramos. dm²: decímetro cuadrado. *: valor referido para un período promedio de un mes. Fuente: Laboratorio Ambiental, S. A., 2015.

Gases de Combustión

SO₂:

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

NO₂:

- En todas las estaciones de muestreo se obtuvieron resultados detectables, pero ninguna supera el valor establecido por El Banco (**40 µg/m³**). Las estaciones EA-4A, EA-1C y EA-5A presentan las concentraciones más altas (siendo estas 24 µg/m³, 22 µg/m³ y 20 µg/m³) mientras que las estaciones EA-2B y EA-7A presentan los valores más bajos de concentración (11 µg/m³).

Partículas Sedimentables Totales

- Las estaciones EA-4A presenta la mayor cantidad de sólidos totales, con concentraciones de 2.13 mg/ (dm² x día). La estación EA-5A presentó la menor cantidad de sólidos totales obteniéndose un valor de 1.02 mg / (dm² x día). Todas las estaciones se encuentran por debajo del valor de la guía utilizado de **2.9 mg/(dm² X día)**.



Anexos

Anexo 1-1: Reportes analíticos

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-057 (CTA)
Fecha de muestreo: Septiembre, 07 al 10 de 2015
Fecha de análisis: Septiembre, 21 de 2015
Emisión del reporte: Septiembre, 23 de 2015

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

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

Métodos analíticos:

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

Cuadro 1: Ubicación de estaciones de muestreo

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-1C	Frente a Escuela San Rafael	E (m): 803,887 N (m): 1,601,801		Casa dentro del pueblo, caminos pavimentados con flujo de vehículos medio, vientos fuertes. Campo de fútbol de tierra frente a la casa.
EA-2B	Aldea La Cuchilla	E (m): 806,470 N (m): 1,601,796		Camino de terracería poco tráfico vehicular, transitan especialmente motos. Construcción de casas con adobe en los alrededores, uso de leña para cocinar en la vivienda y en casas

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
				cercanas.
EA-3B	Aldea El Fucío	E (m): 806,538 N (m): 1,600,367		Camino de terracería cercano al terreno, tráfico vehicular moderado.
EA-4A	Aldea La Puerta de Los Ángeles	E (m): 805,142 N (m): 1,599,903		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan cantidades considerables de polvo. Evidencia de quema de leña para cocinar.
EA-5A	Aldea Sábana Redonda	E (m): 804,352 N (m): 1,600,404		El terreno está cerca de la carretera principal, está en campo abierto y cercano a una fábrica de block.
EA-6	Norte del proyecto, ruta a Mataquesuintla	E (m): 805,168 N (m): 1,603,247		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno, uso de leña en casas cercanas (más de 20 m).

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	E (m): 805,425 N (m): 1,601,523		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino.

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

Cuadro 2: Resultados gases de combustión SO₂ y NO₂

Parámetro	Unidades	LDM	Identificación de las muestras						
			EA-2B	EA-5A	EA-7A	EA-3B	EA-4A	EA-1C	EA-6
Fecha de muestreo (Sept, 2015)			07 al 08	08 al 09	08 al 09	07 al 08	08 al 09	09 al 10	09 al 10
SO ₂	µg/m ³	13	< 13	< 13	< 13	< 13	< 13	< 13	< 13
	ppm	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
NO ₂	µg/m ³	9	11	20	11	16	24	22	14
	ppm	0.005	0.006	0.010	0.006	0.009	0.013	0.012	0.007

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-6	DEA-4A	Unidades	Teórica	Real
SO ₂	µg/m ³	NA	< 13	µg	15.28	15.34
	ppm	NA	< 0.005			
NO ₂	µg/m ³	14	NA	µg/mL	1.000	0.990
	ppm	0.008	NA			

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

Anexos:

- Anexo 1. Cadena de custodia R-02-000671.
- Anexo 2. Cadena de custodia R-02-000673
- Anexo 3. Cadena de custodia R-02-000674.

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



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



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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Sept., 23/15	E.M.	Sept., 23/15	A.G.J.	Sept., 28/15	01





Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-057 (CTA)
Fecha de muestreo: Septiembre 06 a Octubre 07, de 2015
Lugar de muestreo: San Rafael las Flores, Santa Rosa, Guatemala
Fecha de análisis: Octubre, 07 al 16 de 2015
Emisión del reporte: Octubre, 21 de 2015

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

Cuadro 1: Ubicación de estaciones de muestreo

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales
EA-1C	Frente a Escuela San Rafael	N: 1,601,801 E: 803,887		Casa dentro del pueblo, caminos pavimentados, vientos fuertes. Campo de foot ball de tierra frente a la casa. Hay presencia de lluvia en el sector.
EA-2B	Aldea La Cuchilla	N: 1,601,796 E: 806,470		Camino de terracería poco tráfico vehicular, transitan especialmente motos. Construcción de casas con adobe en los alrededores. Se observó evidencia de que el camino de terracería recibió mantenimiento. Hay presencia de lluvia en el sector.

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

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales
EA-3B	Aldea El Fucío	N: 1,600,367 E: 806,538		Camino de terracería cercano al terreno, tráfico vehicular moderado. Hay presencia de lluvia en el sector.
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, se estaban realizando trabajos de construcción. Hay 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. Hay presencia de lluvia en el sector.
EA-6	Norte del proyecto, ruta a Mataquescuintla	N: 1,603,247 E: 805,168		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno. Hay presencia de lluvia en el sector.

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	N: 1,601,523 E: 805,425		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino. Hay presencia de lluvia en el sector.

Coordenadas en metros (m). Datum: NAD83 UTM zona 15 N ²: Factores ambientales que pueden influir en los resultados.

Cuadro 2: Resultados Partículas Sedimentables Totales (PST)

No.	Identificación de la muestra	Tasa de sedimentación			
		Material insoluble en agua [g/(m ² ·30 días)]	Material soluble en agua [g/(m ² ·30 días)]	Total* para un periodo de 30 días [g/(m ² ·30 días)].	Total* para un periodo de 1 día [mg/(dm ² · día)].
LDM		0.0019	0.017	0.019	0.006
1	EA-1C	3.49	2.02	5.51	1.84
2	EA-2B	1.90	2.41	4.31	1.44
3	EA-3A	2.51	2.15	4.66	1.55
4	EA-4A	4.00	2.41	6.40	2.13
5	EA-5A	1.00	2.07	3.07	1.02
6	EA-6	1.22	2.31	3.53	1.18
7	EA-7A	1.53	2.88	4.41	1.47

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

Anexos:

Anexo 1. Cadena de Custodia R-02-000687

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



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Especialista ambiental, Director de Laboratorio

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
J.J.	Oct., 21/15	D.S.	Oct., 21/15	A.G.J.	Oct., 22/15	01

11.3.4 Presión Sonora

ER-1

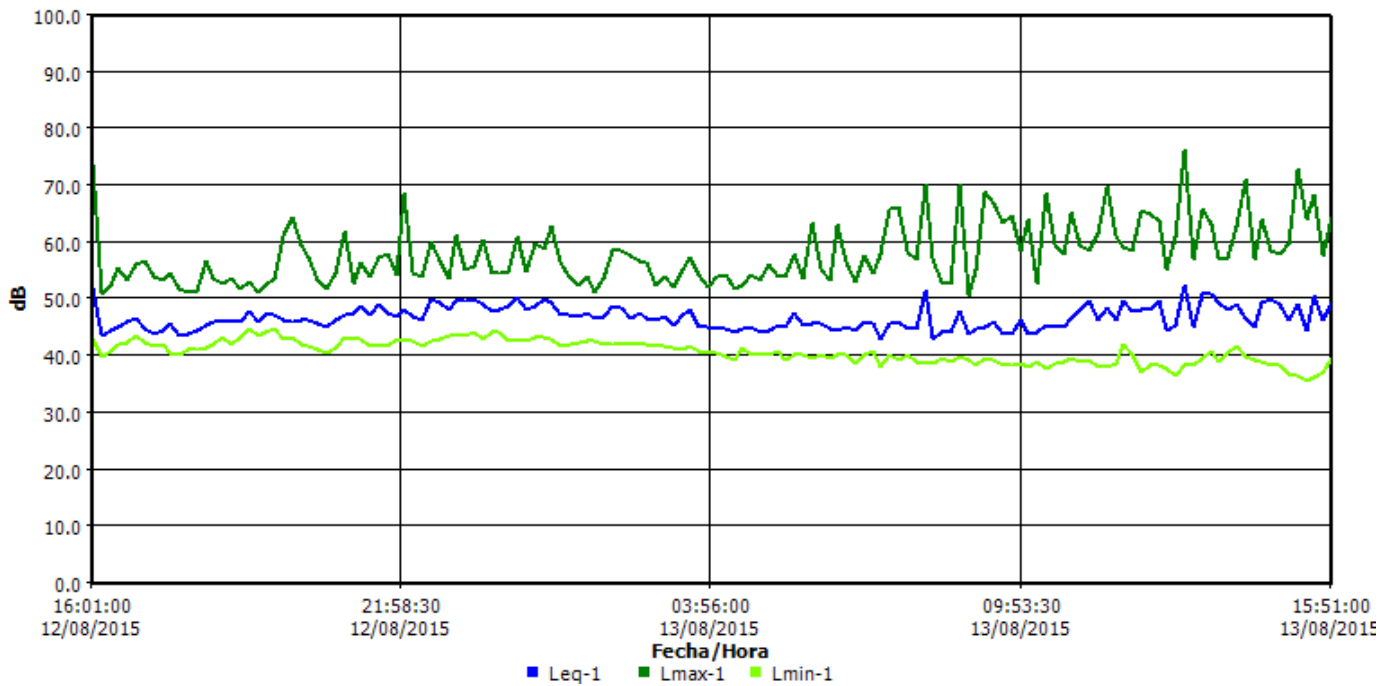
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S105
Hora de inicio Miércoles, 12 de Agosto de 2015 15:51:00
Hora de paro Jueves, 13 de Agosto de 2015 15:51:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	35.5 dB	Lmax	1	76.2 dB
Lpk	1	100 dB	Leq	1	47.2 dB

Gráfica de datos de registro



ER-1A

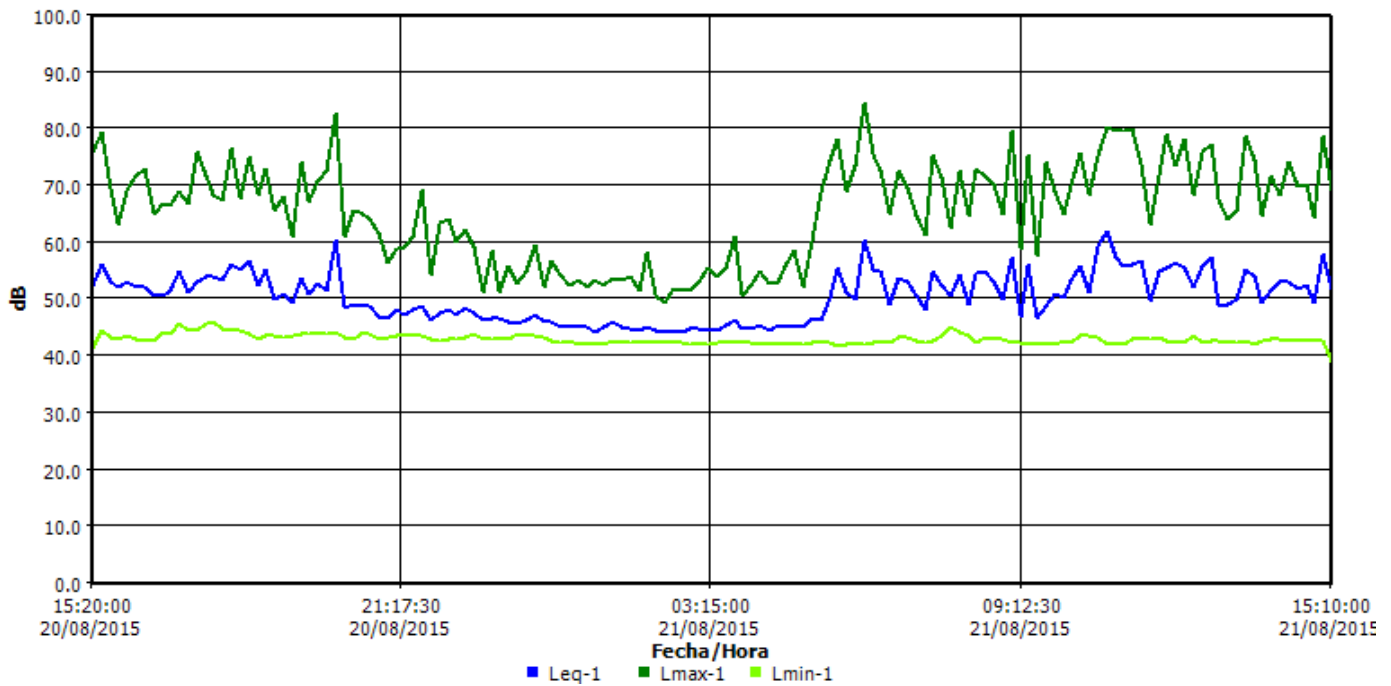
Panel de información

Ubicación San Rafael Las Flores
Nombre ER-1A
Sesión padre S202
Hora de inicio Jueves, 20 de Agosto de 2015 15:10:00
Hora de paro Viernes, 21 de Agosto de 2015 15:10:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.1 dB	Lmax	1	84.7 dB
Lpk	1	97.4 dB	Leq	1	52.5 dB

Gráfica de datos de registro



ER-2

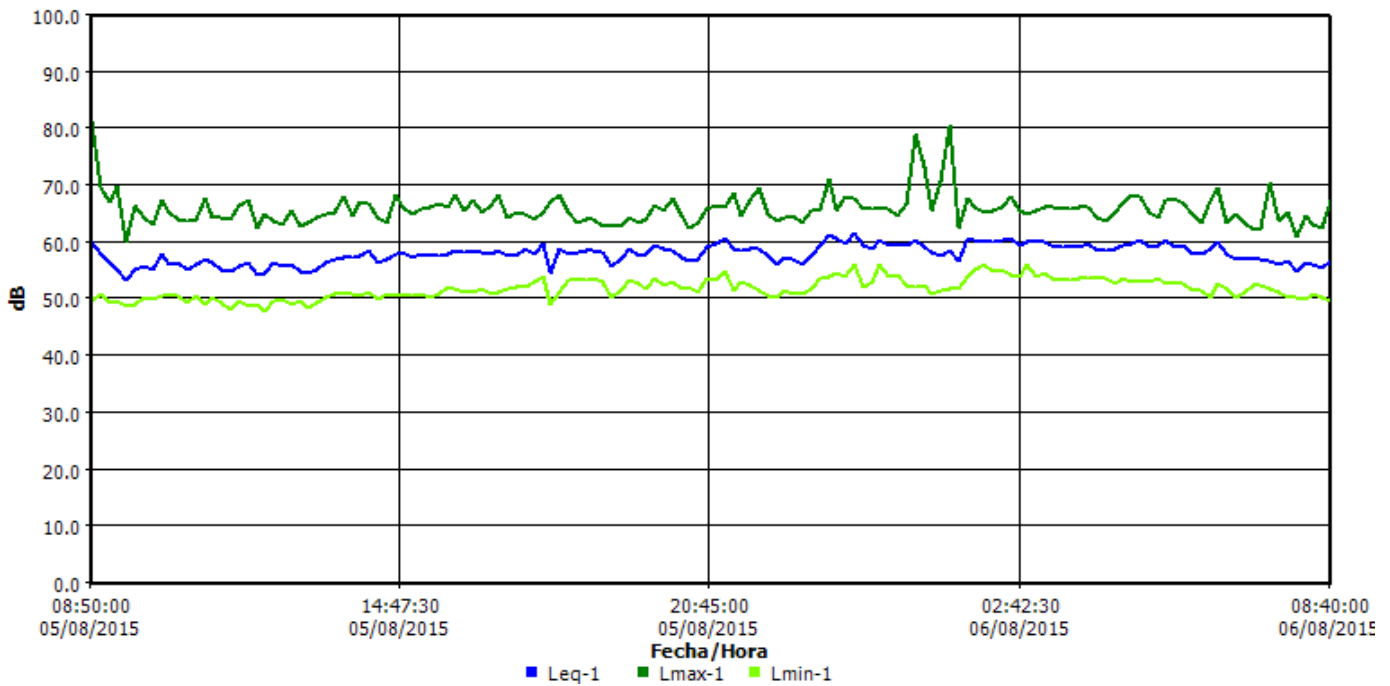
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S197
Hora de inicio Miércoles, 05 de Agosto de 2015 08:40:00
Hora de paro Jueves, 06 de Agosto de 2015 08:40:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	48 dB	Lmax	1	81.2 dB
Lpk	1	98 dB	Leq	1	58.2 dB

Gráfica de datos de registro



ER-3

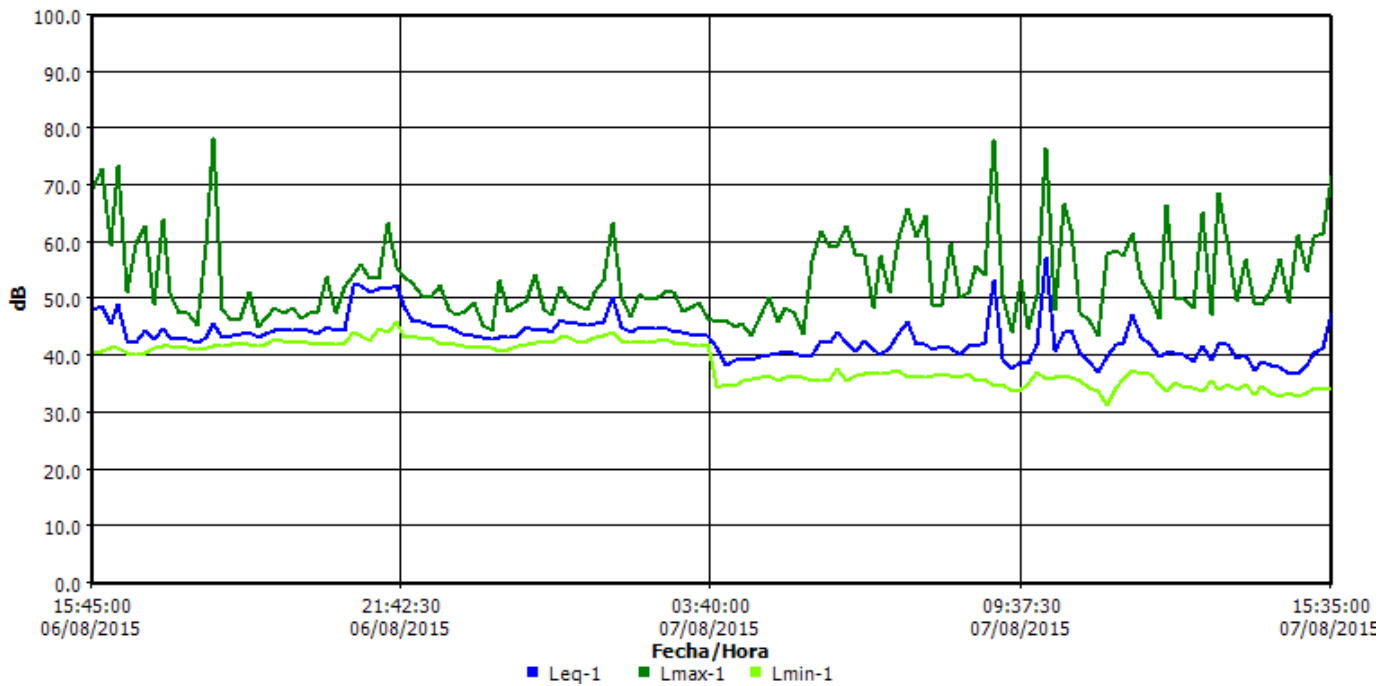
Panel de información

Ubicación Aledaño a Aldea El Fucío.
Nombre ER-3
Sesión padre S104
Hora de inicio Jueves, 06 de Agosto de 2015 15:35:00
Hora de paro Viernes, 07 de Agosto de 2015 15:35:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	31.3 dB	Lmax	1	78.5 dB
Lpk	1	102 dB	Leq	1	45.2 dB

Gráfica de datos de registro



ER-3A

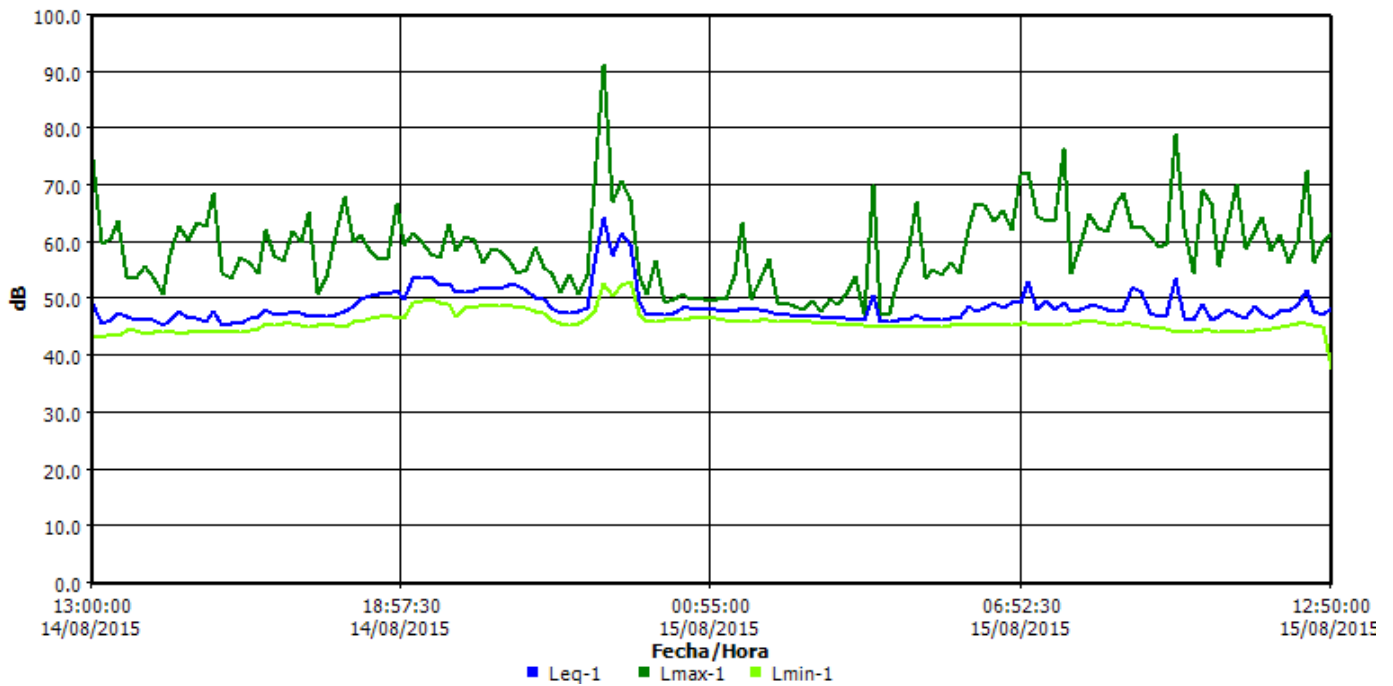
Panel de información

Ubicación Aldea Sabana Redonda
Nombre ER-3A
Sesión padre S199
Hora de inicio Viernes, 14 de Agosto de 2015 12:50:00
Hora de paro Sábado, 15 de Agosto de 2015 12:50:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	37.5 dB	Lmax	1	91.4 dB
Lpk	1	105.9 dB	Leq	1	50.6 dB

Gráfica de datos de registro



ER-4A

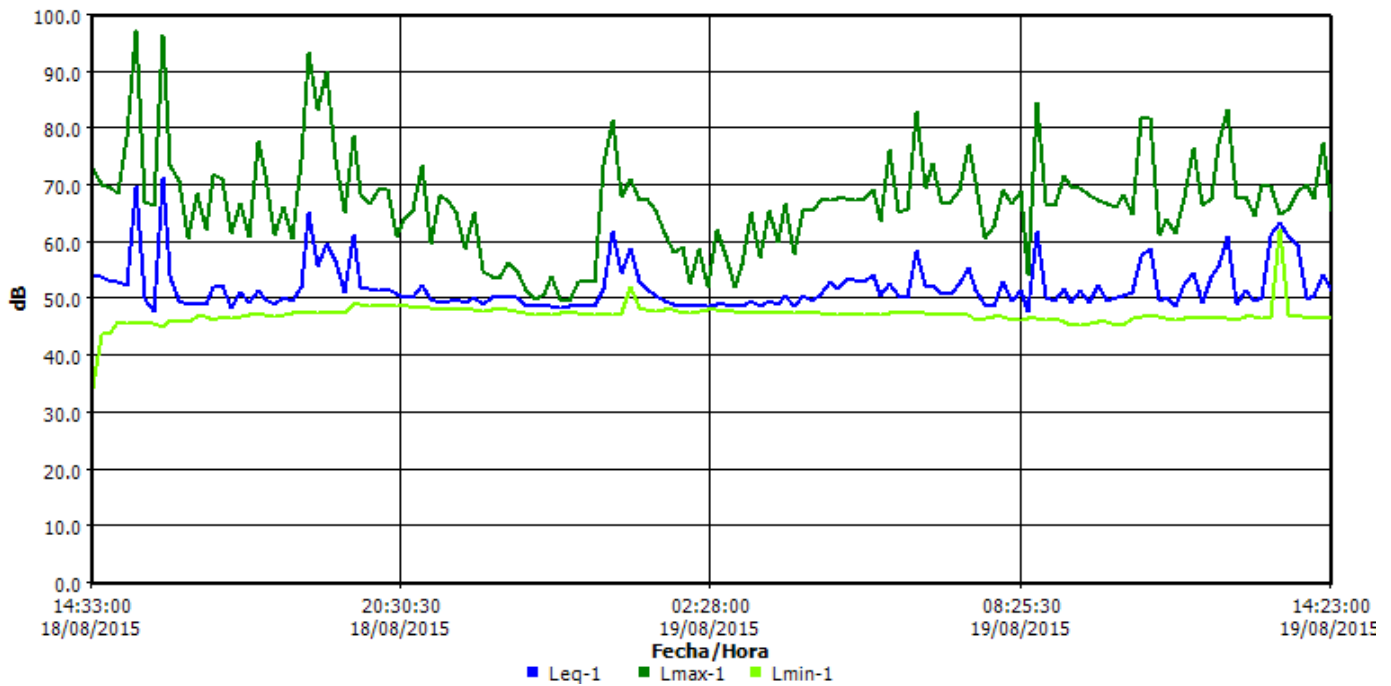
Panel de información

Ubicación Caserío El Portón de los Ángeles
Nombre ER-4A
Sesión padre S107
Hora de inicio Martes, 18 de Agosto de 2015 14:23:00
Hora de paro Miércoles, 19 de Agosto de 2015 14:23:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	34.4 dB	Lmax	1	97.3 dB
Lpk	1	108.3 dB	Leq	1	56.1 dB

Gráfica de datos de registro



ER-5A

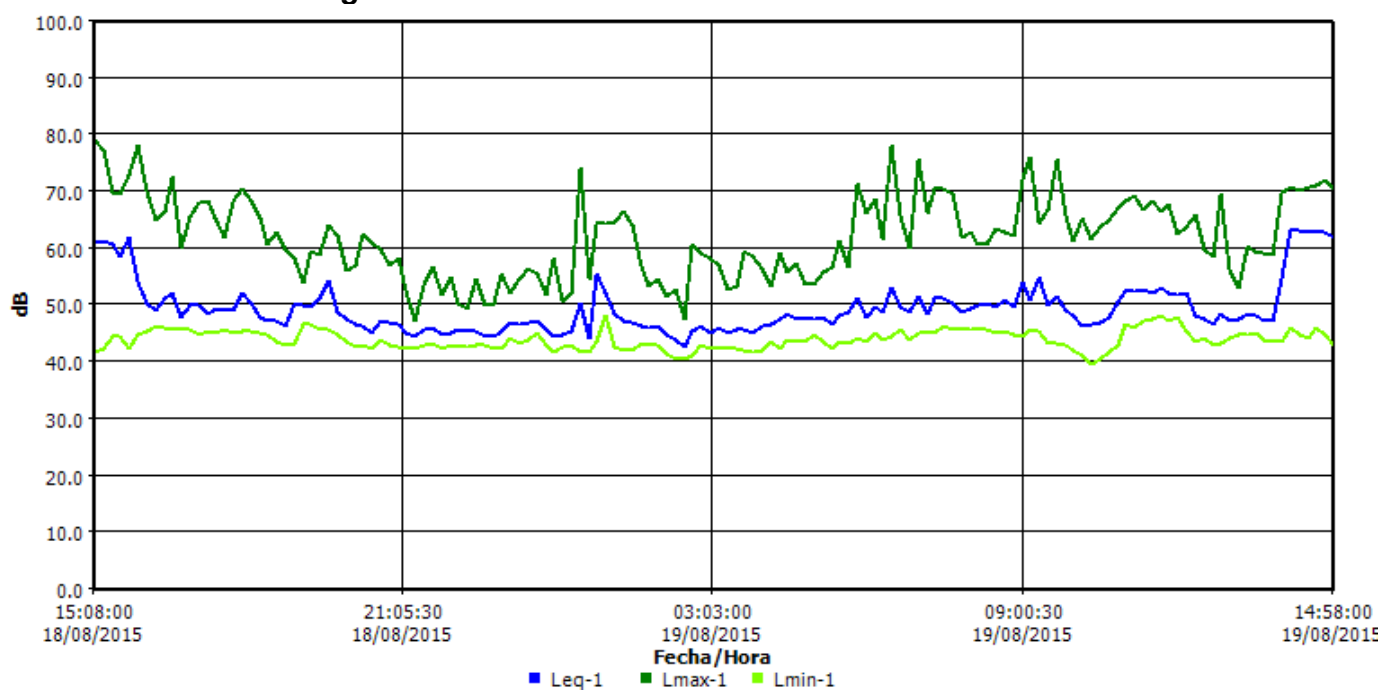
Panel de información

Ubicación Aldea Sabana Redonda
Nombre ER-5A
Sesión padre S200
Hora de inicio Martes, 18 de Agosto de 2015 14:58:00
Hora de paro Miércoles, 19 de Agosto de 2015 14:58:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.6 dB	Lmax	1	79 dB
Lpk	1	105.6 dB	Leq	1	53 dB

Gráfica de datos de registro



ER-6

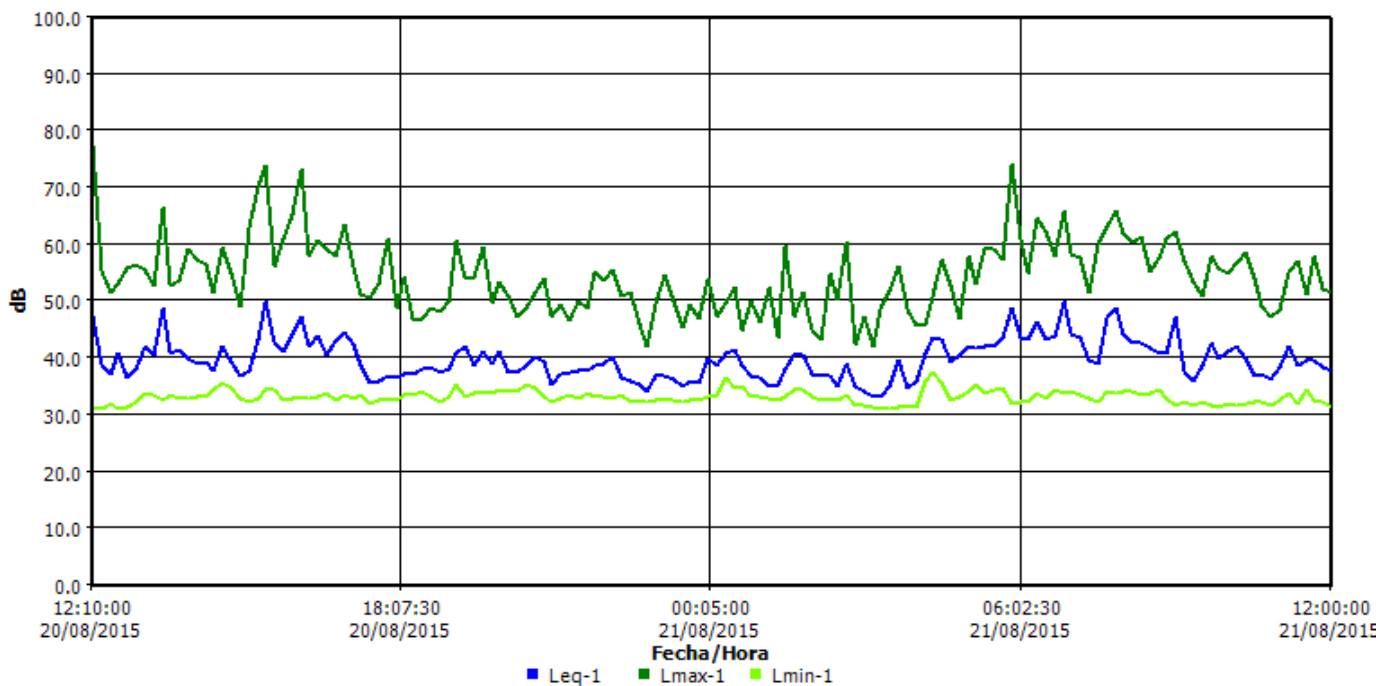
Panel de información

Ubicación Al norte del Proyecto, ruta a Mataquescuintla.
Nombre ER-6
Sesión padre S108
Hora de inicio Jueves, 20 de Agosto de 2015 12:00:00
Hora de paro Viernes, 21 de Agosto de 2015 12:00:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	30.9 dB	Lmax	1	77.1 dB
Lpk	1	93.9 dB	Leq	1	41.4 dB

Gráfica de datos de registro



ER-7A

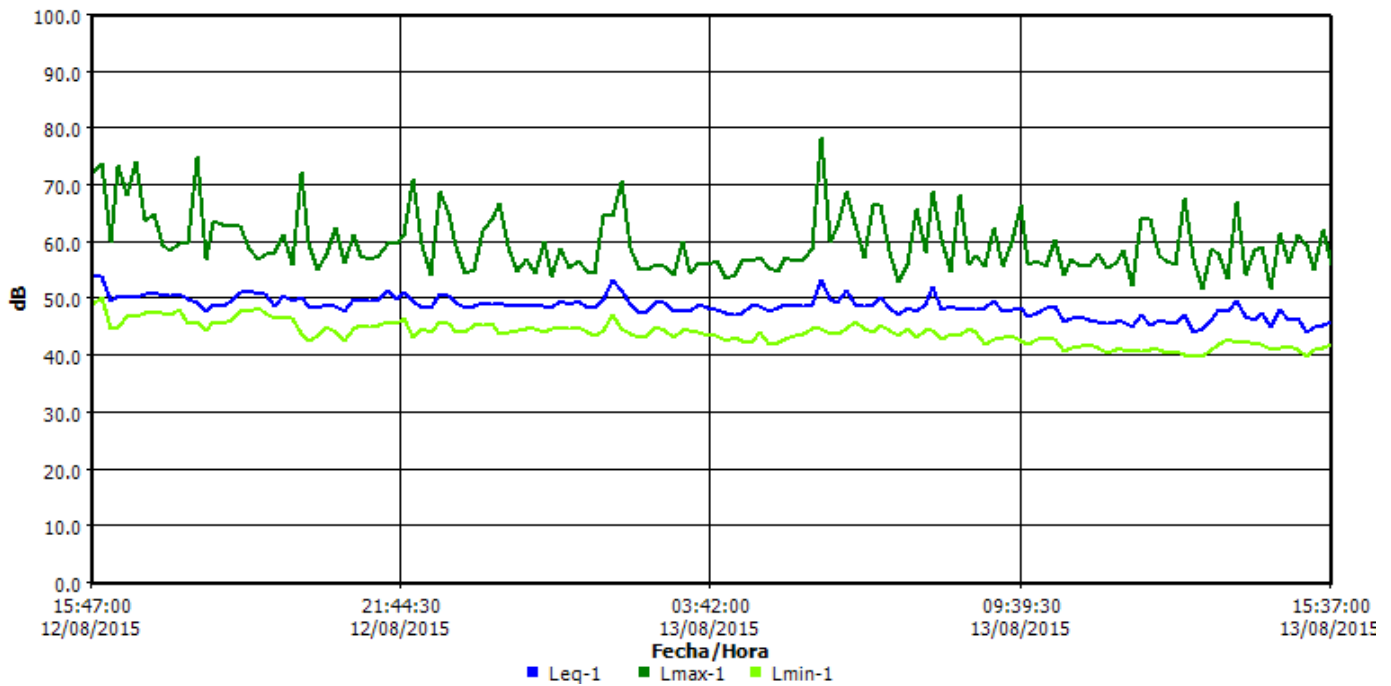
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S198
Hora de inicio Miércoles, 12 de Agosto de 2015 15:37:00
Hora de paro Jueves, 13 de Agosto de 2015 15:37:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.8 dB	Lmax	1	78.3 dB
Lpk	1	96.6 dB	Leq	1	49 dB

Gráfica de datos de registro



ER-7A

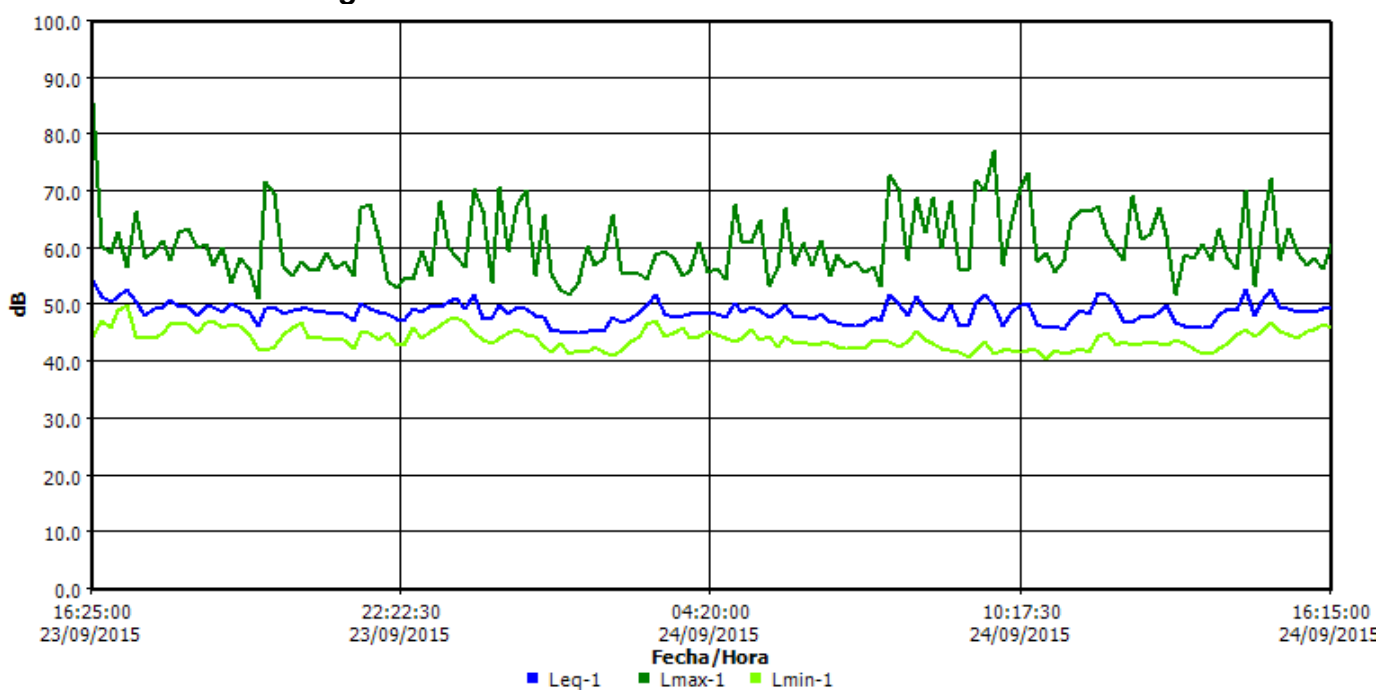
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S110
Hora de inicio Miércoles, 23 de Septiembre de 2015 16:15:00
Hora de paro Jueves, 24 de Septiembre de 2015 16:15:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	40.4 dB	Lmax	1	85.7 dB
Lpk	1	110.2 dB	Leq	1	49 dB

Gráfica de datos de registro



ER-3

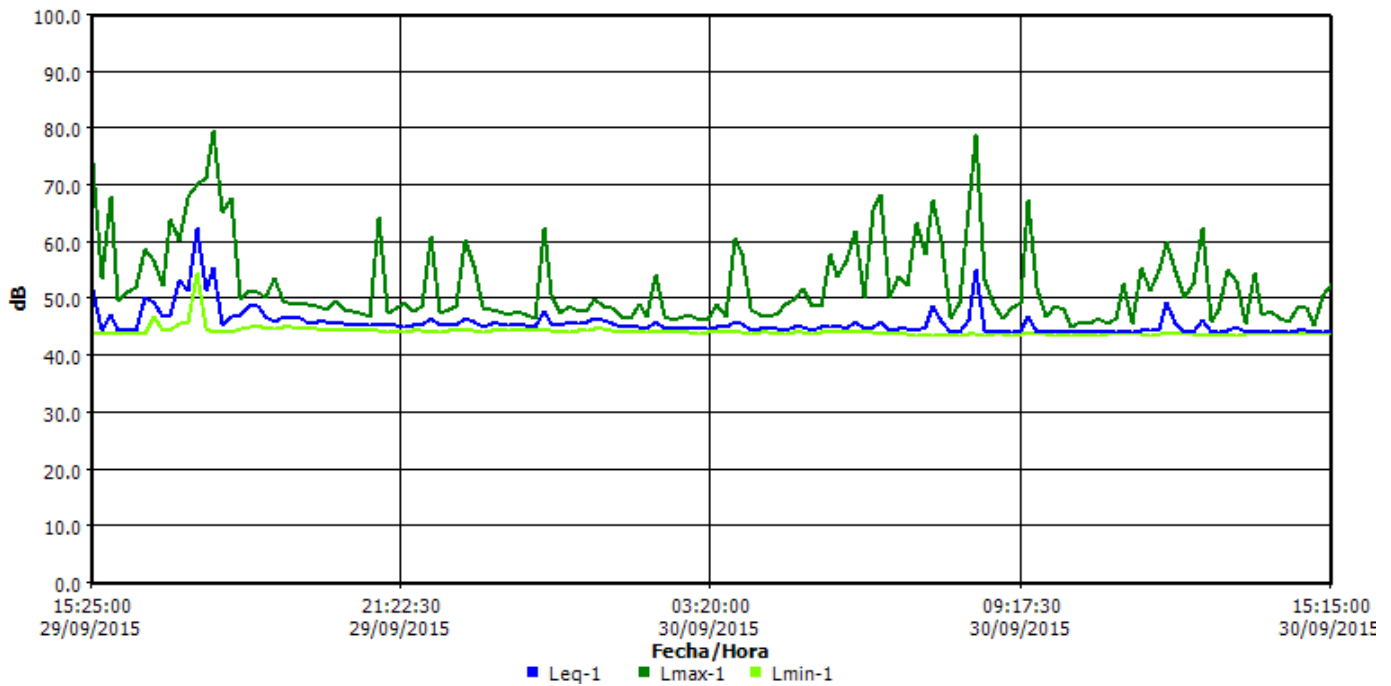
Panel de información

Ubicación Aledaño a Aldea El Fucío.
Nombre ER-3
Sesión padre S008
Hora de inicio Martes, 29 de Septiembre de 2015 15:15:00
Hora de paro Miércoles, 30 de Septiembre de 2015 15:15:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	43.7 dB	Lmax	1	79.7 dB
Lpk	1	99.8 dB	Leq	1	47.4 dB

Gráfica de datos de registro



ER-2

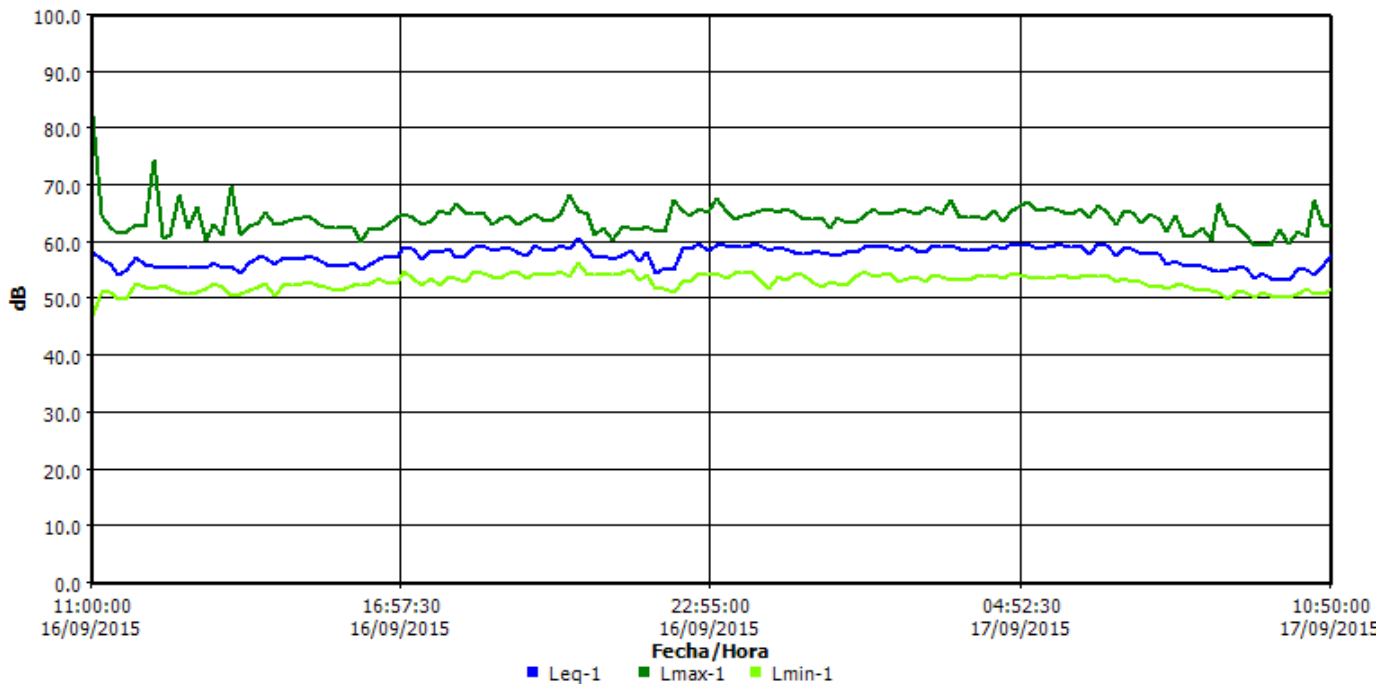
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S109
Hora de inicio Miércoles, 16 de Septiembre de 2015 10:50:00
Hora de paro Jueves, 17 de Septiembre de 2015 10:50:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	47.4 dB	Lmax	1	82 dB
Lpk	1	96.9 dB	Leq	1	57.8 dB

Gráfica de datos de registro



ER-1

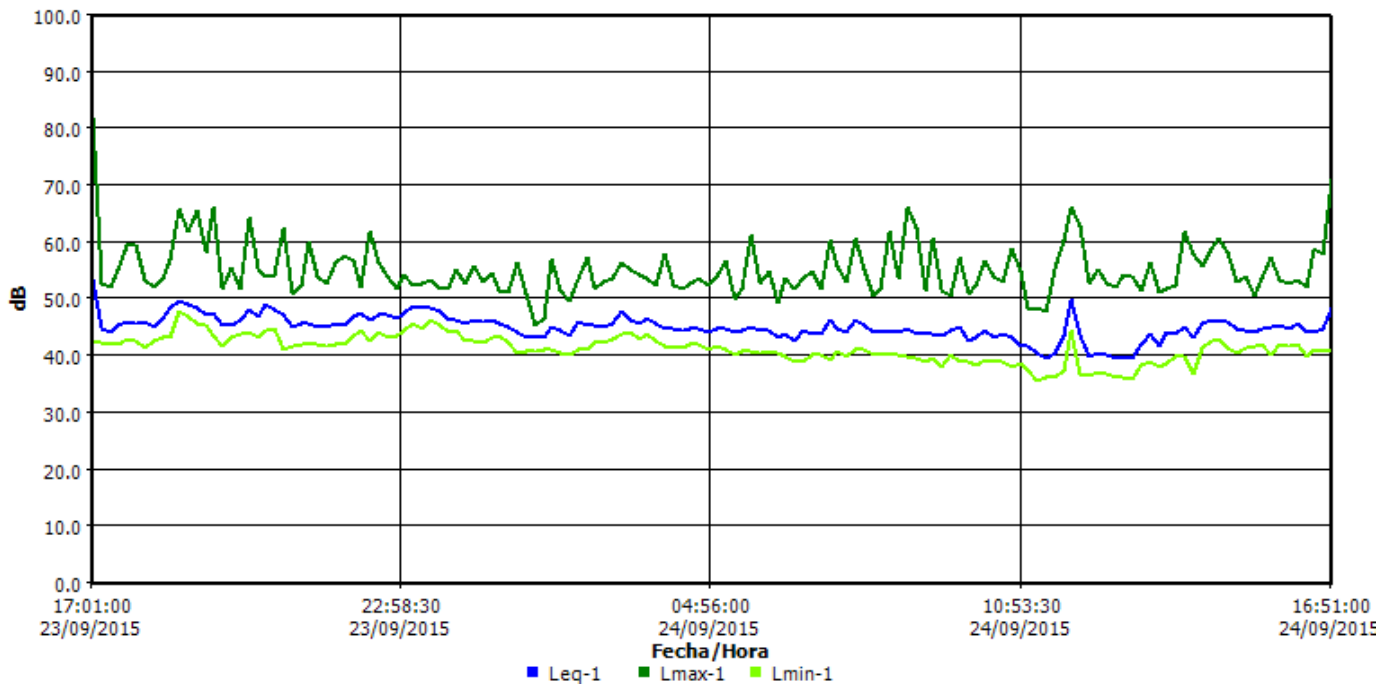
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S204
Hora de inicio Miércoles, 23 de Septiembre de 2015 16:51:00
Hora de paro Jueves, 24 de Septiembre de 2015 16:51:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	35.6 dB	Lmax	1	82.2 dB
Lpk	1	99.6 dB	Leq	1	45.6 dB

Gráfica de datos de registro



ER-7A

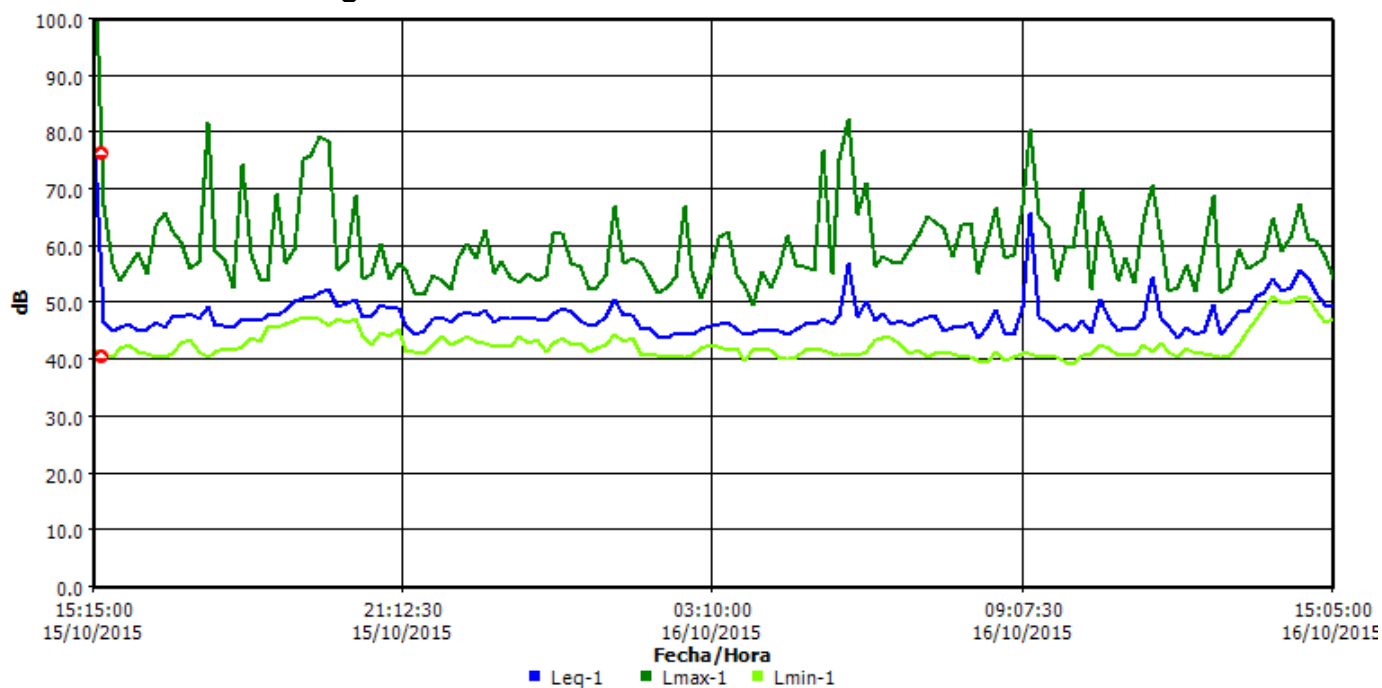
Panel de información

Ubicación Aledaño a aldea Los Planes.
Nombre ER-7A
Sesión padre S111
Hora de inicio Jueves, 15 de Octubre de 2015 15:05:00
Hora de paro Viernes, 16 de Octubre de 2015 15:05:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.2 dB	Lmax	1	111.5 dB
Lpk	1	129.5 dB	Leq	1	56.8 dB

Gráfica de datos de registro



ER-3

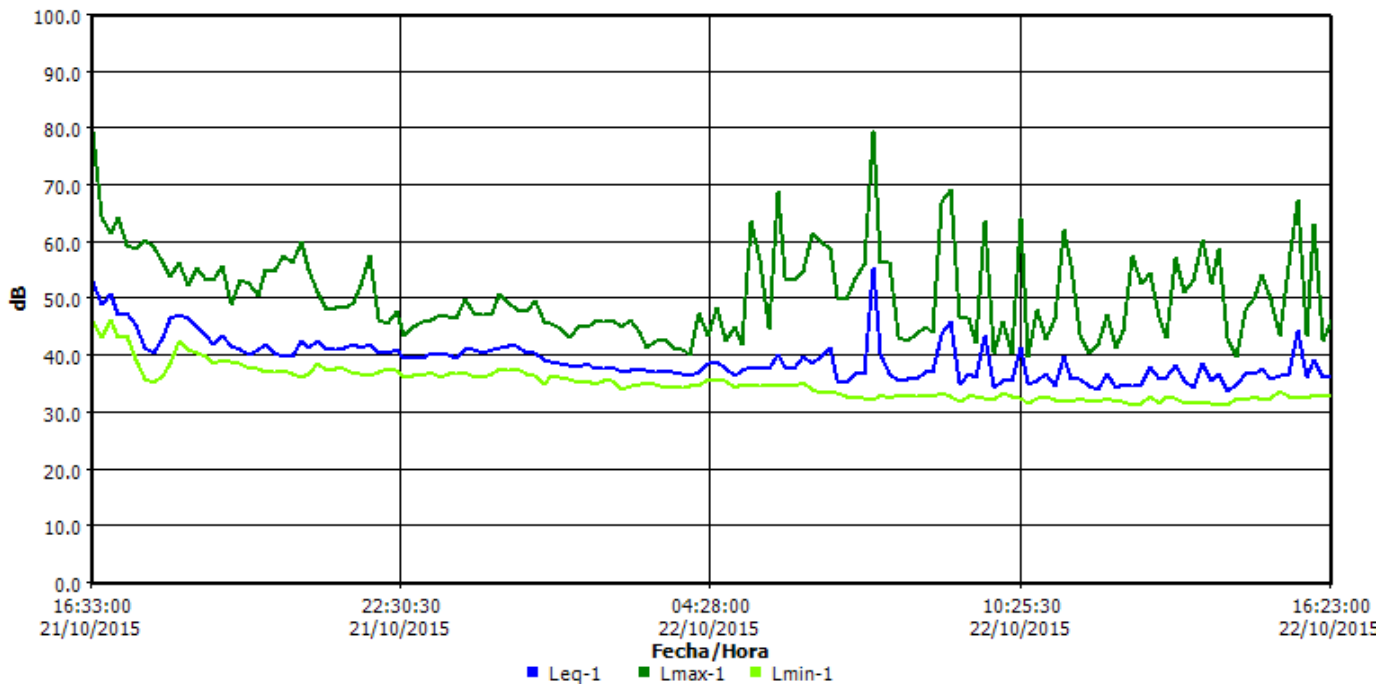
Panel de información

Ubicación Aledaño a Aldea El Fucío.
Nombre ER-3
Sesión padre S206
Hora de inicio Miércoles, 21 de Octubre de 2015 16:23:00
Hora de paro Jueves, 22 de Octubre de 2015 16:23:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	31.2 dB	Lmax	1	79.8 dB
Lpk	1	96.9 dB	Leq	1	41.9 dB

Gráfica de datos de registro



ER-2

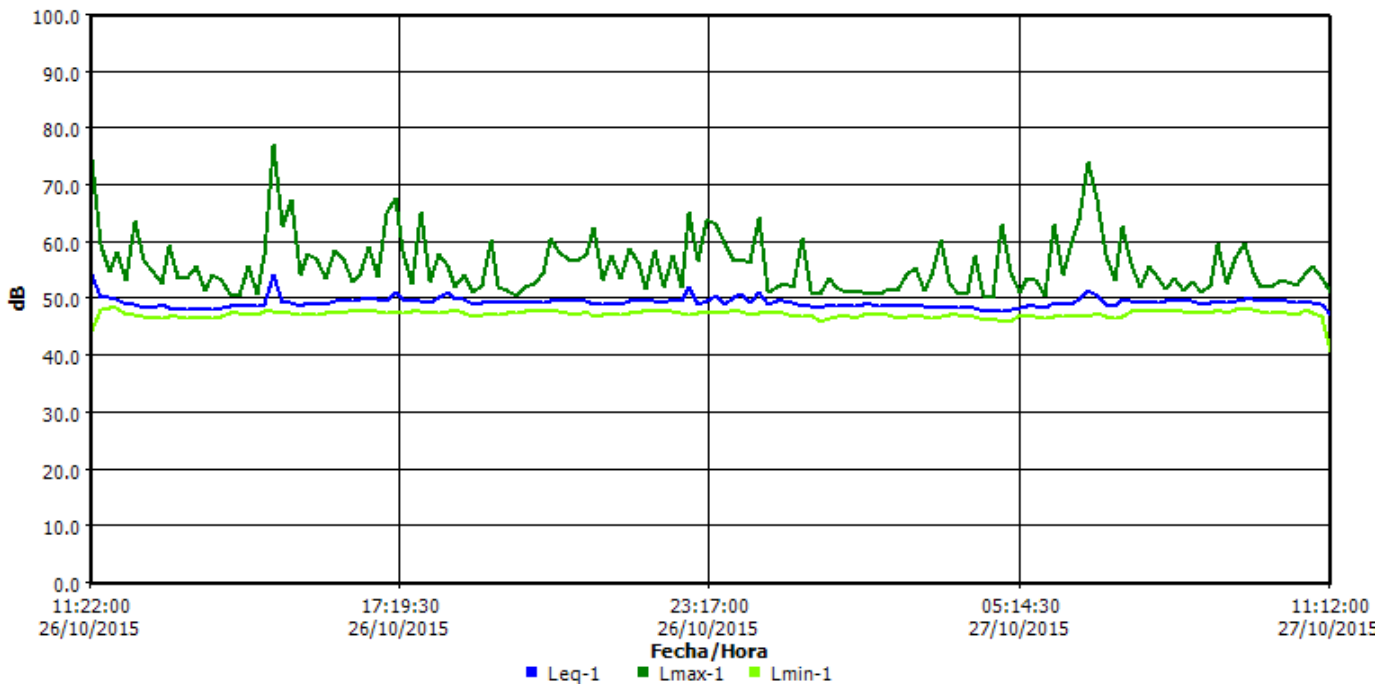
Panel de información

Ubicación Aldea La Cuchilla.
Nombre ER-2
Sesión padre S207
Hora de inicio Lunes, 26 de Octubre de 2015 11:12:00
Hora de paro Martes, 27 de Octubre de 2015 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	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	40.5 dB	Lmax	1	77.2 dB
Lpk	1	97.1 dB	Leq	1	49.5 dB

Gráfica de datos de registro



ER-1

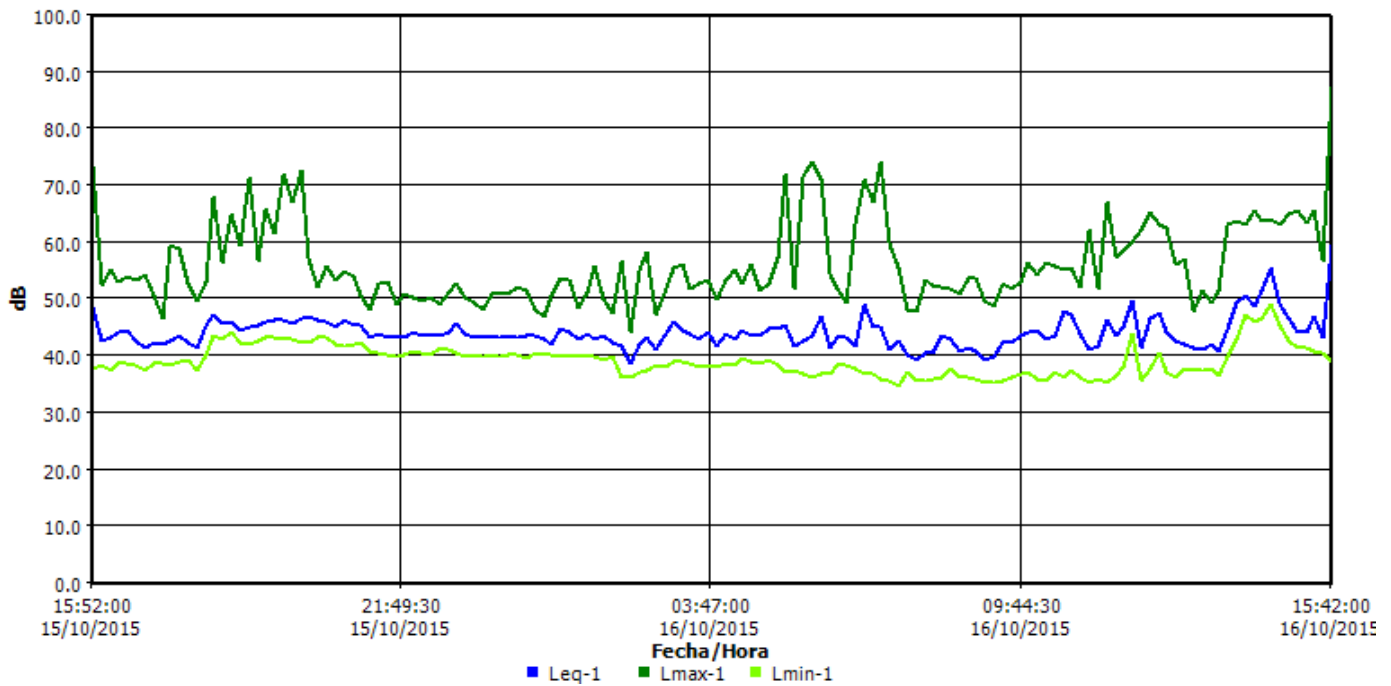
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S205
Hora de inicio Jueves, 15 de Octubre de 2015 15:42:00
Hora de paro Viernes, 16 de Octubre de 2015 15:42:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	34.8 dB	Lmax	1	87.6 dB
Lpk	1	97.8 dB	Leq	1	45.7 dB

Gráfica de datos de registro



11.4 Certificados de verificación de los equipos utilizados

11.4.1 Material Particulado (PM₁₀) y Presión Sonora

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



CERTIFICATE OF CALIBRATION - NIST TRACEABILITY

(Refer to instruction manual for further details of calibration)

tetraCal Serial Number: 508

DATE: 31-Mar-2015

Calibration Operator E. Albuja

Critical Venturi Flow Meter: Max Uncertainty = 0.346%

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

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

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

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

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

Brand: Accu-Safe Serial Number: 254881

NIST Traceability No. 516837

tetraCal:

Ambient Temperature (set): 24.3 °C

Aux (filter) Temperature (set): °C

Barometric Pressure and Absolute Pressure

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

S/N DH085001

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

tetraCal:

Barometric pressure (set): 744 mm of Hg

Results of Venturi Calibration

Flow Rate (Q) vs. Pressure Drop (ΔP).

Where: Q=Lpm, ΔP = Cm of H₂O

No. 1 C 5.92373 ΔP ^ 0.52396

No. 2 C 1.16297 ΔP ^ 0.52701

No. 3 C 0.33840 ΔP ^ 0.54737

Overall Uncertainty: 0.35%

Date Placed In Service _____

(To be filled in by operator upon receipt)

Recommended Recalibration Date _____

(12 months from date placed in service)

Revised: October 2014
Cal102-03T1 Rev A

To Check a Tetra Cal
 6 - 30.00 Lpm
 VER.

31-Mar-2015 E. Albuja

Pre-recert
 BP= 746 mm of Hg

3.41P

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

Serial No. 508

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

To Check a Tetra Cal
 1.20 - 6.00 Lpm

BP= 746 mm of Hg

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

To Check a Tetra Cal
 0.10 - 1.20 Lpm

BP= 746 mm of Hg

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

To Check a Tetra Cal
 6 - 30.00 Lpm
 VER.

31-Mar-2015 E. Albuja

BP= 744 mm of Hg

3.41P

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

Serial No. 508

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

To Check a Tetra Cal
 1.20 - 6.00 Lpm

BP= 744 mm of Hg

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

To Check a Tetra Cal
 0.10 - 1.20 Lpm

BP= 744 mm of Hg

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

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

Certificado Numero: 1937

Características del Equipo

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



Información de la Calibración

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

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

Lectura de Calibración	114.00	dB
Relectura	114.10	dB

Estado del Equipo: CALIBRADO

Características del Equipo de Calibración

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

Responsables

Luis Rey
Responsable

Ing. Hasan Zolata
Supervisor

Falla reportada

Cliente solicita revisión y mantenimiento general.

Observaciones

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

Diagnostico

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

Trabajos realizados

Mantenimiento de los siguientes componentes:

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

Al finalizar el mantenimiento se efectuaron las siguientes verificaciones:

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



Repuestos utilizados

- Ninguno

Responsables:



Luis Rey
Responsable



Ing. Hasan Zolata
Supervisor

Reporte de sesión

04/11/2016

Información general

Nombre S243_BGJ100009_28092016_130505
 Comentarios
 Hora de inicio 22/09/2016 12:22:36 p.m.
 Hora de paro 25/09/2016 12:22:36 p.m.
 Duración: 3.00:00:00
 Tipo de modelo SoundPro DL
 Número de serie BGJ100009
 Revisión del firmware del dispositivo R.13F
 Nombre de la compañía
 Descripción
 Ubicación
 Nombre del usuario

Datos de resumen

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

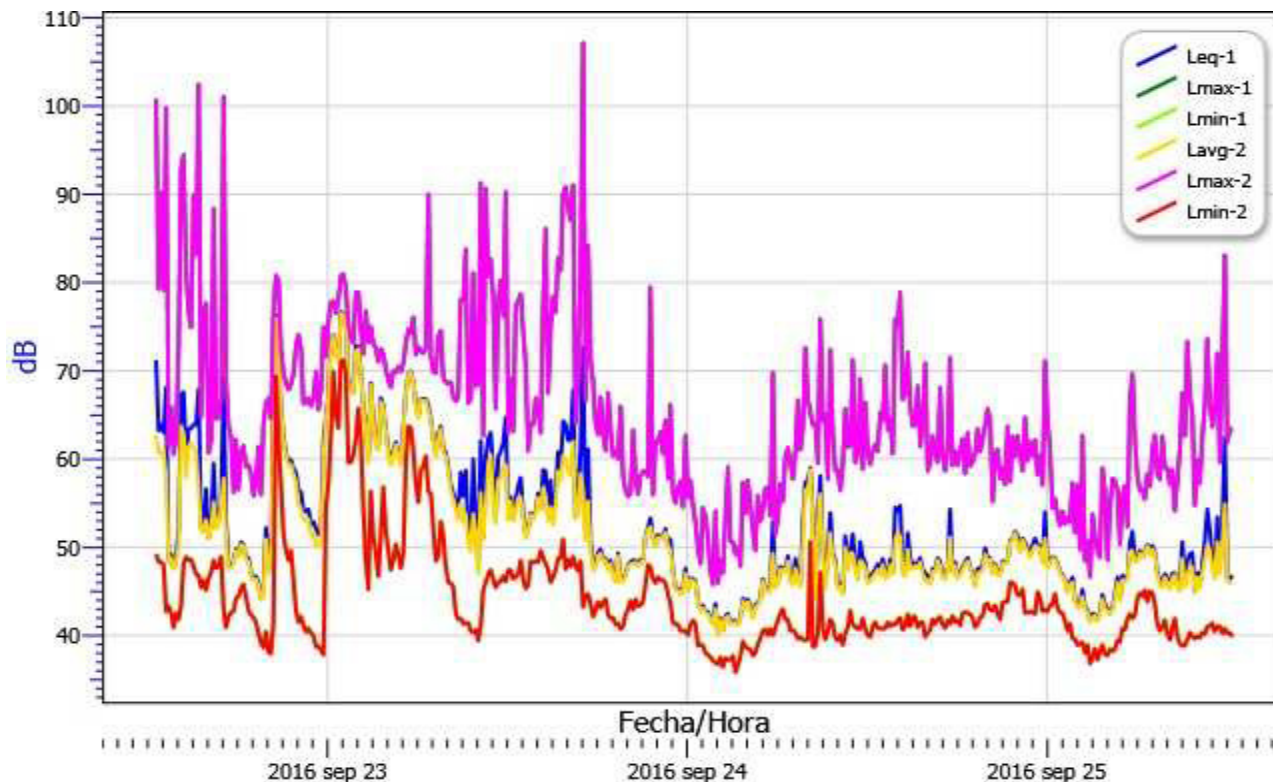
Descripción	Medidor	Valor	Descripción	Medidor	Valor
UL, tiempo límite superior	2	00:00:00	SEL	2	146.6 dB
ProjectedTWA (8:00)	2	56.7 dB	Mntime	2	24/09/2016 03:09:58 a.m.
Mxtime	2	23/09/2016 04:53:44 p.m.	PKtime	2	22/09/2016 12:22:49 p.m.
Ponderación	2	C	Range Ceiling	2	--
Nivel de criterio	2	90 dB	ULL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

Historial de calibración

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

Gráfica de datos de registro

S243_BGJ100009_28092016_130505: Gráfica de datos de registro - Read Only



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

11.5.1 Muestras de Agua Superficial (SW)

July 16, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L25130

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 25, 2015. This project has been assigned to ACZ's project number, L25130. 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 L25130. 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.

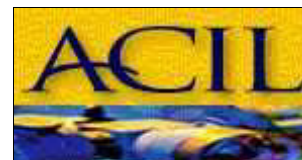
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 15, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

July 16, 2015

Project ID: Escobal

ACZ Project ID: L25130

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 miscellaneous samples from Tahoe Resources, Inc. on June 25, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L25130. 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: **L25130-01**
Date Sampled: 06/23/15 10:50
Date Received: 06/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/15 10:50	mss2
Cyanide, WAD	SM4500-CN I- distillation								07/06/15 11:24	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/15 12:02	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:52	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/01/15 12:27	bsu
Total Hot Plate Digestion	M200.2 ICP								07/02/15 10:36	scp
Total Hot Plate Digestion	M200.2 ICP-MS								07/07/15 12:00	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L25130-01**

Date Sampled: 06/23/15 10:50

Date Received: 06/25/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/02/15 12:26	jjc
Aluminum, total	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	07/06/15 11:29	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	07/07/15 10:27	mfm
Antimony, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	07/08/15 12:43	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0028			mg/L	0.0002	0.001	07/07/15 10:27	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0029			mg/L	0.0002	0.001	07/08/15 12:43	mfm
Barium, dissolved	M200.7 ICP	1	0.121			mg/L	0.003	0.02	07/02/15 12:26	jjc
Barium, total	M200.7 ICP	1	0.144			mg/L	0.003	0.02	07/06/15 11:29	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:26	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:29	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/02/15 12:26	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 11:29	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:46	jjc
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	07/06/15 11:29	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/15 10:27	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 12:43	mfm
Calcium, dissolved	M200.7 ICP	1	43.2			mg/L	0.1	0.5	07/07/15 2:46	jjc
Calcium, total	M200.7 ICP	1	43.5			mg/L	0.1	0.5	07/06/15 11:29	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:46	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:29	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:26	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:29	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:26	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:29	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:26	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:29	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/02/15 12:26	jjc
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	07/06/15 17:19	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/15 10:27	mfm
Lead, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	07/08/15 12:43	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:26	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:29	jjc
Magnesium, dissolved	M200.7 ICP	1	4.5			mg/L	0.2	1	07/07/15 2:46	jjc
Magnesium, total	M200.7 ICP	1	4.5			mg/L	0.2	1	07/06/15 11:29	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/02/15 12:26	jjc
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	07/06/15 11:29	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 12:52	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 14:29	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/02/15 12:26	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 11:29	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:26	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:29	jjc
Potassium, dissolved	M200.7 ICP	1	4.2			mg/L	0.2	1	07/02/15 12:26	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L25130-01**
Date Sampled: 06/23/15 10:50
Date Received: 06/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4.8		mg/L	0.2	1	07/06/15 11:29	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/02/15 12:26	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 11:29	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/08/15 0:03	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/08/15 12:43	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 0:03	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 12:43	mfm
Sodium, dissolved	M200.7 ICP	1	9.3		mg/L	0.2	1	07/07/15 2:46	jjc
Sodium, total	M200.7 ICP	1	9.4		mg/L	0.2	1	07/06/15 11:29	jjc
Strontium, dissolved	M200.7 ICP	1	0.159		mg/L	0.005	0.03	07/02/15 12:26	jjc
Strontium, total	M200.7 ICP	1	0.188		mg/L	0.005	0.03	07/06/15 11:29	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/07/15 10:27	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 12:43	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 2:46	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 11:29	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/02/15 12:26	jjc
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	07/06/15 11:29	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/07/15 10:27	mfm
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 12:43	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/02/15 12:26	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	07/06/15 11:29	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/02/15 12:26	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 11:29	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW1-E

ACZ Sample ID: **L25130-01**
 Date Sampled: 06/23/15 10:50
 Date Received: 06/25/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	89.8		*	mg/L	2	20	06/29/15 0:00	abd
Carbonate as CaCO3		1	2.7	B	*	mg/L	2	20	06/29/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Total Alkalinity		1	92.6		*	mg/L	2	20	06/29/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			07/16/15 0:00	calc
Sum of Anions			3.1			meq/L			07/16/15 0:00	calc
Sum of Cations			3.1			meq/L			07/16/15 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 11:30	enb
Chloride	SM4500Cl-E	1	5.2		*	mg/L	0.5	2	07/06/15 11:47	bsu
Conductivity @25C	SM2510B	1	298		*	umhos/cm	1	10	06/29/15 20:55	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 15:30	mss2
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 16:31	mss2
Fluoride	SM4500F-C	1	0.15	B	*	mg/L	0.05	0.3	07/01/15 13:20	enb
Hardness as CaCO3	SM2340B - Calculation		126			mg/L	0.8	4	07/16/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.24		*	mg/L	0.02	0.1	07/03/15 1:39	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 12:00	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	06/30/15 14:33	mss2
pH (lab)	SM4500H+ B									
pH		1	8.4	H	*	units	0.1	0.1	06/29/15 0:00	abd
pH measured at		1	20.0		*	C	0.1	0.1	06/29/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	07/16/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	07/07/15 23:26	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	06/26/15 19:07	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	07/01/15 16:04	jif
Residue, Filterable (TDS) @180C	SM2540C	1	230		*	mg/L	10	20	06/26/15 10:11	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/26/15 11:56	enb
Residue, Total (TS) @ 105C	SM2540B	1	228		*	mg/L	10	20	06/25/15 16:46	tms
Sulfate	D516-02/-07 - Turbidimetric	5	52.6		*	mg/L	5	25	07/06/15 17:10	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 15:06	enb
TDS (calculated)	Calculation		176			mg/L			07/16/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.31						07/16/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L25130-02**
Date Sampled: 06/23/15 11:45
Date Received: 06/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/15 11:15	mss2
Cyanide, WAD	SM4500-CN I- distillation								07/06/15 11:38	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/15 12:32	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:02	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/01/15 12:33	bsu
Total Hot Plate Digestion	M200.2 ICP								07/02/15 10:45	scp
Total Hot Plate Digestion	M200.2 ICP-MS								07/07/15 12:12	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L25130-02**

Date Sampled: 06/23/15 11:45

Date Received: 06/25/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/02/15 12:35	jjc
Aluminum, total	M200.7 ICP	1	0.10	B		mg/L	0.03	0.2	07/06/15 11:32	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0104			mg/L	0.0004	0.002	07/07/15 10:30	mfm
Antimony, total	M200.8 ICP-MS	1	0.0101			mg/L	0.0004	0.002	07/08/15 12:47	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0088			mg/L	0.0002	0.001	07/07/15 10:30	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0090			mg/L	0.0002	0.001	07/08/15 12:47	mfm
Barium, dissolved	M200.7 ICP	1	0.037			mg/L	0.003	0.02	07/02/15 12:35	jjc
Barium, total	M200.7 ICP	1	0.045			mg/L	0.003	0.02	07/06/15 11:32	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:35	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:32	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/02/15 12:35	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 11:32	jjc
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	07/07/15 2:49	jjc
Boron, total	M200.7 ICP	1	0.05			mg/L	0.01	0.05	07/06/15 11:32	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/15 10:30	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 12:47	mfm
Calcium, dissolved	M200.7 ICP	1	158		*	mg/L	0.1	0.5	07/02/15 12:35	jjc
Calcium, total	M200.7 ICP	1	182			mg/L	0.1	0.5	07/06/15 11:32	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:49	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:32	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:35	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:32	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:35	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:32	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:35	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:32	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/02/15 12:35	jjc
Iron, total	M200.7 ICP	1	0.07			mg/L	0.02	0.05	07/06/15 17:22	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	07/07/15 10:30	mfm
Lead, total	M200.8 ICP-MS	1	0.0032			mg/L	0.0001	0.0005	07/08/15 12:47	mfm
Lithium, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.008	0.04	07/02/15 12:35	jjc
Lithium, total	M200.7 ICP	1	0.026	B		mg/L	0.008	0.04	07/06/15 11:32	jjc
Magnesium, dissolved	M200.7 ICP	1	20.1		*	mg/L	0.2	1	07/02/15 12:35	jjc
Magnesium, total	M200.7 ICP	1	22.7			mg/L	0.2	1	07/06/15 11:32	jjc
Manganese, dissolved	M200.7 ICP	1	0.020	B		mg/L	0.005	0.03	07/02/15 12:35	jjc
Manganese, total	M200.7 ICP	1	0.039			mg/L	0.005	0.03	07/06/15 11:32	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 12:54	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 14:32	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/02/15 12:35	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 11:32	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:35	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:32	jjc
Potassium, dissolved	M200.7 ICP	1	9.9			mg/L	0.2	1	07/02/15 12:35	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L25130-02**
Date Sampled: 06/23/15 11:45
Date Received: 06/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.4			mg/L	0.2	1	07/06/15 11:32	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:35	jjc
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:32	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	07/08/15 0:06	msh
Selenium, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0003	07/08/15 12:47	mfm
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	07/08/15 0:06	msh
Silver, total	M200.8 ICP-MS	1	0.00007	B		mg/L	0.00005	0.0003	07/08/15 12:47	mfm
Sodium, dissolved	M200.7 ICP	1	31.7		*	mg/L	0.2	1	07/02/15 12:35	jjc
Sodium, total	M200.7 ICP	1	37.5			mg/L	0.2	1	07/06/15 11:32	jjc
Strontium, dissolved	M200.7 ICP	1	1.280		*	mg/L	0.005	0.03	07/02/15 12:35	jjc
Strontium, total	M200.7 ICP	1	1.510			mg/L	0.005	0.03	07/06/15 11:32	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/07/15 10:30	mfm
Thallium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/08/15 12:47	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	07/07/15 2:49	jjc
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	07/06/15 11:32	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/02/15 12:35	jjc
Titanium, total	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	07/06/15 11:32	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/07/15 10:30	mfm
Uranium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/08/15 12:47	mfm
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	07/02/15 12:35	jjc
Vanadium, total	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	07/06/15 11:32	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:35	jjc
Zinc, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	07/06/15 11:32	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2-E

ACZ Sample ID: **L25130-02**
 Date Sampled: 06/23/15 11:45
 Date Received: 06/25/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	34.1		*	mg/L	2	20	06/29/15 0:00	abd
Carbonate as CaCO3		1	12.3	B	*	mg/L	2	20	06/29/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Total Alkalinity		1	46.5		*	mg/L	2	20	06/29/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-8.3			%			07/16/15 0:00	calc
Sum of Anions			13			meq/L			07/16/15 0:00	calc
Sum of Cations			11			meq/L			07/16/15 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 11:39	enb
Chloride	SM4500Cl-E	1	32.7		*	mg/L	0.5	2	07/06/15 11:48	bsu
Conductivity @25C	SM2510B	1	1160		*	umhos/cm	1	10	06/29/15 21:38	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 15:32	mss2
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 16:32	mss2
Fluoride	SM4500F-C	1	0.58		*	mg/L	0.05	0.3	07/01/15 13:23	enb
Hardness as CaCO3	SM2340B - Calculation		477			mg/L	0.8	4	07/16/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.73		*	mg/L	0.02	0.1	07/03/15 1:41	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 14:01	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	06/30/15 14:36	mss2
pH (lab)	SM4500H+ B									
pH		1	8.8	H	*	units	0.1	0.1	06/29/15 0:00	abd
pH measured at		1	19.5		*	C	0.1	0.1	06/29/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	07/16/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	07/07/15 23:27	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	06/26/15 19:10	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	07/01/15 16:05	jlf
Residue, Filterable (TDS) @180C	SM2540C	1	954		*	mg/L	10	20	06/26/15 10:13	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	06/26/15 11:57	enb
Residue, Total (TS) @ 105C	SM2540B	1	990		*	mg/L	10	20	06/25/15 16:48	tms
Sulfate	D516-02/-07 - Turbidimetric	20	520		*	mg/L	20	100	07/06/15 17:12	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 15:14	enb
TDS (calculated)	Calculation		802			mg/L			07/16/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.19						07/16/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L25130-03**
Date Sampled: 06/23/15 08:55
Date Received: 06/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/15 11:28	mss2
Cyanide, WAD	SM4500-CN I- distillation								07/06/15 11:52	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/15 13:02	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:12	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/01/15 12:39	bsu
Total Hot Plate Digestion	M200.2 ICP								07/02/15 10:55	scp
Total Hot Plate Digestion	M200.2 ICP-MS								07/07/15 12:24	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L25130-03**

Date Sampled: 06/23/15 08:55

Date Received: 06/25/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/02/15 12:38	jjc
Aluminum, total	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	07/06/15 11:35	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0124			mg/L	0.0004	0.002	07/07/15 10:33	mfm
Antimony, total	M200.8 ICP-MS	1	0.0117			mg/L	0.0004	0.002	07/08/15 12:50	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0062			mg/L	0.0002	0.001	07/07/15 10:33	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0065			mg/L	0.0002	0.001	07/08/15 12:50	mfm
Barium, dissolved	M200.7 ICP	1	0.095			mg/L	0.003	0.02	07/02/15 12:38	jjc
Barium, total	M200.7 ICP	1	0.109			mg/L	0.003	0.02	07/06/15 11:35	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:38	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:35	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/02/15 12:38	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 11:35	jjc
Boron, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	07/07/15 2:52	jjc
Boron, total	M200.7 ICP	1	0.10			mg/L	0.01	0.05	07/06/15 11:35	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/15 10:33	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 12:50	mfm
Calcium, dissolved	M200.7 ICP	1	263		*	mg/L	0.1	0.5	07/02/15 12:38	jjc
Calcium, total	M200.7 ICP	1	300			mg/L	0.1	0.5	07/06/15 11:35	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:52	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:35	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:38	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:35	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:38	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:35	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:38	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:35	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/02/15 12:38	jjc
Iron, total	M200.7 ICP	1	0.08			mg/L	0.02	0.05	07/06/15 17:25	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	07/07/15 10:33	mfm
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	07/08/15 12:50	mfm
Lithium, dissolved	M200.7 ICP	1	0.040			mg/L	0.008	0.04	07/02/15 12:38	jjc
Lithium, total	M200.7 ICP	1	0.048			mg/L	0.008	0.04	07/06/15 11:35	jjc
Magnesium, dissolved	M200.7 ICP	1	18.7		*	mg/L	0.2	1	07/02/15 12:38	jjc
Magnesium, total	M200.7 ICP	1	21.5			mg/L	0.2	1	07/06/15 11:35	jjc
Manganese, dissolved	M200.7 ICP	1	0.444			mg/L	0.005	0.03	07/02/15 12:38	jjc
Manganese, total	M200.7 ICP	1	0.501			mg/L	0.005	0.03	07/06/15 11:35	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 13:01	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 14:38	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/02/15 12:38	jjc
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	07/06/15 11:35	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:38	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:35	jjc
Potassium, dissolved	M200.7 ICP	1	10.7			mg/L	0.2	1	07/02/15 12:38	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L25130-03**
Date Sampled: 06/23/15 08:55
Date Received: 06/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	12.1		mg/L	0.2	1	07/06/15 11:35	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/02/15 12:38	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 11:35	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	07/08/15 0:13	msh
Selenium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	07/08/15 12:50	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 0:13	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 12:50	mfm
Sodium, dissolved	M200.7 ICP	1	51	*	mg/L	0.2	1	07/02/15 12:38	jjc
Sodium, total	M200.7 ICP	1	59.6		mg/L	0.2	1	07/06/15 11:35	jjc
Strontium, dissolved	M200.7 ICP	1	2.400	*	mg/L	0.005	0.03	07/02/15 12:38	jjc
Strontium, total	M200.7 ICP	1	2.730		mg/L	0.005	0.03	07/06/15 11:35	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/07/15 10:33	mfm
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/08/15 12:50	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 2:52	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 11:35	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/02/15 12:38	jjc
Titanium, total	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	07/06/15 11:35	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	07/07/15 10:33	mfm
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	07/08/15 12:50	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/02/15 12:38	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	07/06/15 11:35	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/02/15 12:38	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 11:35	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4-E

ACZ Sample ID: **L25130-03**
 Date Sampled: 06/23/15 08:55
 Date Received: 06/25/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	73.2		*	mg/L	2	20	06/29/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Total Alkalinity		1	73.2		*	mg/L	2	20	06/29/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-8.1			%			07/16/15 0:00	calc
Sum of Anions			20			meq/L			07/16/15 0:00	calc
Sum of Cations			17			meq/L			07/16/15 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 12:06	enb
Chloride	SM4500Cl-E	1	56.1		*	mg/L	0.5	2	07/06/15 12:00	bsu
Conductivity @25C	SM2510B	1	1660		*	umhos/cm	1	10	06/29/15 21:47	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 15:33	mss2
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 16:32	mss2
Fluoride	SM4500F-C	1	0.82		*	mg/L	0.05	0.3	07/01/15 13:27	enb
Hardness as CaCO3	SM2340B - Calculation		734			mg/L	0.8	4	07/16/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2	4.30		*	mg/L	0.04	0.2	07/03/15 2:03	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 12:06	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	06/30/15 14:38	mss2
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/29/15 0:00	abd
pH measured at		1	19.5		*	C	0.1	0.1	06/29/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	07/16/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	07/07/15 23:30	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	06/26/15 19:11	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	07/01/15 16:06	jlf
Residue, Filterable (TDS) @180C	SM2540C	1	1400		*	mg/L	10	20	06/26/15 10:15	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/26/15 11:58	enb
Residue, Total (TS) @ 105C	SM2540B	2	1420		*	mg/L	20	40	06/29/15 15:32	abd
Sulfate	D516-02/-07 - Turbidimetric	50	786		*	mg/L	50	250	07/06/15 17:12	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 15:23	enb
TDS (calculated)	Calculation		1230			mg/L			07/16/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.14						07/16/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L25130-04**
Date Sampled: 06/23/15 08:05
Date Received: 06/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/15 11:41	mss2
Cyanide, WAD	SM4500-CN I- distillation								07/06/15 12:07	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/15 13:17	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:21	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/01/15 12:51	bsu
Total Hot Plate Digestion	M200.2 ICP								07/02/15 11:04	scp
Total Hot Plate Digestion	M200.2 ICP-MS								07/07/15 12:36	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L25130-04**
Date Sampled: 06/23/15 08:05
Date Received: 06/25/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/02/15 12:41	jjc
Aluminum, total	M200.7 ICP	1	1.31			mg/L	0.03	0.2	07/06/15 11:38	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0004	0.002	07/07/15 10:36	mfm
Antimony, total	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	07/08/15 12:53	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0027			mg/L	0.0002	0.001	07/07/15 10:36	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0033			mg/L	0.0002	0.001	07/08/15 12:53	mfm
Barium, dissolved	M200.7 ICP	1	0.068			mg/L	0.003	0.02	07/02/15 12:41	jjc
Barium, total	M200.7 ICP	1	0.093			mg/L	0.003	0.02	07/06/15 11:38	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:41	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:38	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/02/15 12:41	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 11:38	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:55	jjc
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	07/06/15 11:38	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/15 10:36	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 12:53	mfm
Calcium, dissolved	M200.7 ICP	1	15.5		*	mg/L	0.1	0.5	07/02/15 12:41	jjc
Calcium, total	M200.7 ICP	1	17.8			mg/L	0.1	0.5	07/06/15 11:38	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:55	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:38	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:41	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:38	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:41	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:38	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:41	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:38	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/02/15 12:41	jjc
Iron, total	M200.7 ICP	1	0.48			mg/L	0.02	0.05	07/06/15 17:28	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/15 10:36	mfm
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	07/08/15 12:53	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:41	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:38	jjc
Magnesium, dissolved	M200.7 ICP	1	2.9		*	mg/L	0.2	1	07/02/15 12:41	jjc
Magnesium, total	M200.7 ICP	1	3.3			mg/L	0.2	1	07/06/15 11:38	jjc
Manganese, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	07/02/15 12:41	jjc
Manganese, total	M200.7 ICP	1	0.026	B		mg/L	0.005	0.03	07/06/15 11:38	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 13:03	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 14:45	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/02/15 12:41	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 11:38	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:41	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:38	jjc
Potassium, dissolved	M200.7 ICP	1	3.4			mg/L	0.2	1	07/02/15 12:41	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L25130-04**
Date Sampled: 06/23/15 08:05
Date Received: 06/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.9		mg/L	0.2	1	07/06/15 11:38	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/02/15 12:41	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 11:38	jjc
Selenium, dissolved	M200.8 ICP-MS	2		U	mg/L	0.0002	0.0005	07/10/15 11:07	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/08/15 12:53	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 0:20	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 12:53	mfm
Sodium, dissolved	M200.7 ICP	1	7.2	*	mg/L	0.2	1	07/02/15 12:41	jjc
Sodium, total	M200.7 ICP	1	8.5		mg/L	0.2	1	07/06/15 11:38	jjc
Strontium, dissolved	M200.7 ICP	1	0.106	*	mg/L	0.005	0.03	07/02/15 12:41	jjc
Strontium, total	M200.7 ICP	1	0.127		mg/L	0.005	0.03	07/06/15 11:38	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/07/15 10:36	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 12:53	mfm
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 2:55	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 11:38	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/02/15 12:41	jjc
Titanium, total	M200.7 ICP	1	0.029	B	mg/L	0.005	0.03	07/06/15 11:38	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/07/15 10:36	mfm
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 12:53	mfm
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/02/15 12:41	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	07/06/15 11:38	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/02/15 12:41	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 11:38	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW7-E

ACZ Sample ID: **L25130-04**
 Date Sampled: 06/23/15 08:05
 Date Received: 06/25/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	48.0		*	mg/L	2	20	06/29/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Total Alkalinity		1	48.0		*	mg/L	2	20	06/29/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-6.7			%			07/16/15 0:00	calc
Sum of Anions			1.6			meq/L			07/16/15 0:00	calc
Sum of Cations			1.4			meq/L			07/16/15 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 12:15	enb
Chloride	SM4500Cl-E	1	3.7		*	mg/L	0.5	2	07/06/15 12:01	bsu
Conductivity @25C	SM2510B	1	173		*	umhos/cm	1	10	06/29/15 21:56	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 15:34	mss2
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 16:33	mss2
Fluoride	SM4500F-C	1	0.15	B	*	mg/L	0.05	0.3	07/01/15 13:30	enb
Hardness as CaCO3	SM2340B - Calculation		51			mg/L	0.8	4	07/16/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.70		*	mg/L	0.02	0.1	07/03/15 1:44	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 12:08	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	06/30/15 14:39	mss2
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/29/15 0:00	abd
pH measured at		1	19.7		*	C	0.1	0.1	06/29/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	07/16/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	07/07/15 23:31	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	06/26/15 19:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	07/01/15 16:09	jlf
Residue, Filterable (TDS) @180C	SM2540C	5	110		*	mg/L	50	100	06/26/15 10:17	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	06/26/15 12:02	enb
Residue, Total (TS) @ 105C	SM2540B	1	178		*	mg/L	10	20	06/25/15 16:52	tms
Sulfate	D516-02/-07 - Turbidimetric	1	26.3		*	mg/L	1	5	07/06/15 17:19	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 15:32	enb
TDS (calculated)	Calculation		88.5			mg/L			07/16/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.24						07/16/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L25130-05**
Date Sampled: 06/23/15 12:00
Date Received: 06/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/15 11:53	mss2
Cyanide, WAD	SM4500-CN I- distillation								07/06/15 12:21	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/15 13:31	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:31	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/01/15 13:03	bsu
Total Hot Plate Digestion	M200.2 ICP								07/02/15 11:14	scp
Total Hot Plate Digestion	M200.2 ICP-MS								07/07/15 12:48	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L25130-05**
Date Sampled: 06/23/15 12:00
Date Received: 06/25/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/02/15 12:44	jjc
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	07/06/15 11:41	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/07/15 10:40	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/08/15 12:56	mfm
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	07/07/15 10:40	mfm
Arsenic, total	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	07/08/15 12:56	mfm
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	07/02/15 12:44	jjc
Barium, total	M200.7 ICP	1		U		mg/L	0.003	0.02	07/06/15 11:41	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:44	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:41	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/02/15 12:44	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 11:41	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:58	jjc
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:41	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/07/15 10:40	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 12:56	mfm
Calcium, dissolved	M200.7 ICP	1	0.1	B	*	mg/L	0.1	0.5	07/02/15 12:44	jjc
Calcium, total	M200.7 ICP	1		U		mg/L	0.1	0.5	07/06/15 11:41	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 2:58	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:41	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:44	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:41	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:44	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:41	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:44	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:41	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/02/15 12:44	jjc
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	07/06/15 17:32	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	07/07/15 10:40	mfm
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 12:56	mfm
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:44	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:41	jjc
Magnesium, dissolved	M200.7 ICP	1	0.3	B	*	mg/L	0.2	1	07/02/15 12:44	jjc
Magnesium, total	M200.7 ICP	1		U		mg/L	0.2	1	07/06/15 11:41	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/02/15 12:44	jjc
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	07/06/15 11:41	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 13:05	nco
Mercury, total	M245.1 CVAA	1	0.0002	B		mg/L	0.0002	0.001	07/01/15 14:47	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/02/15 12:44	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 11:41	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:44	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:41	jjc
Potassium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	07/02/15 12:44	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L25130-05**
Date Sampled: 06/23/15 12:00
Date Received: 06/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	U	mg/L	0.2	1	07/06/15 11:41	jjc
Scandium, dissolved	M200.7 ICP	1	U *	mg/L	0.1	0.5	07/02/15 12:44	jjc
Scandium, total	M200.7 ICP	1	U *	mg/L	0.1	0.5	07/06/15 11:41	jjc
Selenium, dissolved	M200.8 ICP-MS	2	U	mg/L	0.0002	0.0005	07/10/15 11:10	mfm
Selenium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0003	07/08/15 12:56	mfm
Silver, dissolved	M200.8 ICP-MS	1	U *	mg/L	0.00005	0.0003	07/07/15 10:40	mfm
Silver, total	M200.8 ICP-MS	1	U	mg/L	0.00005	0.0003	07/08/15 12:56	mfm
Sodium, dissolved	M200.7 ICP	1	U *	mg/L	0.2	1	07/02/15 12:44	jjc
Sodium, total	M200.7 ICP	1	U	mg/L	0.2	1	07/06/15 11:41	jjc
Strontium, dissolved	M200.7 ICP	1	U *	mg/L	0.005	0.03	07/02/15 12:44	jjc
Strontium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	07/06/15 11:41	jjc
Thallium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	07/07/15 10:40	mfm
Thallium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	07/08/15 12:56	mfm
Tin, dissolved	M200.7 ICP	1	U	mg/L	0.04	0.2	07/07/15 2:58	jjc
Tin, total	M200.7 ICP	1	U	mg/L	0.04	0.2	07/06/15 11:41	jjc
Titanium, dissolved	M200.7 ICP	1	U	mg/L	0.005	0.03	07/02/15 12:44	jjc
Titanium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	07/06/15 11:41	jjc
Uranium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	07/07/15 10:40	mfm
Uranium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	07/08/15 12:56	mfm
Vanadium, dissolved	M200.7 ICP	1	U	mg/L	0.005	0.03	07/02/15 12:44	jjc
Vanadium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	07/06/15 11:41	jjc
Zinc, dissolved	M200.7 ICP	1	U	mg/L	0.01	0.05	07/02/15 12:44	jjc
Zinc, total	M200.7 ICP	1	U	mg/L	0.01	0.05	07/06/15 11:41	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L25130-05**
Date Sampled: 06/23/15 12:00
Date Received: 06/25/15
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Total Alkalinity		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			07/16/15 0:00	calc
Sum of Anions			N/A			meq/L			07/16/15 0:00	calc
Sum of Cations				U		meq/L			07/16/15 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 12:42	enb
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	07/06/15 12:01	bsu
Conductivity @25C	SM2510B	1	1.2	B	*	umhos/cm	1	10	06/29/15 22:03	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 15:35	mss2
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 16:36	mss2
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	07/01/15 13:48	enb
Hardness as CaCO3	SM2340B - Calculation		1.5	B		mg/L	0.8	4	07/16/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	07/03/15 1:47	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 12:09	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/30/15 14:40	mss2
pH (lab)	SM4500H+ B									
pH		1	6.3	H	*	units	0.1	0.1	06/29/15 0:00	abd
pH measured at		1	19.6		*	C	0.1	0.1	06/29/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	07/16/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	07/07/15 23:32	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	06/26/15 19:13	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	07/01/15 16:11	jif
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	06/26/15 10:19	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/26/15 12:03	enb
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	06/25/15 16:56	tms
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	07/06/15 17:19	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 15:40	enb
TDS (calculated)	Calculation		0.7			mg/L			07/16/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		n/a						07/16/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L25130-06**
Date Sampled: 06/23/15 09:40
Date Received: 06/25/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/06/15 12:06	mss2
Cyanide, WAD	SM4500-CN I- distillation								07/06/15 12:35	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/29/15 13:46	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:40	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/01/15 13:09	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								07/07/15 13:00	scp
Total Hot Plate Digestion	M200.2 ICP								07/02/15 11:24	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L25130-06**
Date Sampled: 06/23/15 09:40
Date Received: 06/25/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/02/15 12:48	jjc
Aluminum, total	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	07/06/15 11:44	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0244			mg/L	0.0004	0.002	07/08/15 0:25	msh
Antimony, total	M200.8 ICP-MS	1	0.0250			mg/L	0.0004	0.002	07/08/15 12:59	mfm
Arsenic, dissolved	M200.8 ICP-MS	1	0.0092			mg/L	0.0002	0.001	07/08/15 0:25	msh
Arsenic, total	M200.8 ICP-MS	1	0.0104			mg/L	0.0002	0.001	07/08/15 12:59	mfm
Barium, dissolved	M200.7 ICP	1	0.044			mg/L	0.003	0.02	07/02/15 12:48	jjc
Barium, total	M200.7 ICP	1	0.054			mg/L	0.003	0.02	07/06/15 11:44	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:48	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:44	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/02/15 12:48	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 11:44	jjc
Boron, dissolved	M200.7 ICP	1	0.13			mg/L	0.01	0.05	07/07/15 3:01	jjc
Boron, total	M200.7 ICP	1	0.14			mg/L	0.01	0.05	07/06/15 11:44	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 0:25	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 12:59	mfm
Calcium, dissolved	M200.7 ICP	1	344		*	mg/L	0.1	0.5	07/02/15 12:48	jjc
Calcium, total	M200.7 ICP	1	391			mg/L	0.1	0.5	07/06/15 11:44	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 3:01	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:44	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:48	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:44	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:48	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:44	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:48	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:44	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/02/15 12:48	jjc
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	07/06/15 17:35	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	07/08/15 0:25	msh
Lead, total	M200.8 ICP-MS	1	0.0009			mg/L	0.0001	0.0005	07/08/15 12:59	mfm
Lithium, dissolved	M200.7 ICP	1	0.080			mg/L	0.008	0.04	07/02/15 12:48	jjc
Lithium, total	M200.7 ICP	1	0.096			mg/L	0.008	0.04	07/06/15 11:44	jjc
Magnesium, dissolved	M200.7 ICP	1	20.6		*	mg/L	0.2	1	07/02/15 12:48	jjc
Magnesium, total	M200.7 ICP	1	24.2			mg/L	0.2	1	07/06/15 11:44	jjc
Manganese, dissolved	M200.7 ICP	1	0.088			mg/L	0.005	0.03	07/02/15 12:48	jjc
Manganese, total	M200.7 ICP	1	0.116			mg/L	0.005	0.03	07/06/15 11:44	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 13:07	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/01/15 14:49	nco
Molybdenum, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	07/02/15 12:48	jjc
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	07/06/15 11:44	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/02/15 12:48	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 11:44	jjc
Potassium, dissolved	M200.7 ICP	1	11			mg/L	0.2	1	07/02/15 12:48	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L25130-06**
Date Sampled: 06/23/15 09:40
Date Received: 06/25/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	12.9			mg/L	0.2	1	07/06/15 11:44	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/02/15 12:48	jjc
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 11:44	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0004			mg/L	0.0001	0.0003	07/08/15 0:25	msh
Selenium, total	M200.8 ICP-MS	1	0.0009			mg/L	0.0001	0.0003	07/08/15 12:59	mfm
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	07/08/15 0:25	msh
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	07/08/15 12:59	mfm
Sodium, dissolved	M200.7 ICP	1	66.2		*	mg/L	0.2	1	07/02/15 12:48	jjc
Sodium, total	M200.7 ICP	1	78.7			mg/L	0.2	1	07/06/15 11:44	jjc
Strontium, dissolved	M200.7 ICP	1	3.590		*	mg/L	0.005	0.03	07/02/15 12:48	jjc
Strontium, total	M200.7 ICP	1	4.230			mg/L	0.005	0.03	07/06/15 11:44	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	07/08/15 0:25	msh
Thallium, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	07/08/15 12:59	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	07/07/15 3:01	jjc
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	07/06/15 11:44	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/02/15 12:48	jjc
Titanium, total	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	07/06/15 11:44	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	07/08/15 0:25	msh
Uranium, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	07/08/15 12:59	mfm
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/02/15 12:48	jjc
Vanadium, total	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	07/06/15 11:44	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/02/15 12:48	jjc
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 11:44	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2B-E

ACZ Sample ID: **L25130-06**
 Date Sampled: 06/23/15 09:40
 Date Received: 06/25/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	42.6		*	mg/L	2	20	06/29/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/29/15 0:00	abd
Total Alkalinity		1	42.6		*	mg/L	2	20	06/29/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-6.4			%			07/16/15 0:00	calc
Sum of Anions			25			meq/L			07/16/15 0:00	calc
Sum of Cations			22			meq/L			07/16/15 0:00	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 12:51	enb
Chloride	SM4500Cl-E	1	69.7		*	mg/L	0.5	2	07/06/15 12:01	bsu
Conductivity @25C	SM2510B	1	2010		*	umhos/cm	1	10	06/29/15 22:12	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 15:37	mss2
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/06/15 16:37	mss2
Fluoride	SM4500F-C	1	1.33		*	mg/L	0.05	0.3	07/01/15 13:51	enb
Hardness as CaCO3	SM2340B - Calculation		944			mg/L	0.8	4	07/16/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	6.09		*	mg/L	0.08	0.4	07/03/15 2:04	pjb
Nitrogen, ammonia	M350.1	1	0.13	B	*	mg/L	0.05	0.2	07/07/15 12:13	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	06/30/15 14:41	mss2
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/29/15 0:00	abd
pH measured at		1	19.5		*	C	0.1	0.1	06/29/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	07/16/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	07/07/15 23:34	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	06/26/15 19:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	07/01/15 16:12	jlf
Residue, Filterable (TDS) @180C	SM2540C	1	1770		*	mg/L	10	20	06/26/15 10:21	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/26/15 12:05	enb
Residue, Total (TS) @ 105C	SM2540B	1	1800		*	mg/L	10	20	06/25/15 16:58	tms
Sulfate	D516-02/-07 - Turbidimetric	100	1040		*	mg/L	100	500	07/06/15 17:44	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 15:49	enb
TDS (calculated)	Calculation		1580			mg/L			07/16/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.12						07/16/15 0:00	calc

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25130-01	WG386230	Strontium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG386057	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386307	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG386057	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386331	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386352	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386271	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG386388	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386129	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG386444	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386007	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
		M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385950	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG385952	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385913	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG386358	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike	

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG386054		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386057		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25130-02	WG386230	Calcium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Magnesium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Sodium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG386057	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386307	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG386057	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386331	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386352	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386271	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG386388	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386129	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.	
		M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386057	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		pH measured at SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG386444	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG386007	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).	
		M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
		M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385950	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG385952	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385913		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG386358		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.
WG386054		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386057		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25130-03	WG386230	Calcium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Magnesium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Sodium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG386057	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386307	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, 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 sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386331	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386352	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386271	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
WG386388	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.	
		M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386129	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.	
		M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386057	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG386444	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG386007	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.	
		M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
		M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG385950		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG385952		Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386081		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG386358		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG386054		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386057		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION	
L25130-04	WG386230	Calcium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		Magnesium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		Sodium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		Strontium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
	WG386057	Bicarbonate as CaCO3	Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand		M410.4	Q6	Sample was received above recommended temperature.
				M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386307	Chloride		SM4500CI-E	M2	Matrix spike recovery was low, 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 sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Conductivity @25C		SM2510B	Q6	Sample was received above recommended temperature.
	WG386331	Cyanide, total		M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
				M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386352	Cyanide, WAD		SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
				SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride		SM4500F-C	Q6	Sample was received above recommended temperature.
				SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Hydroxide as CaCO3		SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386271	Nitrate/Nitrite as N		M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
				M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386388	Nitrogen, ammonia		M350.1	Q6	Sample was received above recommended temperature.
				M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386129	Nitrogen, total Kjeldahl		M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.	
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386057	pH	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
			SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG386444	Phosphorus, dissolved		M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG386007	Phosphorus, ortho dissolved		M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.	
			M365.1 - Automated Ascorbic Acid	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.	
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386200	Phosphorus, total		M365.1 - Auto Ascorbic Acid	Q6	Sample was received above recommended temperature.	

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Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			(digest)		
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385950		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG385953		Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385913		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG386358		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG386054		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386057		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25130-05	WG386230	Calcium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Magnesium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG386367	Silver, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [$<$ MDL].
			M200.8 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG386230	Sodium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG386057	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.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG386307	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, 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 sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG386057	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386331	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG386352	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).
	WG386057	Hydroxide as CaCO ₃	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386271	Nitrate/Nitrite as N	M353.2 - H ₂ SO ₄ preserved	Q6	Sample was received above recommended temperature.
M353.2 - H ₂ SO ₄ preserved			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).	
WG386388	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.	
		M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).	
WG386129	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.	
		M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ($<$ 10x MDL).	
WG386057	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG386444	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG386007	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	

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386200		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385950		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG385953		Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385913		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG386358		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG386054		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386057		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25130-06	WG386230	Calcium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Magnesium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Sodium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG386057	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386307	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, 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 sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386331	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386352	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386057	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386271	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386388	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.	
		M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386129	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.	
		M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386057	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
WG386444	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG386007	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.	
		M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
		M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG386200	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data	

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			(digest)		validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385950		Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG385953		Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385913		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG386358		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG386054		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG386057		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L25130-01**
Date Sampled: 06/23/15 10:50
Date Received: 06/25/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG386225

Analyst: drh
Extract Date: 06/30/15 2:13
Analysis Date: 07/01/15 13:14

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	76.9		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L25130-01**
Date Sampled: 06/23/15 10:50
Date Received: 06/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386533

Analyst: id/itk

Extract Date:

Analysis Date: 07/09/15 12:36

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L25130-02**
Date Sampled: 06/23/15 11:45
Date Received: 06/25/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG386225

Analyst: drh
Extract Date: 06/30/15 3:21
Analysis Date: 07/01/15 14:06

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	79.5		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L25130-02**
Date Sampled: 06/23/15 11:45
Date Received: 06/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup: WG386533**

Analyst: id/itk

Extract Date:

Analysis Date: 07/09/15 12:54

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.16	*	mg/L	2.3	11.6

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L25130-03**

Date Sampled: 06/23/15 8:55

Date Received: 06/25/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG386225

Analyst: drh

Extract Date: 06/30/15 4:30

Analysis Date: 07/01/15 14:32

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	79.3		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L25130-03**

Date Sampled: 06/23/15 8:55

Date Received: 06/25/15

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

Extract Method:

Workgroup: WG386533

Analyst: id/itk

Extract Date:

Analysis Date: 07/09/15 13:12

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L25130-04**

Date Sampled: 06/23/15 8:05

Date Received: 06/25/15

Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG386225

Analyst: drh

Extract Date: 06/30/15 5:38

Analysis Date: 07/01/15 14:58

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.07	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	78.1		1.07	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L25130-04**
Date Sampled: 06/23/15 8:05
Date Received: 06/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386533

Analyst: id/itk

Extract Date:

Analysis Date: 07/09/15 13:30

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-E

ACZ Sample ID: **L25130-05**
Date Sampled: 06/23/15 12:00
Date Received: 06/25/15
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG386225

Analyst: drh
Extract Date: 06/30/15 6:46
Analysis Date: 07/01/15 15:24

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.8		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L25130-05**
Date Sampled: 06/23/15 12:00
Date Received: 06/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386533

Analyst: id/itk

Extract Date:

Analysis Date: 07/09/15 13:48

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L25130-06**

Date Sampled: 06/23/15 9:40

Date Received: 06/25/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG386225

Analyst: drh

Extract Date: 06/30/15 7:54

Analysis Date: 07/01/15 15:50

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	81.7		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L25130-06**
Date Sampled: 06/23/15 9:40
Date Received: 06/25/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386533

Analyst: id/itk

Extract Date:

Analysis Date: 07/09/15 14:06

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

Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25130-01	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386533	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L25130-02	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386533	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L25130-03	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386533	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L25130-04	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386533	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L25130-05	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386533	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L25130-06	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386533	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.	

Tahoe Resources, Inc.

ACZ Project ID: **L25130**

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Bismuth, total	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Gallium, total	M200.7 ICP
Scandium, dissolved	M200.7 ICP
Scandium, total	M200.7 ICP

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L25130
 Date Received: 06/25/2015 10:07
 Received By: ear
 Date Printed: 6/25/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3391	16.5	13	N/A
4239	16.6	14	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L25130
Date Received: 06/25/2015 10:07
Received By: ear
Date Printed: 6/25/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).

25130

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

Report to:

Name: <u>Miguel Berganza</u>	Address: <u>Bulevar 105 Procesos 14-69 Zona 10</u>
Company: <u>Tahoe Resources INC.</u>	Empresarial Zona Pradera Torre W oficina 1406
E-mail: <u>M Berganza@santafael.com.gt</u>	Telephone: <u>(502) 5951 5243</u>

Copy of Report to:

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

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

SAMPLE IDENTIFICATION	DATE: TIME	Matrix	# of Containers							
SW1-E	23/06/15 10:50	SW	10	✓						
SW2-E	23/06/15 11:45	SW	10	✓						
SW4-E	23/06/15 08:55	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

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>23-06-2015 14:50</u>	<u>[Signature]</u>	<u>23.6.15 14:50</u>
	<u>14:50.</u>	<u>[Signature]</u>	<u>6-25/51007</u>

25130 Chain of Custody



Laboratories, Inc. **L25130**

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: Boulevard las Prácticas 24-69 Zona 12
Company: Tanco Resources Inc.	Empresarial Com Piedad Torre 16 oficina 1406
E-mail: M Berganza @ sanrafael.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff	E-mail: cmuerhoff@tancoresourcesinc.com
Company: Tanco Resources Inc.	Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*Sampler's Signature: 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										
SW7-E	23/06/15 08:05	SW	10	SW									
SW10-E	23/06/15 12:00	SW	10										
SW2B-E	23/06/15 09:40	SW	10										

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

REMARKS

COC#2 Please report results of COC #1 and #2 together.

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>	23.06.2015 14:50	Gomez	23.6.15 14:50
	14:50	<i>[Signature]</i>	6.23.15 10:07

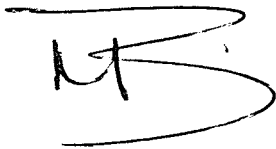
Guatemala June 23rd, 2015

To whom it may concern:

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

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

Yours sincerely,

A handwritten signature in black ink, appearing to be the initials 'MB' with a large, sweeping flourish underneath.

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

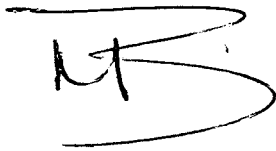
Guatemala June 23rd, 2015

To whom it may concern:

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

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

Yours sincerely,

A handwritten signature in black ink, appearing to be the initials 'MB' with a large, sweeping flourish underneath.

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

July 14, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L25172

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 29, 2015. This project has been assigned to ACZ's project number, L25172. 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 L25172. 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.

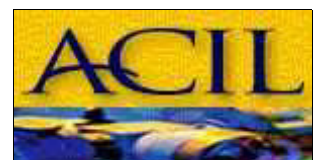
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 13, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

July 14, 2015

Project ID: Escobal

ACZ Project ID: L25172

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 miscellaneous samples from Tahoe Resources, Inc. on June 29, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L25172. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with an "H3", received after the hold time had expired.

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L25172-01**
Date Sampled: 06/24/15 08:00
Date Received: 06/29/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 13:08	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 12:57	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 10:48	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:13	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:07	mss2
Total Hot Plate Digestion	M200.2 ICP								07/06/15 9:40	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 17:19	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L25172-01**

Date Sampled: 06/24/15 08:00

Date Received: 06/29/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/07/15 18:36	jjc
Aluminum, total	M200.7 ICP	1	0.17	B		mg/L	0.03	0.2	07/06/15 21:08	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/08/15 17:58	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/09/15 17:54	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	07/08/15 17:58	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0031			mg/L	0.0002	0.001	07/09/15 17:54	scp
Barium, dissolved	M200.7 ICP	1	0.061			mg/L	0.003	0.02	07/07/15 18:36	jjc
Barium, total	M200.7 ICP	1	0.064			mg/L	0.003	0.02	07/06/15 21:08	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:36	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:08	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 18:36	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:08	jjc
Boron, dissolved	M200.7 ICP	1	0.14			mg/L	0.01	0.05	07/07/15 18:36	jjc
Boron, total	M200.7 ICP	1	0.13			mg/L	0.01	0.05	07/06/15 21:08	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 17:58	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 17:54	scp
Calcium, dissolved	M200.7 ICP	1	14			mg/L	0.1	0.5	07/07/15 18:36	jjc
Calcium, total	M200.7 ICP	1	14.5			mg/L	0.1	0.5	07/06/15 21:08	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:36	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:08	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:36	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:08	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:36	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:08	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 18:36	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:08	jjc
Iron, dissolved	M200.7 ICP	1	0.10			mg/L	0.02	0.05	07/07/15 18:36	jjc
Iron, total	M200.7 ICP	1	0.29			mg/L	0.02	0.05	07/06/15 21:08	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 17:58	mfm
Lead, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	07/09/15 17:54	scp
Lithium, dissolved	M200.7 ICP	1	0.044			mg/L	0.008	0.04	07/07/15 18:36	jjc
Lithium, total	M200.7 ICP	1	0.043			mg/L	0.008	0.04	07/06/15 21:08	jjc
Magnesium, dissolved	M200.7 ICP	1	3			mg/L	0.2	1	07/07/15 18:36	jjc
Magnesium, total	M200.7 ICP	1	3.1			mg/L	0.2	1	07/06/15 21:08	jjc
Manganese, dissolved	M200.7 ICP	1	0.033			mg/L	0.005	0.03	07/07/15 18:36	jjc
Manganese, total	M200.7 ICP	1	0.041			mg/L	0.005	0.03	07/06/15 21:08	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:12	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:29	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/07/15 18:36	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 21:08	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:36	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:08	jjc
Potassium, dissolved	M200.7 ICP	1	3.8			mg/L	0.2	1	07/07/15 18:36	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L25172-01**
Date Sampled: 06/24/15 08:00
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	4		mg/L	0.2	1	07/06/15 21:08	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/07/15 18:36	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 21:08	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/08/15 17:58	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/09/15 17:54	scp
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 17:58	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/09/15 17:54	scp
Sodium, dissolved	M200.7 ICP	1	15.8		mg/L	0.2	1	07/07/15 18:36	jjc
Sodium, total	M200.7 ICP	1	15.7		mg/L	0.2	1	07/06/15 21:08	jjc
Strontium, dissolved	M200.7 ICP	1	0.105		mg/L	0.005	0.03	07/07/15 18:36	jjc
Strontium, total	M200.7 ICP	1	0.108		mg/L	0.005	0.03	07/06/15 21:08	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 17:58	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/09/15 17:54	scp
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 18:36	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 21:08	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:36	jjc
Titanium, total	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	07/06/15 21:08	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 17:58	mfm
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/09/15 17:54	scp
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:36	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	07/06/15 21:08	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/07/15 18:36	jjc
Zinc, total	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	07/06/15 21:08	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW6-E

ACZ Sample ID: **L25172-01**
 Date Sampled: 06/24/15 08:00
 Date Received: 06/29/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	47.8		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	47.8		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			07/14/15 9:16	calc
Sum of Anions			1.8			meq/L			07/14/15 9:16	calc
Sum of Cations			1.8			meq/L			07/14/15 9:16	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 13:09	enb
Chloride	SM4500Cl-E	1	17.3		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	183		*	umhos/cm	1	10	06/30/15 21:31	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:23	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:45	pjb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	07/01/15 14:53	enb
Hardness as CaCO3	SM2340B - Calculation		47			mg/L	0.8	4	07/14/15 9:16	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	07/07/15 23:20	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 16:09	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	07/09/15 22:40	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.9		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	07/14/15 9:16	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	07/08/15 11:00	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	07/02/15 21:08	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	07/07/15 23:57	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	118		*	mg/L	10	20	06/29/15 16:36	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/29/15 15:16	abd
Residue, Total (TS) @ 105C	SM2540B	1	142		*	mg/L	10	20	06/29/15 15:38	abd
Sulfate	D516-02/-07 - Turbidimetric	1	17.3		*	mg/L	1	5	07/08/15 14:24	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 16:53	enb
TDS (calculated)	Calculation		101			mg/L			07/14/15 9:16	calc
TDS (ratio - measured/calculated)	Calculation		1.17						07/14/15 9:16	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L25172-02**
Date Sampled: 06/24/15 09:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 13:21	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 13:33	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 11:06	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:50	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:16	mss2
Total Hot Plate Digestion	M200.2 ICP								07/06/15 9:51	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 17:28	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L25172-02**
Date Sampled: 06/24/15 09:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.03	0.2	07/07/15 18:45	jjc
Aluminum, total	M200.7 ICP	1	0.39			mg/L	0.03	0.2	07/06/15 21:11	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0041			mg/L	0.0004	0.002	07/08/15 18:07	mfm
Antimony, total	M200.8 ICP-MS	1	0.0041			mg/L	0.0004	0.002	07/09/15 17:58	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0053			mg/L	0.0002	0.001	07/08/15 18:07	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0063			mg/L	0.0002	0.001	07/09/15 17:58	scp
Barium, dissolved	M200.7 ICP	1	0.122			mg/L	0.003	0.02	07/07/15 18:45	jjc
Barium, total	M200.7 ICP	1	0.133			mg/L	0.003	0.02	07/06/15 21:11	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:45	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:11	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 18:45	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:11	jjc
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	07/07/15 18:45	jjc
Boron, total	M200.7 ICP	1	0.05			mg/L	0.01	0.05	07/06/15 21:11	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:07	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 17:58	scp
Calcium, dissolved	M200.7 ICP	1	105			mg/L	0.1	0.5	07/07/15 18:45	jjc
Calcium, total	M200.7 ICP	1	115			mg/L	0.1	0.5	07/06/15 21:11	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:45	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:11	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:45	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:11	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:45	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:11	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 18:45	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:11	jjc
Iron, dissolved	M200.7 ICP	1	0.10			mg/L	0.02	0.05	07/07/15 18:45	jjc
Iron, total	M200.7 ICP	1	0.52			mg/L	0.02	0.05	07/06/15 21:11	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:07	mfm
Lead, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	07/09/15 17:58	scp
Lithium, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.008	0.04	07/07/15 18:45	jjc
Lithium, total	M200.7 ICP	1	0.026	B		mg/L	0.008	0.04	07/06/15 21:11	jjc
Magnesium, dissolved	M200.7 ICP	1	9.3			mg/L	0.2	1	07/07/15 18:45	jjc
Magnesium, total	M200.7 ICP	1	10.1			mg/L	0.2	1	07/06/15 21:11	jjc
Manganese, dissolved	M200.7 ICP	1	0.381			mg/L	0.005	0.03	07/07/15 18:45	jjc
Manganese, total	M200.7 ICP	1	0.405			mg/L	0.005	0.03	07/06/15 21:11	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:14	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:31	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/07/15 18:45	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 21:11	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:45	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:11	jjc
Potassium, dissolved	M200.7 ICP	1	10.3			mg/L	0.2	1	07/07/15 18:45	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L25172-02**
Date Sampled: 06/24/15 09:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	10.7		mg/L	0.2	1	07/06/15 21:11	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/07/15 18:45	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 21:11	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	07/08/15 18:07	mfm
Selenium, total	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	07/09/15 17:58	scp
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 18:07	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/09/15 17:58	scp
Sodium, dissolved	M200.7 ICP	1	36.5		mg/L	0.2	1	07/07/15 18:45	jjc
Sodium, total	M200.7 ICP	1	37.7		mg/L	0.2	1	07/06/15 21:11	jjc
Strontium, dissolved	M200.7 ICP	1	1.100		mg/L	0.005	0.03	07/07/15 18:45	jjc
Strontium, total	M200.7 ICP	1	1.190		mg/L	0.005	0.03	07/06/15 21:11	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 18:07	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/09/15 17:58	scp
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 18:45	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 21:11	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:45	jjc
Titanium, total	M200.7 ICP	1	0.017	B	mg/L	0.005	0.03	07/06/15 21:11	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/08/15 18:07	mfm
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/09/15 17:58	scp
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:45	jjc
Vanadium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	07/06/15 21:11	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/07/15 18:45	jjc
Zinc, total	M200.7 ICP	1	0.01	B	mg/L	0.01	0.05	07/06/15 21:11	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW8-E

ACZ Sample ID: **L25172-02**

Date Sampled: 06/24/15 09:40

Date Received: 06/29/15

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	108		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	108		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.3			%			07/14/15 9:17	calc
Sum of Anions			7.9			meq/L			07/14/15 9:17	calc
Sum of Cations			8.1			meq/L			07/14/15 9:17	calc
Chemical Oxygen Demand	M410.4	1	15	B	*	mg/L	10	20	07/06/15 13:18	enb
Chloride	SM4500Cl-E	1	26.6		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	792		*	umhos/cm	1	10	06/30/15 21:40	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:26	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:47	pjb
Fluoride	SM4500F-C	1	0.39		*	mg/L	0.05	0.3	07/01/15 14:56	enb
Hardness as CaCO3	SM2340B - Calculation		300			mg/L	0.8	4	07/14/15 9:17	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.64		*	mg/L	0.02	0.1	07/07/15 23:21	pjb
Nitrogen, ammonia	M350.1	1	1.60		*	mg/L	0.05	0.2	07/07/15 16:12	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2.9		*	mg/L	0.1	0.5	07/09/15 22:42	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.7		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.93			mg/L	0.03	0.2	07/14/15 9:17	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.30		*	mg/L	0.01	0.05	07/08/15 11:02	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.24	H	*	mg/L	0.01	0.05	07/02/15 21:11	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.40		*	mg/L	0.01	0.05	07/07/15 23:58	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	584		*	mg/L	10	20	06/29/15 16:38	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	06/29/15 15:18	abd
Residue, Total (TS) @ 105C	SM2540B	1	658		*	mg/L	10	20	06/29/15 15:39	abd
Sulfate	D516-02/-07 - Turbidimetric	20	237		*	mg/L	20	100	07/08/15 15:09	mss2
Sulfide as S	SM4500S2-D	1	0.02	B	*	mg/L	0.02	0.1	06/29/15 17:04	enb
TDS (calculated)	Calculation		494			mg/L			07/14/15 9:17	calc
TDS (ratio - measured/calculated)	Calculation		1.18						07/14/15 9:17	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L25172-03**
Date Sampled: 06/24/15 08:45
Date Received: 06/29/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 13:33	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 14:09	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 11:25	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:09	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:26	mss2
Total Hot Plate Digestion	M200.2 ICP								07/06/15 10:26	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 17:38	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L25172-03**

Date Sampled: 06/24/15 08:45

Date Received: 06/29/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/07/15 18:48	jjc
Aluminum, total	M200.7 ICP	1	0.22			mg/L	0.03	0.2	07/06/15 21:21	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0015	B		mg/L	0.0004	0.002	07/08/15 18:10	mfm
Antimony, total	M200.8 ICP-MS	1	0.0014	B		mg/L	0.0004	0.002	07/09/15 18:01	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0046			mg/L	0.0002	0.001	07/08/15 18:10	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0050			mg/L	0.0002	0.001	07/09/15 18:01	scp
Barium, dissolved	M200.7 ICP	1	0.105			mg/L	0.003	0.02	07/07/15 18:48	jjc
Barium, total	M200.7 ICP	1	0.111			mg/L	0.003	0.02	07/06/15 21:21	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:48	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:21	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 18:48	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:21	jjc
Boron, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	07/07/15 18:48	jjc
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	07/06/15 21:21	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:10	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:01	scp
Calcium, dissolved	M200.7 ICP	1	61.2			mg/L	0.1	0.5	07/07/15 18:48	jjc
Calcium, total	M200.7 ICP	1	62.9			mg/L	0.1	0.5	07/06/15 21:21	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:48	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:21	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:48	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:21	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:48	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:21	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 18:48	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:21	jjc
Iron, dissolved	M200.7 ICP	1	0.06			mg/L	0.02	0.05	07/07/15 18:48	jjc
Iron, total	M200.7 ICP	1	0.29			mg/L	0.02	0.05	07/06/15 21:21	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:10	mfm
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/09/15 18:01	scp
Lithium, dissolved	M200.7 ICP	1	0.040			mg/L	0.008	0.04	07/07/15 18:48	jjc
Lithium, total	M200.7 ICP	1	0.042			mg/L	0.008	0.04	07/06/15 21:21	jjc
Magnesium, dissolved	M200.7 ICP	1	7.9			mg/L	0.2	1	07/07/15 18:48	jjc
Magnesium, total	M200.7 ICP	1	8.2			mg/L	0.2	1	07/06/15 21:21	jjc
Manganese, dissolved	M200.7 ICP	1	0.102			mg/L	0.005	0.03	07/07/15 18:48	jjc
Manganese, total	M200.7 ICP	1	0.123			mg/L	0.005	0.03	07/06/15 21:21	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:16	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:34	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/07/15 18:48	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 21:21	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:48	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:21	jjc
Potassium, dissolved	M200.7 ICP	1	6.6			mg/L	0.2	1	07/07/15 18:48	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L25172-03**
Date Sampled: 06/24/15 08:45
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	6.8		mg/L	0.2	1	07/06/15 21:21	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/07/15 18:48	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 21:21	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	07/08/15 18:10	mfm
Selenium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	07/09/15 18:01	scp
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 18:10	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/09/15 18:01	scp
Sodium, dissolved	M200.7 ICP	1	27.1		mg/L	0.2	1	07/07/15 18:48	jjc
Sodium, total	M200.7 ICP	1	27.9		mg/L	0.2	1	07/06/15 21:21	jjc
Strontium, dissolved	M200.7 ICP	1	0.559		mg/L	0.005	0.03	07/07/15 18:48	jjc
Strontium, total	M200.7 ICP	1	0.572		mg/L	0.005	0.03	07/06/15 21:21	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 18:10	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/09/15 18:01	scp
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 18:48	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 21:21	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:48	jjc
Titanium, total	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	07/06/15 21:21	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/08/15 18:10	mfm
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/09/15 18:01	scp
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:48	jjc
Vanadium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	07/06/15 21:21	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/07/15 18:48	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 21:21	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW9-E

ACZ Sample ID: **L25172-03**

Date Sampled: 06/24/15 08:45

Date Received: 06/29/15

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	79.1		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	79.1		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.0			%			07/14/15 9:17	calc
Sum of Anions			5.2			meq/L			07/14/15 9:17	calc
Sum of Cations			5.1			meq/L			07/14/15 9:17	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 13:27	enb
Chloride	SM4500Cl-E	1	25.8		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	513		*	umhos/cm	1	10	06/30/15 21:49	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:27	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:48	pjb
Fluoride	SM4500F-C	1	0.30		*	mg/L	0.05	0.3	07/01/15 14:59	enb
Hardness as CaCO3	SM2340B - Calculation		185			mg/L	0.8	4	07/14/15 9:17	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.15		*	mg/L	0.02	0.1	07/07/15 23:23	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 16:14	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	07/09/15 22:44	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.7		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.34			mg/L	0.03	0.2	07/14/15 9:17	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.11		*	mg/L	0.01	0.05	07/08/15 11:04	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	07/02/15 21:13	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.12		*	mg/L	0.01	0.05	07/07/15 23:59	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	374		*	mg/L	10	20	06/29/15 16:39	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/29/15 15:19	abd
Residue, Total (TS) @ 105C	SM2540B	1	412		*	mg/L	10	20	06/29/15 15:40	abd
Sulfate	D516-02/-07 - Turbidimetric	5	135		*	mg/L	5	25	07/08/15 14:35	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 17:14	enb
TDS (calculated)	Calculation		313			mg/L			07/14/15 9:17	calc
TDS (ratio - measured/calculated)	Calculation		1.19						07/14/15 9:17	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L25172-04**
Date Sampled: 06/24/15 11:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 13:46	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 14:27	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 11:34	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:27	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:36	mss2
Total Hot Plate Digestion	M200.2 ICP								07/06/15 10:38	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 18:07	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L25172-04**
Date Sampled: 06/24/15 11:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/07/15 18:51	jjc
Aluminum, total	M200.7 ICP	1	0.23			mg/L	0.03	0.2	07/06/15 21:24	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/08/15 18:13	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/09/15 18:10	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0090			mg/L	0.0002	0.001	07/08/15 18:13	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0101			mg/L	0.0002	0.001	07/09/15 18:10	scp
Barium, dissolved	M200.7 ICP	1	0.129			mg/L	0.003	0.02	07/07/15 18:51	jjc
Barium, total	M200.7 ICP	1	0.136			mg/L	0.003	0.02	07/06/15 21:24	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:51	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:24	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 18:51	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:24	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	07/07/15 18:51	jjc
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:24	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:13	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:10	scp
Calcium, dissolved	M200.7 ICP	1	36.8			mg/L	0.1	0.5	07/07/15 18:51	jjc
Calcium, total	M200.7 ICP	1	38			mg/L	0.1	0.5	07/06/15 21:24	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:51	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:24	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:51	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:24	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:51	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:24	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 18:51	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:24	jjc
Iron, dissolved	M200.7 ICP	1	0.05			mg/L	0.02	0.05	07/07/15 18:51	jjc
Iron, total	M200.7 ICP	1	0.32			mg/L	0.02	0.05	07/06/15 21:24	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:13	mfm
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/09/15 18:10	scp
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:51	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:24	jjc
Magnesium, dissolved	M200.7 ICP	1	3.2			mg/L	0.2	1	07/07/15 18:51	jjc
Magnesium, total	M200.7 ICP	1	3.4			mg/L	0.2	1	07/06/15 21:24	jjc
Manganese, dissolved	M200.7 ICP	1	0.373			mg/L	0.005	0.03	07/07/15 18:51	jjc
Manganese, total	M200.7 ICP	1	0.396			mg/L	0.005	0.03	07/06/15 21:24	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:18	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:40	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/07/15 18:51	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 21:24	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:51	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:24	jjc
Potassium, dissolved	M200.7 ICP	1	4.8			mg/L	0.2	1	07/07/15 18:51	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L25172-04**
Date Sampled: 06/24/15 11:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5		mg/L	0.2	1	07/06/15 21:24	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/07/15 18:51	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 21:24	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/08/15 18:13	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	07/09/15 18:10	scp
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 18:13	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/09/15 18:10	scp
Sodium, dissolved	M200.7 ICP	1	13.4		mg/L	0.2	1	07/07/15 18:51	jjc
Sodium, total	M200.7 ICP	1	13.7		mg/L	0.2	1	07/06/15 21:24	jjc
Strontium, dissolved	M200.7 ICP	1	0.226		mg/L	0.005	0.03	07/07/15 18:51	jjc
Strontium, total	M200.7 ICP	1	0.233		mg/L	0.005	0.03	07/06/15 21:24	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/08/15 18:13	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	07/09/15 18:10	scp
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 18:51	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 21:24	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:51	jjc
Titanium, total	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	07/06/15 21:24	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/08/15 18:13	mfm
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/09/15 18:10	scp
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:51	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	07/06/15 21:24	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/07/15 18:51	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 21:24	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW3-E

ACZ Sample ID: **L25172-04**
 Date Sampled: 06/24/15 11:40
 Date Received: 06/29/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	113		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	114		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.8			%			07/14/15 9:18	calc
Sum of Anions			2.8			meq/L			07/14/15 9:18	calc
Sum of Cations			2.9			meq/L			07/14/15 9:18	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 13:54	enb
Chloride	SM4500Cl-E	1	2.8		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	268		*	umhos/cm	1	10	06/30/15 21:58	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:28	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:49	pjb
Fluoride	SM4500F-C	1	0.18	B	*	mg/L	0.05	0.3	07/01/15 15:14	enb
Hardness as CaCO3	SM2340B - Calculation		105			mg/L	0.8	4	07/14/15 9:18	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.16		*	mg/L	0.02	0.1	07/07/15 23:28	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 16:16	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	07/09/15 22:45	pjb
pH (lab)	SM4500H+ B									
pH		1	8.3	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.6		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	07/14/15 9:18	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	07/08/15 11:05	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	07/02/15 21:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	07/08/15 0:02	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	222		*	mg/L	10	20	06/29/15 16:40	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/29/15 15:20	abd
Residue, Total (TS) @ 105C	SM2540B	1	234		*	mg/L	10	20	06/29/15 15:41	abd
Sulfate	D516-02/-07 - Turbidimetric	1	22.8		*	mg/L	1	5	07/08/15 14:27	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 17:18	enb
TDS (calculated)	Calculation		154			mg/L			07/14/15 9:18	calc
TDS (ratio - measured/calculated)	Calculation		1.44						07/14/15 9:18	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L25172-05**
Date Sampled: 06/24/15 10:15
Date Received: 06/29/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 13:58	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 14:45	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 11:43	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:46	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:45	mss2
Total Hot Plate Digestion	M200.2 ICP								07/06/15 10:50	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 18:16	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L25172-05**
Date Sampled: 06/24/15 10:15
Date Received: 06/29/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.03	0.2	07/07/15 18:54	jjc
Aluminum, total	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	07/06/15 21:27	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0150			mg/L	0.0004	0.002	07/08/15 18:16	mfm
Antimony, total	M200.8 ICP-MS	1	0.0141			mg/L	0.0004	0.002	07/09/15 18:14	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0072			mg/L	0.0002	0.001	07/08/15 18:16	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0076			mg/L	0.0002	0.001	07/09/15 18:14	scp
Barium, dissolved	M200.7 ICP	1	0.094			mg/L	0.003	0.02	07/07/15 18:54	jjc
Barium, total	M200.7 ICP	1	0.097			mg/L	0.003	0.02	07/06/15 21:27	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:54	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:27	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 18:54	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:27	jjc
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	07/07/15 18:54	jjc
Boron, total	M200.7 ICP	1	0.11			mg/L	0.01	0.05	07/06/15 21:27	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:16	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:14	scp
Calcium, dissolved	M200.7 ICP	1	327			mg/L	0.1	0.5	07/07/15 18:54	jjc
Calcium, total	M200.7 ICP	1	340			mg/L	0.1	0.5	07/06/15 21:27	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:54	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:27	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:54	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:27	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:54	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:27	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 18:54	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:27	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/07/15 18:54	jjc
Iron, total	M200.7 ICP	1	0.09			mg/L	0.02	0.05	07/06/15 21:27	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	07/08/15 18:16	mfm
Lead, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	07/09/15 18:14	scp
Lithium, dissolved	M200.7 ICP	1	0.061			mg/L	0.008	0.04	07/07/15 18:54	jjc
Lithium, total	M200.7 ICP	1	0.064			mg/L	0.008	0.04	07/06/15 21:27	jjc
Magnesium, dissolved	M200.7 ICP	1	21.9			mg/L	0.2	1	07/07/15 18:54	jjc
Magnesium, total	M200.7 ICP	1	22.8			mg/L	0.2	1	07/06/15 21:27	jjc
Manganese, dissolved	M200.7 ICP	1	0.351			mg/L	0.005	0.03	07/07/15 18:54	jjc
Manganese, total	M200.7 ICP	1	0.374			mg/L	0.005	0.03	07/06/15 21:27	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:25	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:42	nco
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	07/07/15 18:54	jjc
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	07/06/15 21:27	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:54	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:27	jjc
Potassium, dissolved	M200.7 ICP	1	12.4			mg/L	0.2	1	07/07/15 18:54	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L25172-05**
Date Sampled: 06/24/15 10:15
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	12.9		mg/L	0.2	1	07/06/15 21:27	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/07/15 18:54	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 21:27	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	07/08/15 18:16	mfm
Selenium, total	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	07/09/15 18:14	scp
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 18:16	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/09/15 18:14	scp
Sodium, dissolved	M200.7 ICP	1	67.2		mg/L	0.2	1	07/07/15 18:54	jjc
Sodium, total	M200.7 ICP	1	70.2		mg/L	0.2	1	07/06/15 21:27	jjc
Strontium, dissolved	M200.7 ICP	1	3.090		mg/L	0.005	0.03	07/07/15 18:54	jjc
Strontium, total	M200.7 ICP	1	3.180		mg/L	0.005	0.03	07/06/15 21:27	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/08/15 18:16	mfm
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/09/15 18:14	scp
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 18:54	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 21:27	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 18:54	jjc
Titanium, total	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	07/06/15 21:27	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	07/08/15 18:16	mfm
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	07/09/15 18:14	scp
Vanadium, dissolved	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	07/07/15 18:54	jjc
Vanadium, total	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	07/06/15 21:27	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/07/15 18:54	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 21:27	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4A-E

ACZ Sample ID: **L25172-05**
 Date Sampled: 06/24/15 10:15
 Date Received: 06/29/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	63.1		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	63.1		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.3			%			07/14/15 9:19	calc
Sum of Anions			21			meq/L			07/14/15 9:19	calc
Sum of Cations			22			meq/L			07/14/15 9:19	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 14:03	enb
Chloride	SM4500Cl-E	1	60.9		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	1760		*	umhos/cm	1	10	06/30/15 22:07	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:29	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:52	pjb
Fluoride	SM4500F-C	1	1.04		*	mg/L	0.05	0.3	07/01/15 15:24	enb
Hardness as CaCO3	SM2340B - Calculation		907			mg/L	0.8	4	07/14/15 9:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2	4.02		*	mg/L	0.04	0.2	07/07/15 23:45	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 16:17	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	07/09/15 22:46	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.6		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.34			mg/L	0.03	0.2	07/14/15 9:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.11		*	mg/L	0.01	0.05	07/08/15 11:06	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	07/02/15 21:15	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.12		*	mg/L	0.01	0.05	07/08/15 0:04	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1510		*	mg/L	10	20	06/29/15 16:42	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/29/15 15:22	abd
Residue, Total (TS) @ 105C	SM2540B	1	1590		*	mg/L	10	20	06/29/15 15:43	abd
Sulfate	D516-02/-07 - Turbidimetric	50	842		*	mg/L	50	250	07/08/15 15:15	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 17:21	enb
TDS (calculated)	Calculation		1370			mg/L			07/14/15 9:19	calc
TDS (ratio - measured/calculated)	Calculation		1.10						07/14/15 9:19	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L25172-06**
 Date Sampled: 06/24/15 07:20
 Date Received: 06/29/15
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 14:11	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 15:03	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 11:53	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:04	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:55	mss2
Total Hot Plate Digestion	M200.2 ICP								07/06/15 11:01	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 18:26	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L25172-06**
Date Sampled: 06/24/15 07:20
Date Received: 06/29/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	07/07/15 18:57	jjc
Aluminum, total	M200.7 ICP	1	0.11	B		mg/L	0.03	0.2	07/06/15 21:30	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/08/15 18:20	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	07/09/15 18:23	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0015			mg/L	0.0002	0.001	07/08/15 18:20	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0019			mg/L	0.0002	0.001	07/09/15 18:23	scp
Barium, dissolved	M200.7 ICP	1	0.051			mg/L	0.003	0.02	07/07/15 18:57	jjc
Barium, total	M200.7 ICP	1	0.055			mg/L	0.003	0.02	07/06/15 21:30	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:57	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:30	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 18:57	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:30	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	07/07/15 18:57	jjc
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:30	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:20	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:23	scp
Calcium, dissolved	M200.7 ICP	1	9			mg/L	0.1	0.5	07/07/15 18:57	jjc
Calcium, total	M200.7 ICP	1	9.3			mg/L	0.1	0.5	07/06/15 21:30	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:57	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:30	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:57	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:30	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:57	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:30	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 18:57	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:30	jjc
Iron, dissolved	M200.7 ICP	1	0.08			mg/L	0.02	0.05	07/07/15 18:57	jjc
Iron, total	M200.7 ICP	1	0.30			mg/L	0.02	0.05	07/06/15 21:30	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:20	mfm
Lead, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	07/09/15 18:23	scp
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:57	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:30	jjc
Magnesium, dissolved	M200.7 ICP	1	1.8			mg/L	0.2	1	07/07/15 18:57	jjc
Magnesium, total	M200.7 ICP	1	1.9			mg/L	0.2	1	07/06/15 21:30	jjc
Manganese, dissolved	M200.7 ICP	1	0.028	B		mg/L	0.005	0.03	07/07/15 18:57	jjc
Manganese, total	M200.7 ICP	1	0.032			mg/L	0.005	0.03	07/06/15 21:30	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:30	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:49	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	07/07/15 18:57	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	07/06/15 21:30	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 18:57	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:30	jjc
Potassium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	07/07/15 18:57	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L25172-06**
Date Sampled: 06/24/15 07:20
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.2			mg/L	0.2	1	07/06/15 21:30	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 18:57	jjc
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:30	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	07/08/15 18:20	mfm
Selenium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	07/09/15 18:23	scp
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	07/08/15 18:20	mfm
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	07/09/15 18:23	scp
Sodium, dissolved	M200.7 ICP	1	5.9			mg/L	0.2	1	07/07/15 18:57	jjc
Sodium, total	M200.7 ICP	1	6.1			mg/L	0.2	1	07/06/15 21:30	jjc
Strontium, dissolved	M200.7 ICP	1	0.075			mg/L	0.005	0.03	07/07/15 18:57	jjc
Strontium, total	M200.7 ICP	1	0.078			mg/L	0.005	0.03	07/06/15 21:30	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:20	mfm
Thallium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:23	scp
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	07/07/15 18:57	jjc
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	07/06/15 21:30	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/07/15 18:57	jjc
Titanium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	07/06/15 21:30	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:20	mfm
Uranium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:23	scp
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	07/07/15 18:57	jjc
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	07/06/15 21:30	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 18:57	jjc
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:30	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L25172-06**
 Date Sampled: 06/24/15 07:20
 Date Received: 06/29/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	29.0		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	29.0		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.8			%			07/14/15 9:19	calc
Sum of Anions			1			meq/L			07/14/15 9:19	calc
Sum of Cations			0.946			meq/L			07/14/15 9:19	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 14:12	enb
Chloride	SM4500Cl-E	1	2.3		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	100.0		*	umhos/cm	1	10	06/30/15 22:15	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:30	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:53	pjb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	07/08/15 10:34	enb
Hardness as CaCO3	SM2340B - Calculation		30			mg/L	0.8	4	07/14/15 9:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	07/07/15 23:31	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 16:22	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	07/09/15 22:48	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.5		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	07/14/15 9:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	07/08/15 11:09	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	07/02/15 21:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	07/08/15 0:05	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	86		*	mg/L	10	20	06/29/15 16:43	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/29/15 15:23	abd
Residue, Total (TS) @ 105C	SM2540B	1	94		*	mg/L	10	20	06/29/15 15:44	abd
Sulfate	D516-02/-07 - Turbidimetric	1	16.7		*	mg/L	1	5	07/08/15 14:27	mss2
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	06/29/15 17:25	enb
TDS (calculated)	Calculation		56.8			mg/L			07/14/15 9:19	calc
TDS (ratio - measured/calculated)	Calculation		1.51						07/14/15 9:19	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L25172-07**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 14:36	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 15:21	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 12:02	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:23	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:04	mss2
Total Hot Plate Digestion	M200.2 ICP								07/06/15 11:13	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 18:36	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L25172-07**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	07/07/15 19:00	jjc
Aluminum, total	M200.7 ICP	1	0.07	B		mg/L	0.03	0.2	07/06/15 21:39	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0197			mg/L	0.0004	0.002	07/08/15 18:23	mfm
Antimony, total	M200.8 ICP-MS	1	0.0182			mg/L	0.0004	0.002	07/09/15 18:27	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0104			mg/L	0.0002	0.001	07/08/15 18:23	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0108			mg/L	0.0002	0.001	07/09/15 18:27	scp
Barium, dissolved	M200.7 ICP	1	0.048			mg/L	0.003	0.02	07/07/15 19:00	jjc
Barium, total	M200.7 ICP	1	0.049			mg/L	0.003	0.02	07/06/15 21:39	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:00	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:39	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 19:00	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:39	jjc
Boron, dissolved	M200.7 ICP	1	0.14			mg/L	0.01	0.05	07/07/15 19:00	jjc
Boron, total	M200.7 ICP	1	0.14			mg/L	0.01	0.05	07/06/15 21:39	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:23	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:27	scp
Calcium, dissolved	M200.7 ICP	1	389			mg/L	0.1	0.5	07/07/15 19:00	jjc
Calcium, total	M200.7 ICP	1	394			mg/L	0.1	0.5	07/06/15 21:39	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:00	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:39	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:00	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:39	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:00	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:39	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 19:00	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:39	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/07/15 19:00	jjc
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	07/06/15 21:39	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/08/15 18:23	mfm
Lead, total	M200.8 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	07/09/15 18:27	scp
Lithium, dissolved	M200.7 ICP	1	0.090			mg/L	0.008	0.04	07/07/15 19:00	jjc
Lithium, total	M200.7 ICP	1	0.095			mg/L	0.008	0.04	07/06/15 21:39	jjc
Magnesium, dissolved	M200.7 ICP	1	24			mg/L	0.2	1	07/07/15 19:00	jjc
Magnesium, total	M200.7 ICP	1	24.9			mg/L	0.2	1	07/06/15 21:39	jjc
Manganese, dissolved	M200.7 ICP	1	0.191			mg/L	0.005	0.03	07/07/15 19:00	jjc
Manganese, total	M200.7 ICP	1	0.205			mg/L	0.005	0.03	07/06/15 21:39	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:32	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:51	nco
Molybdenum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.1	07/07/15 19:00	jjc
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	07/06/15 21:39	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 19:00	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:39	jjc
Potassium, dissolved	M200.7 ICP	1	11			mg/L	0.2	1	07/07/15 19:00	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L25172-07**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.5		mg/L	0.2	1	07/06/15 21:39	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/07/15 19:00	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 21:39	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	07/08/15 18:23	mfm
Selenium, total	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	07/09/15 18:27	scp
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 18:23	mfm
Silver, total	M200.8 ICP-MS	1	0.00013	B	mg/L	0.00005	0.0003	07/09/15 18:27	scp
Sodium, dissolved	M200.7 ICP	1	75.7		mg/L	0.2	1	07/07/15 19:00	jjc
Sodium, total	M200.7 ICP	1	78.9		mg/L	0.2	1	07/06/15 21:39	jjc
Strontium, dissolved	M200.7 ICP	1	4.030		mg/L	0.005	0.03	07/07/15 19:00	jjc
Strontium, total	M200.7 ICP	1	4.130		mg/L	0.005	0.03	07/06/15 21:39	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	07/08/15 18:23	mfm
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/09/15 18:27	scp
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 19:00	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 21:39	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 19:00	jjc
Titanium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	07/06/15 21:39	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	07/08/15 18:23	mfm
Uranium, total	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	07/09/15 18:27	scp
Vanadium, dissolved	M200.7 ICP	1	0.010	B	mg/L	0.005	0.03	07/07/15 19:00	jjc
Vanadium, total	M200.7 ICP	1	0.010	B	mg/L	0.005	0.03	07/06/15 21:39	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/07/15 19:00	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 21:39	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2A-E

ACZ Sample ID: **L25172-07**
 Date Sampled: 06/24/15 10:40
 Date Received: 06/29/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	55.4		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	55.4		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.0			%			07/14/15 9:20	calc
Sum of Anions			24			meq/L			07/14/15 9:20	calc
Sum of Cations			25			meq/L			07/14/15 9:20	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 14:21	enb
Chloride	SM4500Cl-E	1	69.8		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	1970		*	umhos/cm	1	10	06/30/15 22:24	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:31	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:54	pjb
Fluoride	SM4500F-C	1	1.33		*	mg/L	0.05	0.3	07/08/15 10:45	enb
Hardness as CaCO3	SM2340B - Calculation		1070			mg/L	0.8	4	07/14/15 9:20	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	2.79		*	mg/L	0.06	0.3	07/07/15 23:47	pjb
Nitrogen, ammonia	M350.1	1	0.08	B	*	mg/L	0.05	0.2	07/07/15 16:23	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	07/09/15 23:02	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.6		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	07/14/15 9:20	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	07/08/15 11:10	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	07/02/15 21:18	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	07/08/15 0:06	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1730		*	mg/L	10	20	06/29/15 16:44	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/29/15 15:24	abd
Residue, Total (TS) @ 105C	SM2540B	1	1810		*	mg/L	10	20	06/29/15 15:45	abd
Sulfate	D516-02/-07 - Turbidimetric	50	1000		*	mg/L	50	250	07/08/15 15:15	mss2
Sulfide as S	SM4500S2-D	1	0.02	B	*	mg/L	0.02	0.1	06/29/15 17:28	enb
TDS (calculated)	Calculation		1610			mg/L			07/14/15 9:20	calc
TDS (ratio - measured/calculated)	Calculation		1.07						07/14/15 9:20	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L25172-08**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								07/07/15 15:01	spl
Cyanide, WAD	SM4500-CN I- distillation								07/07/15 15:39	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								07/09/15 12:11	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:41	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:14	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								07/08/15 18:45	scp
Total Hot Plate Digestion	M200.2 ICP								07/06/15 11:24	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L25172-08**

Date Sampled: 06/24/15 10:40

Date Received: 06/29/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	07/07/15 19:10	jjc
Aluminum, total	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	07/06/15 21:43	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0197			mg/L	0.0004	0.002	07/08/15 18:26	mfm
Antimony, total	M200.8 ICP-MS	1	0.0182			mg/L	0.0004	0.002	07/09/15 18:30	scp
Arsenic, dissolved	M200.8 ICP-MS	1	0.0105			mg/L	0.0002	0.001	07/08/15 18:26	mfm
Arsenic, total	M200.8 ICP-MS	1	0.0110			mg/L	0.0002	0.001	07/09/15 18:30	scp
Barium, dissolved	M200.7 ICP	1	0.048			mg/L	0.003	0.02	07/07/15 19:10	jjc
Barium, total	M200.7 ICP	1	0.048			mg/L	0.003	0.02	07/06/15 21:43	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:10	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:43	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/07/15 19:10	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	07/06/15 21:43	jjc
Boron, dissolved	M200.7 ICP	1	0.14			mg/L	0.01	0.05	07/07/15 19:10	jjc
Boron, total	M200.7 ICP	1	0.13			mg/L	0.01	0.05	07/06/15 21:43	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/08/15 18:26	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	07/09/15 18:30	scp
Calcium, dissolved	M200.7 ICP	1	384			mg/L	0.1	0.5	07/07/15 19:10	jjc
Calcium, total	M200.7 ICP	1	392			mg/L	0.1	0.5	07/06/15 21:43	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:10	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:43	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:10	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:43	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	07/07/15 19:10	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	07/06/15 21:43	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/07/15 19:10	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	07/06/15 21:43	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	07/07/15 19:10	jjc
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	07/06/15 21:43	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	07/08/15 18:26	mfm
Lead, total	M200.8 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	07/09/15 18:30	scp
Lithium, dissolved	M200.7 ICP	1	0.091			mg/L	0.008	0.04	07/07/15 19:10	jjc
Lithium, total	M200.7 ICP	1	0.095			mg/L	0.008	0.04	07/06/15 21:43	jjc
Magnesium, dissolved	M200.7 ICP	1	24.2			mg/L	0.2	1	07/07/15 19:10	jjc
Magnesium, total	M200.7 ICP	1	24.7			mg/L	0.2	1	07/06/15 21:43	jjc
Manganese, dissolved	M200.7 ICP	1	0.193			mg/L	0.005	0.03	07/07/15 19:10	jjc
Manganese, total	M200.7 ICP	1	0.203			mg/L	0.005	0.03	07/06/15 21:43	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 12:34	nco
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	07/07/15 14:53	nco
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	07/07/15 19:10	jjc
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	07/06/15 21:43	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	07/07/15 19:10	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	07/06/15 21:43	jjc
Potassium, dissolved	M200.7 ICP	1	11.1			mg/L	0.2	1	07/07/15 19:10	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L25172-08**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.5		mg/L	0.2	1	07/06/15 21:43	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/07/15 19:10	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	07/06/15 21:43	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	07/08/15 18:26	mfm
Selenium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0003	07/09/15 18:30	scp
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/08/15 18:26	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	07/09/15 18:30	scp
Sodium, dissolved	M200.7 ICP	1	76		mg/L	0.2	1	07/07/15 19:10	jjc
Sodium, total	M200.7 ICP	1	78.8		mg/L	0.2	1	07/06/15 21:43	jjc
Strontium, dissolved	M200.7 ICP	1	4.080		mg/L	0.005	0.03	07/07/15 19:10	jjc
Strontium, total	M200.7 ICP	1	4.130		mg/L	0.005	0.03	07/06/15 21:43	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/08/15 18:26	mfm
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	07/09/15 18:30	scp
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	07/07/15 19:10	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	07/06/15 21:43	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	07/07/15 19:10	jjc
Titanium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	07/06/15 21:43	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	07/08/15 18:26	mfm
Uranium, total	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	07/09/15 18:30	scp
Vanadium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	07/07/15 19:10	jjc
Vanadium, total	M200.7 ICP	1	0.010	B	mg/L	0.005	0.03	07/06/15 21:43	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	07/07/15 19:10	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	07/06/15 21:43	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW11-E

ACZ Sample ID: **L25172-08**
 Date Sampled: 06/24/15 10:40
 Date Received: 06/29/15
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	55.7		*	mg/L	2	20	06/30/15 0:00	tms
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/30/15 0:00	tms
Total Alkalinity		1	55.7		*	mg/L	2	20	06/30/15 0:00	tms
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.0			%			07/14/15 9:20	calc
Sum of Anions			24			meq/L			07/14/15 9:20	calc
Sum of Cations			25			meq/L			07/14/15 9:20	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	07/06/15 15:06	enb
Chloride	SM4500Cl-E	1	70.3		*	mg/L	0.5	2	07/09/15 12:08	bsu
Conductivity @25C	SM2510B	1	1970		*	umhos/cm	1	10	06/30/15 22:33	tms
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 20:33	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	07/07/15 19:55	pjb
Fluoride	SM4500F-C	1	1.37		*	mg/L	0.05	0.3	07/08/15 10:48	enb
Hardness as CaCO3	SM2340B - Calculation		1060			mg/L	0.8	4	07/14/15 9:20	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.70		*	mg/L	0.02	0.1	07/07/15 23:35	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	07/07/15 16:24	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	07/09/15 23:03	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/30/15 0:00	tms
pH measured at		1	19.6		*	C	0.1	0.1	06/30/15 0:00	tms
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	07/14/15 9:20	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	07/08/15 11:11	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	07/02/15 21:21	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	07/08/15 0:07	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1730		*	mg/L	10	20	06/29/15 16:46	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/29/15 15:26	abd
Residue, Total (TS) @ 105C	SM2540B	1	1810		*	mg/L	10	20	06/29/15 15:46	abd
Sulfate	D516-02/-07 - Turbidimetric	50	1010		*	mg/L	50	250	07/08/15 15:15	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/29/15 17:32	enb
TDS (calculated)	Calculation		1620			mg/L			07/14/15 9:20	calc
TDS (ratio - measured/calculated)	Calculation		1.07						07/14/15 9:20	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: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-01	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.
	WG386092	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ Project ID: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-02	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.	
WG386092	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.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-03	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.	
WG386092	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		SM4500S2-D	Q6	Sample was received above recommended temperature.	
		SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-04	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.
	WG386092	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-05	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386178	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.	
WG386092	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		SM4500S2-D	Q6	Sample was received above recommended temperature.	
		SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-06	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386449	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.	
WG386092	Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.	
		SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		SM4500S2-D	Q6	Sample was received above recommended temperature.	
		SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	validation because the sample concentration is too low for accurate evaluation (< 10x MDL). Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-07	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386449	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.
	WG386092	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-08	WG386135	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386291	Chemical Oxygen Demand	M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386545	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG386135	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG386441	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386440	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386449	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386135	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG386442	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG386424	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG386566	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG386135	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG386457	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386268	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.
	WG386445	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386084	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG386071	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG386081	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG386471	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.	
WG386092	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		SM4500S2-D	Q6	Sample was received above recommended temperature.	
		SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG386135	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L25172-01**

Date Sampled: 06/24/15 8:00

Date Received: 06/29/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG386225

Analyst: drh

Extract Date: 06/30/15 13:35

Analysis Date: 07/01/15 18:01

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L25172-01**

Date Sampled: 06/24/15 8:00

Date Received: 06/29/15

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

Extract Method:

Workgroup: WG386668

Analyst: id

Extract Date:

Analysis Date: 07/13/15 12:11

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW8-EACZ Sample ID: **L25172-02**

Date Sampled: 06/24/15 9:40

Date Received: 06/29/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG386225

Analyst: drh

Extract Date: 06/30/15 14:43

Analysis Date: 07/01/15 18:53

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	69.2		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW8-EACZ Sample ID: **L25172-02**

Date Sampled: 06/24/15 9:40

Date Received: 06/29/15

Sample Matrix: Surface Water

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

Extract Method:

Workgroup: WG386668

Analyst: id

Extract Date:

Analysis Date: 07/13/15 12:32

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L25172-03**

Date Sampled: 06/24/15 8:45

Date Received: 06/29/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG386225

Analyst: drh

Extract Date: 06/30/15 15:51

Analysis Date: 07/01/15 19:19

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	78.5		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L25172-03**

Date Sampled: 06/24/15 8:45

Date Received: 06/29/15

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

Extract Method:

Workgroup: WG386668

Analyst: id

Extract Date:

Analysis Date: 07/13/15 12:53

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L25172-04**
Date Sampled: 06/24/15 11:40
Date Received: 06/29/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG386225Analyst: drh
Extract Date: 06/30/15 17:00
Analysis Date: 07/01/15 19:45

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85.1		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L25172-04**
Date Sampled: 06/24/15 11:40
Date Received: 06/29/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386668

Analyst: id

Extract Date:

Analysis Date: 07/13/15 13:13

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L25172-05**
Date Sampled: 06/24/15 10:15
Date Received: 06/29/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG386360Analyst: drh
Extract Date: 07/01/15 20:24
Analysis Date: 07/06/15 10:56

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	77.3		1.03	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L25172-05**
Date Sampled: 06/24/15 10:15
Date Received: 06/29/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386668

Analyst: id

Extract Date:

Analysis Date: 07/13/15 13:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		2.4	B	1.01	*	mg/L	2	10.1

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L25172-06**

Date Sampled: 06/24/15 7:20

Date Received: 06/29/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG386360

Analyst: drh

Extract Date: 07/01/15 21:52

Analysis Date: 07/06/15 11:22

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L25172-07**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG386360Analyst: drh
Extract Date: 07/01/15 23:20
Analysis Date: 07/06/15 11:49

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	81.4		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L25172-07**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386668

Analyst: id

Extract Date:

Analysis Date: 07/13/15 13:55

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SW11-E

ACZ Sample ID: **L25172-08**

Date Sampled: 06/24/15 10:40

Date Received: 06/29/15

Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG386360

Analyst: drh

Extract Date: 07/02/15 0:48

Analysis Date: 07/06/15 12:15

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	84.8		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW11-EACZ Sample ID: **L25172-08**
Date Sampled: 06/24/15 10:40
Date Received: 06/29/15
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG386668

Analyst: id

Extract Date:

Analysis Date: 07/13/15 14:15

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

Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25172-01	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386668	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
	WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L25172-02	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			OTP	M8015D GC/FID	S7
	WG386668	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9	Sample was received above recommended temperature. Insufficient sample received to meet method QC requirements.
	WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L25172-03	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
		WG386668	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9
	WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L25172-04	WG386225	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
		WG386668	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9
	WG386080	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L25172-05	WG386360	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
		WG386668	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9
	WG386191	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L25172-06	WG386360	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386191		M3520	Q9	Insufficient sample received to meet method QC requirements.
L25172-07	WG386360	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
		WG386668	Oil and Grease	1664A - Gravimetric 1664A - Gravimetric	Q6 Q9
	WG386191	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L25172-08	WG386360	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L25172**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG386668	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
	WG386191	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L25172**

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Bismuth, total	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Gallium, total	M200.7 ICP
Scandium, dissolved	M200.7 ICP
Scandium, total	M200.7 ICP

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L25172
 Date Received: 06/29/2015 11:29
 Received By: ear
 Date Printed: 6/29/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples? A change was made in the Sample Identification: Line 1 section prior to ACZ custody.	X		

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks? L25172-06 Container B1607524 (ORANGE): This container was received broken and the associated analysis were removed from the project.		X	
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3783	19.8	14	N/A
4003	19.1	14	N/A
4207	18.9	13	N/A

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L25172
Date Received: 06/29/2015 11:29
Received By: ear
Date Printed: 6/29/2015

Was ice present in the shipment container(s)?

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

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

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).

L2973 CIF 6/29/15

ACZ Laboratories, Inc.

CHAIN of CUSTODY

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

Report to:

Name: Miguel BERGANZA	Address: BUENA VISTA 105 PROSPECTS 24-69 2019 10
Company: Tahoe Resources INC.	600 Presidential Lane Pradera, TREC 10 oficina 1468
E-mail: MBERGANZA@santafel.com.g/	Telephone: (505) 59515248

Copy of Report to:

Name: Charlie Muerhoff	E-mail: CMURHOFF@TahoeResourcesINC.com
Company: Tahoe Resources INC.	Telephone:

Invoice to:

Name: Miguel BERGANZA	Address:
Company: Tahoe Resources INC.	
E-mail: M BERGANZA @ Santafel .com.g/	Telephone:


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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

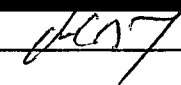
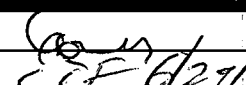
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers												
SW3-E	24/06/15 11:40	SW	10	✓											
SW4A-E	24/06/15 10:15	SW	10	✓											
SW5-E	24/06/15 07:20	SW	10	✓											

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

REMARKS

#1 COC

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
	24.06.2015 14:55	 CIF 6/29/15	24.6.15 14:55 → 1002 CIF 6/29/15

2/2

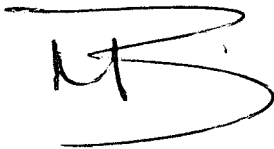
Guatemala June 24th, 2015

To whom it may concern:

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

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

Yours sincerely,

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

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

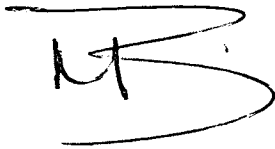
Guatemala June 24th, 2015

To whom it may concern:

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

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Yours sincerely,

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

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

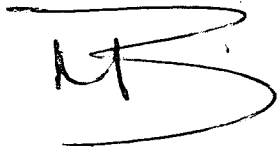
Guatemala June 24th, 2015

To whom it may concern:

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

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

Yours sincerely,

A handwritten signature in black ink, appearing to be the initials 'MB' with a large, sweeping flourish underneath.

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

REG 016 Resultados de Análisis

Muestra: 6 muestras de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 230615
Fecha de ingreso de muestras: 230615
Fecha de análisis: 230615-060715
Fecha de informe: 060715

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)
1659	SW1-E	< 1	< 1	< 10	< 25	N.D.	70
1660	SW2-E	< 1	< 1	< 10	< 25	N.D.	23
1661	SW2B-E	< 1	< 1	< 10	< 25	N.D.	540
1662	SW4-E	< 1	< 1	< 10	< 25	N.D.	9.2 x 10 ³
1663	SW7-E	79	< 1	< 10	< 25	N.D.	1.6 x 10 ⁴
1664	SW10-E	< 1	< 1	< 10	< 25	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas Proyectos Ambientales.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

* Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04

** Análisis referido.



Ing. Oscar Paez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

REG 016 Resultados de Análisis

Ref 1187-15

Pág 1/1

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: 240615
Fecha de ingreso de muestras: 240615
Fecha de análisis: 240615-060715
Fecha de informe: 060715

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)
1667	SW2A-E	< 1	< 1	< 10	< 25	N.D.	240
1668	SW3-E	30	< 1	< 10	< 25	N.D.	2.4 x 10 ³
1669	SW4A-E	< 1	< 1	< 10	< 25	N.D.	4.9 x 10 ³
1670	SW5-E	15	< 1	< 10	< 25	N.D.	240
1671	SW6-E	11	< 1	< 10	< 25	N.D.	2.2 x 10 ³
1672	SW8-E	105	< 1	< 10	< 25	N.D.	1.7 x 10 ⁵
1673	SW9-E	25	< 1	< 10	< 25	N.D.	3.5 x 10 ³
1674	SW11-E	< 1	< 1	< 10	< 25	N.D.	1.7 x 10 ³

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas Proyectos Ambientales.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del limite 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 Paez
Gerente Técnico


VoBo Ing. Fernando Fuentes
Gerente de Calidad

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

June 23, 2015

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L24704

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 04, 2015. This project has been assigned to ACZ's project number, L24704. 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 L24704. 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.

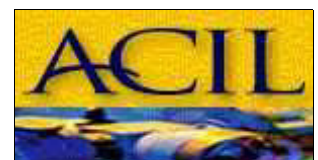
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 23, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

June 23, 2015

Project ID: Escobal

ACZ Project ID: L24704

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 ground water samples from Tahoe Resources, Inc. on June 4, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L24704. 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-1A

ACZ Sample ID: **L24704-01**
Date Sampled: 06/02/15 05:40
Date Received: 06/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/10/15 14:48	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/08/15 10:45	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:13	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:31	jif
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 15:48	jl

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	06/12/15 10:01	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/11/15 22:43	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0011			mg/L	0.0002	0.001	06/11/15 22:43	msh
Barium, dissolved	M200.7 ICP	1	0.046			mg/L	0.003	0.02	06/12/15 10:01	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:01	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:01	aeb
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/12/15 10:01	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:43	msh
Calcium, dissolved	M200.7 ICP	1	6			mg/L	0.1	0.5	06/12/15 10:01	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:01	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:01	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:01	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:01	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/12/15 10:01	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:43	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:01	aeb
Magnesium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	06/12/15 10:01	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:01	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 14:49	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:01	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:01	aeb
Potassium, dissolved	M200.7 ICP	1	4.8			mg/L	0.2	1	06/12/15 10:01	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:01	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	06/11/15 22:43	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/11/15 22:43	msh
Sodium, dissolved	M200.7 ICP	1	8.2			mg/L	0.2	1	06/12/15 10:01	aeb
Strontium, dissolved	M200.7 ICP	1	0.053			mg/L	0.005	0.03	06/12/15 10:01	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:43	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:01	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:01	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:43	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:01	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B	*	mg/L	0.01	0.05	06/12/15 10:01	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L24704-01**
 Date Sampled: 06/02/15 05:40
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	32.7		*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1	32.7		*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			11.1			%			06/23/15 8:19	calc
Sum of Anions			0.8			meq/L			06/23/15 8:19	calc
Sum of Cations			1			meq/L			06/23/15 8:19	calc
Chloride	SM4500Cl-E	1	3.2		*	mg/L	0.5	2	06/11/15 15:16	mss2
Conductivity @25C	SM2510B	1	110		*	umhos/cm	1	10	06/12/15 3:29	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:45	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/08/15 13:58	mss2
Fluoride	SM4500F-C	1	0.16	B	*	mg/L	0.05	0.3	06/11/15 17:07	enb
Hardness as CaCO3	SM2340B - Calculation		25			mg/L	0.8	4	06/23/15 8:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.93		*	mg/L	0.02	0.1	06/12/15 23:10	pjb
Nitrogen, ammonia	M350.1	1	0.13	B	*	mg/L	0.05	0.2	06/09/15 15:31	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	06/10/15 10:05	mss2
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	20.4		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	06/23/15 8:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	06/09/15 22:46	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	06/04/15 19:10	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	06/09/15 23:18	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	180		*	mg/L	10	20	06/08/15 16:30	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1	9.0	B	*	mg/L	5	20	06/09/15 11:01	tms
Residue, Total (TS) @ 105C	SM2540B	1	194		*	mg/L	10	20	06/04/15 15:42	id
Sulfate	D516-02/-07 - Turbidimetric	1	4.2	B	*	mg/L	1	5	06/12/15 12:20	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/08/15 15:06	enb
TDS (calculated)	Calculation		49.2			mg/L			06/23/15 8:19	calc
TDS (ratio - measured/calculated)	Calculation		3.66						06/23/15 8:19	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L24704-02**
Date Sampled: 06/02/15 08:20
Date Received: 06/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/10/15 14:57	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/11/15 10:27	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:23	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:36	jlf
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 15:52	jl

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	06/12/15 10:04	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	06/11/15 22:52	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0089			mg/L	0.0002	0.001	06/11/15 22:52	msh
Barium, dissolved	M200.7 ICP	1	0.113			mg/L	0.003	0.02	06/12/15 10:04	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:04	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:04	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:04	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:52	msh
Calcium, dissolved	M200.7 ICP	1	14.9			mg/L	0.1	0.5	06/12/15 10:04	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:04	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:04	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:04	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:04	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/12/15 10:04	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:52	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:04	aeb
Magnesium, dissolved	M200.7 ICP	1	2.8			mg/L	0.2	1	06/12/15 10:04	aeb
Manganese, dissolved	M200.7 ICP	1	0.083			mg/L	0.005	0.03	06/12/15 10:04	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 14:51	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:04	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:04	aeb
Potassium, dissolved	M200.7 ICP	1	1.7			mg/L	0.2	1	06/12/15 10:04	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:04	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	06/11/15 22:52	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/11/15 22:52	msh
Sodium, dissolved	M200.7 ICP	1	7.9			mg/L	0.2	1	06/12/15 10:04	aeb
Strontium, dissolved	M200.7 ICP	1	0.129			mg/L	0.005	0.03	06/12/15 10:04	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:52	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:04	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:04	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 22:52	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:04	aeb
Zinc, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	06/12/15 10:04	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-2

ACZ Sample ID: **L24704-02**
 Date Sampled: 06/02/15 08:20
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	46.4		*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1	46.4		*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			06/23/15 8:19	calc
Sum of Anions			1.4			meq/L			06/23/15 8:19	calc
Sum of Cations			1.4			meq/L			06/23/15 8:19	calc
Chloride	SM4500Cl-E	1	3.3		*	mg/L	0.5	2	06/11/15 15:18	mss2
Conductivity @25C	SM2510B	1	142		*	umhos/cm	1	10	06/12/15 3:38	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:46	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 16:05	jlf
Fluoride	SM4500F-C	1	0.21	B	*	mg/L	0.05	0.3	06/11/15 17:12	enb
Hardness as CaCO3	SM2340B - Calculation		49			mg/L	0.8	4	06/23/15 8:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.03	B	*	mg/L	0.02	0.1	06/12/15 23:11	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/09/15 15:32	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	06/10/15 10:08	mss2
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	19.6		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	06/23/15 8:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	06/09/15 22:49	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	06/04/15 19:13	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	06/09/15 23:19	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	142		*	mg/L	10	20	06/08/15 16:32	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:02	tms
Residue, Total (TS) @ 105C	SM2540B	1	154		*	mg/L	10	20	06/04/15 15:43	id
Sulfate	D516-02/-07 - Turbidimetric	1	17.0		*	mg/L	1	5	06/12/15 12:20	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/08/15 15:19	enb
TDS (calculated)	Calculation		76.3			mg/L			06/23/15 8:19	calc
TDS (ratio - measured/calculated)	Calculation		1.86						06/23/15 8:19	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-3

ACZ Sample ID: **L24704-03**
Date Sampled: 06/02/15 10:30
Date Received: 06/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/10/15 15:06	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/11/15 10:55	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:27	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:40	jif
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 15:57	jl

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	06/12/15 10:07	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	06/11/15 23:02	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	06/11/15 23:02	msh
Barium, dissolved	M200.7 ICP	1	0.159			mg/L	0.003	0.02	06/12/15 10:07	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:07	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:07	aeb
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/12/15 10:07	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:02	msh
Calcium, dissolved	M200.7 ICP	1	101			mg/L	0.1	0.5	06/12/15 10:07	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:07	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:07	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:07	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:07	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/12/15 10:07	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/11/15 23:02	msh
Lithium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.008	0.04	06/12/15 10:07	aeb
Magnesium, dissolved	M200.7 ICP	1	23.4			mg/L	0.2	1	06/12/15 10:07	aeb
Manganese, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/12/15 10:07	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 14:53	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:07	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:07	aeb
Potassium, dissolved	M200.7 ICP	1	10.6			mg/L	0.2	1	06/12/15 10:07	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:07	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	06/11/15 23:02	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/11/15 23:02	msh
Sodium, dissolved	M200.7 ICP	1	24.2			mg/L	0.2	1	06/12/15 10:07	aeb
Strontium, dissolved	M200.7 ICP	1	0.539			mg/L	0.005	0.03	06/12/15 10:07	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:02	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:07	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/12/15 10:07	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:02	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:07	aeb
Zinc, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	06/12/15 10:07	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-3

ACZ Sample ID: **L24704-03**
 Date Sampled: 06/02/15 10:30
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	67.3		*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1	67.3		*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.8			%			06/23/15 8:20	calc
Sum of Anions			8			meq/L			06/23/15 8:20	calc
Sum of Cations			8.3			meq/L			06/23/15 8:20	calc
Chloride	SM4500Cl-E	1	14.9		*	mg/L	0.5	2	06/11/15 15:18	mss2
Conductivity @25C	SM2510B	1	785		*	umhos/cm	1	10	06/12/15 3:46	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:46	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 16:07	jlf
Fluoride	SM4500F-C	1	0.21	B	*	mg/L	0.05	0.3	06/11/15 17:15	enb
Hardness as CaCO3	SM2340B - Calculation		349			mg/L	0.8	4	06/23/15 8:20	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.91		*	mg/L	0.02	0.1	06/12/15 23:12	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/09/15 15:33	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/10/15 10:09	mss2
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	19.4		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	06/23/15 8:20	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/09/15 22:50	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	06/04/15 19:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/09/15 23:20	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	654		*	mg/L	10	20	06/08/15 16:34	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:03	tms
Residue, Total (TS) @ 105C	SM2540B	1	672		*	mg/L	10	20	06/04/15 15:45	id
Sulfate	D516-02/-07 - Turbidimetric	20	295		*	mg/L	20	100	06/12/15 13:54	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/08/15 15:23	enb
TDS (calculated)	Calculation		511			mg/L			06/23/15 8:20	calc
TDS (ratio - measured/calculated)	Calculation		1.28						06/23/15 8:20	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-10

ACZ Sample ID: **L24704-04**
 Date Sampled: 06/02/15 12:00
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/10/15 15:24	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/11/15 11:23	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:32	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:45	jlf
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:02	jl

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	06/12/15 10:22	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/11/15 23:05	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	06/11/15 23:05	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	06/12/15 10:22	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:22	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:22	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:22	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:05	msh
Calcium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.1	0.5	06/12/15 10:22	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:22	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:22	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:22	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:22	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/12/15 10:22	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:05	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:22	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/12/15 10:22	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:22	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 15:00	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:22	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:22	aeb
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/12/15 10:22	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:22	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/11/15 23:05	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/11/15 23:05	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/12/15 10:22	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:22	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:05	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:22	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:22	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:05	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:22	aeb
Zinc, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	06/12/15 10:22	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-10

ACZ Sample ID: **L24704-04**
 Date Sampled: 06/02/15 12:00
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			06/23/15 8:20	calc
Sum of Anions			N/A			meq/L			06/23/15 8:20	calc
Sum of Cations				U		meq/L			06/23/15 8:20	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	06/11/15 15:18	mss2
Conductivity @25C	SM2510B	1	2.4	B	*	umhos/cm	1	10	06/12/15 3:53	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:48	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 16:08	jlf
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	06/11/15 17:23	enb
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	06/23/15 8:20	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/12/15 23:15	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/15/15 17:27	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/10/15 10:12	mss2
pH (lab)	SM4500H+ B									
pH		1	6.5	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	19.4		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	06/23/15 8:20	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	06/09/15 22:52	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	06/04/15 19:16	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	06/09/15 23:21	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	06/08/15 16:36	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:05	tms
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	06/04/15 15:46	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	06/12/15 13:39	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/08/15 15:28	enb
TDS (calculated)	Calculation		0.3			mg/L			06/23/15 8:20	calc
TDS (ratio - measured/calculated)	Calculation		n/a						06/23/15 8:20	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-11

ACZ Sample ID: **L24704-05**

Date Sampled: 06/02/15 10:30

Date Received: 06/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation		-						06/10/15 15:42	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/11/15 11:36	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:36	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:50	jif
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:07	jl

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	06/12/15 10:26	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	06/11/15 23:09	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0021			mg/L	0.0002	0.001	06/11/15 23:09	msh
Barium, dissolved	M200.7 ICP	1	0.160			mg/L	0.003	0.02	06/12/15 10:26	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:26	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:26	aeb
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/12/15 10:26	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:09	msh
Calcium, dissolved	M200.7 ICP	1	102			mg/L	0.1	0.5	06/12/15 10:26	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:26	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:26	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:26	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:26	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/12/15 10:26	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/11/15 23:09	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	06/12/15 10:26	aeb
Magnesium, dissolved	M200.7 ICP	1	23.8			mg/L	0.2	1	06/12/15 10:26	aeb
Manganese, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	06/12/15 10:26	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 15:06	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:26	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:26	aeb
Potassium, dissolved	M200.7 ICP	1	10.8			mg/L	0.2	1	06/12/15 10:26	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:26	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	06/11/15 23:09	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/11/15 23:09	msh
Sodium, dissolved	M200.7 ICP	1	24.4			mg/L	0.2	1	06/12/15 10:26	aeb
Strontium, dissolved	M200.7 ICP	1	0.546			mg/L	0.005	0.03	06/12/15 10:26	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:09	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:26	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/12/15 10:26	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:09	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:26	aeb
Zinc, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	06/12/15 10:26	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-11

ACZ Sample ID: **L24704-05**
 Date Sampled: 06/02/15 10:30
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	67.3		*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1	67.3		*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.8			%			06/23/15 8:20	calc
Sum of Anions			8.1			meq/L			06/23/15 8:20	calc
Sum of Cations			8.4			meq/L			06/23/15 8:20	calc
Chloride	SM4500Cl-E	1	14.9		*	mg/L	0.5	2	06/11/15 15:18	mss2
Conductivity @25C	SM2510B	1	786		*	umhos/cm	1	10	06/12/15 4:01	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:50	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 16:09	jlf
Fluoride	SM4500F-C	1	0.20	B	*	mg/L	0.05	0.3	06/12/15 13:34	abd
Hardness as CaCO3	SM2340B - Calculation		353			mg/L	0.8	4	06/23/15 8:20	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.92		*	mg/L	0.02	0.1	06/12/15 23:17	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/15/15 17:28	jlf
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/10/15 10:13	mss2
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	20.2		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	06/23/15 8:20	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/09/15 22:53	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	06/04/15 19:17	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/09/15 23:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	674		*	mg/L	10	20	06/08/15 16:40	id
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:06	tms
Residue, Total (TS) @105C	SM2540B	1	680		*	mg/L	10	20	06/04/15 15:49	id
Sulfate	D516-02/-07 - Turbidimetric	20	302		*	mg/L	20	100	06/12/15 14:04	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/08/15 15:27	enb
TDS (calculated)	Calculation		520			mg/L			06/23/15 8:20	calc
TDS (ratio - measured/calculated)	Calculation		1.30						06/23/15 8:20	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: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-01	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384875	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385095	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG384954	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG384972	Phosphorus, dissolved	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.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384887	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG384722	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
		SM2540B	RA	Relative Percent Difference (RPD) was not used for data	

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385168	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG384873	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-02	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385124	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385095	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG384954	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG384972	Phosphorus, dissolved	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.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384887	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG384722	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
		SM2540B	RA	Relative Percent Difference (RPD) was not used for data	

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Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385168	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG384873	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-03	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385124	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385095	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG384954	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG384972	Phosphorus, dissolved	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.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384887	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG384722	Residue, Total (TS) @ 105C	SM2540B SM2540B	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385169	Sulfate	D516-02/-07 - Turbidimetric D516-02/-07 - Turbidimetric	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384873	Sulfide as S	SM4500S2-D SM4500S2-D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-04	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385124	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385095	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385247	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG384972	Phosphorus, dissolved	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.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384887	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG384722	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
		SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for	

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG385169	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384873	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-05	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385124	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385163	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385247	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG384972	Phosphorus, dissolved	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.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG384887	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG384722	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG385169	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384892	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-1A

ACZ Sample ID: **L24704-01**

Date Sampled: 06/02/15 5:40

Date Received: 06/04/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 12:18

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-2

ACZ Sample ID: **L24704-02**

Date Sampled: 06/02/15 8:20

Date Received: 06/04/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 12:31

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-3

ACZ Sample ID: **L24704-03**

Date Sampled: 06/02/15 10:30

Date Received: 06/04/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 12:44

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-10

ACZ Sample ID: **L24704-04**

Date Sampled: 06/02/15 12:00

Date Received: 06/04/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 12:57

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-11

ACZ Sample ID: **L24704-05**

Date Sampled: 06/02/15 10:30

Date Received: 06/04/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 13:11

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.14	*	mg/L	2.3	11.4

Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-01	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-02	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-03	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-04	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-05	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-06	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-07	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-08	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L24704
 Date Received: 06/04/2015 10:26
 Received By: ddp
 Date Printed: 6/4/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples? A change was made in the ID Date:Time Line 3 on COC 2 section prior to ACZ custody.	X		

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3018	11.2	17	N/A
4403	11	13	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L24704
Date Received: 06/04/2015 10:26
Received By: ddp
Date Printed: 6/4/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. **L24704**

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: BUENAVIA Los Proceres 18 Calle 24-69 Zona 10
Empresarial Zona Pradera Torre 110 Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: charlie muerhoff
Company: Tahoe Resources inc.

E-mail: cmuerhoff @TahoeResources inc.com
Telephone:

Invoice to:

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

Address:
Telephone:

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES
NO

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

Are samples for SDWA Compliance Monitoring?

Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers																
GW-1A	02/06/15 10:50	GW	8	✓															
GW-2	02/06/15 08:20	GW	8	✓															
GW-3	02/06/15 10:30	GW	8	✓															
GW-10	02/06/15 12:00	GW	8	✓															

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

REMARKS

COC # 1

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>	02-06-2015 14:47	<i>[Signature]</i>	2/6/15 14:42 6-4-15 10:36

L24704 Chain of Custody



Laboratories, Inc.

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

CHAIN of CUSTODY

24704
24705
WPC6445

Report to:

Name: Miguel Berganza
 Company: Tahoe Resources inc.
 E-mail: mberganza@santafel.com.gt

Address: Bulevar los Proceres 18 calle 24-69 zona 12
 Empresarial Zona Pradera, Torre IV oficina 1406
 Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Muerhoff
 Company: Tahoe Resources inc.

E-mail: cmuerhoff@TahoeResources.com
 Telephone:

Invoice to:

Name: Miguel Berganza
 Company: Tahoe Resources inc.
 E-mail: mberganza@santafel.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	# of Containers	8	/																	
PO#: Escoba																				
Reporting state for compliance testing:																				
Check box if samples include NRC licensed material?																				
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																		
GW-11	02/06/15	10:30	GW	8	/															
RW-1	02/06/15	08:20	GW	8	/															
MW-11	02/06/15	10:30	GW	8	/															
PSA-1	02/06/15	11:50	GW	8	/															

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

REMARKS

COC # 2
Please report results of COC # 1 and # 2 together:

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	02-06-2015 14:52	[Signature] LPL	2/6/15 14:52 6:45 10:27

(2)

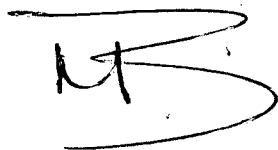
Guatemala June 02nd, 2015

To whom it may concern:

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

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

Yours sincerely,

A handwritten signature in black ink, appearing to be the initials 'MB' with a large, sweeping flourish underneath.

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

REG 016 Resultados de Análisis

Muestras: 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: 020615
Fecha de ingreso de muestras: 020615
Fecha de análisis: 020615-110615
Fecha de informe: 110615

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)
1443	GW-1A	155	8	N.D.	49
1444	GW-2	47	< 1	N.D.	540
1445	GW-3	< 1	< 1	N.D.	< 2
1446	GW-10	< 1	< 1	N.D.	< 2
1447	GW-11	< 1	< 1	N.D.	< 2
1448	RW-1	3	< 1	N.D.	240
1449	MW-11	139	< 1	N.D.	< 2
1450	PSA-1	276	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.


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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*


Ing. Oscar Paez
Gerente Técnico


VoBo Ing. Fernando Fuentes
Gerente de Calidad

June 25, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L24775

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 09, 2015. This project has been assigned to ACZ's project number, L24775. 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 L24775. 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.

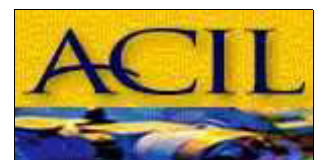
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 25, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

June 25, 2015

Project ID: Escobal

ACZ Project ID: L24775

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 ground water samples from Tahoe Resources, Inc. on June 9, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L24775. 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: MW-3

ACZ Sample ID: **L24775-01**
 Date Sampled: 06/03/15 10:30
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation		-						06/12/15 11:50	mss2
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 11:16	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 11:27	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 11:42	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 10:03	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 16:28	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/18/15 2:48	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	06/18/15 2:48	msh
Barium, dissolved	M200.7 ICP	1	0.036			mg/L	0.003	0.02	06/17/15 17:03	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:28	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 16:28	aeb
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	06/16/15 16:28	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:48	msh
Calcium, dissolved	M200.7 ICP	1	78.6			mg/L	0.1	0.5	06/16/15 16:28	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:28	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:28	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:28	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:28	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/16/15 16:28	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:48	msh
Lithium, dissolved	M200.7 ICP	1	0.020	B		mg/L	0.008	0.04	06/16/15 16:28	aeb
Magnesium, dissolved	M200.7 ICP	1	9.5			mg/L	0.2	1	06/16/15 16:28	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 16:28	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:23	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 16:28	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 16:28	aeb
Potassium, dissolved	M200.7 ICP	1	4			mg/L	0.2	1	06/16/15 16:28	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:28	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	06/18/15 2:48	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 2:48	msh
Sodium, dissolved	M200.7 ICP	1	27.5			mg/L	0.2	1	06/16/15 16:28	aeb
Strontium, dissolved	M200.7 ICP	1	0.737			mg/L	0.005	0.03	06/16/15 16:28	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:48	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/16/15 16:28	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	06/16/15 16:28	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	06/18/15 2:48	msh
Vanadium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/16/15 16:28	aeb
Zinc, dissolved	M200.7 ICP	1	0.06		*	mg/L	0.01	0.05	06/16/15 16:28	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-3

ACZ Sample ID: **L24775-01**
 Date Sampled: 06/03/15 10:30
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	81.4		*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1	81.4		*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.7			%			06/25/15 0:00	calc
Sum of Anions			5.8			meq/L			06/25/15 0:00	calc
Sum of Cations			6.0			meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1	17.8		*	mg/L	0.5	2	06/16/15 9:56	bsu
Conductivity @25C	SM2510B	1	599		*	umhos/cm	1	10	06/16/15 3:14	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/12/15 16:20	jif
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:31	pjb
Fluoride	SM4500F-C	1	0.74		*	mg/L	0.05	0.3	06/17/15 12:15	abd
Hardness as CaCO3	SM2340B - Calculation		235			mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.45		*	mg/L	0.02	0.1	06/16/15 23:55	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 9:58	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:36	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	19.0		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	06/15/15 15:55	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.09	H	*	mg/L	0.01	0.05	06/09/15 18:56	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.01	0.05	06/15/15 16:29	bsu
Residue, Filterable (TDS) @180C	SM2540C	1	488		*	mg/L	10	20	06/09/15 13:59	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:22	tms
Residue, Total (TS) @ 105C	SM2540B	1	510		*	mg/L	10	20	06/10/15 15:48	id
Sulfate	D516-02/-07 - Turbidimetric	5	172		*	mg/L	5	25	06/15/15 13:25	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/09/15 15:52	enb
TDS (calculated)	Calculation		361			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.35						06/25/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-4

ACZ Sample ID: **L24775-02**
Date Sampled: 06/03/15 11:25
Date Received: 06/09/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/12/15 12:04	mss2
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 11:32	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 11:33	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 11:51	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 10:21	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 16:44	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/18/15 2:51	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0024			mg/L	0.0002	0.001	06/18/15 2:51	msh
Barium, dissolved	M200.7 ICP	1	0.029			mg/L	0.003	0.02	06/17/15 17:19	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:44	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 16:44	aeb
Boron, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	06/16/15 16:44	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:51	msh
Calcium, dissolved	M200.7 ICP	1	77.9			mg/L	0.1	0.5	06/16/15 16:44	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:44	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:44	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:44	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:44	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/16/15 16:44	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:51	msh
Lithium, dissolved	M200.7 ICP	1	0.020	B		mg/L	0.008	0.04	06/16/15 16:44	aeb
Magnesium, dissolved	M200.7 ICP	1	8.6			mg/L	0.2	1	06/16/15 16:44	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 16:44	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:25	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 16:44	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 16:44	aeb
Potassium, dissolved	M200.7 ICP	1	4.2			mg/L	0.2	1	06/16/15 16:44	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:44	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	06/18/15 2:51	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 2:51	msh
Sodium, dissolved	M200.7 ICP	1	26.4			mg/L	0.2	1	06/16/15 16:44	aeb
Strontium, dissolved	M200.7 ICP	1	0.712			mg/L	0.005	0.03	06/16/15 16:44	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:51	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/16/15 16:44	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	06/16/15 16:44	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/18/15 2:51	msh
Vanadium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	06/16/15 16:44	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B	*	mg/L	0.01	0.05	06/16/15 16:44	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-4

ACZ Sample ID: **L24775-02**
 Date Sampled: 06/03/15 11:25
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	96.3		*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1	96.3		*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.9			%			06/25/15 0:00	calc
Sum of Anions			5.8			meq/L			06/25/15 0:00	calc
Sum of Cations			5.9			meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1	16.7		*	mg/L	0.5	2	06/16/15 9:56	bsu
Conductivity @25C	SM2510B	1	587		*	umhos/cm	1	10	06/16/15 3:23	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/12/15 16:20	jif
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:32	pjb
Fluoride	SM4500F-C	1	0.87		*	mg/L	0.05	0.3	06/17/15 12:18	abd
Hardness as CaCO3	SM2340B - Calculation		230			mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.58		*	mg/L	0.02	0.1	06/16/15 23:57	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 10:03	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:37	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	19.0		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	06/15/15 15:15	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.01	0.05	06/09/15 18:57	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	06/15/15 16:31	bsu
Residue, Filterable (TDS) @180C	SM2540C	1	482		*	mg/L	10	20	06/09/15 14:01	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:23	tms
Residue, Total (TS) @ 105C	SM2540B	1	492		*	mg/L	10	20	06/10/15 15:49	id
Sulfate	D516-02/-07 - Turbidimetric	5	161		*	mg/L	5	25	06/15/15 13:30	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/09/15 15:56	enb
TDS (calculated)	Calculation		355			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.36						06/25/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-5

ACZ Sample ID: **L24775-03**

Date Sampled: 06/03/15 09:40

Date Received: 06/09/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/12/15 12:18	mss2
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 11:48	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 11:52	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 12:09	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 10:39	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 16:47	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/18/15 2:55	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0002	0.001	06/18/15 2:55	msh
Barium, dissolved	M200.7 ICP	1	0.048			mg/L	0.003	0.02	06/17/15 17:22	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:47	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 16:47	aeb
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	06/16/15 16:47	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:55	msh
Calcium, dissolved	M200.7 ICP	1	192			mg/L	0.1	0.5	06/16/15 16:47	aeb
Chromium, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/16/15 16:47	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:47	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:47	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:47	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/16/15 16:47	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:55	msh
Lithium, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.008	0.04	06/16/15 16:47	aeb
Magnesium, dissolved	M200.7 ICP	1	25.1			mg/L	0.2	1	06/16/15 16:47	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 16:47	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:31	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 16:47	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 16:47	aeb
Potassium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	06/16/15 16:47	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:47	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	06/18/15 2:55	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 2:55	msh
Sodium, dissolved	M200.7 ICP	1	36.5			mg/L	0.2	1	06/16/15 16:47	aeb
Strontium, dissolved	M200.7 ICP	1	0.725			mg/L	0.005	0.03	06/16/15 16:47	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 2:55	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/16/15 16:47	aeb
Titanium, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	06/16/15 16:47	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/18/15 2:55	msh
Vanadium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/16/15 16:47	aeb
Zinc, dissolved	M200.7 ICP	1	0.05		*	mg/L	0.01	0.05	06/16/15 16:47	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-5

ACZ Sample ID: **L24775-03**
 Date Sampled: 06/03/15 09:40
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	80.6		*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1	80.6		*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.7			%			06/25/15 0:00	calc
Sum of Anions			13			meq/L			06/25/15 0:00	calc
Sum of Cations			14			meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1	37.9		*	mg/L	0.5	2	06/16/15 10:50	bsu
Conductivity @25C	SM2510B	1	1200		*	umhos/cm	1	10	06/16/15 3:31	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/12/15 16:23	jif
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:32	pjb
Fluoride	SM4500F-C	1	0.22	B	*	mg/L	0.05	0.3	06/17/15 12:22	abd
Hardness as CaCO3	SM2340B - Calculation		583			mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	5	5.4		*	mg/L	0.1	0.5	06/17/15 22:59	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 10:04	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:40	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	18.9		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	06/15/15 15:57	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	06/09/15 18:58	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	06/15/15 16:33	bsu
Residue, Filterable (TDS) @180C	SM2540C	1	1020		*	mg/L	10	20	06/09/15 14:03	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	06/09/15 11:24	tms
Residue, Total (TS) @105C	SM2540B	1	1090		*	mg/L	10	20	06/10/15 15:51	id
Sulfate	D516-02/-07 - Turbidimetric	50	500		*	mg/L	50	250	06/15/15 13:34	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/09/15 16:01	enb
TDS (calculated)	Calculation		851			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.20						06/25/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-6

ACZ Sample ID: **L24775-04**

Date Sampled: 06/03/15 09:00

Date Received: 06/09/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/12/15 12:32	mss2
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 12:03	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 11:58	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 12:27	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 10:48	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 16:50	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	06/18/15 3:05	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	06/18/15 3:05	msh
Barium, dissolved	M200.7 ICP	1	0.131			mg/L	0.003	0.02	06/17/15 17:25	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:50	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 16:50	aeb
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/16/15 16:50	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:05	msh
Calcium, dissolved	M200.7 ICP	1	126			mg/L	0.1	0.5	06/16/15 16:50	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:50	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:50	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:50	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:50	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/16/15 16:50	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:05	msh
Lithium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.008	0.04	06/16/15 16:50	aeb
Magnesium, dissolved	M200.7 ICP	1	15.9			mg/L	0.2	1	06/16/15 16:50	aeb
Manganese, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	06/16/15 16:50	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:33	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 16:50	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 16:50	aeb
Potassium, dissolved	M200.7 ICP	1	7.9			mg/L	0.2	1	06/16/15 16:50	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:50	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0004			mg/L	0.0001	0.0003	06/18/15 3:05	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 3:05	msh
Sodium, dissolved	M200.7 ICP	1	23.5			mg/L	0.2	1	06/16/15 16:50	aeb
Strontium, dissolved	M200.7 ICP	1	0.551			mg/L	0.005	0.03	06/16/15 16:50	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:05	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/16/15 16:50	aeb
Titanium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	06/16/15 16:50	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	06/18/15 3:05	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/16/15 16:50	aeb
Zinc, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	06/17/15 17:25	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-6

ACZ Sample ID: **L24775-04**
 Date Sampled: 06/03/15 09:00
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	75.6		*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1	75.6		*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.7			%			06/25/15 0:00	calc
Sum of Anions			8.6			meq/L			06/25/15 0:00	calc
Sum of Cations			8.9			meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1	23.7		*	mg/L	0.5	2	06/16/15 10:27	bsu
Conductivity @25C	SM2510B	1	842		*	umhos/cm	1	10	06/16/15 3:40	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/12/15 16:24	jif
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:33	pjb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	06/17/15 12:25	abd
Hardness as CaCO3	SM2340B - Calculation		380			mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.94		*	mg/L	0.06	0.3	06/17/15 0:28	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 10:06	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:42	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	19.9		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	06/15/15 15:34	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	06/09/15 18:59	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	06/15/15 16:34	bsu
Residue, Filterable (TDS) @180C	SM2540C	10	560		*	mg/L	100	200	06/09/15 14:05	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:26	tms
Residue, Total (TS) @ 105C	SM2540B	5	650	H	*	mg/L	50	100	06/23/15 16:57	enb
Sulfate	D516-02/-07 - Turbidimetric	20	306		*	mg/L	20	100	06/15/15 13:35	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/09/15 16:05	enb
TDS (calculated)	Calculation		550			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.02						06/25/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-7

ACZ Sample ID: **L24775-05**
Date Sampled: 06/03/15 08:20
Date Received: 06/09/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/12/15 12:46	mss2
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 12:19	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 12:04	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 12:36	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 10:57	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 16:53	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	06/18/15 3:08	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	06/18/15 3:08	msh
Barium, dissolved	M200.7 ICP	1	0.408			mg/L	0.003	0.02	06/17/15 17:28	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:53	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 16:53	aeb
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	06/16/15 16:53	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:08	msh
Calcium, dissolved	M200.7 ICP	1	31.8			mg/L	0.1	0.5	06/16/15 16:53	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:53	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:53	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:53	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:53	aeb
Iron, dissolved	M200.7 ICP	1	0.10			mg/L	0.02	0.05	06/16/15 16:53	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:08	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 16:53	aeb
Magnesium, dissolved	M200.7 ICP	1	9.5			mg/L	0.2	1	06/16/15 16:53	aeb
Manganese, dissolved	M200.7 ICP	1	0.067			mg/L	0.005	0.03	06/16/15 16:53	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:40	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 16:53	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 16:53	aeb
Potassium, dissolved	M200.7 ICP	1	8.6			mg/L	0.2	1	06/16/15 16:53	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:53	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/18/15 3:08	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 3:08	msh
Sodium, dissolved	M200.7 ICP	1	18.9			mg/L	0.2	1	06/16/15 16:53	aeb
Strontium, dissolved	M200.7 ICP	1	0.218			mg/L	0.005	0.03	06/16/15 16:53	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:08	msh
Tin, dissolved	M200.7 ICP	1	0.10	B		mg/L	0.04	0.2	06/16/15 16:53	aeb
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	06/16/15 16:53	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:08	msh
Vanadium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/16/15 16:53	aeb
Zinc, dissolved	M200.7 ICP	1	0.48		*	mg/L	0.01	0.05	06/17/15 17:28	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-7

ACZ Sample ID: **L24775-05**
 Date Sampled: 06/03/15 08:20
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	90.7		*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1	90.7		*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.4			%			06/25/15 0:00	calc
Sum of Anions			3.4			meq/L			06/25/15 0:00	calc
Sum of Cations			3.5			meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1	15.7		*	mg/L	0.5	2	06/16/15 10:27	bsu
Conductivity @25C	SM2510B	1	361		*	umhos/cm	1	10	06/16/15 3:48	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/12/15 16:25	jif
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:34	pjb
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	06/17/15 12:30	abd
Hardness as CaCO3	SM2340B - Calculation		119			mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.56		*	mg/L	0.02	0.1	06/17/15 0:00	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 10:07	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:45	pjb
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	19.5		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	06/15/15 15:21	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	06/09/15 19:03	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	06/15/15 16:36	bsu
Residue, Filterable (TDS) @180C	SM2540C	1	312		*	mg/L	10	20	06/09/15 14:07	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	15.0	B	*	mg/L	5	20	06/10/15 11:09	enb
Residue, Total (TS) @ 105C	SM2540B	1	324		*	mg/L	10	20	06/10/15 15:54	id
Sulfate	D516-02/-07 - Turbidimetric	5	53.4		*	mg/L	5	25	06/15/15 13:32	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/09/15 16:09	enb
TDS (calculated)	Calculation		194			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.61						06/25/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-9

ACZ Sample ID: **L24775-06**
 Date Sampled: 06/03/15 12:00
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/12/15 13:00	mss2
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 12:34	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 12:10	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 12:45	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 11:06	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 16:57	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/18/15 3:11	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	06/18/15 3:11	msh
Barium, dissolved	M200.7 ICP	1	0.056			mg/L	0.003	0.02	06/17/15 17:32	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:57	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 16:57	aeb
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	06/16/15 16:57	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:11	msh
Calcium, dissolved	M200.7 ICP	1	44.9			mg/L	0.1	0.5	06/16/15 16:57	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:57	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:57	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 16:57	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:57	aeb
Iron, dissolved	M200.7 ICP	1	6.19			mg/L	0.02	0.05	06/16/15 16:57	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:11	msh
Lithium, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.008	0.04	06/16/15 16:57	aeb
Magnesium, dissolved	M200.7 ICP	1	7.8			mg/L	0.2	1	06/16/15 16:57	aeb
Manganese, dissolved	M200.7 ICP	1	0.084			mg/L	0.005	0.03	06/16/15 16:57	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:42	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 16:57	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 16:57	aeb
Potassium, dissolved	M200.7 ICP	1	4.2			mg/L	0.2	1	06/16/15 16:57	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 16:57	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/18/15 3:11	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 3:11	msh
Sodium, dissolved	M200.7 ICP	1	25.3			mg/L	0.2	1	06/16/15 16:57	aeb
Strontium, dissolved	M200.7 ICP	1	0.339			mg/L	0.005	0.03	06/16/15 16:57	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:11	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/16/15 16:57	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/16/15 16:57	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:11	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 16:57	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B	*	mg/L	0.01	0.05	06/17/15 17:32	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-9

ACZ Sample ID: **L24775-06**
 Date Sampled: 06/03/15 12:00
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	115		*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1	115		*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.4			%			06/25/15 0:00	calc
Sum of Anions			4.2			meq/L			06/25/15 0:00	calc
Sum of Cations			4.5			meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1	8.4		*	mg/L	0.5	2	06/16/15 10:27	bsu
Conductivity @25C	SM2510B	1	410		*	umhos/cm	1	10	06/16/15 4:05	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/12/15 16:25	jif
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:35	pjb
Fluoride	SM4500F-C	1	0.58		*	mg/L	0.05	0.3	06/17/15 12:34	abd
Hardness as CaCO3	SM2340B - Calculation		144			mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.03	B	*	mg/L	0.02	0.1	06/17/15 0:02	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 10:08	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:46	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	19.4		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.47			mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.01	0.05	06/15/15 15:24	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	06/09/15 19:04	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.25		*	mg/L	0.01	0.05	06/15/15 16:37	bsu
Residue, Filterable (TDS) @180C	SM2540C	1	322		*	mg/L	10	20	06/09/15 14:09	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	13.0	B	*	mg/L	5	20	06/10/15 11:11	enb
Residue, Total (TS) @ 105C	SM2540B	1	348		*	mg/L	10	20	06/10/15 15:55	id
Sulfate	D516-02/-07 - Turbidimetric	5	79.5		*	mg/L	5	25	06/15/15 13:32	mss2
Sulfide as S	SM4500S2-D	1	0.09	B	*	mg/L	0.02	0.1	06/09/15 16:13	enb
TDS (calculated)	Calculation		247			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.30						06/25/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-20

ACZ Sample ID: **L24775-07**
 Date Sampled: 06/03/15 12:00
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/16/15 13:43	spl/jjf
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 12:50	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 12:16	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 12:54	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 11:15	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 17:00	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/18/15 3:21	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	06/18/15 3:21	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	06/17/15 17:35	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:00	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 17:00	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:00	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:21	msh
Calcium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.1	0.5	06/16/15 17:00	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:00	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:00	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:00	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 17:00	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/16/15 17:00	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:21	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 17:00	aeb
Magnesium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.2	1	06/16/15 17:00	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 17:00	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:44	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 17:00	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 17:00	aeb
Potassium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.2	1	06/16/15 17:00	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 17:00	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/18/15 3:21	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 3:21	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	06/16/15 17:00	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 17:00	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:21	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/16/15 17:00	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 17:00	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:21	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 17:00	aeb
Zinc, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	06/17/15 17:35	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-20

ACZ Sample ID: **L24775-07**
 Date Sampled: 06/03/15 12:00
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			06/25/15 0:00	calc
Sum of Anions			N/A			meq/L			06/25/15 0:00	calc
Sum of Cations				U		meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	06/16/15 10:27	bsu
Conductivity @25C	SM2510B	1	2.1	B	*	umhos/cm	1	10	06/16/15 4:13	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 22:11	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:36	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	06/17/15 12:52	abd
Hardness as CaCO3	SM2340B - Calculation		1.3	B		mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/17/15 0:03	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 10:11	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:47	pjb
pH (lab)	SM4500H+ B									
pH		1	6.5	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	19.2		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/15/15 15:25	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	06/09/15 19:05	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	06/15/15 16:40	bsu
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	06/09/15 14:10	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/10/15 11:12	enb
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	06/10/15 15:57	id
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	06/15/15 13:20	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/09/15 16:17	enb
TDS (calculated)	Calculation		0.6			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		n/a						06/25/15 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-21

ACZ Sample ID: **L24775-08**

Date Sampled: 06/03/15 09:40

Date Received: 06/09/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/16/15 13:52	spl/jjf
Cyanide, WAD	SM4500-CN I- distillation								06/16/15 13:06	spl/jjf
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/12/15 12:22	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 13:03	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 11:24	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/16/15 17:03	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/18/15 3:24	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	06/18/15 3:24	msh
Barium, dissolved	M200.7 ICP	1	0.049			mg/L	0.003	0.02	06/17/15 17:38	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:03	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/16/15 17:03	aeb
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	06/16/15 17:03	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:24	msh
Calcium, dissolved	M200.7 ICP	1	192			mg/L	0.1	0.5	06/16/15 17:03	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:03	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:03	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/16/15 17:03	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 17:03	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/16/15 17:03	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:24	msh
Lithium, dissolved	M200.7 ICP	1	0.017	B		mg/L	0.008	0.04	06/16/15 17:03	aeb
Magnesium, dissolved	M200.7 ICP	1	25			mg/L	0.2	1	06/16/15 17:03	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/16/15 17:03	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:46	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/16/15 17:03	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/16/15 17:03	aeb
Potassium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	06/16/15 17:03	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/16/15 17:03	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	06/18/15 3:24	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/18/15 3:24	msh
Sodium, dissolved	M200.7 ICP	1	36.6			mg/L	0.2	1	06/16/15 17:03	aeb
Strontium, dissolved	M200.7 ICP	1	0.729			mg/L	0.005	0.03	06/16/15 17:03	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 3:24	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/16/15 17:03	aeb
Titanium, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	06/16/15 17:03	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/18/15 3:24	msh
Vanadium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/16/15 17:03	aeb
Zinc, dissolved	M200.7 ICP	1	0.05		*	mg/L	0.01	0.05	06/17/15 17:38	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-21

ACZ Sample ID: **L24775-08**
 Date Sampled: 06/03/15 09:40
 Date Received: 06/09/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	80.9		*	mg/L	2	20	06/16/15 0:00	enb
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/16/15 0:00	enb
Total Alkalinity		1	80.9		*	mg/L	2	20	06/16/15 0:00	enb
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			06/25/15 0:00	calc
Sum of Anions			14			meq/L			06/25/15 0:00	calc
Sum of Cations			14			meq/L			06/25/15 0:00	calc
Chloride	SM4500Cl-E	1	37.8		*	mg/L	0.5	2	06/16/15 10:27	bsu
Conductivity @25C	SM2510B	1	1210		*	umhos/cm	1	10	06/16/15 4:21	enb
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 22:12	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/16/15 21:39	pjb
Fluoride	SM4500F-C	1	0.20	B	*	mg/L	0.05	0.3	06/17/15 12:55	abd
Hardness as CaCO3	SM2340B - Calculation		582			mg/L	0.8	4	06/25/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.47		*	mg/L	0.06	0.3	06/17/15 0:31	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/17/15 10:14	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/12/15 22:48	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/16/15 0:00	enb
pH measured at		1	19.3		*	C	0.1	0.1	06/16/15 0:00	enb
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	06/25/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	06/15/15 15:26	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	06/09/15 19:06	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	06/15/15 16:41	bsu
Residue, Filterable (TDS) @180C	SM2540C	1	1030		*	mg/L	10	20	06/09/15 14:12	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	10.0	B	*	mg/L	5	20	06/10/15 11:13	enb
Residue, Total (TS) @ 105C	SM2540B	1	1070		*	mg/L	10	20	06/10/15 15:58	id
Sulfate	D516-02/-07 - Turbidimetric	20	535		*	mg/L	20	100	06/15/15 14:31	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/09/15 16:22	enb
TDS (calculated)	Calculation		886			mg/L			06/25/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.16						06/25/15 0:00	calc

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit 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: **L24775**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-01	WG385317	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385185	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385347	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385056	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG385215	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.
	WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24775**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24775**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-02	WG385317	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500Cl-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385185	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385347	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385056	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG385215	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.
	WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-03	WG385317	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385185	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385433	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	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.
	WG385218	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385056	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG385215	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
	WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-04	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385185	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385347	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	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.
	WG385218	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385735	Residue, Total (TS) @ 105C	SM2540B	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).	
		SM2540B	Q6	Sample was received above recommended temperature.	
WG385215	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.
	WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-05	WG385374	Zinc, dissolved	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385185	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385347	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	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.
	WG385218	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG384988	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385056	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG385215	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
	WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-06	WG385374	Zinc, dissolved	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385185	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385347	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	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.
	WG385218	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
		M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
		M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG384988	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385056	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG385215	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
	WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-07	WG385374	Zinc, dissolved	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385345	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385347	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	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.
	WG385218	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384988	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385056	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG385215	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.
	WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for

Tahoe Resources, Inc.

ACZ Project ID: **L24775**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG385218	Total Alkalinity	SM2320B - Titration		accurate evaluation (< 10x MDL).
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L24775**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-08	WG385374	Zinc, dissolved	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG385218	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385279	Chloride	SM4500CI-E	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385218	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385345	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG385344	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385368	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385218	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385347	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385354	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385194	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.
	WG385218	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384971	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385249	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384944	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384988	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385056	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG385215	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.	
WG384961	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.	
		SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for	

Tahoe Resources, Inc.

ACZ Project ID: **L24775**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG385218	Total Alkalinity	SM2320B - Titration		accurate evaluation (< 10x MDL).
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
				RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-3ACZ Sample ID: **L24775-01**
Date Sampled: 06/03/15 10:30
Date Received: 06/09/15
Sample Matrix: Ground Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 10:19

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-4

ACZ Sample ID: **L24775-02**

Date Sampled: 06/03/15 11:25

Date Received: 06/09/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 10:38

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-5

ACZ Sample ID: **L24775-03**

Date Sampled: 06/03/15 9:40

Date Received: 06/09/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 10:58

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-6

ACZ Sample ID: **L24775-04**

Date Sampled: 06/03/15 9:00

Date Received: 06/09/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 11:17

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-7

ACZ Sample ID: **L24775-05**

Date Sampled: 06/03/15 8:20

Date Received: 06/09/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 11:37

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-9

ACZ Sample ID: **L24775-06**

Date Sampled: 06/03/15 12:00

Date Received: 06/09/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 11:56

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.06	*	mg/L	2.1	10.6

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-20ACZ Sample ID: **L24775-07**
Date Sampled: 06/03/15 12:00
Date Received: 06/09/15
Sample Matrix: Ground Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 12:16

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-21ACZ Sample ID: **L24775-08**
Date Sampled: 06/03/15 9:40
Date Received: 06/09/15
Sample Matrix: Ground Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG385096

Analyst: DLE

Extract Date:

Analysis Date: 06/11/15 12:35

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

Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L24775**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24775-01	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L24775-02	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L24775-03	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L24775-04	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L24775-05	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L24775-06	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L24775-07	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L24775-08	WG385096	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24775**

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L24775
 Date Received: 06/09/2015 09:58
 Received By: ddp
 Date Printed: 6/9/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples? A change was made in the Date:Time Line 4 section prior to ACZ custody.	X		

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3403	18.6	13	N/A
4153	17.8	12	N/A

Was ice present in the shipment container(s)?

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

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: L24775
Date Received: 06/09/2015 09:58
Received By: ddp
Date Printed: 6/9/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. *24775*

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 PROGRES 18 calle 24-49 zona 10*
Empresarial zona pradera Torre IV Oficina 1406
Telephone: *(502) 5951 5248*

Copy of Report to:

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

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

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*Sampler's Signature: *[Signature]* I attest to the authenticity and validity of this sample. I understand that 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											
<i>MW-3</i>	<i>02/05 10:30</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>										
<i>MW-4</i>	<i>02/05 11:25</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>										
<i>MW-5</i>	<i>03/06/15 09:40</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>										
<i>MW-6</i>	<i>03/06/15 07:40</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>										

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

REMARKS

COC # 1

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>J. OS</i>	<i>03-06-2015</i>	<i>[Signature]</i>	<i>3/6/15 15:40</i>
	<i>15:40</i>	<i>[Signature]</i>	<i>6-9-15 07:58</i>

24775 Chain of Custody



Laboratories, Inc. *C24775*

CHAIN of CUSTODY

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

Report to:

Name: <i>Miguel Berganza</i>	Address: <i>Bulevar Los planes 18 calle 24-6920000</i>
Company: <i>Tahoe Resources inc.</i>	<i>Empresarial, zona pradera Tercera IV of. 1940</i>
E-mail: <i>mberganza@sanrafael.com.gt</i>	Telephone: <i>(502) 59515248</i>

Copy of Report to:

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

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION:

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <i>Water Quality</i>	# of Containers <i>3</i>																			
PO#: <i>Escobal</i>																				
Reporting state for compliance testing:																				
Check box if samples include NRC licensed material?																				
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																		
<i>MW-7</i>	<i>03/06/15 08:20</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>																
<i>MW-9</i>	<i>03/06/15 12:00</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>																
<i>MW-20</i>	<i>03/06/15 12:00</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>																
<i>MW-21</i>	<i>03/06/15 09:40</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>																

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

REMARKS

COC #2
Please present results of COC # 1 and 2 in the same 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>03-06-2015 15:38</i>	<i>[Signature]</i>	<i>3/6/15 15:38</i>
		<i>[Signature]</i>	<i>3-9-15 09:58</i>

2

Guatemala June 3rd, 2015

To whom it may concern:

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

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

Yours sincerely,

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

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

June 23, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L24704

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 04, 2015. This project has been assigned to ACZ's project number, L24704. 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 L24704. 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.

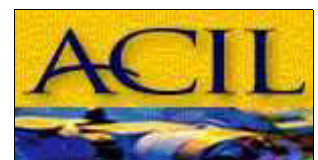
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 23, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

June 23, 2015

Project ID: Escobal

ACZ Project ID: L24704

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 ground water samples from Tahoe Resources, Inc. on June 4, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L24704. 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: RW-1

ACZ Sample ID: **L24704-06**
Date Sampled: 06/02/15 08:20
Date Received: 06/04/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/10/15 15:51	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/11/15 11:50	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:41	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:55	jlf
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:16	jl

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	06/12/15 10:29	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/11/15 23:12	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0002	0.001	06/11/15 23:12	msh
Barium, dissolved	M200.7 ICP	1	0.101			mg/L	0.003	0.02	06/12/15 10:29	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:29	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:29	aeb
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	06/12/15 10:29	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:12	msh
Calcium, dissolved	M200.7 ICP	1	160			mg/L	0.1	0.5	06/12/15 10:29	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:29	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:29	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:29	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:29	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/12/15 10:29	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:12	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	06/12/15 10:29	aeb
Magnesium, dissolved	M200.7 ICP	1	26.9			mg/L	0.2	1	06/12/15 10:29	aeb
Manganese, dissolved	M200.7 ICP	1	1.060			mg/L	0.005	0.03	06/12/15 10:29	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 15:08	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:29	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:29	aeb
Potassium, dissolved	M200.7 ICP	1	12.6			mg/L	0.2	1	06/12/15 10:29	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:29	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/11/15 23:12	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	06/11/15 23:12	msh
Sodium, dissolved	M200.7 ICP	1	43.2			mg/L	0.2	1	06/12/15 10:29	aeb
Strontium, dissolved	M200.7 ICP	1	0.983			mg/L	0.005	0.03	06/12/15 10:29	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:12	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:29	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	06/12/15 10:29	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	06/11/15 23:12	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:29	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B	*	mg/L	0.01	0.05	06/12/15 10:29	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L24704-06**
Date Sampled: 06/02/15 08:20
Date Received: 06/04/15
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	110		*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1	110		*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.0			%			06/23/15 8:21	calc
Sum of Anions			12			meq/L			06/23/15 8:21	calc
Sum of Cations			13			meq/L			06/23/15 8:21	calc
Chloride	SM4500Cl-E	1	46.8		*	mg/L	0.5	2	06/11/15 15:18	mss2
Conductivity @25C	SM2510B	1	1100		*	umhos/cm	1	10	06/12/15 4:10	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:51	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 16:10	jlf
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	06/12/15 13:38	abd
Hardness as CaCO3	SM2340B - Calculation		510			mg/L	0.8	4	06/23/15 8:21	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.78		*	mg/L	0.02	0.1	06/12/15 23:24	pjb
Nitrogen, ammonia	M350.1	1	0.05	B	*	mg/L	0.05	0.2	06/09/15 15:39	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	06/10/15 10:14	mss2
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	20.1		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	06/23/15 8:21	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	06/09/15 22:54	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	06/04/15 19:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	06/09/15 23:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	844		*	mg/L	10	20	06/05/15 15:17	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	06/09/15 11:07	tms
Residue, Total (TS) @ 105C	SM2540B	1	876		*	mg/L	10	20	06/04/15 15:51	id
Sulfate	D516-02/-07 - Turbidimetric	20	412		*	mg/L	20	100	06/12/15 13:53	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	06/08/15 15:31	enb
TDS (calculated)	Calculation		771			mg/L			06/23/15 8:21	calc
TDS (ratio - measured/calculated)	Calculation		1.09						06/23/15 8:21	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-11

ACZ Sample ID: **L24704-07**
 Date Sampled: 06/02/15 11:20
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/10/15 16:00	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/11/15 12:04	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:46	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 17:00	jlf
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:26	jl

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	06/12/15 10:32	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/11/15 23:15	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0029			mg/L	0.0002	0.001	06/11/15 23:15	msh
Barium, dissolved	M200.7 ICP	1	0.028			mg/L	0.003	0.02	06/12/15 10:32	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:32	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:32	aeb
Boron, dissolved	M200.7 ICP	1	0.19			mg/L	0.01	0.05	06/12/15 10:32	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:15	msh
Calcium, dissolved	M200.7 ICP	1	244			mg/L	0.1	0.5	06/12/15 10:32	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:32	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:32	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:32	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:32	aeb
Iron, dissolved	M200.7 ICP	1	1.69			mg/L	0.02	0.05	06/12/15 10:32	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:15	msh
Lithium, dissolved	M200.7 ICP	1	0.083			mg/L	0.008	0.04	06/12/15 10:32	aeb
Magnesium, dissolved	M200.7 ICP	1	36.7			mg/L	0.2	1	06/12/15 10:32	aeb
Manganese, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	06/12/15 10:32	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 15:10	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:32	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:32	aeb
Potassium, dissolved	M200.7 ICP	1	4.4			mg/L	0.2	1	06/12/15 10:32	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:32	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	06/11/15 23:15	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	06/11/15 23:15	msh
Sodium, dissolved	M200.7 ICP	1	70			mg/L	0.2	1	06/12/15 10:32	aeb
Strontium, dissolved	M200.7 ICP	1	2.340			mg/L	0.005	0.03	06/12/15 10:32	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:15	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:32	aeb
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	06/12/15 10:32	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	06/11/15 23:15	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:32	aeb
Zinc, dissolved	M200.7 ICP	1	0.03	B	*	mg/L	0.01	0.05	06/12/15 10:32	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-11

ACZ Sample ID: **L24704-07**
 Date Sampled: 06/02/15 11:20
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	140		*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1	140		*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.7			%			06/23/15 8:21	calc
Sum of Anions			18			meq/L			06/23/15 8:21	calc
Sum of Cations			19			meq/L			06/23/15 8:21	calc
Chloride	SM4500Cl-E	1	62.8		*	mg/L	0.5	2	06/11/15 15:18	mss2
Conductivity @25C	SM2510B	1	1580		*	umhos/cm	1	10	06/12/15 4:53	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:54	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 16:11	jlf
Fluoride	SM4500F-C	1	2.66		*	mg/L	0.05	0.3	06/12/15 13:41	abd
Hardness as CaCO3	SM2340B - Calculation		760			mg/L	0.8	4	06/23/15 8:21	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/12/15 23:25	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/09/15 15:40	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/10/15 10:16	mss2
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	19.8		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	06/23/15 8:21	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	06/09/15 22:55	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	06/04/15 19:21	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	06/09/15 23:27	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1270		*	mg/L	10	20	06/05/15 15:19	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	10.0	B	*	mg/L	5	20	06/09/15 11:09	tms
Residue, Total (TS) @105C	SM2540B	1	1320		*	mg/L	10	20	06/04/15 15:52	id
Sulfate	D516-02/-07 - Turbidimetric	20	654		*	mg/L	20	100	06/12/15 13:53	mss2
Sulfide as S	SM4500S2-D	1	0.05	B	*	mg/L	0.02	0.1	06/08/15 15:35	enb
TDS (calculated)	Calculation		1160			mg/L			06/23/15 8:21	calc
TDS (ratio - measured/calculated)	Calculation		1.09						06/23/15 8:21	calc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-1

ACZ Sample ID: **L24704-08**
 Date Sampled: 06/02/15 11:50
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/10/15 16:09	bsu
Cyanide, WAD	SM4500-CN I- distillation								06/11/15 12:18	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/09/15 10:50	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/15/15 11:06	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/08/15 16:31	jl

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	06/12/15 10:35	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/11/15 23:19	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0069			mg/L	0.0002	0.001	06/11/15 23:19	msh
Barium, dissolved	M200.7 ICP	1	0.022			mg/L	0.003	0.02	06/12/15 10:35	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:35	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/12/15 10:35	aeb
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	06/12/15 10:35	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:19	msh
Calcium, dissolved	M200.7 ICP	1	200			mg/L	0.1	0.5	06/12/15 10:35	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:35	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:35	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/12/15 10:35	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:35	aeb
Iron, dissolved	M200.7 ICP	1	1.98			mg/L	0.02	0.05	06/12/15 10:35	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:19	msh
Lithium, dissolved	M200.7 ICP	1	0.092			mg/L	0.008	0.04	06/12/15 10:35	aeb
Magnesium, dissolved	M200.7 ICP	1	36.3			mg/L	0.2	1	06/12/15 10:35	aeb
Manganese, dissolved	M200.7 ICP	1	0.054			mg/L	0.005	0.03	06/12/15 10:35	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/17/15 15:12	nco
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/12/15 10:35	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/12/15 10:35	aeb
Potassium, dissolved	M200.7 ICP	1	4.7			mg/L	0.2	1	06/12/15 10:35	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/12/15 10:35	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	06/11/15 23:19	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	06/11/15 23:19	msh
Sodium, dissolved	M200.7 ICP	1	46.7			mg/L	0.2	1	06/12/15 10:35	aeb
Strontium, dissolved	M200.7 ICP	1	1.950			mg/L	0.005	0.03	06/12/15 10:35	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/11/15 23:19	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/12/15 10:35	aeb
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	06/12/15 10:35	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	06/11/15 23:19	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/12/15 10:35	aeb
Zinc, dissolved	M200.7 ICP	1		U	*	mg/L	0.01	0.05	06/12/15 10:35	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-1

ACZ Sample ID: **L24704-08**
 Date Sampled: 06/02/15 11:50
 Date Received: 06/04/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	156		*	mg/L	2	20	06/12/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/12/15 0:00	abd
Total Alkalinity		1	156		*	mg/L	2	20	06/12/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			06/23/15 8:21	calc
Sum of Anions			15			meq/L			06/23/15 8:21	calc
Sum of Cations			15			meq/L			06/23/15 8:21	calc
Chloride	SM4500Cl-E	1	44		*	mg/L	0.5	2	06/11/15 15:18	mss2
Conductivity @25C	SM2510B	1	1300		*	umhos/cm	1	10	06/12/15 5:02	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 0:55	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/11/15 16:13	jlf
Fluoride	SM4500F-C	1	2.58		*	mg/L	0.05	0.3	06/12/15 13:45	abd
Hardness as CaCO3	SM2340B - Calculation		649			mg/L	0.8	4	06/23/15 8:21	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	06/12/15 23:27	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/09/15 15:41	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/10/15 10:17	mss2
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/12/15 0:00	abd
pH measured at		1	20.2		*	C	0.1	0.1	06/12/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	06/23/15 8:21	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/15/15 15:07	bsu
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	06/04/15 19:22	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	06/09/15 23:28	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1010		*	mg/L	10	20	06/05/15 15:21	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/09/15 11:10	tms
Residue, Total (TS) @105C	SM2540B	1	1060		*	mg/L	10	20	06/04/15 15:54	id
Sulfate	D516-02/-07 - Turbidimetric	20	520		*	mg/L	20	100	06/12/15 13:53	mss2
Sulfide as S	SM4500S2-D	1	0.10		*	mg/L	0.02	0.1	06/08/15 15:40	enb
TDS (calculated)	Calculation		953			mg/L			06/23/15 8:21	calc
TDS (ratio - measured/calculated)	Calculation		1.06						06/23/15 8:21	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: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-06	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385124	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385163	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG384954	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG384972	Phosphorus, dissolved	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.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384787	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG384722	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG385169	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	
		D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG384892	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-07	WG385122	Silver, dissolved	M200.8 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385124	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385163	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG384954	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG384972	Phosphorus, dissolved	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.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384787	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG384722		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG385169		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG384892		Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385118		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-08	WG385122	Silver, dissolved	M200.8 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG385139	Zinc, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG385118	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385109	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385118	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385073	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385124	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385163	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385195	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG384954	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384990	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG385245	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG384739	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384975	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384787	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG384933	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384722	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG385169	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG384892	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385118	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: RW-1

ACZ Sample ID: **L24704-06**

Date Sampled: 06/02/15 8:20

Date Received: 06/04/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 13:24

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-11ACZ Sample ID: **L24704-07**
Date Sampled: 06/02/15 11:20
Date Received: 06/04/15
Sample Matrix: Ground Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 13:37

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

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: PSA-1

ACZ Sample ID: **L24704-08**

Date Sampled: 06/02/15 11:50

Date Received: 06/04/15

Sample Matrix: Ground Water

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

Extract Method:

Workgroup: WG384832

Analyst: DLE

Extract Date:

Analysis Date: 06/08/15 13:50

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

Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24704-01	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-02	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-03	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-04	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-05	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-06	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-07	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
L24704-08	WG384832	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L24704**

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L24704
 Date Received: 06/04/2015 10:26
 Received By: ddp
 Date Printed: 6/4/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples? A change was made in the ID Date:Time Line 3 on COC 2 section prior to ACZ custody.	X		

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3018	11.2	17	N/A
4403	11	13	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L24704
Date Received: 06/04/2015 10:26
Received By: ddp
Date Printed: 6/4/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. **L24704**

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: BUENAVIAJAS LOS PROGRESOS 18 CALLE 24-69 ZONA 10
Empresarial Zona Pradera Torre 110 Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: charlie muerhoff
Company: Tahoe Resources inc.

E-mail: cmuerhoff @ Tahoe Resources inc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers												
GW-1A	02/06/15 10:50	GW	8	✓											
GW-2	02/06/15 08:20	GW	8	✓											
GW-3	02/06/15 10:30	GW	8	✓											
GW-10	02/06/15 12:00	GW	8	✓											

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

REMARKS

COC # 1

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

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

[Signature]	02-06-2015	[Signature]	2/6/15 14:42
	14:47		6-4-15 10:36

①

L24704 Chain of Custody



Laboratories, Inc.

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

624704
624705
WPC6445

CHAIN of CUSTODY

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: mberganza@santafed.com.gt

Address: Bulevar los Proceres 18 calle 24-69 Zona 10
Empresarial Zona Pradera, Torre IV oficina 1406
Telephone: (602) 5951-5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc.

E-mail: cmuerhoff@TahoeResources.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: mberganza@santafed.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?

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers								
GW-11	02/06/15 10:30	GW	8	/							
RW-1	02/06/15 08:20	GW	8	/							
MW-11	02/06/15 10:30	GW	8	/							
PSA-1	02/06/15 11:50	GW	8	/							

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

REMARKS

COC # 2
Please report results of COC # 1 and # 2 together:

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	02-06-2015 14:52	[Signature]	2/6/15 14:52
		LPL	6-4-15 10:27

(2)

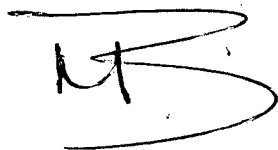
Guatemala June 02nd, 2015

To whom it may concern:

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

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

Yours sincerely,

A handwritten signature in black ink, consisting of a large, stylized 'M' and 'B' intertwined.

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

June 25, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L24857

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 12, 2015. This project has been assigned to ACZ's project number, L24857. 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 L24857. 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.

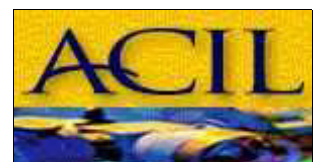
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 25, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

June 25, 2015

Project ID: Escobal

ACZ Project ID: L24857

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 1 ground water sample from Tahoe Resources, Inc. on June 12, 2015. The sample was received in good condition. Upon receipt, the sample custodian removed the sample from the cooler, inspected the contents, and logged the sample into ACZ's computerized Laboratory Information Management System (LIMS). The sample was assigned ACZ LIMS project number L24857. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with an "HE", received too close to the hold time.

Sample Analysis

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

1. For the TS value flagged with an "N1", the 105 degree oven was out of specifications at 102 degrees on 06/16/15. The oven was back in range when the workgroup was removed.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-SR

ACZ Sample ID: **L24857-01**
Date Sampled: 06/10/15 11:15
Date Received: 06/12/15
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/17/15 12:10	spl
Cyanide, WAD	SM4500-CN I- distillation								06/19/15 11:08	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								06/19/15 12:41	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								06/18/15 16:36	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								06/18/15 14:57	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	06/18/15 22:11	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	06/23/15 4:03	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0125			mg/L	0.0002	0.001	06/18/15 18:40	mfm
Barium, dissolved	M200.7 ICP	1	0.099			mg/L	0.003	0.02	06/18/15 22:11	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/18/15 22:11	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	06/18/15 22:11	aeb
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	06/18/15 22:11	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 18:40	mfm
Calcium, dissolved	M200.7 ICP	1	103			mg/L	0.1	0.5	06/18/15 22:11	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/18/15 22:11	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/18/15 22:11	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/18/15 22:11	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/18/15 22:11	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	06/18/15 22:11	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 18:40	mfm
Lithium, dissolved	M200.7 ICP	1	0.140			mg/L	0.008	0.04	06/18/15 22:11	aeb
Magnesium, dissolved	M200.7 ICP	1	6.6			mg/L	0.2	1	06/18/15 22:11	aeb
Manganese, dissolved	M200.7 ICP	1	0.029	B	*	mg/L	0.005	0.03	06/18/15 22:11	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	06/18/15 16:59	nci
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	06/18/15 22:11	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	06/18/15 22:11	aeb
Potassium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	06/18/15 22:11	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	06/18/15 22:11	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	06/18/15 18:40	mfm
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	06/23/15 4:03	msh
Sodium, dissolved	M200.7 ICP	1	80.5			mg/L	0.2	1	06/18/15 22:11	aeb
Strontium, dissolved	M200.7 ICP	1	4.360			mg/L	0.005	0.03	06/18/15 22:11	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	06/18/15 18:40	mfm
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	06/18/15 22:11	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	06/18/15 22:11	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	06/18/15 18:40	mfm
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	06/18/15 22:11	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	06/18/15 22:11	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-SR

ACZ Sample ID: **L24857-01**
 Date Sampled: 06/10/15 11:15
 Date Received: 06/12/15
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	173		*	mg/L	2	20	06/18/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	06/18/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	06/18/15 0:00	abd
Total Alkalinity		1	173		*	mg/L	2	20	06/18/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.1			%			06/25/15 12:42	calc
Sum of Anions			10			meq/L			06/25/15 12:42	calc
Sum of Cations			9.4			meq/L			06/25/15 12:42	calc
Chloride	SM4500Cl-E	1	4.7		*	mg/L	0.5	2	06/16/15 11:52	bsu
Conductivity @25C	SM2510B	1	871		*	umhos/cm	1	10	06/18/15 21:56	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/18/15 11:26	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	06/19/15 21:29	pjb
Fluoride	SM4500F-C	1	0.82		*	mg/L	0.05	0.3	06/18/15 13:42	abd
Hardness as CaCO3	SM2340B - Calculation		284			mg/L	0.8	4	06/25/15 12:42	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.09	B	*	mg/L	0.02	0.1	06/19/15 23:38	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	06/19/15 11:41	jif
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	06/19/15 23:43	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	06/18/15 0:00	abd
pH measured at		1	19.6		*	C	0.1	0.1	06/18/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	06/25/15 12:42	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/18/15 21:41	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	06/13/15 14:51	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	06/18/15 22:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	622		*	mg/L	10	20	06/16/15 13:25	apk
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	06/16/15 15:17	tms
Residue, Total (TS) @ 105C	SM2540B	1	660		*	mg/L	10	20	06/15/15 12:07	id
Sulfate	D516-02/-07 - Turbidimetric	20	302		*	mg/L	20	100	06/16/15 14:45	bsu
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	06/12/15 14:51	enb
TDS (calculated)	Calculation		610			mg/L			06/25/15 12:42	calc
TDS (ratio - measured/calculated)	Calculation		1.02						06/25/15 12:42	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: **L24857**

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385497													
WG385497PBW1	PBW	06/18/15 16:15				U	mg/L		-20	20			
WG385497LCSW3	LCSW	06/18/15 16:33	WC150617-8	820.0001		800	mg/L	98	90	110			
WG385497LCSW6	LCSW	06/18/15 20:07	WC150617-8	820.0001		790	mg/L	96	90	110			
WG385497PBW2	PBW	06/18/15 20:14				U	mg/L		-20	20			
L24867-05DUP	DUP	06/18/15 23:48			696	696	mg/L				0	20	
WG385497LCSW9	LCSW	06/19/15 0:06	WC150617-8	820.0001		806	mg/L	98	90	110			
WG385497PBW3	PBW	06/19/15 0:14				U	mg/L		-20	20			
WG385497LCSW12	LCSW	06/19/15 3:52	WC150617-8	820.0001		812	mg/L	99	90	110			
WG385497PBW4	PBW	06/19/15 4:00				U	mg/L		-20	20			

Aluminum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.972	mg/L	99	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.09	0.09			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	1.0015		1.046	mg/L	104	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	1.0015	U	1.093	mg/L	109	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	1.0015	U	1.118	mg/L	112	85	115	2	20	

Antimony, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385648													
WG385648ICV	ICV	06/23/15 2:35	MS150601-9	.02		.02102	mg/L	105	90	110			
WG385648ICB	ICB	06/23/15 2:38				U	mg/L		-0.0012	0.0012			
WG385648LFB	LFB	06/23/15 2:41	MS150601-2	.01001		.0105	mg/L	105	85	115			
L24841-01AS	AS	06/23/15 3:43	MS150601-2	.01001	U	.00961	mg/L	96	70	130			
L24841-01ASD	ASD	06/23/15 3:47	MS150601-2	.01001	U	.00995	mg/L	99	70	130	3	20	

Arsenic, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385500													
WG385500ICV	ICV	06/18/15 17:19	MS150601-9	.05		.05137	mg/L	103	90	110			
WG385500ICB	ICB	06/18/15 17:22				U	mg/L		-0.0006	0.0006			
WG385500LFB	LFB	06/18/15 17:25	MS150601-2	.0501		.04802	mg/L	96	85	115			
L24838-03AS	AS	06/18/15 18:19	MS150601-2	.0501	U	.05182	mg/L	103	70	130			
L24838-03ASD	ASD	06/18/15 18:22	MS150601-2	.0501	U	.05476	mg/L	109	70	130	6	20	

Barium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.994	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.009	0.009			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.5		.5185	mg/L	104	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.5	U	.5229	mg/L	105	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.5	U	.5306	mg/L	106	85	115	1	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Beryllium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.995	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.03	0.03			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.5005		.513	mg/L	102	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.5005	U	.503	mg/L	100	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.5005	U	.51	mg/L	102	85	115	1	20	

Bismuth, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		2.001	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.12	0.12			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	1		1.006	mg/L	101	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	1	U	1.034	mg/L	103	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	1	U	1.041	mg/L	104	85	115	1	20	

Boron, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.983	mg/L	99	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.03	0.03			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.5005		.519	mg/L	104	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.5005	.05	.585	mg/L	107	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.5005	.05	.59	mg/L	108	85	115	1	20	

Cadmium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385500													
WG385500ICV	ICV	06/18/15 17:19	MS150601-9	.05		.05163	mg/L	103	90	110			
WG385500ICB	ICB	06/18/15 17:22				U	mg/L		-0.0003	0.0003			
WG385500LFB	LFB	06/18/15 17:25	MS150601-2	.05005		.05024	mg/L	100	85	115			
L24838-03AS	AS	06/18/15 18:19	MS150601-2	.05005	.0004	.05377	mg/L	107	70	130			
L24838-03ASD	ASD	06/18/15 18:22	MS150601-2	.05005	.0004	.05594	mg/L	111	70	130	4	20	

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	100		100.22	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.3	0.3			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	68.01261		71.1	mg/L	105	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	68.01261	237	294.5	mg/L	85	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	68.01261	237	297.6	mg/L	89	85	115	1	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Chloride SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385292													
WG385292ICB	ICB	06/16/15 9:44				U	mg/L		-1.5	1.5			
WG385292ICV	ICV	06/16/15 9:44	WI141103-1	54.835		56.68	mg/L	103	90	110			
WG385292LFB1	LFB	06/16/15 11:15	WI141209-1	30		32.31	mg/L	108	90	110			
WG385292LFB2	LFB	06/16/15 11:40	WI141209-1	30		32.61	mg/L	109	90	110			
L24810-06AS	AS	06/16/15 11:40	WI141209-1	30	3.3	36.39	mg/L	110	90	110			
L24815-01DUP	DUP	06/16/15 11:52			18.3	18.3	mg/L				0	20	

Chromium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.945	mg/L	97	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.03	0.03			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.5005		.505	mg/L	101	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.5005	U	.502	mg/L	100	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.5005	U	.506	mg/L	101	85	115	1	20	

Cobalt, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2.002		1.998	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.03	0.03			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.5005		.503	mg/L	100	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.5005	U	.504	mg/L	101	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.5005	U	.509	mg/L	102	85	115	1	20	

Conductivity @25C SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385497													
WG385497LCSW2	LCSW	06/18/15 16:20	PCN47275	1409		1470	umhos/cm	104	90	110			
WG385497LCSW5	LCSW	06/18/15 19:55	PCN47275	1409		1450	umhos/cm	103	90	110			
L24867-05DUP	DUP	06/18/15 23:48			1570	1570	umhos/cm				0	20	
WG385497LCSW8	LCSW	06/18/15 23:53	PCN47275	1409		1440	umhos/cm	102	90	110			
WG385497LCSW11	LCSW	06/19/15 3:39	PCN47275	1409		1440	umhos/cm	102	90	110			
WG385497LCSW14	LCSW	06/19/15 6:28	PCN47275	1409		1440	umhos/cm	102	90	110			

Copper, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.971	mg/L	99	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.03	0.03			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.499		.516	mg/L	103	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.499	U	.525	mg/L	105	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.499	U	.531	mg/L	106	85	115	1	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Cyanide, total M335.4 - Colorimetric w/ distillation

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385457													
WG385457ICV	ICV	06/18/15 11:22	WI150610-7	.3003		.3206	mg/L	107	90	110			
WG385457ICB	ICB	06/18/15 11:23				U	mg/L		-0.003	0.003			
WG385387LRB	LRB	06/18/15 11:24				U	mg/L		-0.003	0.003			
L24857-01DUP	DUP	06/18/15 11:27			U	U	mg/L				0	20	RA
L24858-01LFM	LFM	06/18/15 11:29	WI150610-4	.2	U	.193	mg/L	97	90	110			
WG385457ICV1	ICV	06/18/15 14:34	WI150610-7	.3003		.3217	mg/L	107	90	110			
WG385457ICB1	ICB	06/18/15 14:35				U	mg/L		-0.003	0.003			
WG385387LFB	LFB	06/18/15 14:36	WI150610-4	.2		.1846	mg/L	92	90	110			

Cyanide, WAD SM4500-CN I,E-Colorimetric w/ distillation

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385570													
WG385570ICV	ICV	06/19/15 21:20	WI150610-7	.3003		.3193	mg/L	106	90	110			
WG385570ICB	ICB	06/19/15 21:21				U	mg/L		-0.003	0.003			
WG385527LRB	LRB	06/19/15 21:22				U	mg/L		-0.003	0.003			
WG385527LFB	LFB	06/19/15 21:22	WI150610-6	.2002		.2089	mg/L	104	90	110			
L24850-01DUP	DUP	06/19/15 21:24			U	U	mg/L				0	20	RA
L24851-01LFM	LFM	06/19/15 21:26	WI150610-6	.2002	U	.198	mg/L	99	90	110			

Fluoride SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385442													
WG385442ICV	ICV	06/18/15 10:42	WC150605-8	2		1.948	mg/L	97	95	105			
WG385442ICB	ICB	06/18/15 10:46				.094	mg/L		-0.15	0.15			
WG385442LFB1	LFB	06/18/15 10:52	WC150209-7	5.015		4.909	mg/L	98	90	110			
WG385442LFB2	LFB	06/18/15 13:00	WC150209-7	5.015		4.886	mg/L	97	90	110			
L24839-02AS	AS	06/18/15 13:06	WC150209-7	5.015	1.89	6.622	mg/L	94	90	110			
L24839-02DUP	DUP	06/18/15 13:10			1.89	1.886	mg/L				0	20	

Gallium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		2.03	mg/L	102	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.3	0.3			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	1		1.01	mg/L	101	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	1	U	1.02	mg/L	102	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	1	U	1.02	mg/L	102	85	115	0	20	

Iron, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.979	mg/L	99	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.06	0.06			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	1.0001		1.039	mg/L	104	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	1.0001	U	1.029	mg/L	103	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	1.0001	U	1.045	mg/L	104	85	115	2	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Lead, dissolved

M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385500													
WG385500ICV	ICV	06/18/15 17:19	MS150601-9	.05		.0498	mg/L	100	90	110			
WG385500ICB	ICB	06/18/15 17:22				U	mg/L		-0.0003	0.0003			
WG385500LFB	LFB	06/18/15 17:25	MS150601-2	.05005		.04797	mg/L	96	85	115			
L24838-03AS	AS	06/18/15 18:19	MS150601-2	.05005	.0007	.05	mg/L	99	70	130			
L24838-03ASD	ASD	06/18/15 18:22	MS150601-2	.05005	.0007	.05265	mg/L	104	70	130	5	20	

Lithium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		2.0082	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.024	0.024			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	1.001		1.013	mg/L	101	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	1.001	.1	1.127	mg/L	103	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	1.001	.1	1.141	mg/L	104	85	115	1	20	

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	100		97.63	mg/L	98	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.6	0.6			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	50.00416		49.08	mg/L	98	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	50.00416	42.3	88.78	mg/L	93	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	50.00416	42.3	89.97	mg/L	95	85	115	1	20	

Manganese, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.9665	mg/L	98	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.015	0.015			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.499		.5075	mg/L	102	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.499	2.09	2.468	mg/L	76	85	115			M3
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.499	2.09	2.49	mg/L	80	85	115	1	20	M3

Mercury, dissolved

M245.1 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385388													
WG385388ICV	ICV	06/18/15 9:17	II150602-3	.005		.00508	mg/L	102	95	105			
WG385388ICB	ICB	06/18/15 9:19				U	mg/L		-0.0002	0.0002			
WG385458													
WG385458LRB	LRB	06/18/15 16:14				U	mg/L		-0.00044	0.00044			
WG385458LFB	LFB	06/18/15 16:17	II150615-3	.002004		.00194	mg/L	97	85	115			
L24841-03LFB	LFB	06/18/15 16:55	II150615-3	.002004	U	.00197	mg/L	98	85	115			
L24841-03LFMD	LFMD	06/18/15 16:57	II150615-3	.002004	U	.00208	mg/L	104	85	115	5	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Molybdenum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		2.014	mg/L	101	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.06	0.06			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.4995		.512	mg/L	103	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.4995	U	.504	mg/L	101	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.4995	U	.51	mg/L	102	85	115	1	20	

Nickel, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		2.0005	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.024	0.024			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.501		.5214	mg/L	104	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.501	.1	.6016	mg/L	100	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.501	.1	.6047	mg/L	101	85	115	1	20	

Nitrate/Nitrite as N M353.2 - H2SO4 preserved

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385572													
WG385572ICV	ICV	06/19/15 23:26	WI150422-7	2.416		2.413	mg/L	100	90	110			
WG385572ICB	ICB	06/19/15 23:27				U	mg/L		-0.06	0.06			
WG385572LFB	LFB	06/19/15 23:28	WI150613-3	2		1.97	mg/L	99	90	110			
L24717-01AS	AS	06/19/15 23:31	WI150613-3	2	.76	2.542	mg/L	89	90	110			M2
L24717-02DUP	DUP	06/19/15 23:33			1.81	1.814	mg/L				0	20	

Nitrogen, ammonia M350.1

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385530													
WG385530ICV	ICV	06/19/15 9:26	WI150505-1	11.988		12.51	mg/L	104	90	110			
WG385530ICB	ICB	06/19/15 9:27				U	mg/L		-0.15	0.15			
WG385530LFB2	LFB	06/19/15 10:49	WI150615-1	10		10.842	mg/L	108	90	110			
L24838-01AS	AS	06/19/15 10:52	WI150615-1	10	U	11.172	mg/L	112	90	110			M1
L24838-02DUP	DUP	06/19/15 10:55			U	U	mg/L				0	20	RA
WG385530ICV1	ICV	06/19/15 11:36	WI150505-1	11.988		11.907	mg/L	99	90	110			
WG385530ICB1	ICB	06/19/15 11:38				U	mg/L		-0.15	0.15			
WG385530LFB1	LFB	06/19/15 11:51	WI150615-1	10		9.943	mg/L	99	90	110			
WG385530ICV2	ICV	06/19/15 15:11	WI150505-1	11.988		11.934	mg/L	100	90	110			
WG385530ICB2	ICB	06/19/15 15:12				U	mg/L		-0.15	0.15			

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Nitrogen, total Kjeldahl M351.2 - TKN by Block Digester

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385573													
WG385573ICV	ICV	06/19/15 23:31	WI150527-1	4		4.29	mg/L	107	90	110			
WG385573ICB	ICB	06/19/15 23:33				U	mg/L		-0.3	0.3			
WG385544LRB	LRB	06/19/15 23:34				U	mg/L		-0.3	0.3			
WG385544LFB	LFB	06/19/15 23:35	WI150422-2	2.5		2.69	mg/L	108	90	110			
L24837-02LFM	LFM	06/19/15 23:42	WI150422-2	2.5	.4	3.53	mg/L	125	90	110			M1
L24857-01DUP	DUP	06/19/15 23:44				U	mg/L				0	20	RA
WG385573ICV1	ICV	06/20/15 0:20	WI150527-1	4		4.21	mg/L	105	90	110			
WG385573ICB1	ICB	06/20/15 0:21				U	mg/L		-0.3	0.3			

pH (lab) SM4500H+ B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385497													
WG385497LCSW1	LCSW	06/18/15 16:18	PCN46943	6.01		6.1	units	101	5.9	6.1			
WG385497LCSW4	LCSW	06/18/15 19:53	PCN46943	6.01		6.1	units	101	5.9	6.1			
L24867-05DUP	DUP	06/18/15 23:48			8.6	8.6	units				0	20	
WG385497LCSW7	LCSW	06/18/15 23:52	PCN46943	6.01		6.1	units	101	5.9	6.1			
WG385497LCSW10	LCSW	06/19/15 3:37	PCN46943	6.01		6.1	units	101	5.9	6.1			

Phosphorus, dissolved M365.1 - Auto Ascorbic Acid (digest)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385514													
WG385514ICV	ICV	06/18/15 21:05	WI150616-3	.65228		.639	mg/L	98	90	110			
WG385514ICB	ICB	06/18/15 21:08				.012	mg/L		-0.03	0.03			
WG385476LRB	LRB	06/18/15 21:09				U	mg/L		-0.03	0.03			
WG385476LFB	LFB	06/18/15 21:10	WI150608-2	.5		.51	mg/L	102	90	110			
L24805-05LFM	LFM	06/18/15 21:28	WI150608-2	.5	.02	.536	mg/L	103	90	110			
L24805-06DUP	DUP	06/18/15 21:31			.02	.022	mg/L				10	20	RA

Phosphorus, ortho dissolved M365.1 - Automated Ascorbic Acid

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385201													
WG385201ICV	ICV	06/13/15 14:46	WI150411-1	.6523		.646	mg/L	99	90	110			
WG385201ICB	ICB	06/13/15 14:48				.01	mg/L		-0.03	0.03			
WG385201LFB	LFB	06/13/15 14:50	WI150608-2	.5		.511	mg/L	102	90	110			
L24857-01AS	AS	06/13/15 14:52	WI150608-2	.5	.02	.533	mg/L	103	90	110			
L24858-01DUP	DUP	06/13/15 14:55			.05	.048	mg/L				4	20	RA

Phosphorus, total M365.1 - Auto Ascorbic Acid (digest)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385514													
WG385514ICV	ICV	06/18/15 21:05	WI150616-3	.65228		.639	mg/L	98	90	110			
WG385514ICB	ICB	06/18/15 21:08				.012	mg/L		-0.03	0.03			
WG385516													
WG385477LRB	LRB	06/18/15 22:07				U	mg/L		-0.03	0.03			
WG385477LFB	LFB	06/18/15 22:08	WI150608-2	.5		.502	mg/L	100	90	110			
L24831-01LFM	LFM	06/18/15 22:11	WI150608-2	.5	.18	.693	mg/L	103	90	110			
L24831-02DUP	DUP	06/18/15 22:13			.13	.133	mg/L				2	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Potassium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	20		19.51	mg/L	98	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.6	0.6			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	100.0125		98.88	mg/L	99	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	100.0125	4.1	103.4	mg/L	99	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	100.0125	4.1	105.1	mg/L	101	85	115	2	20	

Residue, Filterable (TDS) @180C SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385297													
WG385297PBW	PBW	06/16/15 12:40				U	mg/L		-20	20			
WG385297LCSW	LCSW	06/16/15 12:43	PCN48720	260		274	mg/L	105	80	120			
L24862-03DUP	DUP	06/16/15 13:50			98	106	mg/L				8	10	RA

Residue, Non-Filterable (TSS) @105C SM2540D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385311													
WG385311PBW	PBW	06/16/15 14:30				U	mg/L		-15	15			
WG385311LCSW	LCSW	06/16/15 14:32	PCN48720	160		163	mg/L	102	80	120			
L24858-01DUP	DUP	06/16/15 15:30			U	U	mg/L				0	10	RA

Residue, Total (TS) @ 105C SM2540B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385229													
WG385229PBW	PBW	06/15/15 12:00				U	mg/L		-20	20			
WG385229LCSW	LCSW	06/15/15 12:03	PCN48726	420		442	mg/L	105	80	120			
L24874-01DUP	DUP	06/15/15 12:30			330	312	mg/L				6	10	N1

Scandium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		2.01	mg/L	101	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.3	0.3			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.999		1.02	mg/L	102	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.999	U	1.02	mg/L	102	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.999	U	1.03	mg/L	103	85	115	1	20	

Selenium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385500													
WG385500ICV	ICV	06/18/15 17:19	MS150601-9	.05		.0492	mg/L	98	90	110			
WG385500ICB	ICB	06/18/15 17:22				U	mg/L		-0.0003	0.0003			
WG385500LFB	LFB	06/18/15 17:25	MS150601-2	.05015		.04706	mg/L	94	85	115			
L24838-03AS	AS	06/18/15 18:19	MS150601-2	.05015	.0001	.05156	mg/L	103	70	130			
L24838-03ASD	ASD	06/18/15 18:22	MS150601-2	.05015	.0001	.05454	mg/L	109	70	130	6	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Silver, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385648													
WG385648ICV	ICV	06/23/15 2:35	MS150601-9	.02		.01964	mg/L	98	90	110			
WG385648ICB	ICB	06/23/15 2:38				U	mg/L		-0.00015	0.00015			
WG385648LFB	LFB	06/23/15 2:41	MS150601-2	.01002		.009831	mg/L	98	85	115			
L24841-01AS	AS	06/23/15 3:43	MS150601-2	.01002	U	.005687	mg/L	57	70	130			M2 ZA
L24841-01ASD	ASD	06/23/15 3:47	MS150601-2	.01002	U	.006175	mg/L	62	70	130	8	20	M2 ZA

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	100		97.01	mg/L	97	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.6	0.6			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	100.0581		99.14	mg/L	99	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	100.0581	53.7	149.5	mg/L	96	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	100.0581	53.7	152.3	mg/L	99	85	115	2	20	

Strontium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.9732	mg/L	99	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.015	0.015			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.5005		.5119	mg/L	102	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.5005	.795	1.269	mg/L	95	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.5005	.795	1.283	mg/L	98	85	115	1	20	

Sulfate D516-02/-07 - Turbidimetric

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385310													
WG385310ICB	ICB	06/16/15 13:22				U	mg/L		-3	3			
WG385310ICV	ICV	06/16/15 13:22	WI150612-4	20		19.6	mg/L	98	90	110			
WG385310LFB	LFB	06/16/15 13:43	WI150302-1	10.01		10.8	mg/L	108	90	110			
L24807-06DUP	DUP	06/16/15 14:17			161	163	mg/L				1	20	
L24807-07AS	AS	06/16/15 14:43	SO4TURB50X	10	904	905	mg/L	10	90	110			M3

Sulfide as S SM4500S2-D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385147													
WG385147ICV	ICV	06/12/15 9:30	WC150611-5	.26134		.236	mg/L	90	90	110			
WG385147ICB	ICB	06/12/15 9:41				U	mg/L		-0.06	0.06			
WG385182													
WG385182LFB	LFB	06/12/15 14:44	WC150611-8	.23556		.235	mg/L	100	80	120			
L24858-01AS	AS	06/12/15 15:05	WC150611-8	.35334	U	.336	mg/L	95	75	125			
L24858-01DUP	DUP	06/12/15 15:12			U	U	mg/L				0	20	RA

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Thallium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385500													
WG385500ICV	ICV	06/18/15 17:19	MS150601-9	.05		.05194	mg/L	104	90	110			
WG385500ICB	ICB	06/18/15 17:22				U	mg/L		-0.0003	0.0003			
WG385500LFB	LFB	06/18/15 17:25	MS150601-2	.0501		.04952	mg/L	99	85	115			
L24838-03AS	AS	06/18/15 18:19	MS150601-2	.0501	U	.05165	mg/L	103	70	130			
L24838-03ASD	ASD	06/18/15 18:22	MS150601-2	.0501	U	.05462	mg/L	109	70	130	6	20	

Tin, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.936	mg/L	97	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.12	0.12			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	1.001		.958	mg/L	96	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	1.001	U	.95	mg/L	95	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	1.001	U	.954	mg/L	95	85	115	0	20	

Titanium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.99	mg/L	100	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.015	0.015			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.999		1.022	mg/L	102	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.999	.008	1.014	mg/L	101	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.999	.008	1.026	mg/L	102	85	115	1	20	

Uranium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385500													
WG385500ICV	ICV	06/18/15 17:19	MS150601-9	.05		.05252	mg/L	105	90	110			
WG385500ICB	ICB	06/18/15 17:22				U	mg/L		-0.0003	0.0003			
WG385500LFB	LFB	06/18/15 17:25	MS150601-2	.05		.04991	mg/L	100	85	115			
L24838-03AS	AS	06/18/15 18:19	MS150601-2	.05	.0007	.05255	mg/L	104	70	130			
L24838-03ASD	ASD	06/18/15 18:22	MS150601-2	.05	.0007	.05522	mg/L	109	70	130	5	20	

Vanadium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		2.0155	mg/L	101	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.015	0.015			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.5		.5173	mg/L	103	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.5	U	.5069	mg/L	101	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.5	U	.5202	mg/L	104	85	115	3	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Zinc, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG385473													
WG385473ICV	ICV	06/18/15 20:32	II150616-3	2		1.975	mg/L	99	95	105			
WG385473ICB	ICB	06/18/15 20:38				U	mg/L		-0.03	0.03			
WG385473LFB	LFB	06/18/15 20:51	II150617-2	.4995		.51	mg/L	102	85	115			
L24841-01AS	AS	06/18/15 21:52	II150617-2	.4995	.08	.616	mg/L	107	85	115			
L24841-01ASD	ASD	06/18/15 21:55	II150617-2	.4995	.08	.653	mg/L	115	85	115	6	20	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24857-01	WG385473	Manganese, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG385648	Silver, dissolved	M200.8 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M200.8 ICP-MS	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.
	WG385497	Bicarbonate as CaCO3 Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385292	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG385497	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG385457	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385570	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385442	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG385497	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG385572	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG385530	Nitrogen, ammonia	M350.1	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG385573	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
M351.2 - TKN by Block Digester			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385497	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG385514	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385201	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).	
		M365.1 - Automated Ascorbic Acid	Q6	Sample was received above recommended temperature.	
		M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG385516	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG385297	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
		SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG385311		Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385229		Residue, Total (TS) @ 105C	SM2540B	N1	See Case Narrative.
			SM2540B	Q6	Sample was received above recommended temperature.
WG385310		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.
WG385182		Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG385497		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: PSA-SRACZ Sample ID: **L24857-01**
Date Sampled: 06/10/15 11:15
Date Received: 06/12/15
Sample Matrix: Ground Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG385359

Analyst: DRH

Extract Date:

Analysis Date: 06/17/15 9:54

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

Report Header Explanations

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

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24857-01	WG385359	Oil and Grease	1664A - Gravimetric	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L24857**

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bismuth, dissolved	M200.7 ICP
Gallium, dissolved	M200.7 ICP
Scandium, dissolved	M200.7 ICP

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfide as S	SM4500S2-D
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L24857
 Date Received: 06/12/2015 09:51
 Received By: ear
 Date Printed: 6/12/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4468	15.5	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: L24857
Date Received: 06/12/2015 09:51
Received By: ear
Date Printed: 6/12/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. *C24857*

CHAIN of CUSTODY

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

Report to:

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

Address: *Bulevar los procesos 18 calle 24-69 zona 10*
empresarial zona pradera fase IV oficina 1406
Telephone: *(502) 5951-5248*

Copy of Report to:

Name: *charlie Muehff*
Company: *tabac RESOURCES inc*

E-mail: *cmuehff@tabacresourcesinc.com*
Telephone:

Invoice to:

Name: *Miguel Berganza*
Company: *tabac RESOURCES inc*
E-mail: *M.Berganza@santofed.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 #:	PO#:	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	GW	TOTAL								
<i>Water Quality</i>	<i>Escobal</i>			<i>PSA-SR</i>	<i>10/06/15</i>	<i>11:15</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>								
				<i>HW-1</i>	<i>10/06/15</i>	<i>10:40</i>	<i>GW</i>	<i>8</i>	<input checked="" type="checkbox"/>								
				<i>Pieta 1</i>	<i>10/06/15</i>	<i>08:26</i>	<i>SW</i>	<i>1</i>		<input checked="" type="checkbox"/>							
				<i>Pieta 2</i>	<i>10/06/15</i>	<i>07:58</i>	<i>SW</i>	<i>1</i>		<input checked="" type="checkbox"/>							
				<i>Pieta 3</i>	<i>10/06/15</i>	<i>07:35</i>	<i>SW</i>	<i>1</i>		<input checked="" type="checkbox"/>							
				<i>Pieta de Proceso</i>	<i>10/06/15</i>	<i>09:10</i>	<i>WW</i>	<i>1</i>		<input checked="" type="checkbox"/>							
				<i>Pozo PP</i>	<i>10/06/15</i>	<i>08:30</i>	<i>GW</i>	<i>1</i>		<input checked="" type="checkbox"/>							
				<i>EP-10</i>	<i>10/06/15</i>	<i>12:00</i>	<i>SW</i>	<i>1</i>		<input checked="" type="checkbox"/>							
				<i>WW14</i>	<i>10/06/15</i>	<i>0:00-12:00</i>	<i>WW</i>	<i>1</i>		<input checked="" type="checkbox"/>							

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

REMARKS

Please present results of PSA-SR 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>10.06.2015</i>	<i>[Signature]</i>	<i>10.06.15 16:05</i>
	<i>16:05</i>	<i>[Signature]</i>	<i>10/15 0951</i>

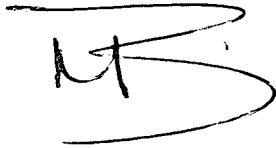
Guatemala June 10th, 2015

To whom it may concern:

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

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

Yours sincerely,

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

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

REG 016 Resultados de Análisis

Ref 1024-15

Pág 1/1

Muestras: 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: 030615
Fecha de ingreso de muestras: 030615
Fecha de análisis: 030615-110615
Fecha de informe: 110615

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)
1452	MW-7	20	< 1	N.D.	540
1453	MW-6	< 1	< 1	N.D.	9.3
1454	MW-5	< 1	< 1	N.D.	23
1455	MW-3	< 1	< 1	N.D.	4.5
1456	MW-4	< 1	< 1	N.D.	4.5
1457	MW-9	< 1	< 1	N.D.	< 2
1458	MW-21	< 1	< 1	N.D.	< 2
1459	MW-20	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.


N.D. No detectable. Debajo del limite de detección.


Limites 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 Paez
Gerente Técnico


VoBo Ing. Fernando Fuentes
Gerente de Calidad

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestras: 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: 020615
Fecha de ingreso de muestras: 020615
Fecha de análisis: 020615-110615
Fecha de informe: 110615

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)
1443	GW-1A	155	8	N.D.	49
1444	GW-2	47	< 1	N.D.	540
1445	GW-3	< 1	< 1	N.D.	< 2
1446	GW-10	< 1	< 1	N.D.	< 2
1447	GW-11	< 1	< 1	N.D.	< 2
1448	RW-1	3	< 1	N.D.	240
1449	MW-11	139	< 1	N.D.	< 2
1450	PSA-1	276	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*


Ing. Oscar Paez
Gerente Técnico


VoBo Ing. Fernando Fuentes
Gerente de Calidad

REG 016 Resultados de Análisis

Muestras: 1 muestra de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 100615
Fecha de ingreso de muestras: 100615
Fecha de análisis: 100615-190615
Fecha de informe: 190615

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)
1487	PSA-SR	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Fernando Fuentes
Gerente de Calidad

11.6 Informes originales de los Resultados Analíticos obtenidos del muestreo de sedimentos, Septiembre 2015.

July 29, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L25266

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 06, 2015. This project has been assigned to ACZ's project number, L25266. 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 L25266. 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.

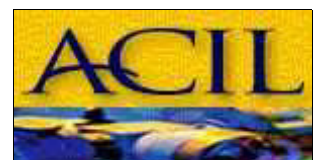
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 28, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

July 29, 2015

Project ID: Escobal

ACZ Project ID: L25266

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 20 sediment samples from Tahoe Resources, Inc. on July 6, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L25266. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with "H" flags (H1, H3), 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: **L25266-01**
Date Sampled: 06/23/15 10:50
Date Received: 07/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 10:48	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 13:19	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10200	7330		*	mg/Kg	10	50	07/27/15 22:40	msh
Antimony, total (3050)	M6020 ICP-MS	510	0.6	B	*	mg/Kg	0.2	1	07/23/15 18:17	msh
Arsenic, total (3050)	M6020 ICP-MS	510	8.6		*	mg/Kg	0.1	0.5	07/23/15 18:17	msh
Barium, total (3050)	M6020 ICP-MS	510	125			mg/Kg	0.3	1	07/23/15 18:17	msh
Boron, total (3050)	M6010B ICP	102		U		mg/Kg	1	5	07/23/15 12:19	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	0.19	B		mg/Kg	0.05	0.3	07/23/15 18:17	msh
Calcium, total (3050)	M6010B ICP	102	2600		*	mg/Kg	10	50	07/23/15 12:19	aeb
Chromium, total (3050)	M6020 ICP-MS	510	2.1			mg/Kg	0.3	1	07/23/15 18:17	msh
Copper, total (3050)	M6020 ICP-MS	510	7.4			mg/Kg	0.3	1	07/23/15 18:17	msh
Iron, total (3050)	M6010B ICP	102	10700		*	mg/Kg	2	5	07/23/15 12:19	aeb
Lead, total (3050)	M6020 ICP-MS	510	11.80		*	mg/Kg	0.05	0.3	07/23/15 18:17	msh
Magnesium, total (3050)	M6010B ICP	102	1020		*	mg/Kg	20	100	07/23/15 12:19	aeb
Manganese, total (3050)	M6020 ICP-MS	10200	378		*	mg/Kg	5	30	07/27/15 22:40	msh
Mercury, total	M7471A CVAA	243	0.05	B	*	mg/Kg	0.05	0.2	07/09/15 11:08	nco
Molybdenum, total (3050)	M6010B ICP	102		U		mg/Kg	2	10	07/23/15 12:19	aeb
Nickel, total (3050)	M6020 ICP-MS	510	3.4			mg/Kg	0.3	2	07/23/15 18:17	msh
Potassium, total (3050)	M6010B ICP	102	1900			mg/Kg	20	100	07/23/15 12:19	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.11			mg/Kg	0.05	0.1	07/23/15 18:17	msh
Silver, total (3050)	M6020 ICP-MS	510	0.09	B		mg/Kg	0.03	0.1	07/23/15 18:17	msh
Zinc, total (3050)	M6020 ICP-MS	10200	50			mg/Kg	20	50	07/27/15 22:40	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	72.5		*	%	0.1	0.5	07/13/15 16:20	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:08	cra
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 15:28	pta
Digestion - Hot Plate	M3050B ICP								07/22/15 15:28	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:13	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-1

ACZ Sample ID: **L25266-01**

Date Sampled: 06/23/15 10:50

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	32.4		UH	*	mg/Kg	0.2	0.6	07/09/15 13:37	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	114	0.0240		*	%	0.00114	0.0057	07/08/15 12:43	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2

ACZ Sample ID: **L25266-02**
Date Sampled: 06/23/15 11:45
Date Received: 07/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:01	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 13:36	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	16600		*	mg/Kg	50	300	07/28/15 18:08	msh
Antimony, total (3050)	M6020 ICP-MS	505	3.6		*	mg/Kg	0.2	1	07/23/15 18:20	msh
Arsenic, total (3050)	M6020 ICP-MS	505	36.3		*	mg/Kg	0.1	0.5	07/23/15 18:20	msh
Barium, total (3050)	M6020 ICP-MS	505	205			mg/Kg	0.3	1	07/23/15 18:20	msh
Boron, total (3050)	M6010B ICP	101	2	B		mg/Kg	1	5	07/23/15 12:22	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	6.17			mg/Kg	0.05	0.3	07/23/15 18:20	msh
Calcium, total (3050)	M6010B ICP	101	36000		*	mg/Kg	10	50	07/23/15 12:22	aeb
Chromium, total (3050)	M6020 ICP-MS	505	7.7			mg/Kg	0.3	1	07/23/15 18:20	msh
Copper, total (3050)	M6020 ICP-MS	505	22.1			mg/Kg	0.3	1	07/23/15 18:20	msh
Iron, total (3050)	M6010B ICP	101	14500		*	mg/Kg	2	5	07/23/15 12:22	aeb
Lead, total (3050)	M6020 ICP-MS	10100	254			mg/Kg	1	5	07/27/15 22:45	msh
Magnesium, total (3050)	M6010B ICP	101	6130		*	mg/Kg	20	100	07/23/15 12:22	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	1900		*	mg/Kg	5	30	07/27/15 22:45	msh
Mercury, total	M7471A CVAA	272	0.11	B	*	mg/Kg	0.05	0.3	07/09/15 11:10	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 12:22	aeb
Nickel, total (3050)	M6020 ICP-MS	505	7.7			mg/Kg	0.3	2	07/23/15 18:20	msh
Potassium, total (3050)	M6010B ICP	101	2180			mg/Kg	20	100	07/23/15 12:22	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.18			mg/Kg	0.05	0.1	07/23/15 18:20	msh
Silver, total (3050)	M6020 ICP-MS	505	18.30			mg/Kg	0.03	0.1	07/23/15 18:20	msh
Zinc, total (3050)	M6020 ICP-MS	505	488		*	mg/Kg	1	3	07/23/15 18:20	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	72.7		*	%	0.1	0.5	07/13/15 18:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:11	cra
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 16:16	pta
Digestion - Hot Plate	M3050B ICP								07/22/15 16:16	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:18	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2

ACZ Sample ID: **L25266-02**

Date Sampled: 06/23/15 11:45

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	23.8		UH	*	mg/Kg	0.1	0.5	07/09/15 13:39	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	132	0.0324		*	%	0.00132	0.0066	07/08/15 13:06	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2A

ACZ Sample ID: **L25266-03**

Date Sampled: 06/24/15 10:40

Date Received: 07/06/15

Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:14	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 13:53	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	14100		*	mg/Kg	50	300	07/28/15 18:10	msh
Antimony, total (3050)	M6020 ICP-MS	505	2.9		*	mg/Kg	0.2	1	07/23/15 18:22	msh
Arsenic, total (3050)	M6020 ICP-MS	505	37.8		*	mg/Kg	0.1	0.5	07/23/15 18:22	msh
Barium, total (3050)	M6020 ICP-MS	505	80.1			mg/Kg	0.3	1	07/23/15 18:22	msh
Boron, total (3050)	M6010B ICP	101	1	B		mg/Kg	1	5	07/23/15 12:25	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	3.59			mg/Kg	0.05	0.3	07/23/15 18:22	msh
Calcium, total (3050)	M6010B ICP	101	22800		*	mg/Kg	10	50	07/23/15 12:25	aeb
Chromium, total (3050)	M6020 ICP-MS	505	7.1			mg/Kg	0.3	1	07/23/15 18:22	msh
Copper, total (3050)	M6020 ICP-MS	505	18.9			mg/Kg	0.3	1	07/23/15 18:22	msh
Iron, total (3050)	M6010B ICP	101	14800		*	mg/Kg	2	5	07/23/15 12:25	aeb
Lead, total (3050)	M6020 ICP-MS	505	168		*	mg/Kg	0.05	0.3	07/23/15 18:22	msh
Magnesium, total (3050)	M6010B ICP	101	5980		*	mg/Kg	20	100	07/23/15 12:25	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	1750		*	mg/Kg	5	30	07/27/15 22:47	msh
Mercury, total	M7471A CVAA	241	0.06	B	*	mg/Kg	0.05	0.2	07/09/15 11:12	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 12:25	aeb
Nickel, total (3050)	M6020 ICP-MS	505	7.3			mg/Kg	0.3	2	07/23/15 18:22	msh
Potassium, total (3050)	M6010B ICP	101	1580			mg/Kg	20	100	07/23/15 12:25	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.15			mg/Kg	0.05	0.1	07/23/15 18:22	msh
Silver, total (3050)	M6020 ICP-MS	505	11.90			mg/Kg	0.03	0.1	07/23/15 18:22	msh
Zinc, total (3050)	M6020 ICP-MS	505	317		*	mg/Kg	1	3	07/23/15 18:22	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	71.9		*	%	0.1	0.5	07/13/15 18:50	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:13	cra
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 17:04	pta
Digestion - Hot Plate	M3050B ICP								07/22/15 17:04	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:22	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2A

ACZ Sample ID: **L25266-03**

Date Sampled: 06/24/15 10:40

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	21.6		UH	*	mg/Kg	0.1	0.4	07/09/15 13:41	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	73.9	0.0246		*	%	0.00074	0.0037	07/08/15 12:45	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2A

ACZ Sample ID: **L25266-04**
Date Sampled: 06/25/15 10:30
Date Received: 07/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:20	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/16/15 13:30	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	32000		*	mg/Kg	50	300	07/28/15 18:12	msh
Antimony, total (3050)	M6020 ICP-MS	505	6.8		*	mg/Kg	0.2	1	07/23/15 18:25	msh
Arsenic, total (3050)	M6020 ICP-MS	505	55.8		*	mg/Kg	0.1	0.5	07/23/15 18:25	msh
Barium, total (3050)	M6020 ICP-MS	10100	290			mg/Kg	5	30	07/27/15 22:50	msh
Boron, total (3050)	M6010B ICP	101	5			mg/Kg	1	5	07/23/15 12:34	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	12.60			mg/Kg	0.05	0.3	07/23/15 18:25	msh
Calcium, total (3050)	M6010B ICP	101	27300		*	mg/Kg	10	50	07/23/15 12:34	aeb
Chromium, total (3050)	M6020 ICP-MS	505	9			mg/Kg	0.3	1	07/23/15 18:25	msh
Copper, total (3050)	M6020 ICP-MS	505	34.7			mg/Kg	0.3	1	07/23/15 18:25	msh
Iron, total (3050)	M6010B ICP	101	20500		*	mg/Kg	2	5	07/23/15 12:34	aeb
Lead, total (3050)	M6020 ICP-MS	10100	532			mg/Kg	1	5	07/27/15 22:50	msh
Magnesium, total (3050)	M6010B ICP	101	6830		*	mg/Kg	20	100	07/23/15 12:34	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	6120		*	mg/Kg	30	100	07/28/15 18:12	msh
Mercury, total	M7471A CVAA	492	0.3	B	*	mg/Kg	0.1	0.5	07/09/15 14:37	nco
Molybdenum, total (3050)	M6010B ICP	101	4	B		mg/Kg	2	10	07/23/15 12:34	aeb
Nickel, total (3050)	M6020 ICP-MS	505	6.7			mg/Kg	0.3	2	07/23/15 18:25	msh
Potassium, total (3050)	M6010B ICP	101	3390			mg/Kg	20	100	07/23/15 12:34	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.19			mg/Kg	0.05	0.1	07/23/15 18:25	msh
Silver, total (3050)	M6020 ICP-MS	505	24.30			mg/Kg	0.03	0.1	07/23/15 18:25	msh
Zinc, total (3050)	M6020 ICP-MS	10100	1210			mg/Kg	20	50	07/27/15 22:50	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	40.6		*	%	0.1	0.5	07/13/15 19:40	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:16	cra
Digestion - Hot Plate	M3050B ICP								07/22/15 19:28	pta
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 19:28	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:27	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2A

ACZ Sample ID: **L25266-04**

Date Sampled: 06/25/15 10:30

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	25.1	0.9		*	mg/Kg	0.2	0.5	07/09/15 13:42	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	106	0.0275		*	%	0.00106	0.0053	07/21/15 13:53	bsu

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2B

ACZ Sample ID: **L25266-05**

Date Sampled: 06/23/15 09:40

Date Received: 07/06/15

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:27	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:10	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	22100		*	mg/Kg	50	300	07/28/15 18:15	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.6		*	mg/Kg	0.2	1	07/23/15 18:27	msh
Arsenic, total (3050)	M6020 ICP-MS	505	20.5		*	mg/Kg	0.1	0.5	07/23/15 18:27	msh
Barium, total (3050)	M6020 ICP-MS	505	225			mg/Kg	0.3	1	07/23/15 18:27	msh
Boron, total (3050)	M6010B ICP	101	1	B		mg/Kg	1	5	07/23/15 12:37	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.58			mg/Kg	0.05	0.3	07/23/15 18:27	msh
Calcium, total (3050)	M6010B ICP	101	7670		*	mg/Kg	10	50	07/23/15 12:37	aeb
Chromium, total (3050)	M6020 ICP-MS	505	5.2			mg/Kg	0.3	1	07/23/15 18:27	msh
Copper, total (3050)	M6020 ICP-MS	505	11.5			mg/Kg	0.3	1	07/23/15 18:27	msh
Iron, total (3050)	M6010B ICP	101	17000		*	mg/Kg	2	5	07/23/15 12:37	aeb
Lead, total (3050)	M6020 ICP-MS	505	26.80		*	mg/Kg	0.05	0.3	07/23/15 18:27	msh
Magnesium, total (3050)	M6010B ICP	101	1910		*	mg/Kg	20	100	07/23/15 12:37	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	2530		*	mg/Kg	30	100	07/28/15 18:15	msh
Mercury, total	M7471A CVAA	256	0.09	B	*	mg/Kg	0.05	0.3	07/09/15 14:39	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 12:37	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3.6			mg/Kg	0.3	2	07/23/15 18:27	msh
Potassium, total (3050)	M6010B ICP	101	1420			mg/Kg	20	100	07/23/15 12:37	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.16			mg/Kg	0.05	0.1	07/23/15 18:27	msh
Silver, total (3050)	M6020 ICP-MS	505	0.72			mg/Kg	0.03	0.1	07/23/15 18:27	msh
Zinc, total (3050)	M6020 ICP-MS	10100	70			mg/Kg	20	50	07/27/15 22:52	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	69.8		*	%	0.1	0.5	07/13/15 20:30	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:19	cra
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 20:15	pta
Digestion - Hot Plate	M3050B ICP								07/22/15 20:15	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:31	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2B

ACZ Sample ID: **L25266-05**

Date Sampled: 06/23/15 09:40

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.2	0.2	BH	*	mg/Kg	0.2	0.6	07/09/15 13:42	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	112	0.0239		*	%	0.00112	0.0056	07/08/15 12:46	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-3

ACZ Sample ID: **L25266-06**
Date Sampled: 06/24/15 11:40
Date Received: 07/06/15
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:33	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:27	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	7800			mg/Kg	10	50	07/27/15 22:59	msh
Antimony, total (3050)	M6020 ICP-MS	505	2		*	mg/Kg	0.2	1	07/23/15 18:30	msh
Arsenic, total (3050)	M6020 ICP-MS	505	17		*	mg/Kg	0.1	0.5	07/23/15 18:30	msh
Barium, total (3050)	M6020 ICP-MS	505	158			mg/Kg	0.3	1	07/23/15 18:30	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/23/15 12:47	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.17	B		mg/Kg	0.05	0.3	07/23/15 18:30	msh
Calcium, total (3050)	M6010B ICP	101	3770		*	mg/Kg	10	50	07/23/15 12:47	aeb
Chromium, total (3050)	M6020 ICP-MS	505	3			mg/Kg	0.3	1	07/23/15 18:30	msh
Copper, total (3050)	M6020 ICP-MS	505	4.5			mg/Kg	0.3	1	07/23/15 18:30	msh
Iron, total (3050)	M6010B ICP	101	9740		*	mg/Kg	2	5	07/23/15 12:47	aeb
Lead, total (3050)	M6020 ICP-MS	505	8.62		*	mg/Kg	0.05	0.3	07/23/15 18:30	msh
Magnesium, total (3050)	M6010B ICP	101	1000		*	mg/Kg	20	100	07/23/15 12:47	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	521		*	mg/Kg	5	30	07/27/15 22:59	msh
Mercury, total	M7471A CVAA	220		U	*	mg/Kg	0.04	0.2	07/09/15 14:42	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 12:47	aeb
Nickel, total (3050)	M6020 ICP-MS	505	2.5			mg/Kg	0.3	2	07/23/15 18:30	msh
Potassium, total (3050)	M6010B ICP	101	1630			mg/Kg	20	100	07/23/15 12:47	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.05	B		mg/Kg	0.05	0.1	07/23/15 18:30	msh
Silver, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.03	0.1	07/23/15 18:30	msh
Zinc, total (3050)	M6020 ICP-MS	10100	40	B		mg/Kg	20	50	07/27/15 22:59	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	78.9		*	%	0.1	0.5	07/13/15 21:20	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:21	cra
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 21:03	pta
Digestion - Hot Plate	M3050B ICP								07/22/15 21:03	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:36	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-3

ACZ Sample ID: **L25266-06**

Date Sampled: 06/24/15 11:40

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.6		UH	*	mg/Kg	0.2	0.6	07/09/15 13:43	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	92.6	0.0120		*	%	0.00093	0.00463	07/08/15 12:47	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4

ACZ Sample ID: **L25266-07**
Date Sampled: 06/23/15 08:55
Date Received: 07/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:40	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 14:44	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	51000	23300		*	mg/Kg	50	300	07/28/15 18:17	msh
Antimony, total (3050)	M6020 ICP-MS	510	1.9		*	mg/Kg	0.2	1	07/23/15 18:37	msh
Arsenic, total (3050)	M6020 ICP-MS	510	19		*	mg/Kg	0.1	0.5	07/23/15 18:37	msh
Barium, total (3050)	M6020 ICP-MS	510	239			mg/Kg	0.3	1	07/23/15 18:37	msh
Boron, total (3050)	M6010B ICP	102		U		mg/Kg	1	5	07/23/15 12:50	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	0.75			mg/Kg	0.05	0.3	07/23/15 18:37	msh
Calcium, total (3050)	M6010B ICP	102	4740		*	mg/Kg	10	50	07/23/15 12:50	aeb
Chromium, total (3050)	M6020 ICP-MS	510	4			mg/Kg	0.3	1	07/23/15 18:37	msh
Copper, total (3050)	M6020 ICP-MS	510	12.7			mg/Kg	0.3	1	07/23/15 18:37	msh
Iron, total (3050)	M6010B ICP	102	15000		*	mg/Kg	2	5	07/23/15 12:50	aeb
Lead, total (3050)	M6020 ICP-MS	510	30.40		*	mg/Kg	0.05	0.3	07/23/15 18:37	msh
Magnesium, total (3050)	M6010B ICP	102	1240		*	mg/Kg	20	100	07/23/15 12:50	aeb
Manganese, total (3050)	M6020 ICP-MS	10200	824		*	mg/Kg	5	30	07/27/15 23:02	msh
Mercury, total	M7471A CVAA	260	0.12	B	*	mg/Kg	0.05	0.3	07/09/15 14:53	nco
Molybdenum, total (3050)	M6010B ICP	102		U		mg/Kg	2	10	07/23/15 12:50	aeb
Nickel, total (3050)	M6020 ICP-MS	510	3.2			mg/Kg	0.3	2	07/23/15 18:37	msh
Potassium, total (3050)	M6010B ICP	102	1770			mg/Kg	20	100	07/23/15 12:50	aeb
Selenium, total (3050)	M6020 ICP-MS	510	0.13			mg/Kg	0.05	0.1	07/23/15 18:37	msh
Silver, total (3050)	M6020 ICP-MS	510	1.0			mg/Kg	0.03	0.1	07/23/15 18:37	msh
Zinc, total (3050)	M6020 ICP-MS	10200	80			mg/Kg	20	50	07/27/15 23:02	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	66.1		*	%	0.1	0.5	07/13/15 22:10	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:24	cra
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 21:51	pta
Digestion - Hot Plate	M3050B ICP								07/22/15 21:51	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:41	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4

ACZ Sample ID: **L25266-07**

Date Sampled: 06/23/15 08:55

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	33.3		UH	*	mg/Kg	0.2	0.7	07/09/15 13:46	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	128	0.0230		*	%	0.00128	0.0064	07/08/15 12:48	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4A

ACZ Sample ID: **L25266-08**

Date Sampled: 06/24/15 10:15

Date Received: 07/06/15

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:46	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:01	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	17800		*	mg/Kg	50	300	07/28/15 18:19	msh
Antimony, total (3050)	M6020 ICP-MS	505	3.2		*	mg/Kg	0.2	1	07/23/15 18:40	msh
Arsenic, total (3050)	M6020 ICP-MS	505	20.8		*	mg/Kg	0.1	0.5	07/23/15 18:40	msh
Barium, total (3050)	M6020 ICP-MS	10100	267			mg/Kg	5	30	07/27/15 23:04	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/23/15 12:56	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	1.08			mg/Kg	0.05	0.3	07/23/15 18:40	msh
Calcium, total (3050)	M6010B ICP	101	6510		*	mg/Kg	10	50	07/23/15 12:56	aeb
Chromium, total (3050)	M6020 ICP-MS	505	5.1			mg/Kg	0.3	1	07/23/15 18:40	msh
Copper, total (3050)	M6020 ICP-MS	505	11.5			mg/Kg	0.3	1	07/23/15 18:40	msh
Iron, total (3050)	M6010B ICP	101	16000		*	mg/Kg	2	5	07/23/15 12:56	aeb
Lead, total (3050)	M6020 ICP-MS	505	50.10		*	mg/Kg	0.05	0.3	07/23/15 18:40	msh
Magnesium, total (3050)	M6010B ICP	101	1710		*	mg/Kg	20	100	07/23/15 12:56	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	1250		*	mg/Kg	5	30	07/27/15 23:04	msh
Mercury, total	M7471A CVAA	256		U	*	mg/Kg	0.05	0.3	07/09/15 14:55	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 12:56	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3.6			mg/Kg	0.3	2	07/23/15 18:40	msh
Potassium, total (3050)	M6010B ICP	101	1750			mg/Kg	20	100	07/23/15 12:56	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.14			mg/Kg	0.05	0.1	07/23/15 18:40	msh
Silver, total (3050)	M6020 ICP-MS	505	2.48			mg/Kg	0.03	0.1	07/23/15 18:40	msh
Zinc, total (3050)	M6020 ICP-MS	505	104		*	mg/Kg	1	3	07/23/15 18:40	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	66.6		*	%	0.1	0.5	07/13/15 23:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:27	cra
Digestion - Hot Plate	M3050B ICP								07/22/15 22:39	pta
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 22:39	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:45	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4A

ACZ Sample ID: **L25266-08**

Date Sampled: 06/24/15 10:15

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	16.2		UH	*	mg/Kg	0.1	0.3	07/09/15 13:47	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	110	0.0255		*	%	0.0011	0.0055	07/08/15 12:49	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-5

ACZ Sample ID: **L25266-09**
Date Sampled: 06/24/15 07:20
Date Received: 07/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:53	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:18	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	5550		*	mg/Kg	10	50	07/27/15 23:06	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.7	B	*	mg/Kg	0.2	1	07/23/15 18:42	msh
Arsenic, total (3050)	M6020 ICP-MS	505	8.1		*	mg/Kg	0.1	0.5	07/23/15 18:42	msh
Barium, total (3050)	M6020 ICP-MS	505	105			mg/Kg	0.3	1	07/23/15 18:42	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/23/15 12:59	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.11	B		mg/Kg	0.05	0.3	07/23/15 18:42	msh
Calcium, total (3050)	M6010B ICP	101	1130		*	mg/Kg	10	50	07/23/15 12:59	aeb
Chromium, total (3050)	M6020 ICP-MS	505	3.8			mg/Kg	0.3	1	07/23/15 18:42	msh
Copper, total (3050)	M6020 ICP-MS	505	4.4			mg/Kg	0.3	1	07/23/15 18:42	msh
Iron, total (3050)	M6010B ICP	101	9910		*	mg/Kg	2	5	07/23/15 12:59	aeb
Lead, total (3050)	M6020 ICP-MS	505	5.09		*	mg/Kg	0.05	0.3	07/23/15 18:42	msh
Magnesium, total (3050)	M6010B ICP	101	770		*	mg/Kg	20	100	07/23/15 12:59	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	300		*	mg/Kg	5	30	07/27/15 23:06	msh
Mercury, total	M7471A CVAA	224	0.05	B	*	mg/Kg	0.04	0.2	07/09/15 14:58	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 12:59	aeb
Nickel, total (3050)	M6020 ICP-MS	505	1.9	B		mg/Kg	0.3	2	07/23/15 18:42	msh
Potassium, total (3050)	M6010B ICP	101	1180			mg/Kg	20	100	07/23/15 12:59	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B		mg/Kg	0.05	0.1	07/23/15 18:42	msh
Silver, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.03	0.1	07/23/15 18:42	msh
Zinc, total (3050)	M6020 ICP-MS	10100	30	B		mg/Kg	20	50	07/27/15 23:06	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	86.4		*	%	0.1	0.5	07/13/15 23:50	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:30	cra
Digestion - Hot Plate	M3050B ICP-MS								07/22/15 23:27	pta
Digestion - Hot Plate	M3050B ICP								07/22/15 23:27	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:50	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-5

ACZ Sample ID: **L25266-09**

Date Sampled: 06/24/15 07:20

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	28.5		UH	*	mg/Kg	0.2	0.6	07/09/15 13:48	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	90.6	0.00677		*	%	0.00091	0.00453	07/08/15 12:51	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-6

ACZ Sample ID: **L25266-10**
Date Sampled: 06/24/15 08:00
Date Received: 07/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 11:59	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:35	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	7910		*	mg/Kg	10	50	07/27/15 23:09	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.3	B	*	mg/Kg	0.2	1	07/23/15 18:45	msh
Arsenic, total (3050)	M6020 ICP-MS	505	25.3		*	mg/Kg	0.1	0.5	07/23/15 18:45	msh
Barium, total (3050)	M6020 ICP-MS	505	97.6			mg/Kg	0.3	1	07/23/15 18:45	msh
Boron, total (3050)	M6010B ICP	101	7			mg/Kg	1	5	07/23/15 13:02	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.17	B		mg/Kg	0.05	0.3	07/23/15 18:45	msh
Calcium, total (3050)	M6010B ICP	101	1640		*	mg/Kg	10	50	07/23/15 13:02	aeb
Chromium, total (3050)	M6020 ICP-MS	505	4.9			mg/Kg	0.3	1	07/23/15 18:45	msh
Copper, total (3050)	M6020 ICP-MS	505	8.8			mg/Kg	0.3	1	07/23/15 18:45	msh
Iron, total (3050)	M6010B ICP	101	14300		*	mg/Kg	2	5	07/23/15 13:02	aeb
Lead, total (3050)	M6020 ICP-MS	505	4.73		*	mg/Kg	0.05	0.3	07/23/15 18:45	msh
Magnesium, total (3050)	M6010B ICP	101	1030		*	mg/Kg	20	100	07/23/15 13:02	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	353		*	mg/Kg	5	30	07/27/15 23:09	msh
Mercury, total	M7471A CVAA	534		U	*	mg/Kg	0.1	0.5	07/09/15 15:00	nco
Molybdenum, total (3050)	M6010B ICP	101	5	B		mg/Kg	2	10	07/23/15 13:02	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3			mg/Kg	0.3	2	07/23/15 18:45	msh
Potassium, total (3050)	M6010B ICP	101	1340			mg/Kg	20	100	07/23/15 13:02	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.24			mg/Kg	0.05	0.1	07/23/15 18:45	msh
Silver, total (3050)	M6020 ICP-MS	505	0.06	B		mg/Kg	0.03	0.1	07/23/15 18:45	msh
Zinc, total (3050)	M6020 ICP-MS	10100	40	B		mg/Kg	20	50	07/27/15 23:09	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	34.9		*	%	0.1	0.5	07/14/15 0:40	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:32	cra
Digestion - Hot Plate	M3050B ICP-MS								07/23/15 0:15	pta
Digestion - Hot Plate	M3050B ICP								07/23/15 0:15	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:54	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-6

ACZ Sample ID: **L25266-10**

Date Sampled: 06/24/15 08:00

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	54		UH	*	mg/Kg	0.3	1	07/09/15 13:48	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	191	0.0313		*	%	0.00191	0.00955	07/08/15 12:52	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-7

ACZ Sample ID: **L25266-11**
Date Sampled: 06/23/15 08:05
Date Received: 07/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 13:01	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 15:52	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	5670		*	mg/Kg	10	50	07/27/15 23:11	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.6	B	*	mg/Kg	0.2	1	07/23/15 18:47	msh
Arsenic, total (3050)	M6020 ICP-MS	50500		U	*	mg/Kg	10	50	07/28/15 18:22	msh
Barium, total (3050)	M6020 ICP-MS	505	105			mg/Kg	0.3	1	07/23/15 18:47	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/23/15 13:05	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.11	B		mg/Kg	0.05	0.3	07/23/15 18:47	msh
Calcium, total (3050)	M6010B ICP	101	1250		*	mg/Kg	10	50	07/23/15 13:05	aeb
Chromium, total (3050)	M6020 ICP-MS	505	1.5			mg/Kg	0.3	1	07/23/15 18:47	msh
Copper, total (3050)	M6020 ICP-MS	505	3.7			mg/Kg	0.3	1	07/23/15 18:47	msh
Iron, total (3050)	M6010B ICP	101	6640		*	mg/Kg	2	5	07/23/15 13:05	aeb
Lead, total (3050)	M6020 ICP-MS	505	6.64		*	mg/Kg	0.05	0.3	07/23/15 18:47	msh
Magnesium, total (3050)	M6010B ICP	101	830		*	mg/Kg	20	100	07/23/15 13:05	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	385		*	mg/Kg	5	30	07/27/15 23:11	msh
Mercury, total	M7471A CVAA	246		U	*	mg/Kg	0.05	0.2	07/09/15 15:02	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 13:05	aeb
Nickel, total (3050)	M6020 ICP-MS	505	1.6	B		mg/Kg	0.3	2	07/23/15 18:47	msh
Potassium, total (3050)	M6010B ICP	101	2010			mg/Kg	20	100	07/23/15 13:05	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.05	B		mg/Kg	0.05	0.1	07/23/15 18:47	msh
Silver, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.03	0.1	07/23/15 18:47	msh
Zinc, total (3050)	M6020 ICP-MS	10100	30	B		mg/Kg	20	50	07/27/15 23:11	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	72.8		*	%	0.1	0.5	07/14/15 1:30	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:35	cra
Digestion - Hot Plate	M3050B ICP-MS								07/23/15 1:03	pta
Digestion - Hot Plate	M3050B ICP								07/23/15 1:03	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 12:59	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-7

ACZ Sample ID: **L25266-11**

Date Sampled: 06/23/15 08:05

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	33.9		UH	*	mg/Kg	0.2	0.7	07/11/15 13:07	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	74	0.00689		*	%	0.00074	0.0037	07/08/15 12:53	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-8

ACZ Sample ID: **L25266-12**
Date Sampled: 06/24/15 09:40
Date Received: 07/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 13:12	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/07/15 16:09	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	6960		*	mg/Kg	10	50	07/27/15 23:14	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.5	B	*	mg/Kg	0.2	1	07/23/15 18:50	msh
Arsenic, total (3050)	M6020 ICP-MS	505	6.7		*	mg/Kg	0.1	0.5	07/23/15 18:50	msh
Barium, total (3050)	M6020 ICP-MS	505	75.8			mg/Kg	0.3	1	07/23/15 18:50	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/23/15 13:08	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.27	B		mg/Kg	0.05	0.3	07/23/15 18:50	msh
Calcium, total (3050)	M6010B ICP	101	1800		*	mg/Kg	10	50	07/23/15 13:08	aeb
Chromium, total (3050)	M6020 ICP-MS	505	1.8			mg/Kg	0.3	1	07/23/15 18:50	msh
Copper, total (3050)	M6020 ICP-MS	505	6.7			mg/Kg	0.3	1	07/23/15 18:50	msh
Iron, total (3050)	M6010B ICP	101	7730		*	mg/Kg	2	5	07/23/15 13:08	aeb
Lead, total (3050)	M6020 ICP-MS	505	24.70		*	mg/Kg	0.05	0.3	07/23/15 18:50	msh
Magnesium, total (3050)	M6010B ICP	101	440		*	mg/Kg	20	100	07/23/15 13:08	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	334		*	mg/Kg	5	30	07/27/15 23:14	msh
Mercury, total	M7471A CVAA	319	0.09	B	*	mg/Kg	0.06	0.3	07/09/15 15:04	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 13:08	aeb
Nickel, total (3050)	M6020 ICP-MS	505	1.1	B		mg/Kg	0.3	2	07/23/15 18:50	msh
Potassium, total (3050)	M6010B ICP	101	1550			mg/Kg	20	100	07/23/15 13:08	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B		mg/Kg	0.05	0.1	07/23/15 18:50	msh
Silver, total (3050)	M6020 ICP-MS	505	0.18			mg/Kg	0.03	0.1	07/23/15 18:50	msh
Zinc, total (3050)	M6020 ICP-MS	10100	60			mg/Kg	20	50	07/27/15 23:14	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	58.6		*	%	0.1	0.5	07/14/15 2:20	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:38	cra
Digestion - Hot Plate	M3050B ICP-MS								07/23/15 1:51	pta
Digestion - Hot Plate	M3050B ICP								07/23/15 1:51	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 13:03	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-8

ACZ Sample ID: **L25266-12**

Date Sampled: 06/24/15 09:40

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	28.2		UH	*	mg/Kg	0.2	0.6	07/11/15 13:08	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	95.3	0.0366		*	%	0.00095	0.00477	07/08/15 12:56	mss2

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-9

ACZ Sample ID: **L25266-13**
Date Sampled: 06/24/15 08:45
Date Received: 07/06/15
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								07/09/15 13:24	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								07/16/15 13:48	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	8580		*	mg/Kg	10	50	07/27/15 23:16	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.7	B	*	mg/Kg	0.2	1	07/23/15 18:52	msh
Arsenic, total (3050)	M6020 ICP-MS	505	6.3		*	mg/Kg	0.1	0.5	07/23/15 18:52	msh
Barium, total (3050)	M6020 ICP-MS	505	113			mg/Kg	0.3	1	07/23/15 18:52	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	07/23/15 13:11	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.27	B		mg/Kg	0.05	0.3	07/23/15 18:52	msh
Calcium, total (3050)	M6010B ICP	101	2080		*	mg/Kg	10	50	07/23/15 13:11	aeb
Chromium, total (3050)	M6020 ICP-MS	505	2.3			mg/Kg	0.3	1	07/23/15 18:52	msh
Copper, total (3050)	M6020 ICP-MS	505	6.2			mg/Kg	0.3	1	07/23/15 18:52	msh
Iron, total (3050)	M6010B ICP	101	8880		*	mg/Kg	2	5	07/23/15 13:11	aeb
Lead, total (3050)	M6020 ICP-MS	505	12.60		*	mg/Kg	0.05	0.3	07/23/15 18:52	msh
Magnesium, total (3050)	M6010B ICP	101	1070		*	mg/Kg	20	100	07/23/15 13:11	aeb
Manganese, total (3050)	M6020 ICP-MS	10100	490		*	mg/Kg	5	30	07/27/15 23:16	msh
Mercury, total	M7471A CVAA	289	0.08	B	*	mg/Kg	0.06	0.3	07/09/15 15:06	nco
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	07/23/15 13:11	aeb
Nickel, total (3050)	M6020 ICP-MS	505	2.2			mg/Kg	0.3	2	07/23/15 18:52	msh
Potassium, total (3050)	M6010B ICP	101	1500			mg/Kg	20	100	07/23/15 13:11	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.07	B		mg/Kg	0.05	0.1	07/23/15 18:52	msh
Silver, total (3050)	M6020 ICP-MS	505	0.12			mg/Kg	0.03	0.1	07/23/15 18:52	msh
Zinc, total (3050)	M6020 ICP-MS	10100	50			mg/Kg	20	50	07/27/15 23:16	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	67		*	%	0.1	0.5	07/14/15 3:10	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								07/13/15 16:41	cra
Digestion - Hot Plate	M3050B ICP-MS								07/23/15 2:39	pta
Digestion - Hot Plate	M3050B ICP								07/23/15 2:39	pta
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								07/17/15 13:08	arc

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-9

ACZ Sample ID: **L25266-13**

Date Sampled: 06/24/15 08:45

Date Received: 07/06/15

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	15.8		UH	*	mg/Kg	0.09	0.3	07/11/15 13:10	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	121	0.0137		*	%	0.00121	0.00605	07/21/15 13:54	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: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-01	WG387430	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
			Iron, total (3050)	M6010B ICP	M3
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386456	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
M9012B - Automated Colorimetric			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M9012B - Automated Colorimetric			Q6	Sample was received above recommended temperature.	
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-02	WG387584	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
			Iron, total (3050)	M6010B ICP	M3
		Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386456	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG387357	Zinc, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-03	WG387584	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
			Iron, total (3050)	M6010B ICP	M3
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386456	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG387357	Zinc, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-04	WG387584	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
			Iron, total (3050)	M6010B ICP	M3
		Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387584	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG387159	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-05	WG387584	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
		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.
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387584	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
M9012B - Automated Colorimetric			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M9012B - Automated Colorimetric			Q6	Sample was received above recommended temperature.	
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-06	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
		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.
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
M9012B - Automated Colorimetric			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M9012B - Automated Colorimetric			Q6	Sample was received above recommended temperature.	
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-07	WG387584	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
			Iron, total (3050)	M6010B ICP	M3
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
M9012B - Automated Colorimetric			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M9012B - Automated Colorimetric			Q6	Sample was received above recommended temperature.	
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-08	WG387584	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
		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.
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG387357	Zinc, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-09	WG387430	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
		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.
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-10	WG387430	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
			Iron, total (3050)	M6010B ICP	M3
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386548	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-11	WG387430	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387584	Arsenic, total (3050)	M6020 ICP-MS	M4	The spiked sample required a dilution such that the spike recovery calculation does not provide useful information. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387315	Calcium, 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.
			Iron, total (3050)	M6010B ICP	M3
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386641	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
M9012B - Automated Colorimetric			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M9012B - Automated Colorimetric			Q6	Sample was received above recommended temperature.	
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-12	WG387430	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
		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.
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386641	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
M9012B - Automated Colorimetric			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M9012B - Automated Colorimetric			Q6	Sample was received above recommended temperature.	
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25266-13	WG387430	Aluminum, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG387357	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Arsenic, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
	WG387315	Calcium, 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.
		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.
	WG387357	Lead, total (3050)	M6020 ICP-MS	B7	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 10X the concentration in the method blank.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387315	Magnesium, total (3050)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG387430	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.
	WG386495	Mercury, total	M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG386641	Cyanide, total	M9012B - Automated Colorimetric	H1	Sample prep or analysis performed past holding time. See case narrative.
			M9012B - Automated Colorimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG387159	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	

Tahoe Resources, Inc.

ACZ Project ID: **L25266**

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Solids, Percent	D2216-80
-----------------	----------

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)
-------------------	--------------------------------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L25266
 Date Received: 07/06/2015 10:04
 Received By: ear
 Date Printed: 7/6/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?		X	
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples? A change was made in the sample information section prior to ACZ custody.	X		

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA22090	18.7	13	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: L25266
Date Received: 07/06/2015 10:04
Received By: ear
Date Printed: 7/6/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

Handwritten signature/initials

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza, Company: Tahoe Resources Inc., Address: Belvas los Pinos, Telephone: (502) 595 5248

Copy of Report to:

Name: Charlie Muerhoff, Company: Tahoe Resources Inc., E-mail: cmuerhoff@tahoeresourcesinc.com

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

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

REMARKS

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

RELINQUISHED BY: [Signature], DATE:TIME 30.06.2015 17:35, RECEIVED BY: [Signature], DATE:TIME 14:35 30/6/15

25266 Chain of Custody



Laboratories, Inc.

ESD

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tabor Resources Inc.
E-mail: mberganza@santafed.com.gt

Address: Finca Los Prioceros 18 Calle 469 Zona 10
Empresarial Zona Pradera Toluca Oficina 1425
Telephone: (502) 395 5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tabor Resources Inc.

E-mail: cmuerhoff@taborresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tabor Resources Inc.
E-mail: M Berganza@santafed.com.gt

Address:
Telephone:

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

Are samples for SDWA Compliance Monitoring? Yes No
If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: LF Sampler's Site Information State Zip code Time Zone
*Sampler's Signature: [Signature]
I attest to the authenticity and validity of this sample. I understand that 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#: ESCOB91
Reporting state for compliance testing:
Check box if samples include NRC licensed material?

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

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix. Lists samples like SED-7, SED-8, SED-9, SED-GW2, SED-GW6, SED-GW7, SED-GW8, SED-WW7, SED-WW9, SED-WW14.

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

REMARKS

Blank remarks section.

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

Table with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME. Includes signatures and dates like 30-06-2015.

11.7 Informes Originales de los Resultados Analíticos obtenidos del Efluente en los meses de Agosto a Octubre de 2015.

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: 110515

Fecha de ingreso de muestras: 110515

Fecha de análisis: 110515-200515

Fecha de informe: 200515

Identificación de la muestra: WW9

Correlativo Ecosistemas: 1268

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	7.75	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	12	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.007	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

teléfonos: (502) 2437 7224 - 2437 4455

17 avenida 2-39 zona 4 de Mixco

Ofibodegas Zaragoza 2, Bodega No. 2, Guatemala.

laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

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 mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04

** Análisis referido.

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

May 22, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L24279

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 13, 2015. This project has been assigned to ACZ's project number, L24279. 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 L24279. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

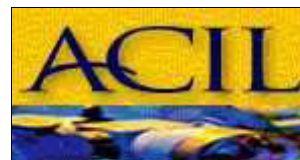
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after June 21, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L24279-01**

Date Sampled: 05/11/15 12:00

Date Received: 05/13/15

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								05/21/15 12:49	thf

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	05/22/15 12:40	thf

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: **L24279**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L24279-01	WG383975	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L24279-02	WG383975	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L24279**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L24279
 Date Received: 05/13/2015 09:47
 Received By: ear
 Date Printed: 5/13/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4421	14.1	13	Yes

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L24279
Date Received: 05/13/2015 09:47
Received By: ear
Date Printed: 5/13/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

24279

CHAIN of CUSTODY

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

Report to:

Name: Miguel Bergezca
Company: Tahoe Resources inc.
E-mail: M.Bergezca@samuelad.com.legit

Address: Boulevard los Pinos 1800m 24-69 zona 10
Empresarial zona Prodeca zona 11 Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Muehlhoff
Company: Tahoe Resources inc.

E-mail: cmuehlhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Bergezca
Company: Tahoe Resources inc.
E-mail: M.Bergezca

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

*Sampler's Signature: 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, Matrix, and analysis results. Includes handwritten 'SW' and '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 of cyanide 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.

24279 Chain of Custody



REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 03:00 horas

Alicuota 2: 06:00 horas

Alicuota 2: 09:00 horas

Alicuota 3: 12:00 horas

Análisis solicitado por: Ing. Miguel Berganza

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

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 150615

Fecha de ingreso de muestras: 150615

Fecha de análisis: 150615-240615

Fecha de informe: 240615

Identificación de la muestra: WW 9

Correlativo Ecosistemas: 1524

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	7.50	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	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	---	---	---
Relación DQO/DBO ₅	---	---	---	---	---
* Sólidos Suspendedos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.008	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* 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	14	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 mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente de Calidad

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 150615
Fecha de ingreso de muestras: 150615
Fecha de análisis: 150615-240615
Fecha de informe: 240615

Identificación de la muestra: WW 10
Correlativo Ecosistemas: 1525

Acuerdo Gubernativo 236-2006 (excepto cianuros)

Límites Máximos Permisibles Entes
Generadores Nuevos
Acuerdo 236-2006

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	6.90	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
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

*** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**** Análisis referido.**

Comparación de descarga según información del cliente.

Ing. Fernando Fuentes
Gerente de Calidad

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

July 01, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L25031

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 19, 2015. This project has been assigned to ACZ's project number, L25031. 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 L25031. 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.

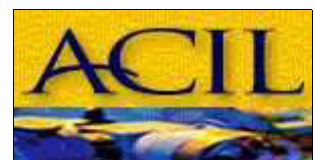
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 31, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L25031-01**

Date Sampled: 06/15/15 12:00

Date Received: 06/19/15

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/25/15 15:58	spl

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	06/25/15 23:06	pjb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW10

ACZ Sample ID: **L25031-02**
 Date Sampled: 06/15/15 12:00
 Date Received: 06/19/15
 Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								06/25/15 16:15	spl

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	06/25/15 23:07	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: **L25031**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25031-01	WG385931	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L25031-02	WG385931	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L25031**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L25031
 Date Received: 06/19/2015 10:31
 Received By: ear
 Date Printed: 6/19/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3206	15.4	15	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L25031
Date Received: 06/19/2015 10:31
Received By: ear
Date Printed: 6/19/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

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

25031

CHAIN of CUSTODY

Report to:

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

Address: Boulevard 105 Proceros, Pasaje 74-69 Zona 10
 Empressarial Zona Proceros, Torre IV Oficina 1406
 Telephone: (502) 5951 5248

Copy of Report to:

Name: Charlie Muerhoff
 Company: Tanco Resources Inc.

E-mail: CMuerhoff@tancoresourcesinc.com
 Telephone:

Invoice to:

Name: Miguel Berganza@sanrafael.com.gt
 Company: Tanco 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: [Signature] 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 #:	PO#:	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	Total									
Water Quality	Escobal			1. WW	15/06/15	03:00-12:00	WW	1	✓								
				2. WW	15/06/15	12:00	WW	1	✓								
				Pileta 1	12/06/15	08:40	SW	1	✓								
				Pileta 2	12/06/15	08:35	SW	1	✓								
				Pileta 3	12/06/15	08:30	SW	1	✓								
				Pileta de Proceso	12/06/15	09:10	WW	1	✓								
				Pozo PP	12/06/15	09:05	GW	1	✓								
				Agua de Proceso	15/06/15	09:57	WW	1	✓								
				TND	16/06/15	09:10	SW	1	✓								

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

REMARKS

Please report samples # 1 and 2 in a different document.

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

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

JCA 17-06-2015 15:52 [Signature] [Signature] 18/06/15 15:52 (19/15/10/3)

25031 Chain of Custody

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 03:00 horas

Alicuota 2: 06:00 horas

Alicuota 3: 09:00 horas

Alicuota 4: 12:00 horas

Análisis solicitado por: Ing. Miguel Berganza

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

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 270715

Fecha de ingreso de muestras: 270715

Fecha de análisis: 270715-060815

Fecha de informe: 060815

Identificación de la muestra: WW9

Correlativo Ecosistemas: 1977

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 Suspendedos	mg/L	10	12	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	0.007	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* 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	69	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04

** Análisis referido.

Comparación de descarga según información del cliente.



Ing. Oscar Paez
Gerente Técnico



VoBo Ing. Fernando Fuentes
Gerente de Calidad

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876



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: 270715

Fecha de ingreso de muestras: 270715

Fecha de análisis: 270715-060815

Fecha de informe: 060815

Identificación de la muestra: WW11

Correlativo Ecosistemas: 1979

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	7.49	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	---	---	---
Relación DQO/DBO ₅	---	---	---	---	---
* Sólidos Suspendidos	mg/L	10	13	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	0.05	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.008	UNICAM AN40177 E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181 E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	64	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	2	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros limites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

Comparación de descarga según información del cliente.


Ing. Oscar Paez
Gerente Técnico


VoBo Ing. Bernardo Fuentes
Gerente de Calidad

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

August 06, 2015

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L25739

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 29, 2015. This project has been assigned to ACZ's project number, L25739. 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 L25739. 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.

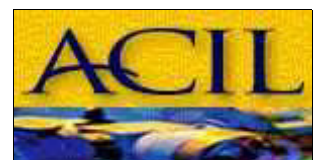
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 05, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L25739-01**

Date Sampled: 07/27/15 12:00

Date Received: 07/29/15

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								08/04/15 11:58	spl

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	08/05/15 0:02	pjb

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW11

ACZ Sample ID: **L25739-03**

Date Sampled: 07/27/15 12:00

Date Received: 07/29/15

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								08/04/15 12:28	spl

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	08/05/15 0:05	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: **L25739**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L25739-01	WG387944	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L25739-02	WG387944	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L25739-03	WG387944	Cyanide, total	M335.4 - Colorimetric w/ distillation	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L25739**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L25739
 Date Received: 07/29/2015 09:42
 Received By: ddp
 Date Printed: 7/30/2015

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? ¹			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2875	15.8	14	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L25739
Date Received: 07/29/2015 09:42
Received By: ddp
Date Printed: 7/30/2015

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

L25739

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5495

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 14 Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources Inc.

E-mail: cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns: # of Containers, Matrix, and analysis results. Includes handwritten 'SW' and 'total' in the # of Containers column.

1. *
2. *
3. *

COPY

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results. Includes rows for WW9, WW10, WW11, SW2A, SW2B, SW3A, SW4A, WW6.

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

REMARKS

* Present results on a different report.

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

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

Handwritten signatures and dates for Relinquished and Received by.



L25739 Chain of Custody