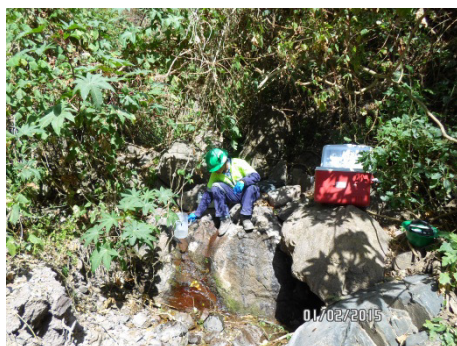


Proyecto Minero Escobal
San Rafael Las Flores, Santa Rosa

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

FEBRERO - ABRIL 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 Febrero a Abril 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 once estaciones de agua superficial, 5 estaciones de agua subterránea (manantiales), 2 estaciones de pozos de producción y diez 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 968 voladuras durante los meses de Febrero a Abril 2015.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 58 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 Febrero a Abril 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 Febrero a Abril 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 Febrero a Abril 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
Febrero 2015										
30.77	9.07	18.91	109.95	0.16	23.96	135.12	100	22.87	65.87	3.29
Marzo 2015										
31.46	10.93	20.25	89.66	0.16	18.95	123.01	100	15.74	63.89	15.69
Abril 2015										
31.94	15.33	21.59	71.26	0.31	9.17	121.91	100	20.04	71.93	78.68

°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 30.77° a los 31.94°C y en el mes de Febrero se registró la menor precipitación (3.29mm). El mes que en promedio presentó la mayor humedad relativa fue Abril con 71.93% y el mes que en promedio presentó la mayor velocidad de vientos fue Febrero con 23.96 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.

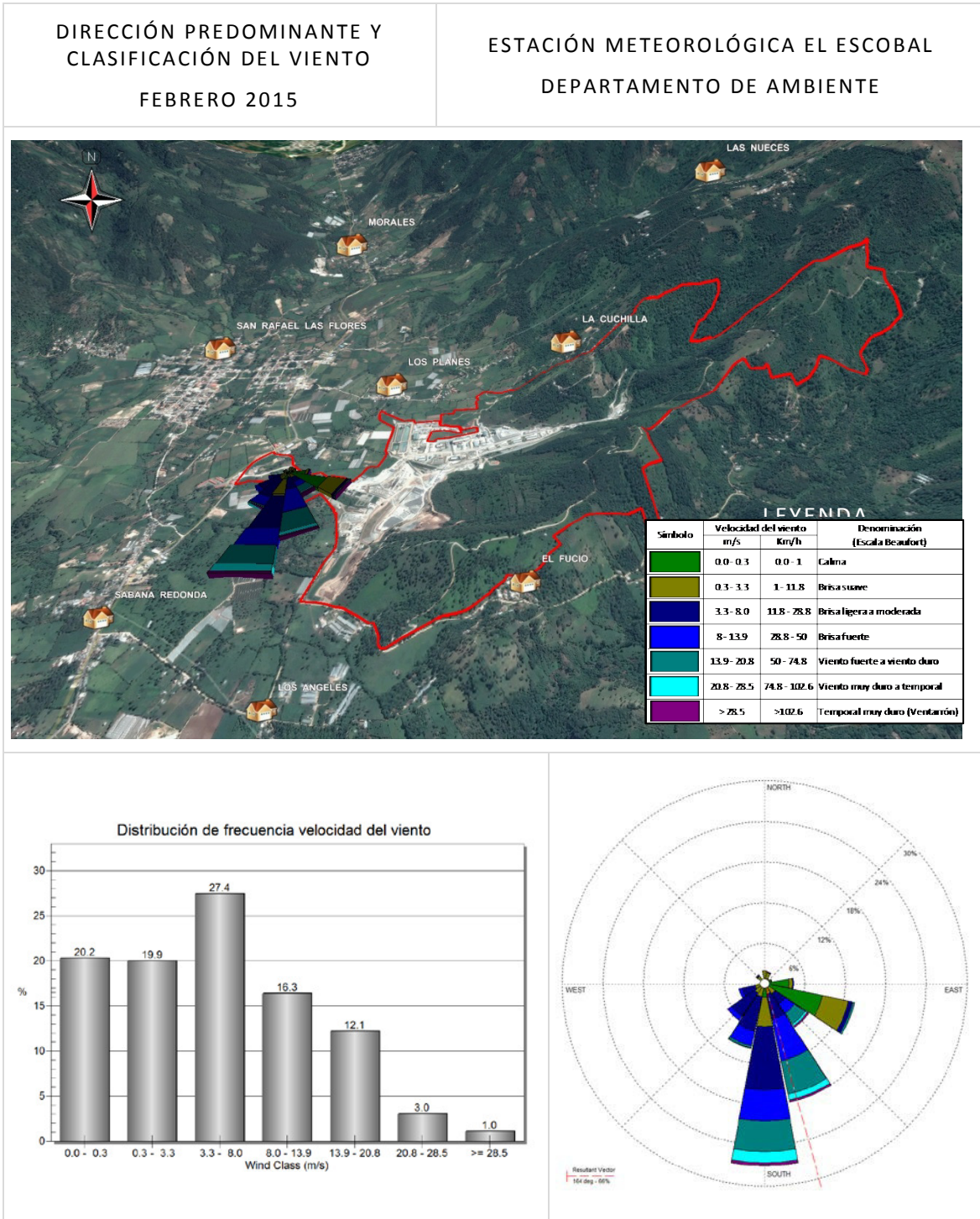


Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa

Fuente: MSR, 2015.

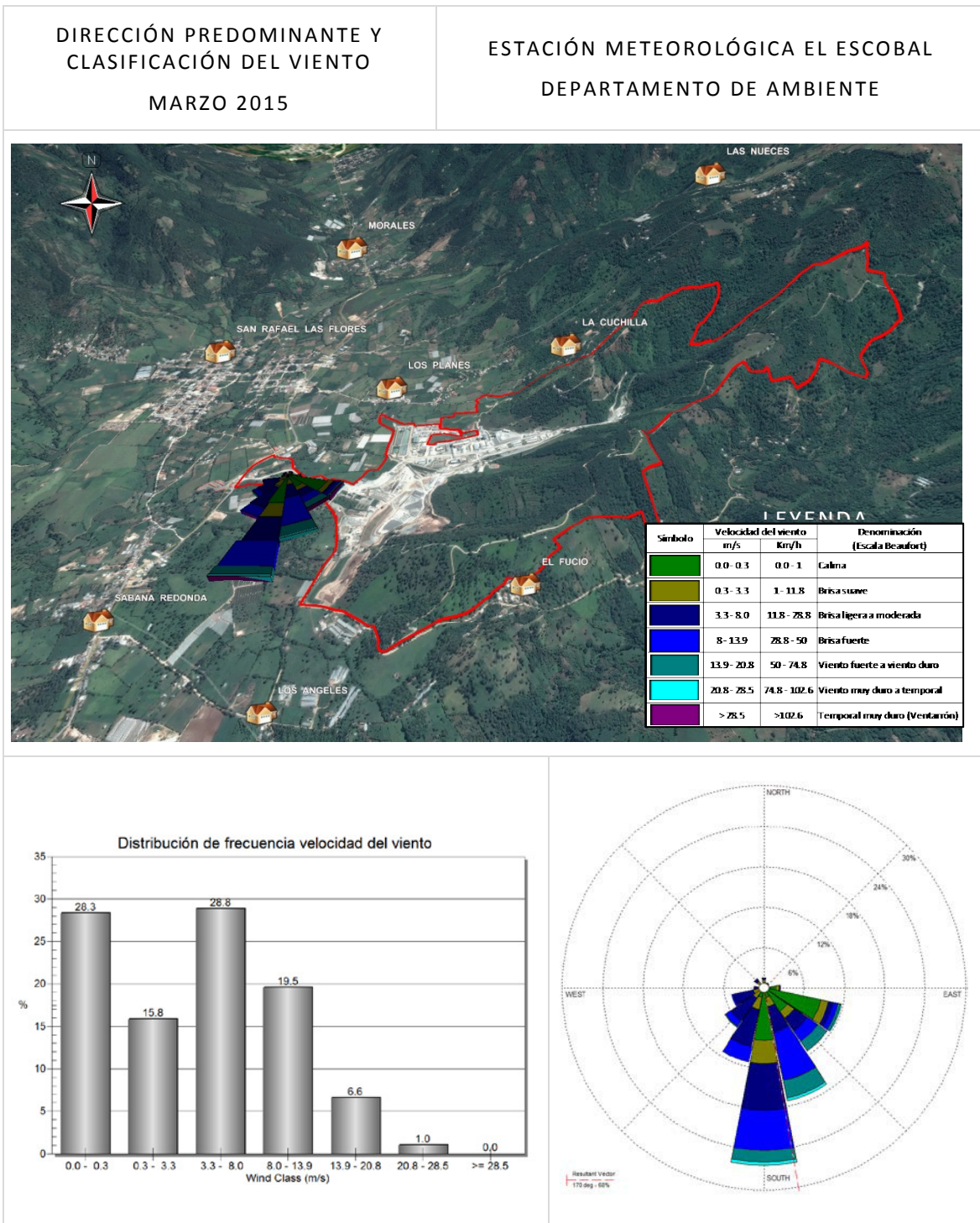
Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 la predominancia de los vientos de Febrero a Abril de 2015 fue de norte a sur oeste.

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



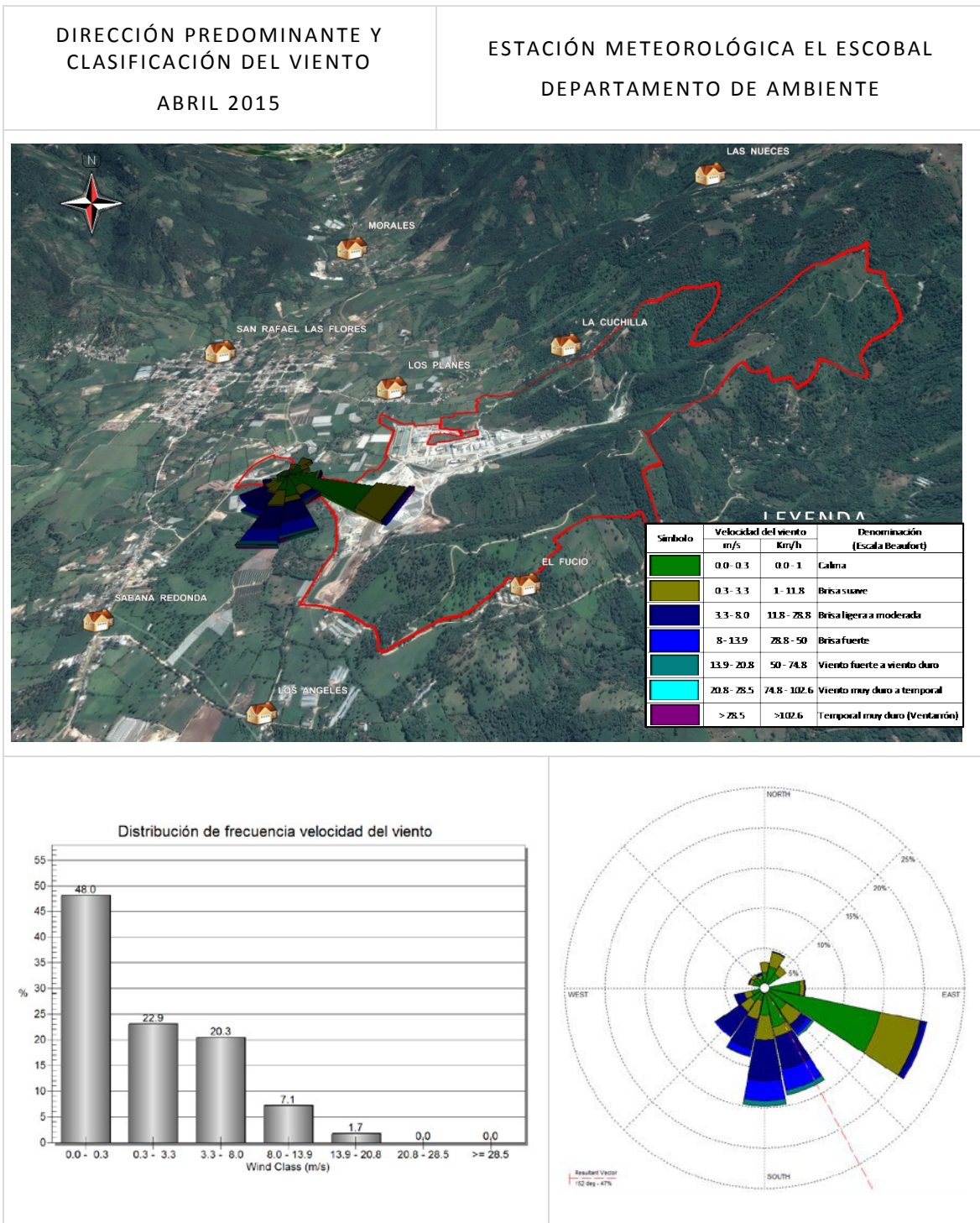
Fuente: MSR, 2015.

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



Fuente: MSR, 2015.

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



Fuente: MSR, 2015.

3 Calidad de Aire

3.1 Material Particulado

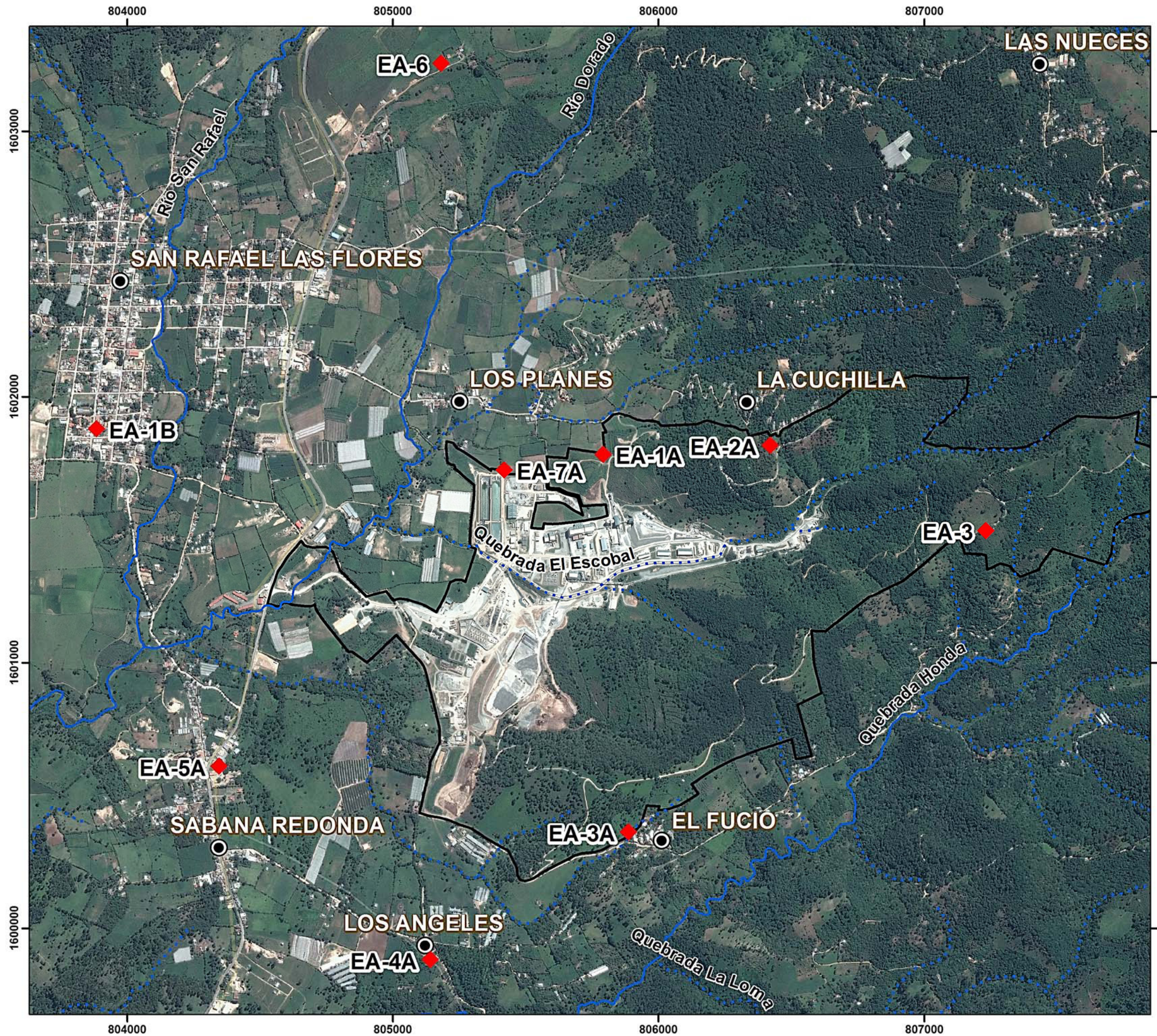
3.1.1 Sitios de Monitoreo

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

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

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

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



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

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

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

LEYENDA

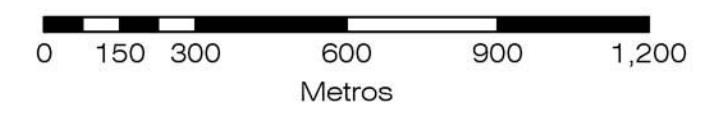
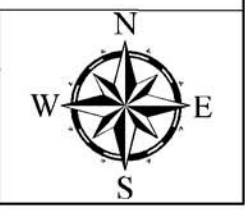
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO (PM10)

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

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000. Hojas catográficas año 2010 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: Abril 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 Febrero a Abril 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 ($150 \mu\text{g}/\text{m}^3$), excepto por el valor registrado durante Febrero de 2015 en la estación EA-4A. Probablemente el aumento del valor de PM₁₀ estuvo afectado debido a que cercano al punto de monitoreo, se estaba realizando una construcción para entubar agua, asimismo ese día no se registró precipitación.

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	Feb-15	Mar-15	Abr-15
				(µg/m ³)					
EA-1A	150	150**	50	24.36	89.95	3.67	25.83	38.69	56.16
EA-1B				NR	NR	NR	25.58	NA	NA
EA-2A				21.40	76.20	2.74	37.43	12.48	52.41
EA-3				25.68	78.85	1.25	39.79	23.24	20.30
EA-3A				NR	NR	NR	59.2	NA	NA
EA-4A				103.55	120.40	86.70	210.23	NA	NA
EA-5A				50.73 [¥]	104.80 [¥]	11.80 [¥]	92.37	NA	NA
EA-6				23.05	57.90	1.70	50.3	NA	NA
EA-7A				46.48 [¥]	115.90 [¥]	13.40 [¥]	23.87	43.26	54.91

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 Febrero a Abril de 2015 se encontraron entre los 12.48 a 210.23 µg/m³. En Marzo se registró el menor valor de PM₁₀ en la estación EA-2A (12.48 µg/m³), mientras que en Febrero y Abril se registró en la estación EA-7A y EA-3 (23.87 y 20.30 µg/m³ respectivamente). Los valores más altos de PM₁₀ se registraron en la estaciones EA-4A durante Febrero (210.23 µg/m³), mientras que los valores más altos en Marzo y Abril se registraron en las estaciones EA-7A y EA-1A (43.26 y 56.16 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, a excepción del valor aislado de PM₁₀ de la estación EA-4A registrado durante Febrero de 2015.

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 metales en PM₁₀ durante el mes de Febrero de 2015, los resultados de laboratorio del análisis de metales en filtros y los cálculos realizados para determinar el PM₁₀ se presentan en el anexo 11.3.2. La concentración de metales registradas durante Febrero de 2015 se encontraron cercanos a los valores registrados durante Febrero de 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			
		feb-15	Línea Base			feb-15	feb-15	Línea Base			feb-15
		2583-0101	Promedio	Máximo	Mínimo	2564-1410	2581-1616	Promedio	Máximo	Mínimo	2582-1740
Aluminio	µg/m ³	0.814	0,23	0,28	<0.34	0.803	4.430	1,27	1,27	1,27	3.453
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		3.631	1,49	2,17	0,80	0.99	4.720	1,23	1,23	1,23	2.978
Bario		0.018	0,01	0,01	<0.02	0.017	0.036	<0.02	<0.02	<0.02	0.069
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		0.045	0,27	0,50	0,03	N.D.	0.048	<0.1	<0.1	<0.1	0.029
Cadmio		N.D.	<0.02	<0.03	<0.01	N.D.	N.D.	<0.03	<0.03	<0.03	N.D.
Calcio		1.115	0,65	1,10	0,20	1.138	15.818	0,78	0,78	0,78	1.639
Cromo		N.D.	NR	NR	NR	0.001	0.369	NR	NR	NR	0.007
Cobalto		N.D.				N.D.	N.D.				N.D.
Cobre		N.D.				N.D.	N.D.				N.D.
Estaño		N.D.				N.D.	N.D.				N.D.
Estroncio		N.D.				0.019	0.012				
Fósforo		N.D.				0.201	0.092				
Hierro		0.846				0,26	0,32				0,20
Magnesio		0.323	0,11	0,14	<0.17	0.251	0.682	<0.33	<0.33	<0.33	0.778
Manganeso		0.031	0,01	0,01	<0.02	0.054	0.090	0,09	0,09	0,09	0.133
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.	0.123	<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	0.029	0.034	<0.05	<0.05	<0.05	0.023
Potasio		N.D.	0,55	0,60	0,50	N.D.	2.150	0,73	0,73	0,73	0.998
Selenio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Silicio		0.668	0,42	0,53	0,30	0.369	0.650	0,55	0,55	0,55	0.711
Sodio		0.226	0,53	0,60	0,46	0.03	2.215	1,40	1,40	1,40	0.187
Talio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Titanio		0.047	0,02	0,02	0,02	0.042	0.045	0,09	0,09	0,09	0.173
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.				0.054	0.221				0.059
Zirconio	N.D.	<0.012	<0.02	<0.004	N.D.	N.D.	<0.01	<0.01	<0.01	N.D.	

NR = cálculo No Realizado por falta de datos de línea base. µg/m³ = microgramos por metro cúbico. Fuente: MSR, 2015.

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

Parámetros	Unidades	EA-5A				EA-6				EA-7A			
		Línea Base			feb-15	Línea Base			feb-15	Línea Base			feb-15
		Promedio	Máximo	Mínimo	2584-0202	Promedio	Máximo	Mínimo	2585-0303	Promedio	Máximo	Mínimo	2562-0606
Aluminio	µg/m ³	<0.33	<0.33	<0.33	1.281	0,31	0,45	<0.33	1.022	0,45	0,73	<0.33	0.285
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	2.117	3,02	4,73	1,30	2.982	2,28	4,35	<0.42	0.554
Bario		<0.02	<0.02	<0.02	0.031	0,01	0,01	<0.02	0.021	0,01	0,01	<0.02	0.009
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	0.036	<0.10	<0.10	<0.10	0.039	<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	1.032	0,79	1,50	<0.17	0.825	0,28	0,48	<0.17	0.319
Cromo		NR	NR	NR	N.D.	NR	NR	NR	0.004	NR	NR	NR	N.D.
Cobalto					N.D.				N.D.				
Cobre					N.D.				N.D.				
Estaño					0.108				N.D.				
Estroncio					0.006				N.D.				
Fósforo					0.017				N.D.				
Hierro					0,18				0,18				0,18
Magnesio		<0.33	<0.33	<0.33	0.395	3,05	6,02	<0.17	0.362	0,23	0,38	<0.17	N.D.
Manganeso		<0.02	<0.02	<0.02	0.059	0,02	0,02	<0.02	0.036	0,02	0,03	<0.02	0.014
Molibdeno		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Níquel		<0.05	<0.05	<0.05	N.D.	0,25	0,48	<0.05	N.D.	0,04	0,05	<0.05	N.D.
Plata		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Plomo		<0.05	<0.05	<0.05	N.D.	<0.05	<0.05	<0.05	N.D.	<0.05	<0.05	<0.05	N.D.
Potasio		<0.5	<0.5	<0.5	0.832	0,83	1,05	0,60	0.825	0,80	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	0.607	0,49	0,58	0,40	0.343	0,43	0,78	<0.17	0.180
Sodio		<0.08	<0.08	<0.08	0.374	0,07	0,10	<0.08	0.577	1,27	2,50	<0.08	0.357
Talio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Titanio		<0.02	<0.02	<0.02	0.069	0,02	0,03	<0.02	0.058	0,02	0,03	<0.02	0.014
Uranio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Vanadio					N.D.				N.D.				
Zinc					0.028				N.D.				
Zirconio	<0.01				<0.01				<0.01				N.D.

NR = cálculo No Realizado por falta de datos de línea base. µg/m³ = microgramos por metro cúbico. Fuente: MSR, 2015.

3.3 Partículas Sedimentables Totales (PST)

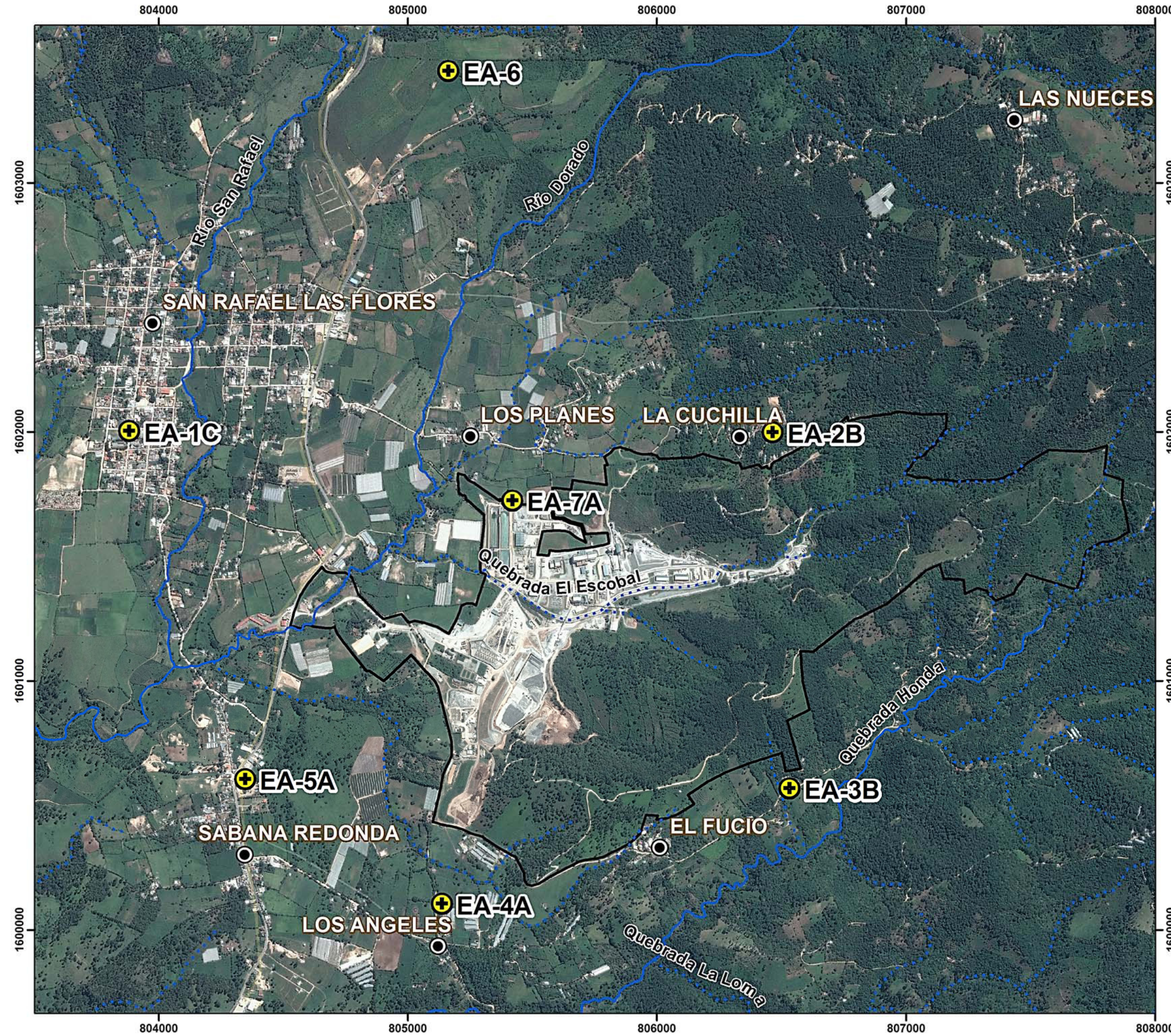
3.3.1 Sitios de Monitoreo

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

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

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

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



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE PARTICULAS SEDIMENTABLES
TOTALES

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

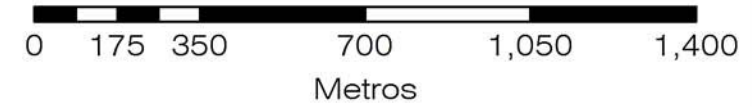
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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

Fecha de Elaboración: Abril 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 Marzo 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	Mar-15	Mar-15	Mar-15	Línea Base		Muestreo	Línea Base			Muestreo	Mar-15	Mar-15	Mar-15
						Promedio	Mínimo	Máximo	Mar-15	Promedio	Mínimo	Máximo			
g/(m² x 30 días)															
Sólidos insolubles	ND	ND	12.54	9.50	12.09	6.27	2.60	10.80	24.49	6.50	0.80	16.00	9.19	2.69	2.93
Sólidos solubles			2.17	2.25	1.81	2.12	0.90	2.90	2.09	11.26	2.00	37.00	1.96	2.59	1.73
Sólidos totales			14.71	11.74	13.90	8.37	4.60	13.00	26.58	17.58	3.20	50.00	11.15	5.28	4.66

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

Los valores de PST se encuentran entre 4.66 a 26.58 g/(m² x 30 días), los cuales corresponden a las estaciones EA-7A y EA-4A respectivamente. Únicamente el valor para la estación EA-4A (26.58 g/(m² x 30 días)) se encuentra por arriba de los valores mínimos y máximos registrados durante el establecimiento de la línea base. Sin embargo, los valores de PST en la misma estación han venido descendiendo desde el cuarto trimestre de 2013. Las estaciones EA-1C, EA-2B, EA-3B, EA-6 y EA-7A no cuentan con línea base.

3.4 Gases de Combustión (SO₂ y NO₂)

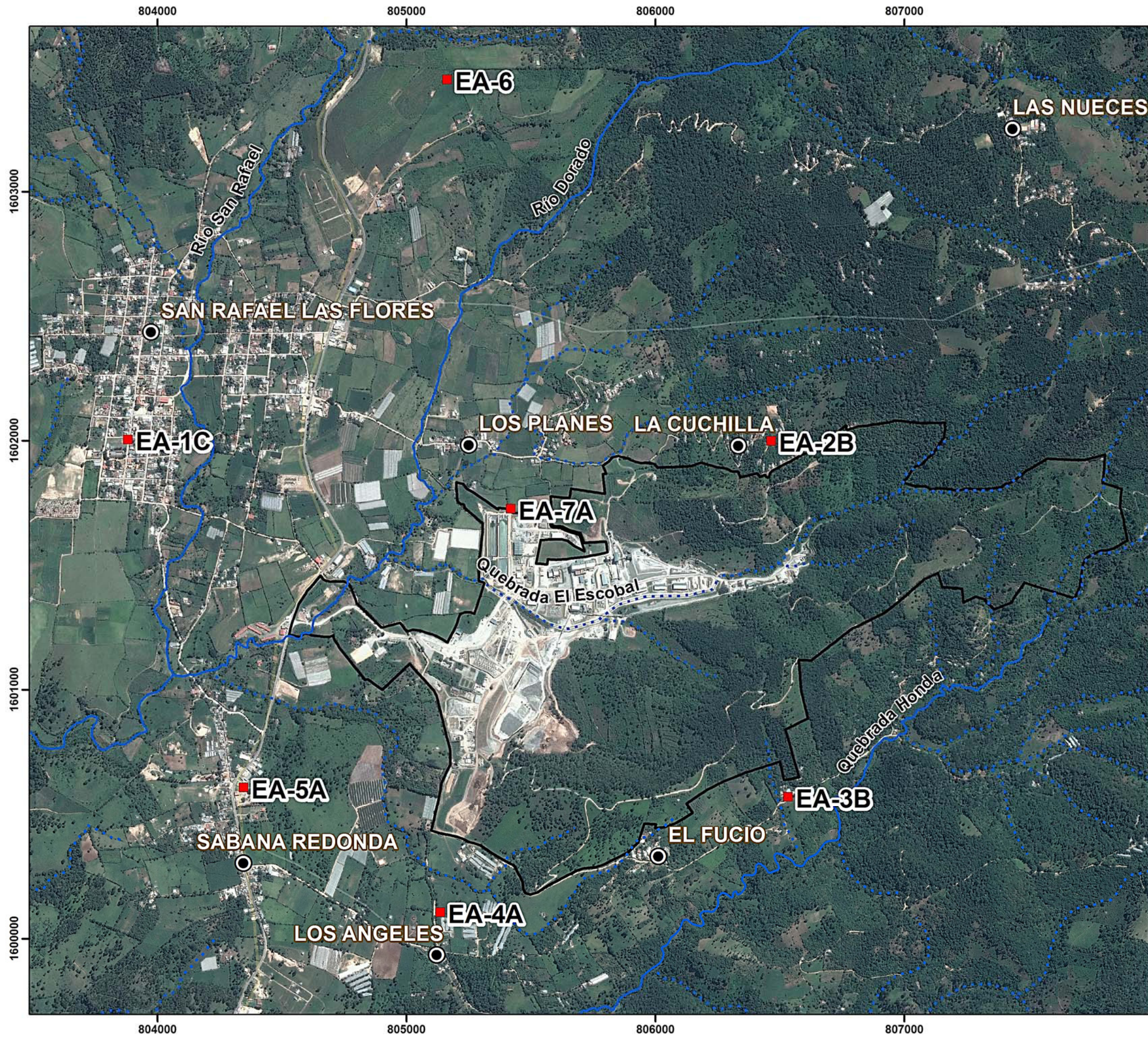
3.4.1 Sitios de Monitoreo

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

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

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

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



MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE GASES DE COMBUSTIÓN

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

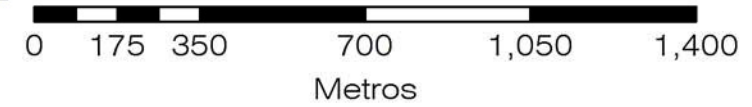
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

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

Fecha de Elaboración: Abril 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 9 µg/m³ (EA-3B) y 13 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				
									Línea base**				Muestreo	Línea base**			Muestreo
	USEPA ¹	Banco Mundial ²	OMS ³	British Columbia ⁴	Mar-15	Mar-15	Mar-15	Mar-15	Promedio	Mínimo	Máximo	Mar-15	Mar-15	Promedio	Mínimo	Máximo	Mar-15
(µg/m ³)																	
SO ₂	370	20	20	160	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
NO ₂	100 [¥]	40 [¥]	40 [¥]	200	12	11	9	13	<9	<9	<9	11	<9	<9	<9	<9	<9

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

3.5 Niveles de Presión Sonora

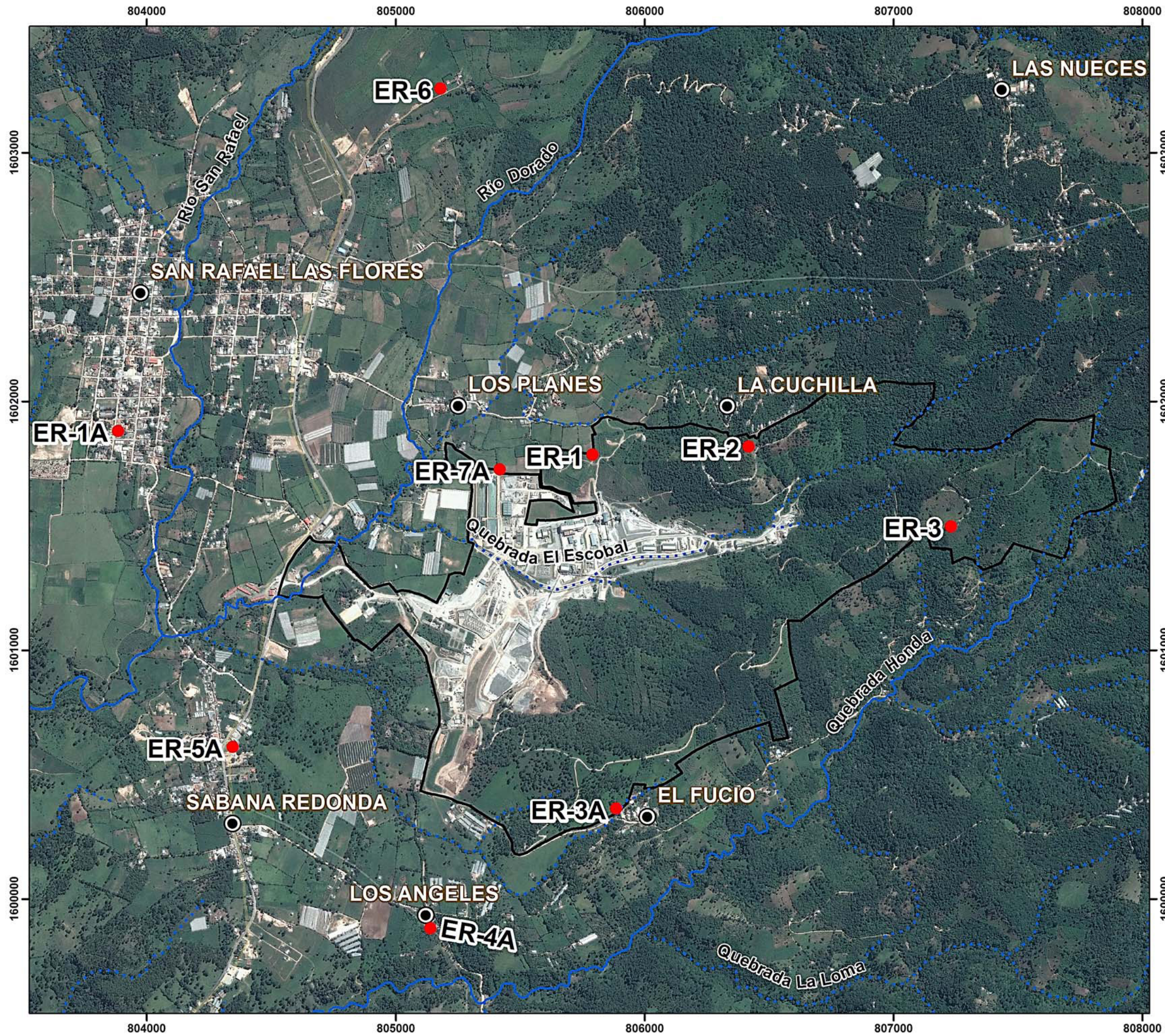
3.5.1 Sitios de Monitoreo

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

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

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

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



**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
NIVELES DE PRESIÓN SONORA**

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael S.A.
GUATEMALA

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

LEYENDA

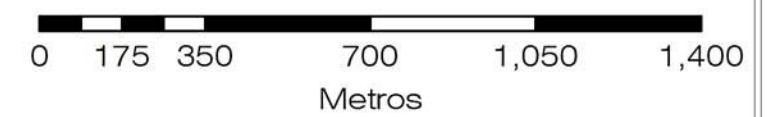
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

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

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catastrales 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: Abril 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 Febrero a Abril 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 46.2dBa y 57.1 dBa, los cuales corresponden a las estaciones ER-3 y ER-2 respectivamente.

La estación ER-3 presentó el menor promedio diurno (46.6 dBa) y el menor promedio nocturno (45.2 dBa) de todas las mediciones efectuadas durante el monitoreo; mientras que la estación ER-2 se presentó el mayor promedio diurno (56.3 dBa) y el mayor promedio nocturno (58.3 dBa).

Las estaciones ER-1, 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 Febrero a Abril en promedio nocturno en la estación ER-2, la medición de Febrero en promedio diurno y la medición de Febrero a Abril en promedio nocturno en la estación ER-7A y en las mediciones de Febrero en promedio diurno y nocturno de las estaciones ER-4A y ER-5A. 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 Febrero a Abril 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 y ER-1A. Los promedios nocturnos registrados estuvieron por debajo de la norma establecida por la USEPA (55 dBa), a excepción de las estaciones ER-1, ER-1A y 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			Feb-15	Mar-15	Abr-15	Línea Base			Feb-15	Mar-15	Abr-15
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
			dBA													
Lmax					89.3	99.5	64.6	76.1	75.8	82.1	86.7	97.8	64.9	76.6	86.4	82.5
Lmin	NL	NL	NL	NL	32.5	37.7	27.0	43.3	31.4	33.1	35.2	42.8	26.5	47.6	47.2	48.1
Leq					49.9	57.1	41.2	54.6	47.7	50	49.4	58.7	39.7	57.1	56.9	55.9
PD	55	55	55	70	50.5	59.1	39.7	53.5	47.1	49.6	48.8	57.1	39.8	56.3	56	55.4
PN	55	50	45	70	47.6	55.7	39.3	56	48.6	50.6	46.6	54.5	37.9	58.3	57.6	56.9

Parámetro	Norma*		Guías*		ER-3						ER-7A					
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Feb-15	Mar-15	Abr-15	Línea Base**			Feb-15	Mar-15	Abr-15
			Residencial	Industrial	Promedio	Máximo	Mínimo				Promedio	Máximo	Mínimo			
			dBA													
Lmax					87.4	100.7	67.2	70.6	75.4	75.7	87.5	89.0	82.1	90.1	72.9	75.1
Lmin	NL	NL	NL	NL	49.4	56.2	26.9	35.5	38.1	35.5	NR	NR	NR	43.7	37.5	40
Leq					56.8	63.2	39.7	46.5	46.2	47.1	52.8	54.5	50.9	53.1	51.7	51.7
PD	55	55	55	70	56.5	63.1	41.0	46.6	46.8	48.1	52.1	53.5	50.4	53.8	50.5	50.1
PN	55	50	45	70	57.2	64.0	34.1	46.3	45.2	45.2	49.7	50.9	48.8	51.4	53.3	49.9

*Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. ¹ USEPA, 2006. Normas nacionales de niveles de presión sonora. ² Guías sobre ruido comunitario, OMS 1999. ³ Guías 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			Feb-15	Línea Base			Feb-15	Línea Base			Feb-15	
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
			dBA														
Lmax								93.8					70.2	80.6	78.2	82.1	76
Lmin	NL	NL	NL	NL				45.6					31.3	NR	NR	NR	40.3
Leq					NR	NR	NR	55.8	NR	NR	NR		47.4	50.2	49.3	50.9	50.9
PD	55	55	55	70				56					48.5	49.5	48.4	50.4	51.3
PN	55	50	45	70				55.5					45.6	48.6	48.2	48.9	50.2

Parámetro	Norma*		Guías*		ER-5A				ER-6			
	USEPA ¹	OMS ²	Banco Mundial ³		Línea Base			Feb-15	Línea Base			Feb-15
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
			dBA									
Lmax					91.6	85.1	92.2	74.9				81
Lmin	NL	NL	NL	NL	NR	NR	NR	41.1				30.8
Leq					65.8	51.6	67.6	53.4	NR	NR	NR	52.3
PD	55	55	55	70	61.2	50.2	63.8	54.9				54.1
PN	55	50	45	70	62.8	45.9	65.0	48.8				45.9

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

4 Calidad del Agua

4.1 Sitios de Monitoreo

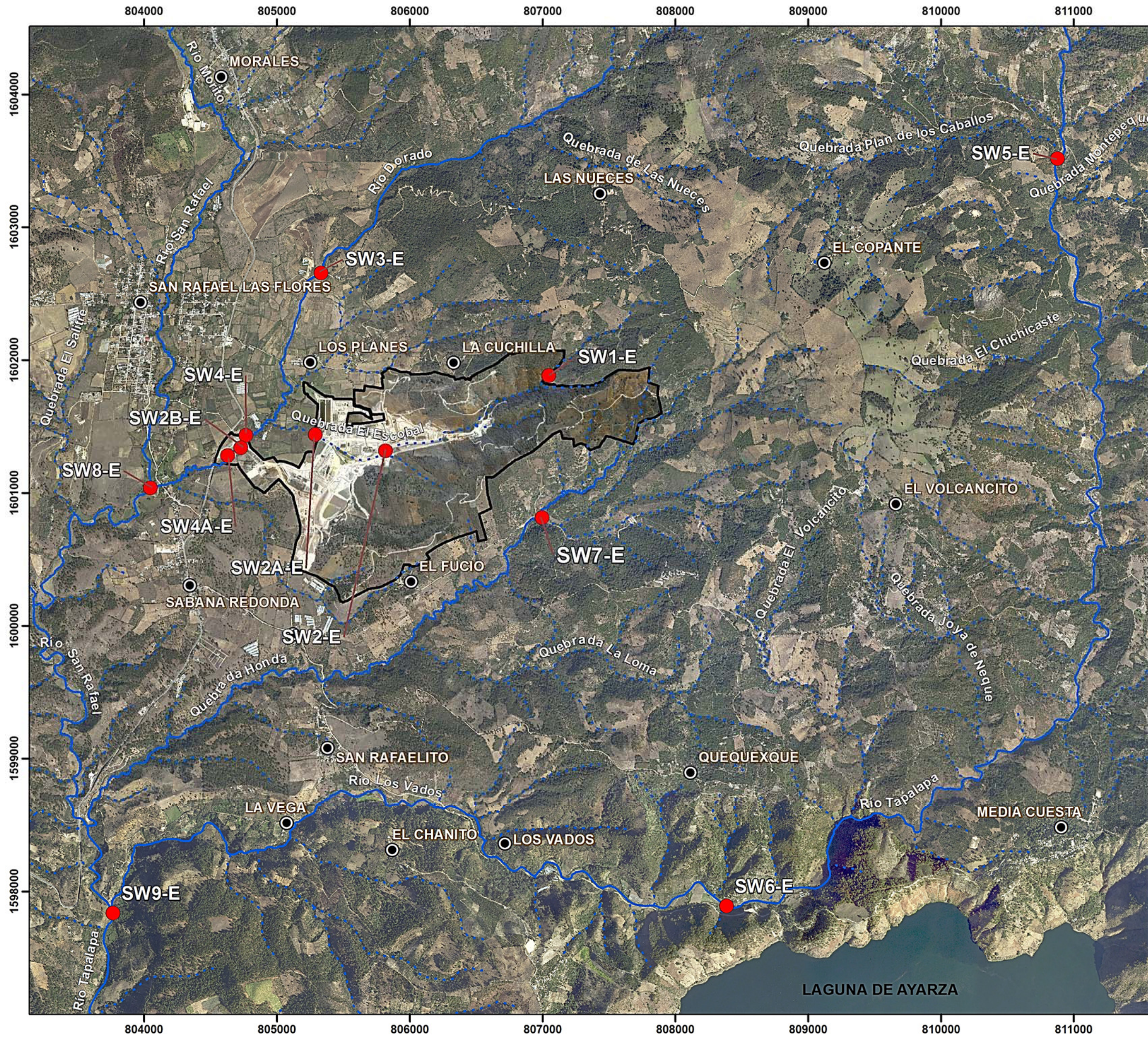
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua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

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

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

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

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



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO AGUA SUPERFICIAL

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

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

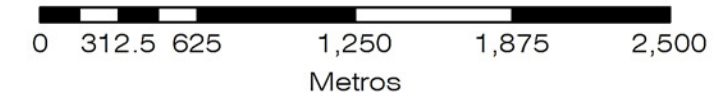
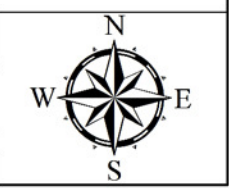
LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

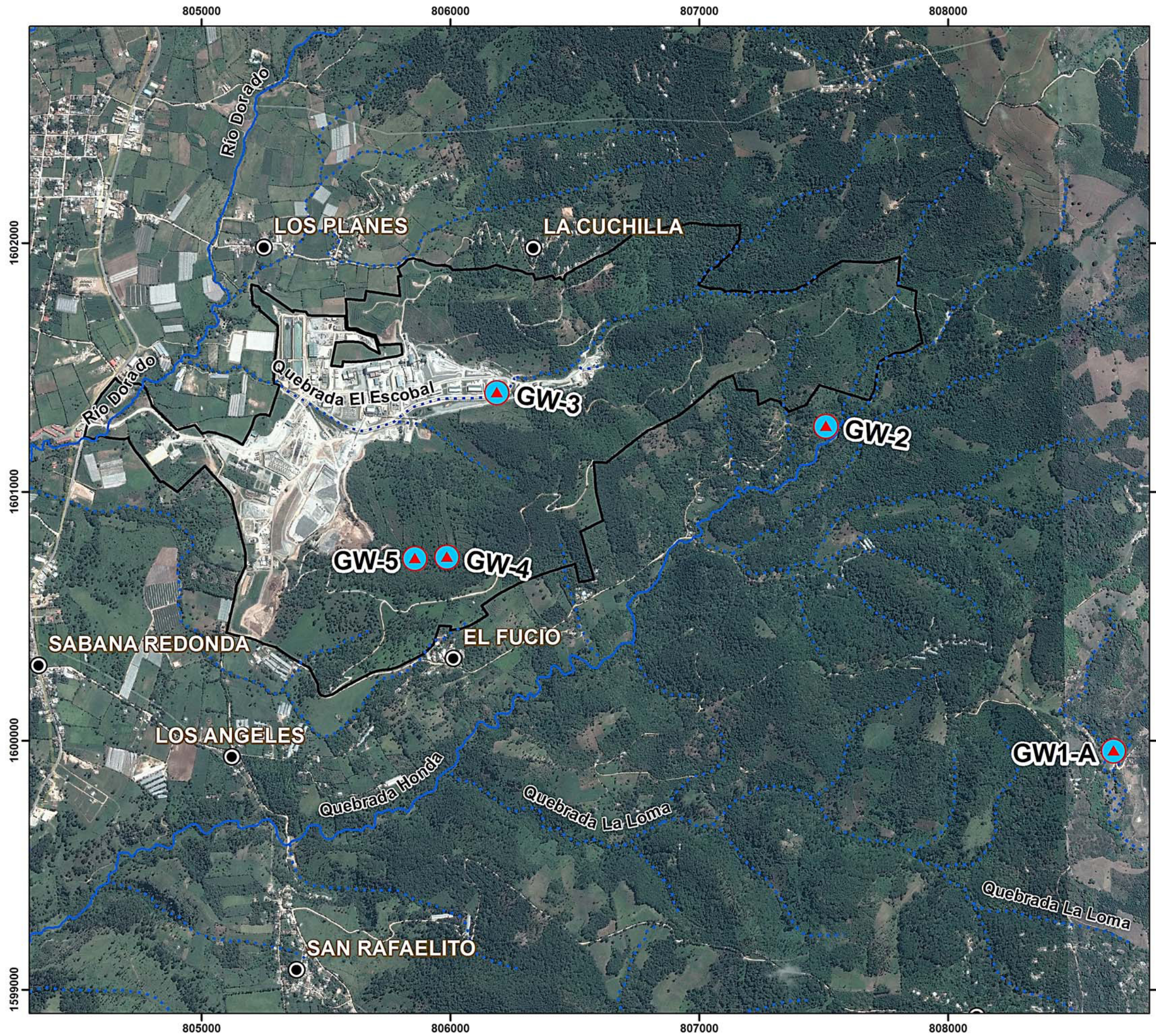
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW6-E	808385	1597892
	SW7-E	806995	1600815
	SW8-E	804048	1601037
	SW9-E	803766	1597838

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintia (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: Abril de 2015
Distancia Horizontal y Vertical de Grilla: 1,000 metros
Escala 1:30,000



LAGUNA DE AYARZA



**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
CALIDAD DE AGUA SUBTERRÁNEA**

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO (POZOS)

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

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

Fecha de Elaboración: Abril de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:16,000





MAPA DE LOCALIZACIÓN ESTACIONES (POZOS) DE MONITOREO Y REFERENCIA

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO (POZOS)

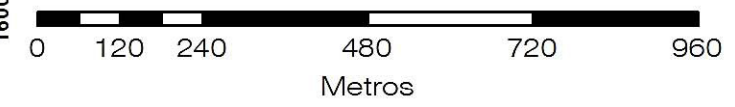
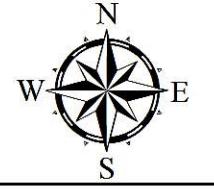
Símbolo	Estación	X	Y	
	MW-2	805201	1600768	
	MW-3	805148	1600993	
	MW-4	805181	1601212	
	MW-5	805299	1601463	
	MW-6	805452	1601657	
	MW-7	805791	1601785	
	MW-8	805298	1601480	
	MW-9	805192	1601222	
	MW-11	805607	1601267	
		RW-1	804803	1601175
		PSA-SR	803672	1602247
HW-1		803888	1601977	
PSA-1		805212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

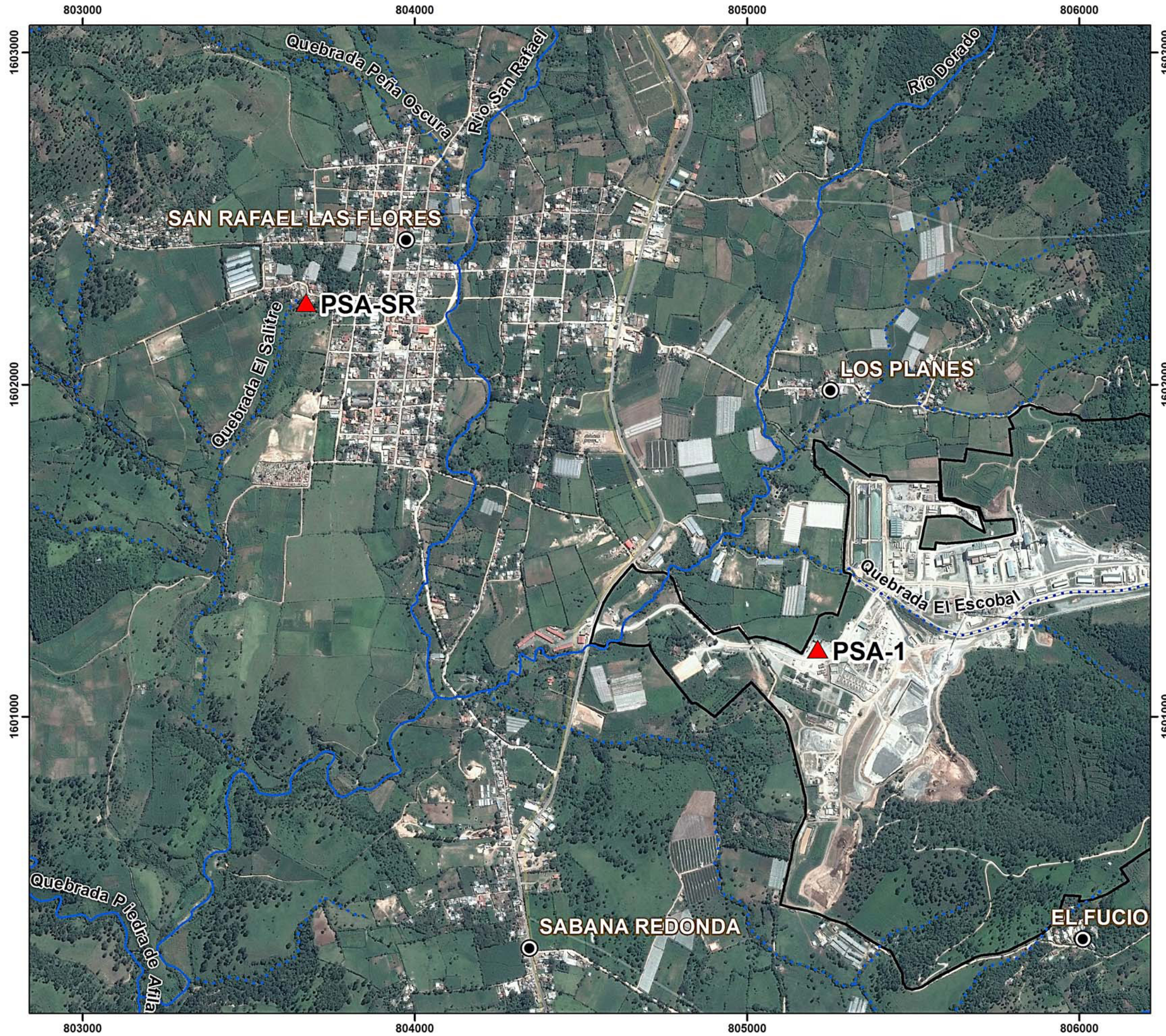
FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000
Hojas catográficas año 2010 Mataquesuintla (2159-I) y Laguna de Ayarza (2159-II) del IGN,
Ortofotos año 2006 del MAGA y Fotografía aérea del proyecto el Escobal año 2014,
datos de campo del departamento de Ambiente.

Fecha de Elaboración: Abril de 2015

Distancia Horizontal y Vertical
de Grilla: 1,000 metros

Escala 1:11,000





MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO POZOS DE SUMINISTRO

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

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

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

Fecha de Elaboración: Abril 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 Marzo de 2015 se emplearon muestras control para determinar la confiabilidad de los parámetros analizados por el laboratorio encargado del análisis de muestras. En total se efectuaron 3 muestras blanco y tres muestras duplicado. Los resultados obtenidos se presentan en el Cuadro 4-3.

En las tres muestras del control de calidad de los blancos de campo, se detectaron concentraciones mínimas de calcio disuelto (SW10, GW10 y MW20) calcio total (SW10), magnesio total (SW10), magnesio disuelto (GW10 y MW20), potasio disuelto (SW10, GW10 y MW20), potasio total (SW10), potasio disuelto (SW10, GW10 y MW20), sodio disuelto (SW10, GW10 y MW20) y fosfatos (SW10), fósforo total (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	2.4 x 10 ³	49	<2	<2	<23	<2
Color Aparente	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	<1	61
Color Real	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	0.03	<0.03	<0.03
Aluminio Total		<0.03	NA	NA	0.05	0.07	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0122	0.0123	0.0005	0.0004	<0.0004	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0123	0.0123	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.0079	0.0083	0.0025	0.0021	0.0008	0.0016
Arsénico Total		<0.0002	NA	NA	0.0088	0.0085	NA			
Bario Disuelto		<0.003	<0.003	<0.003	0.041	0.042	0.138	0.14	0.048	0.058
Bario Total		<0.003	NA	NA	0.043	0.043	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	0.1	0.1	0.02	0.02	0.06	0.03
Boro Total		<0.01	NA	NA	0.12	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	0.2	0.2	313	318	68.8	69.8	149	46.8
Calcio Total		0.1	NA	NA	321	322	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	10.9	
Hierro Total	<0.02	NA	NA	0.02	0.04	NA				
Plomo Disuelto	<0.0001	<0.0001	<0.0001	0.0006	0.0007	<0.0001	<0.0001	<0.0001	<0.0001	
Plomo Total	<0.0001	NA	NA	0.0036	0.0033	NA				
Litio Disuelto	<0.008	<0.008	<0.008	0.085	0.088	<0.008	<0.008	<0.008	0.014	

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Litio Total	mg/L	<0.008	NA	NA	0.092	0.092	NA			
Magnesio Disuelto		<0.2	0.3	0.3	20	20.2	15.6	16.1	20.4	8.5
Magnesio Total		0.2	NA	NA	20.3	20.5	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.014	0.015	<0.005	<0.005	<0.005	0.131
Manganeso Total		<0.005	NA	NA	0.027	0.026	NA			
Mercurio Disuelto		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total		<0.0002	NA	NA	<0.0002	<0.0002	NA			
Molibdeno Disuelto		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Molibdeno Total		<0.02	NA	NA	<0.02	0.02	NA			
Níquel Disuelto		<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0,008	<0,008	<0.008
Níquel Total		<0.008	NA	NA	<0.008	<0.008	NA			
Potasio Disuelto		0.2	0.3	0.2	9.7	9.8	9.1	9.1	8.4	4.2
Potasio Total		0.2	NA	NA	10.1	10.1	NA			
Escandio Disuelto		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Escandio Total		<0.1	NA	NA	<0.1	<0.1	NA			
Selenio Disuelto		<0.0001	<0.0001	<0.0001	0.0007	0.0006	0.0003	0.0003	0.0006	<0,001
Selenio Total		<0.0001	NA	NA	0.0006	0.0006	NA			
Plata Disuelta		<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<0.00005	<0.00005	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵	<5x10 ⁻⁵
Plata Total		<0.00005	NA	NA	0.0002	0.00011	NA			
Sodio Disuelto		0.3	0.3	<0.2	67.4	68.8	20.6	21.4	31.7	25.7
Sodio Total		<0.2	NA	NA	69.6	69.3	NA			
Estroncio Disuelto		<0.005	<0.005	<0.005	3.39	3.47	0.388	0.397	0.584	0.370
Estroncio Total		<0.005	NA	NA	3.51	3.52	NA			
Talio Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Talio Total		<0.0001	NA	NA	0.0002	0.0002	NA			
Estaño Disuelto		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0,04	<0,04
Estaño Total		<0.04	NA	NA	<0.04	<0.04	NA			
Titanio Disuelto		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Titanio Total		<0.005	NA	NA	<0.005	<0.005	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	0.0003	0.0003	<0.0001	<0.0001	0.0004	<0.0001
Uranio Total		<0.0001	NA	NA	0.0003	0.0003	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	0.008	0.008	<0.005	0.005	<0.005	<0.005
Vanadio Total		<0.005	NA	NA	0.008	0.007	NA			
Zinc Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.02	<0.01
Zinc Total		<0.01	NA		<0.01	<0.01	NA			
Grasas y Aceites		<2	NA		<2	<2	NA			
DQO		<10	NA		<10	<10	NA			
Cloruros		<0.5	<0.5	<0.5	61.6	61.6	10	9.8	26.6	9
Cianuro Total		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoruros		<0.05	<0.05	<0.05	1.37	1.80	0.16	0.18	0.18	0.57
Nitratos/Nitritos como N	<0.02	<0.02	<0.02	4.85	4.7	2.95	3.06	7.23	<0.02	
Amonio	<0.05	<0.05	<0.05	0.24	0.18	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)	<0.1	<0.1	<0.1	0.3	0.4	<0.1	<0.1	<0.1	<0.1	
Fosfatos	0.03	<0.03	0.03	0.03	0.03	0.03	0.06	0.12	0.40	
Fósforo Disuelto (Orto)	<0.01	<0.01	<0.01	0.01	0.01	0.04	0.04	0.05	0.01	
Fósforo Total	0.01	<0.01	<0.01	0.02	0.02	0.02	0.02	0.03	0.19	
STD (TDS)	<10	<10	<10	1470	1480	498	490	812	316	
SST (TSS)	<5	<5	<5	<5	5	<5	<5	7.0	25.0	
ST (TS)	<10	<10	<10	1530	1540	516	510	860	356	
Sulfatos	<1	<1	<1	868	845	210	197	408	94.1	

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Alcalinidad Total		<2	<2	<2	53.1	53.2	69.9	68.8	88.2	124
Hidrocarburos totales (TPH)	mg/L	<0.1	NA		<0.1	<0.1	NA			

u.e.: unidades exponenciales. mg/L: miligramos por litro. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. Fuente: MSR, 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 Marzo de 2015 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 (7.15 a 8.33 u.e.). En ninguna de las estaciones se detectaron valores de cianuro total cumpliendo con las guías establecidas por la USEPA para la salud humana, el Banco Mundial y el Acuerdo Gubernativo 236-2006 (**Acuerdo**) para aguas residuales. La Demanda Química de Oxígeno (**DQO**) no fue detectada en ninguna de las estaciones por lo que se cumple con lo establecido por el Banco Mundial (125 mg/L). En ninguna estación se detectó concentración alguna de Demanda Bioquímica de Oxígeno (**DBO**).

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

En tres de las once estaciones se detectó sólidos suspendidos totales encontrándose por debajo de los valores establecidos por el Acuerdo (100 mg/L), por el Banco Mundial (50 mg/L) y dentro de los valores establecidos durante el levantamiento de línea base.

Los Sulfatos Totales 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 SW3, SW4, SW6, SW8 y SW9.

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 siete estaciones en diferentes concentraciones. Sin embargo los datos se encuentran dentro de los límites establecidos durante el levantamiento de la línea base. El Antimonio fue detectado en seis estaciones, y se detectó en un rango de concentración de 0.0015 – 0.0123 mg/L, por debajo de los límites máximos establecidos durante la línea base.

Las concentraciones de Arsénico Total se encuentran por debajo de los límites establecidos por el Acuerdo (0.1 mg/L). Respecto de las directrices de la USEPA (0.01mg/L) todas las estaciones se encontraron por debajo del valor guía. En ninguna estación de monitoreo de agua superficial fue detectado el Mercurio y Cianuro Total. Y en todas las estaciones, excepto la estación SW6, fue detectado el Plomo Total, registrándose todas las concentraciones por debajo de los valores guía sugeridos por la USEPA (0.015 mg/L) y el Acuerdo (0.4 mg/L).

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E			
					Quebrada Escobal-aguas arriba				Quebrada Escobal-en medio del Proyecto				Quebrada Escobal- salida del Proyecto			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-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	7.35	7.42	6.56	7.87	8.33				7.73
Temperatura (campo)	°C				17.4	13	19.8	18.4	22.4	20.3	25.6	26.2				26.9
Conductividad (campo)	µS/cm				277.9	66.3	566.6	378.5	807.3	177.3	1965	1509				1785
Oxígeno disuelto (campo)					3.6	0.1	6.4	5.10	4.76	3.5	5.8	7.36				6.40
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							23				49				49
Color Aparente	U Pt/Co				NR	NR	NR	<1	NR	NR	NR	<1				<1
Color Real								<1				<1				<1
Turbidez	NTU							3.47				2.77				2.21
Aluminio Disuelto					0.035	<0.03	0.09	<0.03	0.043	<0.03	0.12	0.04				<0.03
Aluminio Total		0.2			5.02	<0.03	35.1	<0.03	2.35	0.06	8.77	0.05				0.07
Antimonio Disuelto					<0.0004	<0.0004	0.0006	<0.0004	<0.0004	<0.0004	<0.0004	0.0088				0.0123
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	<0.0004	<0.0004	<0.0004	0.0005	0.0086				0.0123
Arsénico Disuelto					0.00216	0.0005	0.0034	0.0024	0.00184	0.0013	0.0024	0.0067				0.0083
Arsénico Total		0.01		0.1	0.00339	0.0015	0.0094	0.0023	0.00266	0.0012	0.0054	0.0066				0.0085
Bario Disuelto					0.1361	0.086	0.207	0.197	0.109	0.088	0.133	0.046				0.042
Bario Total		1			0.186	0.1	0.434	0.201	0.131	0.096	0.186	0.047				0.043
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	0.08				0.1
Boro Total					<0.01	<0.01	0.02	0.01	0.11	<0.01	0.28	0.09				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	57.6	144.9	20.7	333	276				318
Calcio Total					45.5	20.9	70.5	58.5	144.6	20.5	331	285				322
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	0.14				<0.02
Hierro Total		0.3			2.7	<0.02	19.5	<0.02	1.3	0.06	5.19	0.16				0.04
Plomo Disuelto					<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001	0.0007				0.0007
Plomo Total		0.015		0.4	0.0025	<0.0001	0.0191	0.0001	0.00088	<0.0001	0.0038	0.0073				0.0033
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.079				0.088
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.083				0.092
Magnesio Disuelto					3.9	2.6	5.3	6.3	15.9	3.2	37.3	16.6				20.2
Magnesio Total					4.2	2.8	5.2	6.3	15.1	3.6	32.2	16.7				20.5
Manganeso Disuelto					0.0051	<0.005	0.02	0.021	0.0195	<0.005	0.07	0.058				0.015
Manganeso Total		0.4			0.1041	<0.005	0.721	0.021	0.0602	0.007	0.174	0.065				0.026
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	0.02				<0.02

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E				
					Quebrada Escobal-aguas arriba				Quebrada Escobal-en medio del Proyecto				Quebrada Escobal- salida del Proyecto				
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02				0.02	
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	5.8	6.1	4.9	7.6	9.3				9.8	
Potasio Total					5.3	3.5	13	5.9	6.3	5.2	7.4	9.6				10.1	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00045	<0.0001	0.0002	0.0006				0.0006	
Selenio Total		0.17			0.0001	<0.0001	0.0003	<0.0001	0.00011	<0.0001	0.0002	0.0006				0.0006	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005	
Plata Total					<0.00005	<0.00005	0.00015	<0.00005	<0.00005	<0.00005	0.00006	0.00008				0.00011	
Sodio Disuelto					9.81	8.3	11.6	11.3	40.1	9.4	87.8	60.1				68.8	
Sodio Total					9.46	7.8	11.8	11.2	39.8	9.4	85.2	61.2				69.3	
Estroncio Disuelto					0.17	0.09	0.26	0.256	1.23	0.1	2.99	3.16				3.47	
Estroncio Total					0.18	0.1	0.25	0.256	1.23	0.11	2.91	3.22				3.52	
Talio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	0.0001	0.0002				0.0002	
Talio Total		0.002			<0.0001	<0.0001	0.0004	<0.0001	0.0001	<0.0001	0.0002	0.0002				0.0002	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	0.04				<0.04	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005				<0.005	
Titanio Total					0.092	<0.005	0.591	<0.005	0.2715	<0.005	0.171	<0.005				<0.005	
Uranio Disuelto					0.00013	<0.0001	0.0003	0.0002	0.00028	<0.0001	0.0006	0.0002				0.0003	
Uranio Total					0.00038	<0.0001	0.0011	0.0002	0.00024	<0.0001	0.0005	0.0002				0.0003	
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	0.0065	<0.005	0.015	0.008		NR	NR	NR	0.008
Vanadio Total					0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	0.006				0.007	
Zinc Disuelto					0.053	<0.01	0.1	<0.01	0.046	<0.02	0.1	<0.01				<0.01	
Zinc Total		7.4		10	0.064	<0.01	0.12	<0.01	0.041	<0.01	0.06	<0.01				<0.01	
Grasas y Aceites			10	10	<2.062	<2.062	<2.248	<2	<2.04	<2.04	<2.04	<2				<2	
DQO			125		15.7	<10	40	<10	<2.04	<2.04	<2.04	<10				<10	
Cloruros		250			5	4	7	4.8	<2.04	<2.04	<2.04	50.8				61.6	
Cianuro Total		0.14		1	0.004	<0.003	0.015	<0.0003	<0.003	<0.003	<0.003	<0.003				<0.003	
Fluoruros		4			0.125	<0.1	0.2	0.12	0.6	0.1	1.2	0.98				1.80	
Nitratos/Nitritos como N					1.61	0.08	4.87	0.08	2.46	0.03	4.9	2.13				4.7	
Amonio					<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	0.07				0.18	
Nitrógeno Kjeldahl (TKN)					3.53	<0.1	25.9	0.1	0.32	<0.1	0.8	0.3				0.4	
Fosfatos					0.185	0.1	0.3	0.16	0.19	0.1	0.4	0.03				0.03	
Fósforo Disuelto (Orto)					0.06	0.03	0.1	0.05	0.06	0.02	0.13	<0.01				0.01	
Fósforo Total			2	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	294	754	170	1620	1250				1480	
SST (TSS)			50	100	163.6	<5	780	<5	67	<5	320	<5				5.0	
ST (TS)					346.3	200	1080	288	850	230	1660	1300				1540	
Sulfatos		250			26.3	10	42	43.3	472.6	14	1600	671				845	
Alcalinidad Total					104	38	161	150	80	44	119	90.5				53.2	
Hidrocarburos totales (TPH)					<0.1	<0.09	<0.1	0.1	<0.1	<0.09	<0.1	<0.1				<0.1	

Dónde: **u.e.**: unidades exponenciales; **mg/L**: miligramos por litro; **µS/cm**: micro siemens por centímetro; **°C**: grados centígrados; **NMP/100ml**: número más probable en 100ml; **u Pt/Co**: unidades platino cobalto; **NA**: no analizado; **NR** = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E			
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.58	7.17	8.17	7.91	7.4	6.56	7.94	7.25				7.64
Temperatura (campo)	°C				19.8	17	24	21.5	21	17.2	24	20.3				26.0
Conductividad (campo)	µS/cm				219.7	80	374.5	313.6	308.9	120	612	1547				1733
Oxígeno disuelto (campo)					3.8	0.1	6.8	7.58	4.2	0.1	7.5	6.25				6.37
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							1.6 x 10 ³				430				5.4 x 10 ⁴
Color Aparente	U Pt/Co				NR	NR	NR	<1	NR	NR	NR	<1				<1
Color Real								<1				<1				<1
Turbidez	NTU							1.05				17.5				3.75
Aluminio Disuelto					0.061	<0.03	0.15	<0.03	0.03	<0.03	0.1	<0.03				<0.03
Aluminio Total		0.2			3.25	<0.03	17.4	<0.03	5.72	0.1	36	0.04				0.12
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0086				0.01
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.0012	0.0005	0.0037	0.0083				0.0097
Arsénico Disuelto					0.00797	0.0041	0.0139	0.0093	0.00541	0.0039	0.0072	0.0054				0.0069
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0096	0.00873	0.0043	0.0326	0.0052				0.0072
Bario Disuelto					0.0915	0.051	0.118	0.128	0.1645	0.08	0.234	0.094				0.079
Bario Total		1			0.12445455	0.098	0.253	0.132	0.2356	0.144	0.567	0.095				0.081
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	0.01	0.012	<0.01	0.02	0.1				0.11
Cadmio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NR	NR	NR	<0.0001
Cadmio Total		0.003		0.1	<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0005	<0.0001				<0.0001
Calcio Disuelto					27.8	11.7	39.9	43.9	37.4	18.5	61.7	279				306
Calcio Total					27.9272727	12.3	38.7	44.3	38.3	17.2	58.9	283				313
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cromo Total		0.1		0.1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01				<0.01
Cobalto Disuelto					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobalto Total					0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobre Disuelto					<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Total		1.3		3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Hierro Disuelto					0.033	<0.02	0.06	<0.02	0.032	<0.02	0.15	<0.02				<0.02
Hierro Total		0.3			1.9	0.06	10.2	0.02	3.8	0.09	26.5	0.04				0.11
Plomo Disuelto					<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	0.0002	0.0001				<0.0001
Plomo Total		0.015		0.4	0.0013	<0.0001	0.0072	0.0004	0.003	<0.0001	0.0198	0.0003				0.0007
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.059				0.073
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.061				0.078
Magnesio Disuelto					2.6	1.3	3.5	3.3	4.2	2.4	7.3	16.9				20.6
Magnesio Total					2.7	1.6	3.5	3.4	4.6	2.5	7.3	16.7				20.7
Manganeso Disuelto					0.07418182	0.01	0.381	0.019	0.116	0.011	0.26	0.15				0.147
Manganeso Total		0.4			0.14745455	0.025	0.403	0.027	0.2844	0.101	1.23	0.165				0.168
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02				<0.02

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E				
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo				
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-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				<0.02	
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.02	<0.008				<0.008	
Níquel Total		0.61		2	<0.01	<0.01	0.05	<0.008	0.01	<0.01	0.06	<0.008				<0.008	
Potasio Disuelto					4.2	3.5	5.5	4.5	5.8	4.2	8.7	11.4				11.6	
Potasio Total					4.5	3.6	7	4.6	6.5	4.4	11.7	11.5				11.7	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1	
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0007				0.0005	
Selenio Total		0.17			<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0007				0.0006	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005	
Plata Total					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	<0.00005				<0.00005	
Sodio Disuelto					12.65	7.7	16.6	14.4	12.44	9	15.6	61.8				64.2	
Sodio Total					12.17	7.5	15.4	14.4	12.13	8.6	15.2	61.5				65.3	
Estroncio Disuelto					0.19	0.06	0.3	0.273	0.22	0.09	0.36	2.8				3.17	
Estroncio Total					0.18818182	0.08	0.3	0.28	0.228	0.11	0.33	2.82				3.26	
Talio Disuelto					<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	0.0002				0.0002	
Talio Total		0.002			<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007	0.0002				0.0002	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005				<0.005	
Titanio Total					0.071	<0.005	0.307	<0.005	0.127	0.005	0.534	<0.005				<0.005	
Uranio Disuelto					<0.0001	<0.0001	0.0002	0.0002	0.00012	<0.0001	0.0004	0.0002				0.0002	
Uranio Total					0.00019	<0.0001	0.0005	0.0002	0.00027	<0.0001	0.0009	0.0001		NR	NR	NR	0.0002
Vanadio Disuelto					<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	0.005				0.006	
Vanadio Total					0.0051	<0.005	0.019	<0.005	0.0085	<0.005	0.04	<0.005				0.005	
Zinc Disuelto					0.068	<0.01	0.14	<0.01	0.061	0.05	0.14	<0.01				<0.01	
Zinc Total		7.4		10	0.174	<0.01	1.01	<0.01	0.065	0.01	0.17	<0.01				<0.01	
Grasas y Aceites				10	<2.062	<2.04	<2.326	<2	<2.062	<2.02	<2.084	<2				5.6	
DQO			125		10.9	<10	40	<10	16.8	<10	60	<10				<10	
Cloruros		250			2.7	2	3	2.5	8.5	4	16	14				61.7	
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	0.23	0.15	0.1	0.2	0.95				1.21	
Nitratos/Nitritos como N					0.59	<0.02	1.51	0.04	4.49	1.96	10.1	3.75				4.88	
Amonio					0.05	<0.05	0.21	<0.05	0.059	<0.05	0.15	0.13				<0.05	
Nitrógeno Kjeldahl (TKN)					0.35	<0.1	0.6	0.2	0.58	0.1	1.3	0.5				0.2	
Fosfatos					0.12	0.1	0.4	0.06	0.36	0.1	1.2	0.19				0.28	
Fósforo Disuelto (Orto)					0.04	0.02	0.12	0.02	0.12	0.03	0.39	0.05				0.1	
Fósforo Total			2	10	0.05	0.02	0.14	0.03	0.17	0.04	0.39	0.06				0.09	
STD (TDS)		500			183.636364	140	220	228	233.6	150	350	1290				1430	
SST (TSS)			50	100	48	5	340	<5	115	<5	880	<5				6.0	
ST (TS)				231.8	140	500	244	378.2	260	1180	1350				1490		
Sulfatos	250			16.9	4	25	29.8	27.5	10	57	740				811		
Alcalinidad Total				83	38	118	134	80	45	102	60.4				62.2		
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; **NA:** no analizado; **NR** = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW5-E				SW6-E				SW7-E			
					Río Tapalapa – Aguas arriba				Río Los Vados				Quebrada La Honda			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15*
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.5	7.1	8	7.75	7.4	7.1	7.8	7.18	7.5	6.9	8	
Temperatura (campo)	°C				17.4	14.5	21.5	16	19.4	12.2	27.3	18	18.7	15	21.3	
Conductividad (campo)	µS/cm				72.1	0.1	160.2	138.3	259	60	948	287.2	216	120	416.2	
Oxígeno disuelto (campo)					4	0	8	8.08	4	0	8.3	8.28	3.9	0.1	7.5	
Cr VI	mg/L							<0.05				<0.05				
DBO								<10				<10				
Coliformes Fecales	NMP/100ml							2.8 x 10 ³				540				
Color Aparente	U Pt/Co				NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	
Color Real								<1				<1				
Turbidez	NTU							4.44				1.29				
Aluminio Disuelto					0.055	<0.03	0.14	0.03	0.031	<0.03	0.08	<0.03	0.033	<0.03	0.13	
Aluminio Total		0.2			1.09	<0.03	3.7	0.13	1.89	<0.03	8.1	<0.03	3.05	0.1	16.4	
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0013	<0.0004	<0.0004	<0.0004	0.0009	
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0005	<0.0004	0.0007	
Arsénico Disuelto					0.00139	0.0005	0.0024	0.0012	0.0032	0.0007	0.0076	0.004	0.00382	0.0022	0.0054	
Arsénico Total		0.01		0.1	0.00177	0.0013	0.0028	0.0014	0.00387	0.0025	0.0074	0.0042	0.00446	0.003	0.0061	
Bario Disuelto					0.0447	0.023	0.072	0.058	0.0618	0.027	0.136	0.071	0.0946	0.052	0.143	
Bario Total		1			0.0556	0.039	0.069	0.062	0.0806	0.055	0.136	0.075	0.2142	0.088	0.99	
Berilio Disuelto					<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01	<0.002	<0.002	<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	
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.1	<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	
Boro Disuelto					0.01	<0.01	0.01	0.01	0.361	<0.01	1.8	0.28	<0.01	<0.01	0.01	
Boro Total					0.01	<0.01	0.02	<0.01	0.379	<0.01	1.93	0.29	0.013	<0.01	0.02	
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NA
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	
Calcio Disuelto					7.9	3.4	13.7	10.3	15.1	5.4	38.9	18.9	23.1	11.2	38.1	
Calcio Total					7.73	3.4	13.1	10.4	14.81	5.9	37.5	19.2	23.04	11.5	36.7	
Cromo Disuelto					<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	
Cobalto Disuelto					<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	
Cobre Disuelto					<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	
Galio Disuelto					<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	
Hierro Disuelto					0.055	0.03	0.09	0.06	0.097	<0.02	0.28	0.06	0.022	<0.02	0.07	
Hierro Total		0.3			0.7	0.16	1.8	0.26	1.3	0.33	4.8	0.14	1.8	0.08	9.5	
Plomo Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0014	<0.0001	<0.0001	<0.0001	<0.0001	
Plomo Total		0.015		0.4	0.0003	<0.0001	0.0012	0.0002	0.0007	<0.0001	0.0028	<0.0001	0.0015	<0.0001	0.0083	
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	0.13	<0.02	0.67	0.096	<0.02	<0.02	<0.02	
Litio Total					<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.101	<0.02	<0.02	<0.02	
Magnesio Disuelto					1.5	0.8	2.5	1.9	3	1.4	7.4	3.6	4.1	2.2	6.4	
Magnesio Total					1.5	0.9	2.5	1.9	3.1	1.8	7.5	3.7	4.3	2.6	6.5	
Manganeso Disuelto					0.025	0.006	0.047	0.056	0.114	<0.005	0.551	0.024	0.032	0.014	0.074	
Manganeso Total		0.4			0.0406	0.014	0.062	0.068	0.1482	0.04	0.543	0.031	0.0981	0.019	0.342	
Mercurio Disuelto					<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	
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	

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			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15*
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	
Níquel Disuelto					<0.01	<0.01	0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	
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	
Potasio Disuelto					3	2.5	3.7	3.1	4.1	3.2	7.1	4.4	4.1	3.6	5.4	
Potasio Total					3	2.2	4.1	3.1	4.2	3.1	7.5	4.4	4.5	3.6	7	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Escandio Total					<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	
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	
Plata Disuelta					<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	
Sodio Disuelto					6.34	3.7	10.8	6.7	32.16	6	135	28	11.69	8.7	15.4	
Sodio Total					5.99	3.4	9.4	6.8	31.11	5.3	124	28.1	11.45	8.3	15.5	
Estroncio Disuelto					0.06	0.02	0.09	0.088	0.12	0.03	0.33	0.139	0.17	0.07	0.29	
Estroncio Total					0.057	0.02	0.08	0.085	0.122	0.04	0.35	0.144	0.174	0.09	0.28	
Talio Disuelto					<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	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.006	
Titanio Total					0.027	<0.005	0.094	0.006	0.05	<0.005	0.22	<0.005	0.069	<0.005	0.325	
Uranio Disuelto					<0.0001	<0.0001	<0.0002	<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	
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.01	<0.005	<0.0005	<0.0005	0.008	
Vanadio Total					<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.005	<0.005	0.0047	<0.0005	0.018	
Zinc Disuelto					0.04	<0.01	0.1	<0.01	<0.1	<0.1	0.4	<0.01	0.131	<0.01	0.81	
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	
Grasas y Aceites				10	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	<2	<2.062	<2.02	<2.084	
DQO			125		6.5	<10	20	<10	<10	<10	30	<10	10	<10	40	
Cloruros		250			1.8	1	3	2.2	43.9	3	230	33.8	3	5	3	
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	
Fluoruros		4			<0.1	<0.1	<0.1	0.08	0.11	<0.1	0.3	0.17	<0.1	0.2	0.1	
Nitratos/Nitritos como N					0.13	0.03	0.42	0.03	0.3	<0.02	1.22	<0.02	<0.1	3.53	0.19	
Amonio					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<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	
Fosfatos					0.04	<0.03	0.2	0.03	0.08	<0.03	0.3	0.06	0.1	0.2	0.09	
Fósforo Disuelto (Orto)					0.15	<0.01	0.06	0.01	0.03	<0.01	0.09	0.02	0.03	0.08	0.03	
Fósforo Total			2	10	0.02	<0.01	0.05	0.01	0.04	0.02	0.08	0.03	0.03	0.19	0.19	
STD (TDS)		500			84	60	110	102	187	90	540	182	140	240	100	
SST (TSS)			50	100	9	<5	32	<5	21	<5	105	<5	<5	330	6	
ST (TS)					97	70	130	104	221	120	550	192	150	610	140	
Sulfatos		250			16.5	<10	47	20.1	14	<10	23	31.2	9	38	19.4	
Alcalinidad Total					25	13	43	29.5	48	22	108	58.8	30	101	54	
Hidrocarburos totales (TPH)					<0.1	<0.09	<0.09	<0.1	11.54375	<0.1	92	<0.1	<0.09	<0.1	<0.1	

NA

*Al momento de tomar la muestra el cuerpo de agua se encontraba sin agua. Dónde: **u.e.:** unidades exponenciales; **mg/L:** miligramos por litro; **µS/cm:** micro siemens por centímetro; **°C:** grados centígrados; **NMP/100ml:** número más probable en 100ml; **u Pt/Co:** unidades platino cobalto; **NA:** no analizado; **NR =** Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2015.

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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			Mar-15	Línea Base			Mar-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	7.15	7.86	7.5	10.7	8.25
Temperatura (campo)	°C				22.1	18.9	25.1	22.6	21.8	19.1	24.2	20.9
Conductividad (campo)	µS/cm				363.7	186.8	807.6	1015	267.4	121.8	518	625.4
Oxígeno disuelto (campo)					5.14	0.28	7.48	5.97	6.2	0.8	8.5	8.06
Cr VI	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO					15	15	25	<10	<10	<10	<10	<10
Coliformes Fecales	NMP/100ml				2x10 ⁶	2x10 ⁴	5x10 ⁶	5.4 x 10 ⁵	9x10 ⁴	1x10 ²	2x10 ⁵	700
Color Aparente	U Pt/Co				172	19	351	10	342	29	824	<1
Color Real					20	22	36	<1	43	10	60	<1
Turbidez	NTU				14.15	6.09	22.2	503.7	25.72	4.93	46.5	2.74
Aluminio Disuelto					0.033	<0.03	0.06	<0.03	0.087	<0.03	0.22	<0.03
Aluminio Total	0.2				2.39	0.04	7.35	0.22	2.96	0.4	8.6	0.08
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0045	0.0006	<0.0004	0.0013	0.0015
Antimonio Total	0.006				0.001	<0.0004	0.0027	0.0044	0.0007	<0.0004	0.0012	0.0015
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0049	0.004	0.0023	0.0057	0.0044
Arsénico Total	0.01			0.1	0.006	0.0041	0.0096	0.0054	0.0042	0.002	0.006	0.0046
Bario Disuelto					0.107	0.074	0.143	0.1	0.094	0.056	0.135	0.089
Bario Total	1				0.136	0.102	0.185	0.107	0.121	0.09	0.154	0.094
Berilio Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total	0.004				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Bismuto Total					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					0.022	<0.01	0.05	0.05	0.043	<0.01	0.09	0.11
Boro Total					0.023	<0.01	0.06	0.06	0.041	<0.01	0.1	0.12
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total	0.003			0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Calcio Disuelto					50.4	17.5	156	179	35.7	18.2	78.3	73.8
Calcio Total					52.1	18.6	156	183	36.2	18.5	79.7	75.7
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	0.03	0.09	<0.02	0.17	<0.02
Hierro Total	0.3				1.53	0.05	4.36	0.27	1	0.25	2.2	0.08
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	0.0007	0.0022	0.0002	0.008	<0.0001
Litio Disuelto					<0.02	<0.02	0.04	0.042	<0.02	<0.02	0.04	0.038
Litio Total					<0.02	<0.02	0.04	0.044	<0.02	<0.02	0.04	0.041
Magnesio Disuelto					6.3	3.2	14.7	13.7	6	3.3	9.7	9.4
Magnesio Total					6.6	3.3	14.8	13.9	6.2	3.4	10.1	9.5
Manganeso Disuelto					0.095	0.009	0.118	0.113	0.057	0.023	0.148	0.014
Manganeso Total	0.4				0.1808	0.047	0.349	0.154	0.115	0.043	0.187	0.035
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total	0.002			0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW8-E				SW9-E			
					Aguas debajo de la confluencia del Río San Rafael Y el Río El Dorado				Río Tapalapa, aguas debajo de la confluencia del Río San Rafael Río Los Vados y Quebrada La Honda			
					Línea Base			Mar-15	Línea Base			Mar-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	6	4.5	8.1	6.6
Potasio Total					6.8	6.4	7.8	9.2	6.1	4.8	8.5	6.8
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto					<0.0001	<0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0002
Selenio Total		0.17			0.00011	<0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0001
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total					<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					18.8	12.3	33.7	44.2	17.6	10.7	26.9	31.7
Sodio Total					18.4	12.9	34.3	44.6	17.4	11	28.5	31.9
Estroncio Disuelto					0.44	0.16	1.5	1.86	0.29	0.14	0.71	0.692
Estroncio Total					0.44	0.16	1.48	1.89	0.295	0.14	0.73	0.709
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Talio Total		0.002			<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Estaño Total					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	0.005	<0.005	<0.005	<0.005	0.009	<0.005
Titanio Total					0.069	<0.005	0.195	0.006	0.084	0.015	0.237	<0.005
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	<2	<2.02	<2.02	<5	<2
DQO			125		20	<10	40	<10	17.8	<10	35	<10
Cloruros		250			10	7	19	39.3	12	6	20	28.7
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	0.69	0.006	<0.003	0.013	0.39
Nitratos/Nitritos como N					3.07	2.01	5.23	3.51	1.97	1.14	3.85	1.39
Amonio					0.24	<0.05	0.58	0.40	0.129	<0.05	0.22	<0.05
Nitrógeno Kjeldahl (TKN)					0.74	<0.1	1.6	0.9	0.57	0.3	0.9	0.3
Fosfatos					0.55	0.3	1	0.37	0.49	0.22	1.3	0.31
Fósforo Disuelto (Orto)					0.18	0.08	0.33	0.11	0.18	0.09	0.49	0.10
Fósforo Total			2	10	0.27	0.12	0.51	0.15	0.25	0.09	0.58	0.10
STD (TDS)		500			312	160	750	878	255	160	440	438
SST (TSS)			50	100	34	<5	102	12.0	73	<5	340	<5
ST (TS)					362	180	750	918	310	200	450	480
Sulfatos		250			91	22	360	472	60	25	169	171
Alcalinidad Total					79	50	110	87.3	70	45	90	93.7
Hidrocarburos totales (TPH)					<0.01	<0.01	<0.01	<0.1	70	45	90	<0.1

Dónde: **u.e.**: unidades exponenciales; **mg/L**: miligramos por litro; **µS/cm**: micro siemens por centímetro; **°C**: grados centígrados; **NMP/100ml**: número más probable en 100ml; **u Pt/Co**: unidades platino cobalto; **NA**: no analizado; **NR** = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2015.

4.3.3 Agua Subterránea

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

La temperatura de las estaciones muestreadas se encontró entre 16.8 y 18.9 °C. La lectura menor de pH se obtuvo en la estación GW-3 (6.3 u.e.) y la mayor en la estación GW-1A (7.81 u.e.). Los Sólidos Suspendidos Totales (**SST**) se registraron en la estación GW-1A (5.0 mg/L) por debajo de las guías del Acuerdo (100 mg/L) y del Banco Mundial (50 mg/L). Las concentraciones registradas de Cloruros están por debajo de las guías de la USEPA (250 mg/L).

La concentración de sulfatos está por debajo de las guías de la USEPA (250mg/L) en todas las estaciones de monitoreo. Los sólidos disueltos totales (**TDS**) están por debajo de las directrices de la USEPA (500mg/L) en todas las estaciones de monitoreo.

El Cadmio, Cianuro, Berilio, Bismuto, Cobalto, Cobre, Cromo, Galio, Plomo, Litio, Cromo hexavalente, Mercurio, Molibdeno, Níquel, Escandio, Talio, Estaño, Titanio, Plata, Uranio, Vanadio y Zinc no fueron detectados en ninguna de las estaciones. El Selenio fue detectado en la estación GW-3 (0.0003 mg/L) por debajo de la guía de la USEPA (0.17mg/L). El Antimonio fue detectado en las estaciones GW-2 y GW-3 en concentraciones por debajo de la guía dada por la USEPA (0.01 mg/L). En todas las estaciones se registró Arsénico, a excepción de la estación. 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).

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	GW1-A				GW-2				GW-3				GW-4				GW-5			
					Nacimiento Aldea El Volcancito				Nacimiento Aldea El Fucío				Nacimiento – Zona central del Proyecto (frente al portal oeste)				Manantial – Aguas arriba del depósito de colas				Manantial – Aguas arriba del depósito de colas debajo de GW-4			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15*	Línea Base			Mar-15**
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
STD (TDS)	mg/L	500			190	190	190	178	223	130	350	148	213	190	260	490	170	170	170	NA	NR	NR	NR	NA
SST (TSS)			50	100	6.5	6	7	5.0	7.7	6	9	<5	39	5	105	<5	206	206	206					
ST (TS)					200	180	220	182	237.5	140	380	148	217.5	170	270	510	360	360	360					
Sulfatos		250			12.5	11	14	3.1	43	7	90	8.6	30	16	71	197	7	7	7					
Alcalinidad Total					31	31	31	59.0	0.18	0.09	0.27	47.5	83	71	97	68.8	35	35	35					

*Sin agua al momento del muestreo. *Al momento de tomar la muestra no había flujo suficiente para tomar la muestra. u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. NA: no aplica. NR = Cálculo No Realizado por falta de datos de línea base. ND = no determinado. Fuente: MSR, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	6.56	6.37	6.77	7.12	6.44	6.34	6.49	6.56	6.32	6.23	6.41	6.67	6.19	6.04	6.34	6.34
Temperatura de campo	°C				24.4	23.4	25.1	20.3	24.1	23.7	24.5	25.1	23.3	22.2	24.4	25.4	23.4	23	24.6	25.3
Conductividad de campo	µS/cm				427.5	211.9	1001.3	219.4	803.9	741.6	829.1	578.3	916.9	872.1	944.8	574.2	469.7	401.4	494.1	976.1
Oxígeno Disuelto de campo	mg/L				0.75	0.3	1.21	6	0.65	0.11	1.44	5.21	0.97	0.48	1.93	5.44	0.82	0.19	1.77	4.25
Turbidez	NTU							>1000				0.89				1.14				1.22
Materia flotante	Visual			Ausente				Ausente				Ausente				Ausente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	3365	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1
Color Real								162				<1				<1				<1
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2				4.50				<2
Aluminio Disuelto		0.2			0.038	<0.03	0.07	0.91	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Antimonio Disuelto		0.01			<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Arsénico Disuelto		0.01	0.1		0.0011	0.0008	0.0014	0.0009	0.0023	0.0021	0.0027	0.0021	0.0023	0.0021	0.0028	0.0022	0.0013	0.001	0.0016	0.0009
Bario Disuelto		1			0.03	0.024	0.039	0.146	0.036	0.032	0.041	0.037	0.042	0.038	0.047	0.032	0.162	0.157	0.166	0.049
Berilio Disuelto		0.004			<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					0.014	<0.01	0.04	<0.01	0.06	0.05	0.07	0.07	0.078	0.06	0.09	0.07	0.015	<0.01	0.03	0.05
Cadmio Disuelto		0.003	0.1		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcio Disuelto					20.6	9.4	48.7	8.8	80.3	76.4	83.3	76	100	93	107	78.7	40.8	39.2	42.2	151
Cromo Disuelto		0.1	0.1		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Disuelto					<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto		1.3	3		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hierro Disuelto		0.3			<0.02	<0.02	0.02	1.78	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Plomo Disuelto		0.015	0.4		<0.0001	<0.0001	0.0001	0.004	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0001	<0.0001	<0.0001	0.0002	<0.0001
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	0.02	0.016	<0.02	<0.02	0.02	0.016	<0.02	<0.02	<0.02	<0.008
Magnesio Disuelto					3.5	2.4	6.1	2.7	10.3	10.1	10.7	9.4	11.3	10.9	11.6	8.8	7.3	6.8	7.6	20.7
Manganeso Disuelto		0.05			0.108	0.03	0.308	0.845	<0.005	<0.005	0.008	<0.005	0.009	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	<0.005
Mercurio Disuelto		0.002	0.01		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto		0.61	2		<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Potasio Disuelto					2.2	1.9	2.4	3.1	4.2	3.9	4.6	4	4.7	4.5	5.2	4.2	6	5.5	6.5	8.4
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	<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	0.0006
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
Sodio Disuelto					22	17.4	33.6	14.6	29.5	28.2	30.9	27.2	32.3	30.4	35.8	26.8	16.9	15.6	19.1	31.7
Estroncio Disuelto					0.18	0.07	0.46	0.063	0.74	0.71	0.77	0.733	0.89	0.84	0.98	0.737	0.27	0.26	0.29	0.587
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	0.023	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranio Disuelto					0.00016	<0.0001	0.0005	0.0007	0.0002	0.0002	0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0002	0.00033	0.0001	0.001	0.0004
Vanadio Disuelto					0.0059	<0.005	0.008	0.02	0.0055	<0.005	0.009	0.005	0.006	<0.005	0.009	0.005	<0.005	<0.005	<0.005	<0.005
Zinc Disuelto		7.4	10		0.031	<0.01	0.11	0.09	0.053	<0.01	0.1	0.02	<0.01	<0.01	0.1	0.01	<0.01	<0.01	0.1	0.02
Cloruros		250			12	3	28	4.9	16	16	17	16.3	20	19	21	15.5	9	8	9	26.9
Cianuro Total		0.14	1		0.0039	<0.003	0.011	<0.003	0.005	<0.003	0.014	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003
Fluoruros					0.35	0.2	0.7	0.37	0.8	0.8	0.8	0.69	0.8	0.8	0.8	0.83	0.18	0.1	0.2	0.36
Nitratos/Nitritos como N					2.48	2.04	2.93	2.71	2.2	2.08	2.26	2.42	2.13	1.98	2.32	2.54	3.32	3	3.57	7.37
Amonio					<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)					0.56	<0.1	1.1	1.8	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.3	<0.1

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Fosfatos	mg/L				0.233	0.21	0.27	0.25	0.315	0.27	0.37	0.25	0.248	0.24	0.27	0.22	0.203	0.15	0.24	0.09
Fósforo Total			2	10	0.24	0.06	0.44	0.50	0.09	0.08	0.1	0.07	0.07	0.06	0.08	0.06	0.06	0.05	0.07	0.03
STD (TDS)		500			253	190	360	270	470	460	480	450	553	540	560	410	305	290	320	824
SST (TSS)			50	100	345.8	137	584	970	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5
ST (TS)					597.5	350	810	1480	487.5	450	510	490	555	520	580	498	325	280	350	868
Sulfatos		250			28.5	4	97	8.5	166	162	169	177	212.5	210	220	170	72.3	64	76	381
Alcalinidad Total					64	56	80	46.5	84	82	86	81.6	85	83	88	86.8	66	61	68	88.6

u.e.: unidades exponenciales. mg/L: miligramos por litro. μ S/cm: micro siemens por centímetro. °C: grados centígrados. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. NA: no aplica. NR = Cálculo No Realizado por falta de datos de línea base. ND = no determinado. Fuente: MSR, 2015.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-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	6.13	6.38	6.14	6.98	6.02	6.16	6.07	6.29	6.26	7.15	6.9	7.4	6.85
Temperatura de campo	°C				22.3	21.6	22.8	24.6	22.4	22	23.1	22.5	23.3	23.2	23.4	24.2	27.5	25.9	29	28.7
Conductividad de campo	µS/cm				538.2	342.9	752.6	1178	299.6	285.9	323.8	344	426.8	424.6	428.1	821.3	1595	1569	1621	441.5
Oxígeno Disuelto de campo	mg/L				0.69	0.19	1.67	3.12	0.61	0.25	1.19	3.12	0.72	0.16	1.45	3.85	0.38	0.35	0.41	2.05
Turbidez	NTU							1.23				1.23				0.15				9.58
Materia flotante	Visual			Ausente				Ausente				Ausente				Ausente				Ausente
Color Aparente	u Pt/Co			500	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	<1	NR	NR	NR	61
Color Real								<1				<1				<1				<1
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05
Coliformes Fecales	NMP/100mL			<1x10 ⁴				4.5				23				<2				<2
Aluminio Disuelto		0.2			<0.03	<0.03	0.05	<0.03	0.053	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Antimonio Disuelto		0.01			0.00045	<0.0004	0.0012	<0.0004	0.00063	0.0005	0.0008	0.0006	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	0.0022	0.0034	0.0029	0.0041	0.0022	0.0021	0.0019	0.0024	0.0013	0.003	0.0007	0.0052	0.0016
Bario Disuelto		1			0.198	0.134	0.281	0.114	0.156	0.129	0.176	0.42	0.125	0.122	0.129	0.081	0.031	0.028	0.034	0.058
Berilio Disuelto		0.004			<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.002	<0.002	0.003	<0.01	<0.01	<0.002	<0.01	<0.01
Bismuto Disuelto					<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Boro Disuelto					<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.04	0.09	0.08	0.1	0.03
Cadmio Disuelto		0.003	0.1		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcio Disuelto					52.5	35.1	71.9	202	16.7	13.9	19.6	27.6	34.6	32.5	36.3	118	185.5	170	201	48.8
Cromo Disuelto		0.1	0.1		<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalto Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobre Disuelto		1.3	3		<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hierro Disuelto		0.3			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	5.52	1.53	9.51	10.9
Plomo Disuelto		0.015	0.4		<0.0001	<0.0001	<0.0001	0.0002	0.00013	<0.0001	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.01	0.07	0.07	0.07	0.014
Magnesio Disuelto					7.5	4.9	10.5	24.6	4.8	4.6	5	8.9	6.4	6.3	6.7	18.8	35.8	34.4	37.2	8.5
Manganeso Disuelto		0.05			<0.005	<0.005	0.006	0.015	0.0065	<0.005	0.012	0.019	0.019	0.012	0.029	<0.005	0.203	0.149	0.257	0.131
Mercurio Disuelto		0.002	0.01		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molibdeno Disuelto	mg/L				<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto		0.61	2		<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Potasio Disuelto					5.7	5	6.5	9.1	6.2	5.4	6.8	8.6	4.8	4.6	5.1	7	4.8	4.6	5	4.2
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenio Disuelto		0.17			0.0005	0.0004	0.0005	0.0006	0.0002	0.0001	0.0002	<0.0001	0.0004	0.0003	0.0006	0.0005	<0.0001	<0.0001	<0.0001	<0.0001
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					14	12.3	17	29.8	19.1	15.4	27.5	18	15.2	15	15.6	27.1	45.1	44.7	45.4	25.7
Estroncio Disuelto					0.26	0.18	0.35	0.89	0.1	0.09	0.11	0.201	0.22	0.21	0.23	0.437	1.64	1.58	1.69	0.37
Talio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranio Disuelto					0.00013	0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	<0.0001	0.00017	0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0004	<0.0001
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc Disuelto		7.4	10		0.034	<0.01	0.1	0.09	0.034	<0.01	0.1	0.34	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Cloruros		250			11	6	17	30	11	9	12	14.2	6	6	6	22.6	37	36	37	9
Cianuro Total		0.14	1		0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.005	<0.003	0.015	<0.003	0.007	<0.003	0.012	<0.003
Fluoruros					0.18	0.1	0.2	0.12	0.13	0.1	0.2	0.12	0.17	0.1	0.2	0.14	2.55	2.5	2.6	0.57
Nitratos/Nitritos como N					5.08	4.42	6.15	8.16	4.75	4.08	5.24	2.58	2.76	2.63	2.83	5.84	<0.02	<0.02	<0.02	<0.02
Amonio					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrógeno Kjeldahl (TKN)					<0.1	<0.1	0.2	<0.1	0.21	<0.1	0.4	<0.1	0.09	<0.1	0.2	<0.1	0.23	<0.1	0.4	<0.1

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Fosfatos	mg/L				0.173	0.15	0.21	0.12	0.113	0.09	0.18	0.03	0.23	0.21	0.24	0.12	<0.03	<0.03	<0.03	0.40
Fósforo Total			2	10	0.05	0.04	0.06	0.04	0.04	0.01	0.07	0.02	0.07	0.06	0.08	0.04	<0.01	<0.01	0.02	0.19
STD (TDS)		500			340	260	440	992	233	220	250	284	277	270	290	676	905	890	920	316
SST (TSS)			50	100	<5	<5	<5	<5	19.75	7	45	<5	9	6	14	<5	27	25	29	25.0
ST (TS)					345	240	450	1020	260	230	280	300	300	290	310	690	940	910	970	356
Sulfatos			250		85.3	33	153	503	19.3	17	23	56.4	54.7	54	55	324	440	440	440	94.1
Alcalinidad Total					65	62	68	89.8	48	41	60	77.9	68	66	70	80.9	147	136	157	124

u.e.: unidades exponenciales. mg/L: miligramos por litro. μ S/cm: micro siemens por centímetro. °C: grados centígrados. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. NA: no aplica. NR = Cálculo No Realizado por falta de datos de línea base. ND = no determinado. Fuente: MSR, 2015.

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

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1			
					Línea Base				Línea Base				Línea Base				Línea Base				Línea Base			
					Promedio	Mínimo	Máximo	Mar-15	Promedio	Mínimo	Máximo	Mar-15	Promedio	Mínimo	Máximo	Mar-15	Promedio	Mínimo	Máximo	Mar-15	Promedio	Mínimo	Máximo	Mar-15
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.05	7.05	7.05	7.36	7.45	7.45	7.45	7.31				7.92				6.49			7.32	
Temperatura de campo	°C				30.4	30.4	30.4	32.1	27.8	27.8	27.8	29.1				25.1				22			32.5	
Conductividad de campo	µS/cm				2.243	2.243	2.243	1613	663.9	663.9	663.9	912.1				630				1314			1309	
Oxígeno Disuelto de campo	mg/L				0.09	0.09	0.09	3.95	0.05	0.05	0.05	1.05				7.36				4.68			4.46	
Turbidez	NTU							3.2				0.79				1.37				2.2			5.38	
Materia flotante	Visual			Ausente				Ausente				NA				NA				Presente				
Color Aparente	u Pt/Co			500	NR	NR	NR	131	NR	NR	NR	<1				<1				<1			254	
Color Real								<1				<1				<1				<1			<1	
Cr (VI)	mg/L			0.1				<0.05				<0.05				<0.05				<0.05			<0.05	
Coliformes Fecales	NMP/100mL			<1x10 ⁴				<2				<2				<2				<2			<2	
Aluminio Disuelto		0.2			<0.03	<0.03	<0.03	0.04	0.06	0.06	0.06	<0.03				<0.03				0.03			0.04	
Antimonio Disuelto		0.01			0.001	0.001	0.001	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004				<0.0004				<0.0004			<0.0004	
Arsénico Disuelto		0.01		0.1	0.0022	0.0022	0.0022	0.0028	0.0136	0.0136	0.0136	0.0124				0.0085				0.0007			0.0068	
Bario Disuelto		1			0.033	0.033	0.033	0.03	0.125	0.125	0.125	0.092				0.078				0.094			0.021	
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	0.2	0.07	0.07	0.07	0.09				0.07				0.06			0.12	
Cadmio Disuelto		0.003		0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001				0.0002			<0.0001	
Calcio Disuelto					271	271	271	241	47.5	47.5	47.5	99.6				64.2				172			188	
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	1.54	0.05	0.05	0.05	<0.02		NR	NR	NR	<0.02		NR	<0.02		NR	NR	NR
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	0.078	0.08	0.08	0.08	0.138				0.087				<0.008			0.086	
Magnesio Disuelto					41.3	41.3	41.3	37.8	4.1	4.1	4.1	6.5				5.2				33.2			34.9	
Manganeso Disuelto		0.05			0.044	0.044	0.044	0.026	0.03	0.03	0.03	0.025				<0.005				2.02			0.052	
Mercurio Disuelto		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002				<0.0002			<0.0002	
Molibdeno Disuelto					0.01	0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.02				<0.02				<0.02			<0.02	
Níquel Disuelto		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008				<0.008				<0.008			<0.008	
Potasio Disuelto					5	5	5	4.5	2.5	2.5	2.5	2.3				2.9				13.3			4.7	
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1				<0.1			<0.1	
Selenio Disuelto		0.17			0.0006	0.0006	0.0006	0.0001	<0.0001	<0.0001	<0.0001	0.0001				0.0001				<0.0001			<0.0001	
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005				<0.00005			<0.00005	
Sodio Disuelto					77.4	77.4	77.4	70.2	55.2	55.2	55.2	78.4				50.7				44.5			44.8	
Estroncio Disuelto					2.23	2.23	2.23	2.38	1.33	1.33	1.33	4.34				2.53				1.05			1.88	
Talio Disuelto					0.0002	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001				0.0001			<0.0001	
Estaño Disuelto					<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.04				<0.04				<0.04			<0.04	
Titanio Disuelto					<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005				<0.005				<0.005			<0.005	
Uranio Disuelto					0.0007	0.0007	0.0007	0.0004	0.0002	0.0002	0.0002	0.0002				0.0002				0.0006			0.0005	
Vanadio Disuelto					<0.005	<0.005	<0.005	<0.005	0.005	0.005	0.005	<0.005				<0.005				<0.005			<0.005	
Zinc Disuelto		7.4		10	0.04	0.04	0.04	0.03	0.12	0.12	0.12	<0.01				<0.01				0.02			0.02	
Cloruros		250			68	68	68	63.8	32	32	32	4.1				5.2				50.7			41.9	
Cianuro Total		0.14		1	<0.003	<0.003	<0.003	<0.003	0.003	0.003	0.003	<0.003				<0.003				<0.003			<0.003	
Fluoruros					2.7	2.7	2.7	2.54	0.7	0.7	0.7	0.85				0.54				0.06			2.45	
Nitratos/Nitritos como N					0.19	0.19	0.19	<0.02	<0.02	<0.02	<0.02	0.06				1.13				0.14			<0.02	
Amonio					<0.05	<0.05	<0.05	<0.05	0.06	0.06	0.06	<0.05				<0.05				<0.05			<0.05	

Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11				PSA-SR				HW-1				RW-1				PSA-1			
					Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15	Línea Base			Mar-15
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Nitrógeno Kjeldahl (TKN)	mg/L				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1				0.1				<0.1
Fosfatos					0.03	0.03	0.03	<0.03	0.06	0.06	0.06	<0.03				0.12				0.09				<0.03
Fósforo Total			2	10	0.06	0.06	0.06	<0.01	0.02	0.02	0.02	0.02				0.05				0.04				<0.01
STD (TDS)		500			1370	1370	1370	1250	320	320	320	612	NR	NR	NR	442	NR	NR	NR	976	NR	NR	NR	986
SST (TSS)			50	100	145	145	145	5.0	<5	<5	<5	<5				6.0				<5				
ST (TS)					1000	1000	1000	1280	300	300	300	636				456				1050				1030
Sulfatos		250			700	700	700	733	45	45	45	279				177				511				531
Alcalinidad Total					133	133	133	136	186	186	186	178				119				126				177

u.e.: unidades exponenciales. mg/L: miligramos por litro. µS/cm: micro siemens por centímetro. °C: grados centígrados. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. NR = Cálculo No Realizado por falta de datos de línea base. ND = no determinado. NA= no analizado. Fuente: MSR, 2015.

En el Cuadro 4-6 se presentan los resultados de la calidad del agua subterránea (Pozos de Monitoreo, Producción y Artesanal) correspondientes al mes de Marzo de 2015. 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 6.02 a 7.92 u.e. y la temperatura en el rango de 20.3 a 32.5 °C. Las concentraciones registradas de Cloruros están por debajo de las directrices de la USEPA (250 mg/L).

En los pozos MW-5, MW-6, MW-7, MW-8, MW-11, PSA-SR y PSA-1 los valores registrados de sulfatos se encuentran por encima de los valores establecidos durante el levantamiento de línea base y/o por las guías de USEPA (250 mg/L). Todos los demás pozos se encuentran por debajo de las directrices que establece la USEPA.

Se reportaron valores de Sólidos Suspendidos Totales (**SST**) en los pozos MW2, MW5, MW9, MW11 y RW-1, los cuales se encuentran debajo de las guías establecidas por el Banco Mundial y el Acuerdo (50 y 100 mg/L respectivamente) y dentro de los rangos establecidos en la línea base.

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

El Antimonio se detectó en los pozos MW-7 y MW-8, en concentraciones por debajo de la guía establecida por la USEPA (0.01 mg/L). El Bario fue detectado en todas las estaciones en concentraciones menores a la guía de la USEPA (1 mg/L).

El Plomo fue detectado MW-2, MW-4, MW-6, MW-7 y MW-11 en concentraciones menores a lo establecido por la guía de la USEPA (0.015 mg/L).

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

5 Sedimentos

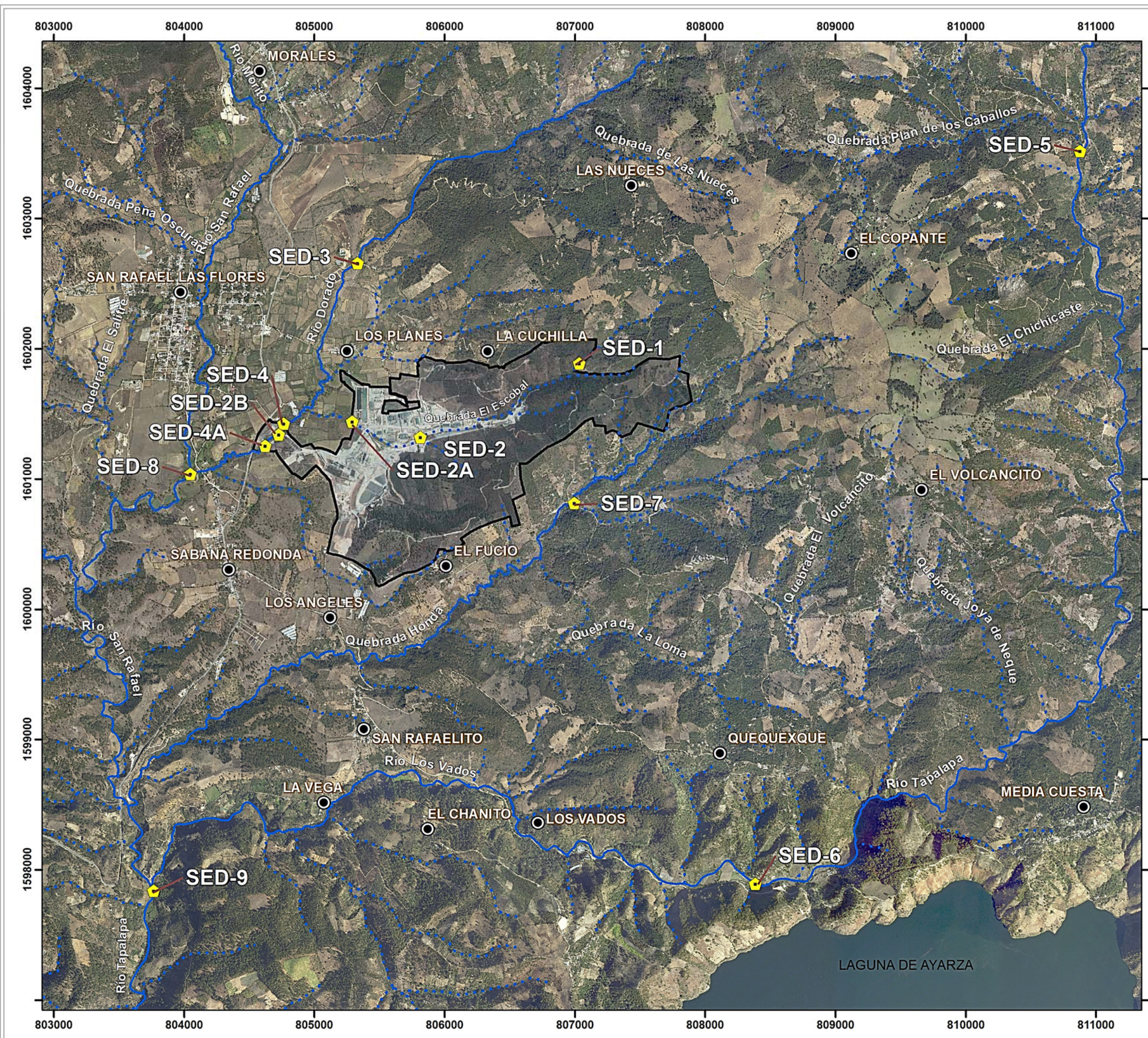
5.1 Sitios de Monitoreo

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

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

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

Nota: en ninguna de las estaciones monitoreadas se cuenta con línea base de metales en sedimentos. Sistema de coordenadas proyectadas UTM, NAD27 ZONA 15. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2015.



MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO DE SEDIMENTOS

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

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

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

Fecha de Elaboración: Abril de 2015	
Distancia Horizontal y Vertical de Grilla: 1,000 metros	
Escala 1:30,000	

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

5.2 Metodología

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

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

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

Fuente: MSR, 2015.

5.3 Resultados

En el Cuadro 5-3 se presenta los resultados de metales registrados para el mes de Marzo de 2015. Los resultados del laboratorio se presentan en el Anexo 0

El porcentaje de fósforo total se encuentra en el rango de 0.0034% (SED-5) a 0.102% (SED-2A). No se detectó cianuro en ninguna de las estaciones muestreadas.

El mercurio se detectó en todas las estaciones, excepto en SED-1, 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 de la estación SED-2 para Pb. Todas las estaciones muestreadas registraron concentraciones de Arsénico menor al valor sugerido (50 mg/Kg), a excepción de la estación SED-2.

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	Mar-15	Mar-15	Mar-15	Mar-15	Mar-15	Mar-15
Arsénico Total	mg/Kg**	50	13	52.9	49.8	13.6	13.3	39.7
Cadmio Total	mg/Kg**	50	0.37	21.6	8.82	0.17	0.31	1.77
Cromo Total	mg/Kg**	1500	3.1	9.2	12.5	1.8	6	22.8
Plomo Total	mg/Kg**	500	14.4	861	460	7.12	11.4	73.8
Mercurio Total	mg/Kg**	25	<0.05	0.2	0.2	0.08	0.08	0.2
Cianuro Total	mg/Kg**		<0.2	<0.2	<0.5	<0.2	<0.2	<0.2
Fósforo Total	%		0.0422	0.0339	0.0272	0.0134	0.0467	0.102

Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7*	SED-8	SED-9
		Aplicación al suelo	Mar-15	Mar-15	Mar-15	Mar-15	Mar-15
Arsénico Total	mg/Kg**	50	17.3	12.5	NA	7.3	9.5
Cadmio Total	mg/Kg**	50	0.15	0.13		0.57	0.36
Cromo Total	mg/Kg**	1500	1	8.2		3	3.3
Plomo Total	mg/Kg**	500	9.28	5.84		11.5	19.6
Mercurio Total	mg/Kg**	25	0.09	0.08		0.09	0.1
Cianuro Total	mg/Kg**		<0.2	<0.2		<0.2	<0.2
Fósforo Total	%		0.00338	0.012		0.0411	0.026

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

6 Calidad de Efluentes

6.1 Sitios de Monitoreo

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

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

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

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

805000 806000

1602000

1602000



1601000

1601000

805000 806000

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

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada 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: Abril 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	Febrero	Marzo	Abril		
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11**	WW9
No. Reporte Lab.			280-15	552-15	800-15		799-15
Grasas y Aceites	mg/L	10	<5	<5	<5		<5
Materia Flotante	NL	Ausente	ausente	ausente	ausente		ausente
DBO	mg/L	200	< 10	< 10	< 10	NA	< 10
DQO			< 25	< 25	< 25		< 25
SST (TSS)		100	< 10	< 10	< 10		< 10
Sólidos Sedimentables			< 0.1	< 0.1	< 0.1		< 0.1
Nitrógeno Total		20	<10	<10	<10		<10
Fósforo Total		10	<0.05	<0.05	<0.05		<0.05
Arsénico		0.1	<0.002	<0.002	<0.002		0.009
Cadmio		0.1	<0.02	<0.02	<0.02		<0.02
Cobre		3	<0.03	<0.03	<0.03		<0.03
Cromo Hexavalente		0.1	<0.05	<0.05	<0.05		<0.05
Cianuro Total*		1	<0.003	<0.003	<0.003		<0.003
Mercurio		0.01	<0.004	<0.004	<0.004		<0.004
Níquel		2	<0.05	<0.05	<0.05		<0.05
Plomo		0.4	<0.05	<0.05	<0.05		<0.05
Zinc		10	<0.01	<0.01	<0.01		<0.01
Color Aparente	u Pt/Co	500	< 1	< 1	< 1	< 1	
Color Real			< 1	< 1	< 1	< 1	
Coliformes Fecales	NMP/100ml	<1x10 ⁴	< 2	< 2	< 2		2.4 x 10 ³

*análisis realizado por laboratorio AZC. **No analizado por fallo en el automestreador. u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. NA: no analizado. NL = no hay límite establecido para este parámetro. Fuente: MSR, 2015.

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

En el Cuadro 6-4 se pueden observar los resultados de la calidad del efluente de la planta de tratamiento del Proyecto Minero Escobal. Los resultados de laboratorio se presentan en el Anexo 11.6.

Los valores de pH se encontraron en el rango de 7.24 a 7.62 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)	Febrero	Marzo	Abril	
Fecha Muestreo					10/02/2015	30/03/2015	27/04/2015	
ID Muestra					WW9	WW9	WW9	
No. Reporte Lab.					281-15	551-15	799-15	
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.24	7.62	7.28	
Temperatura de campo	°C		+/- 3		25.8	24.8	27	
Temperatura. Quebrada El Escobal					28.13	26.53	27.1	
Grasas y Aceites	mg/L	10	10		<5	<5	<5	
Materia Flotante		Ausente			ausente	ausente	ausente	
DBO	mg/L	200	50	30	< 10	< 10	< 10	
DQO			150			< 25	< 25	< 25
SST (TSS)		100	50			< 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		0.01	0.011	0.009	
Cadmio		0.1	0.05		<0.02	<0.02	<0.02	
Cobre		3	0.3	0.3	<0.03	<0.03	<0.03	
Cromo Hexavalente		0.1	0.1		<0.05	<0.05	<0.05	
Cianuro Total*		1	1		<0.003	<0.003	<0.003	
Mercurio		0.01	0.002	0.002	<0.004	<0.004	<0.004	
Níquel		2	0.5		<0.05	<0.05	<0.05	
Plomo		0.4	0.2	0.6	0.05	<0.05	<0.05	
Zinc		10	0.5	1.5	0.01	<0.01	<0.01	
Color Aparente	u Pt/Co	500			1	30	< 1	
Color Real					1	< 1	< 1	
Coliformes Fecales	NMP/100ml	<1x10⁴	400		2	1.6 x 10 ³	2.4 x 10 ³	

NA: no analizado. SF= sin flujo de agua. u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. *: análisis efectuados en laboratorio ACZ. Fuente: MSR, 2015.

7 Vibraciones

7.1 Sitios de Monitoreo

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

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

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

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



**MAPA DE LOCALIZACIÓN
ESTACIONES DE MONITOREO
DE VIBRACIONES PERMANENTE**

PROYECTO MINERO ESCOBAL
SAN RAFAEL LAS FLORES, SANTA ROSA

Minera San Rafael, S.A.
GUATEMALA

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

LEYENDA

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

ESTACIONES DE MONITOREO

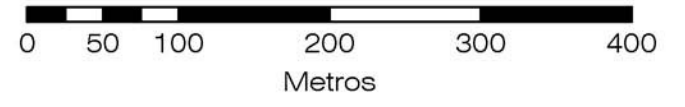
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

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: Abril 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 febrero a abril 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 sismógrafos, y los resultados se encuentran por debajo del límite de detección del equipo (1.3 mm/s). Según la norma del United States Bureau of Mines, el límite a partir del cual las vibraciones inducidas por una voladura pueden ocasionar daños a estructuras es de 50.8 mm/s. Por lo que se puede determinar que las mismas no son sensibles y por lo tanto no representan un impacto para el ambiente.

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

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Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1265-6330	1	05:30AM	<1.3
	1440-R/O	1	05:35AM	<1.3
	1215-C/E	1	05:40AM	<1.3
	1315-6760	1	05:45AM	<1.3
	1290-6650	1	05:30PM	<1.3
	1190-6400	1	05:35PM	<1.3
	1190-CF/O	1	05:40PM	<1.3
	1340-CF/E	1	05:45PM	<1.3
	1365-CF/E	1	05:50PM	<1.3
	1190-C/F.RAM.O	2	05:30AM	<1.3
	12156400	2	05:35AM	<1.3
	1215-C/O	2	05:30PM	<1.3
	1240-6560	2	05:35PM	<1.3
	1240-C/F-E	2	05:40PM	<1.3
	1190-6400	2	05:45PM	<1.3
	1265-6370	2	05:50PM	<1.3
	1365-6840	2	05:55PM	<1.3
	1215-6380	2	06:00PM	<1.3
	1340-6640	2	06:05PM	<1.3
	1290-6650	2	06:05PM	<1.3
	1365-C/F.E	3	05:30AM	<1.3
	1365-6840	3	05:35AM	<1.3
	1215-CF/E	3	05:40AM	<1.3
	1340-6640	3	05:45AM	<1.3
	1340-6640	3	05:50AM	<1.3
	1290-6650	3	05:30PM	<1.3
	1215-P/E	3	05:35PM	<1.3
	1240-C/F.E	3	05:40PM	<1.3
	1240-6660	3	05:45PM	<1.3
	1290-6370	3	05:50PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1290-6610	3	05:55PM	<1.3
	1290-6650	4	05:30AM	<1.3
	1265-6340	4	05:35AM	<1.3
	1440-DDS	4	05:40AM	<1.3
	1215-CF/O	4	05:45AM	<1.3
	1215-6400	4	05:50AM	<1.3
	1215-6440	4	05:55AM	<1.3
	05:30AM	4	05:30PM	<1.3
	05:35AM	4	05:35PM	<1.3
	05:40AM	4	05:40PM	<1.3
	05:45AM	4	05:45PM	<1.3
	05:50AM	4	05:50PM	<1.3
	05:55am	4	05:55PM	<1.3
	1340-6640	5	05:30AM	<1.3
	1290-6650	5	05:35AM	<1.3
	1365-6800	5	05:40AM	<1.3
	1190-C/F.O RAMP.A. E	5	05:45AM	<1.3
	1190-6500	5	05:50AM	<1.3
	1190-6400	5	05:30PM	<1.3
	1215-6840	5	05:35PM	<1.3
	1440-RAMPA	5	05:40PM	<1.3
	1290-6610	5	05:45PM	<1.3
	1240-C/FE	5	05:50PM	<1.3
	1290-6500	6	05:30AM	<1.3
	1365-C/F.O R. E.	6	05:35AM	<1.3
	1040-DESGUINCHE	6	05:40AM	<1.3
	1215-6400	6	05:45AM	<1.3
	1190-6800	6	05:50AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1215-6800	6	05:30PM	<1.3
	1215C/F.E.	6	05:35PM	<1.3
	1240 C/F.O.	6	05:40PM	<1.3
	1240-6660	6	05:45PM	<1.3
	1440- RAMPA	6	05:50PM	<1.3
	1265-6330	6	05:55PM	<1.3
	1240-C/F.O	7	05:30AM	<1.3
	1240-6680	7	05:35AM	<1.3
	1190-C/FO	7	05:40AM	<1.3
	1190-6400	7	05:45AM	<1.3
	1290-6500	7	05:50AM	<1.3
	1365/CFE	7	05:55AM	<1.3
	1215C/F.O	7	05:30PM	<1.3
	1365-6800	7	05:35PM	<1.3
	1290-66-10	7	05:40PM	<1.3
	1190-C/F.O	7	05:45PM	<1.3
	1340-6640	8	05:30AM	<1.3
	1190-6500	8	05:35AM	<1.3
	1190-6800	8	05:40AM	<1.3
	1365-C/F.E	8	05:45AM	<1.3
	1265-6330	8	05:50AM	<1.3
	1215-C/FR.E	8	05:30PM	<1.3
	1215-6400	8	05:35PM	<1.3
	1215-6360	8	05:40PM	<1.3
	1440-RAMPA	8	05:45PM	<1.3
	1365-6800	8	05:50PM	<1.3
	1190-C/F.E	9	05:30AM	<1.3
	1215-6860	9	05:35AM	<1.3
	1440-RAMPA	9	05:40AM	<1.3
	1240-C/F.O	9	05:45AM	<1.3
1190-6500	9	05:50AM	<1.3	
1290-6500	9	05:55AM	<1.3	
12-15C/F.E	9	05:30PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1190- SERVICIO	9	05:35PM	<1.3
	1290-6610	9	05:40PM	<1.3
	1315-7000	9	05:45PM	<1.3
	1315-6640	9	05:50PM	<1.3
	1215-6360	10	05:30PM	<1.3
	1240-C/F.E	10	05:35PM	<1.3
	1240-6680	10	05:40PM	<1.3
	1365-C/F.E	10	05:45PM	<1.3
	1315-7000	10	05:50PM	<1.3
	1240-C/F. O	11	05:30AM	<1.3
	1240-6540	11	05:35AM	<1.3
	1290-6610	11	05:40AM	<1.3
	1190-C/F. E.	11	05:45AM	<1.3
	1190-SERVICIOS	11	05:50AM	<1.3
	1340-6580	11	05:30PM	<1.3
	1340-6640	11	05:35PM	<1.3
	1290-6500	11	05:40PM	<1.3
	1190-6800	11	05:45PM	<1.3
	1140-RAMPA	11	05:50PM	<1.3
	1365-C/F.E	11	05:55PM	<1.3
	1365-6800	11	06:00PM	<1.3
	1215-6400	11	06:05PM	<1.3
	1240-C/F. E	12	05:30AM	<1.3
	1340-6580	12	05:35AM	<1.3
	1365-6800	12	05:40AM	<1.3
	1440-RAMPA	12	05:45AM	<1.3
	1190-C/F.E	12	05:50AM	<1.3
	1240-6680	12	05:55AM	<1.3
	1215-C/F.E.	12	05:30PM	<1.3
	1365--C/F.E.R.E	12	05:35PM	<1.3
1365-6860	12	05:40PM	<1.3	
1215-6400	12	05:45PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1215-6860	12	05:50PM	<1.3
	1315-6600	12	05:55PM	<1.3
	1240-C/FO	13	05:30AM	<1.3
	1240-6540	13	05:35AM	<1.3
	1362-DESGUINCHE	13	05:40AM	<1.3
	1365-6840	13	05:45AM	<1.3
	1190-6800	13	05:50AM	<1.3
	1190-SERVICIOS	13	05:55AM	<1.3
	1190-C/FO	13	06:00:AM	<1.3
	1290-6500	13	06:05AM	<1.3
	1263-6360	13	05:30PM	<1.3
	1365-C/FE	13	05:35PM	<1.3
	1215-C/O	13	05:40PM	<1.3
	1240-C/E	13	05:45PM	<1.3
	1215-6360	13	05:50PM	<1.3
	1290-610	14	05:30AM	<1.3
	1365-6800	14	05:35AM	<1.3
	1190-6500	14	05:40AM	<1.3
	1190-C/FO	14	05:45AM	<1.3
	1215-C/FO	14	05:50AM	<1.3
	1440-RAMPA	14	05:30PM	<1.3
	1290-6370	14	05:35PM	<1.3
	121-6400	14	05:40PM	<1.3
	1215-6860	14	05:45PM	<1.3
	1215-C/E	14	05:50PM	<1.3
	1190-C/F.O.R.E	15	05:30AM	<1.3
	1190-6800	15	05:35AM	<1.3
	1365-C/FO	15	05:40AM	<1.3
	1365-6860	15	05:45AM	<1.3
	1365-6780	15	05:50AM	<1.3
1440-RAMPA	15	05:30PM	<1.3	
1240-C/O	15	05:35PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1385-C/E	15	05:40PM	<1.3
	1290-6940	15	05:45PM	<1.3
	1240-C/E	15	05:50PM	<1.3
	1240-6680	15	05:55PM	<1.3
	1365-C/FE	16	05:30AM	<1.3
	1215-6860	16	05:35AM	<1.3
	1290-6610	16	05:40AM	<1.3
	1190-C/FO	16	05:45AM	<1.3
	1190-6500	16	05:50AM	<1.3
	1215-C/FE	16	05:55AM	<1.3
	1215-C/O	16	06:00:AM	<1.3
	1215-6360	16	06:05AM	<1.3
	1440-RAMPA	16	05:35PM	<1.3
	1290-6370	16	05:40PM	<1.3
	1290-6610	16	05:45PM	<1.3
	1290-6940	16	05:50PM	<1.3
	1190-SEVICIO	17	05:30AM	<1.3
	1215-6360	17	05:35AM	<1.3
	1290-6370	17	05:40AM	<1.3
	1340-6580	17	05:45AM	<1.3
	1240-C/E	17	05:30PM	<1.3
	1290-6610	17	05:35PM	<1.3
	1240-C/FO	18	05:30AM	<1.3
	1240-6560	18	05:35AM	<1.3
	1365-C/FO	18	05:40AM	<1.3
	1190-C/FORE	18	05:45AM	<1.3
	1190-C/F,E,R.O	18	05:50AM	<1.3
	1340-6700	18	05:30PM	<1.3
	1365-6800	18	05:35PM	<1.3
	1440-RAMPA	18	05:40PM	<1.3
1190-C/F.E.R.O.	18	05:45PM	<1.3	
1215-6400	18	05:50PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1190-6400	18	05:55PM	<1.3
	1240-RAMPA	19	05:30AM	<1.3
	1290-6610	19	05:35AM	<1.3
	1365-6740	19	05:40AM	<1.3
	1240-C/FE	19	05:45AM	<1.3
	1240-6700	19	05:50AM	<1.3
	1340-6580	19	05:55AM	<1.3
	1340-6700	19	05:30PM	<1.3
	1365-C/FE.	19	05:35PM	<1.3
	1365-6860	19	05:40PM	<1.3
	1215-C/FO.	19	05:45PM	<1.3
	1190-6400	19	05:50PM	<1.3
	1215-6340	19	05:55PM	<1.3
	1190-C/F.E	20	05:30AM	<1.3
	1240-6680	20	05:35AM	<1.3
	1290-6370	20	05:40AM	<1.3
	1240-6540	20	05:45AM	<1.3
	1440-RAMPA	20	05:50AM	<1.3
	1240-C/F.O	20	05:30PM	<1.3
	12401-6520	20	05:35PM	<1.3
	1215-6400	20	05:40PM	<1.3
	1215-C/F.E	20	05:45PM	<1.3
	1215-6680	20	05:50PM	<1.3
	1315-7000	21	05:30AM	<1.3
	1190-6400	21	05:35AM	<1.3
	1190-6520	21	05:40AM	<1.3
	1190-C/F.E	21	05:45AM	<1.3
	1365-6860	21	05:50AM	<1.3
	1365-C/F.E	21	05:55AM	<1.3
	1340-6700	21	06:00:AM	<1.3
	1190-SERVICIOS	21	05:30PM	<1.3
	1215-C/F.O	21	05:35PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1365-6720	21	05:40PM	<1.3
	1365-6740	21	05:45PM	<1.3
	1365-C/FO	21	05:50PM	<1.3
	1290-6610	22	05:30AM	<1.3
	1440-RAMPA	22	05:35AM	<1.3
	1290-6370	22	05:40AM	<1.3
	1215-C/F.E	22	05:45AM	<1.3
	1215-6870	22	05:50AM	<1.3
	1340-6700	22	05:55AM	<1.3
	1315-7000	22	06:00:AM	<1.3
	1240-C/F.O	22	05:30PM	<1.3
	1215-6400	22	05:35PM	<1.3
	1240-6540	22	05:40PM	<1.3
	1190-C/F.E	22	05:45PM	<1.3
	1290-6940	23	05:30AM	<1.3
	1315-7000	23	05:35AM	<1.3
	1365-6740	23	05:40AM	<1.3
	1365-C/F.O	23	05:45AM	<1.3
	1440-RAMPA	23	05:50AM	<1.3
	1340-C/F.E	23	05:55AM	<1.3
	1215-C/F.O	23	05:30PM	<1.3
	1365-C/F.E	23	05:35PM	<1.3
	1240-C/F,O	23	05:40PM	<1.3
	1365-6860	23	05:45PM	<1.3
	1290-6610	24	05:30AM	<1.3
	1240-C/F.E	24	05:35AM	<1.3
	1190-C/F,E	24	05:30PM	<1.3
	1190-6520	24	05:35PM	<1.3
	1290-6370	24	05:40PM	<1.3
	1315-7000	24	05:45PM	<1.3
	1215-C/F.E.	25	05:30AM	<1.3
	1215-C/F.O.	25	05:35AM	<1.3
1215-6340	25	05:40AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1290-6370	25	05:45AM	<1.3
	1240-C/F.O.	25	05:50AM	<1.3
	1215-6400	25	05:30PM	<1.3
	1190-C/F.O	25	05:35PM	<1.3
	1365-6800	25	05:40PM	<1.3
	1365-C/F. E.	25	05:45PM	<1.3
	1440- RAMPA	25	05:50PM	<1.3
	1315-7000	25	05:55PM	<1.3
	1440-RAMPA	26	05:30AM	<1.3
	1365-C/F.E.	26	05:35AM	<1.3
	1365-6880	26	05:40AM	<1.3
	1240-C/F.E.	26	05:45AM	<1.3
	1240-6700	26	05:50AM	<1.3
	1365-6720	26	05:30PM	<1.3
	1190-C/F.R.E.	26	05:35PM	<1.3
	125-6340	26	05:40PM	<1.3
	1365-6800	26	05:45PM	<1.3
	1215-C/F.E.	27	05:30AM	<1.3
	1215-6880	27	05:35AM	<1.3
	1290-6370	27	05:40AM	<1.3
	1290-6610	27	05:45AM	<1.3
	1365-6800	27	05:50AM	<1.3
	1240-C/F.O.	27	05:30PM	<1.3
	1240-6520	27	05:35PM	<1.3
	1215-6400	27	05:40PM	<1.3
	1190-C/F.O.	27	05:45PM	<1.3
	1190-6520	27	05:50PM	<1.3
	1240-C/F.E.	28	05:30AM	<1.3
	1240-6400	28	05:35AM	<1.3
	1435-RAMPA	28	05:40AM	<1.3
1365-6800	28	05:45AM	<1.3	
1290-6460	28	05:50AM	<1.3	
1190-C/F.E.	28	05:30PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	121-C/F.O.	28	05:35PM	<1.3
	1440-RAMPA	28	05:40PM	<1.3
	1365-C/F.O.	28	05:45PM	<1.3
	1315-6650	28	05:50PM	<1.3
	1365-6720	2	05:30AM	<1.3
Marzo	1365-C/F.E.	2	05:35AM	<1.3
	1290-6370	2	05:40AM	<1.3
	1240-C/F.E.	2	05:45AM	<1.3
	1240-C/F.O.	2	05:50AM	<1.3
	1340-7000	2	05:55AM	<1.3
	1290-6460	2	06:00:AM	<1.3
	1215-C/F.E.	2	05:30PM	<1.3
	1215-6880	2	05:35PM	<1.3
	1215-6400	2	05:40PM	<1.3
	1290-6610	2	05:45PM	<1.3
	1435-RAMPA	2	05:50PM	<1.3
	1315-6650	3	05:30AM	<1.3
	1190-C/F.O.	3	05:35AM	<1.3
	1190-6520	3	05:40AM	<1.3
	1190-SERVICIOS	3	05:45AM	<1.3
	1365-C/F.O.	3	05:50AM	<1.3
	1340-6620	3	05:30PM	<1.3
	1440-RAMPA	3	05:35PM	<1.3
	1215-6340	3	05:40PM	<1.3
	1265-6460	3	05:45PM	<1.3
	1430-RAMPA	4	05:30AM	<1.3
	1290-6610	4	05:35AM	<1.3
	1240-C/F.E.	4	05:40AM	<1.3
	1190-6500	4	05:45AM	<1.3
	1340-6620	4	05:30PM	<1.3
1340-C/F.E.	4	05:35PM	<1.3	
1365-6800	4	05:40PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1215-C/F.O.	4	05:45PM	<1.3
	1190-C/F.O.	4	05:50PM	<1.3
	1440-RAMPA	4	05:55PM	<1.3
	1215-C/F.O.	5	05:30AM	<1.3
	1365-6880	5	05:35AM	<1.3
	1365-C/F.E.	5	05:40AM	<1.3
	1190-6520	5	05:45AM	<1.3
	1340-VENTILACION	5	05:50AM	<1.3
	1190-C/F.E.	5	05:55AM	<1.3
	1290-6370	5	05:30PM	<1.3
	1365-C/F.E.	5	05:35PM	<1.3
	1240-C/F.O.	5	05:40PM	<1.3
	1240-6520	5	05:45PM	<1.3
	1340-6620	5	05:50PM	<1.3
	1290-6460	5	05:55PM	<1.3
	1190-C/F.O.	6	05:30AM	<1.3
	1190-SERVICIOS	6	05:35AM	<1.3
	1315-6600	6	05:40AM	<1.3
	1430-RAMPA	6	05:45AM	<1.3
	1430-RAMPA	6	05:30PM	<1.3
	1440-RAMPA	6	05:35PM	<1.3
	1215-C/F.E.	6	05:40PM	<1.3
	1215-C/F.O.	6	05:45PM	<1.3
	1215-	6	05:50PM	<1.3
	1365-C/F.E.	7	05:30AM	<1.3
	1365-C/F.O.	7	05:35AM	<1.3
	1240-C/F.E.	7	05:40AM	<1.3
	1240-6880	7	05:45AM	<1.3
	1440-RAMPA	7	05:50AM	<1.3
	1190-SERVICIOS	7	05:30PM	<1.3
121-C/F.O.	7	05:35PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1340-VENTILACION	7	05:40PM	<1.3
	1240-6520	7	05:45PM	<1.3
	1190-C/F.E.R.O.	7	05:50PM	<1.3
	1215-6400	8	05:30AM	<1.3
	1240-C/F.O.	8	05:35AM	<1.3
	1430-RAMPA	8	05:40AM	<1.3
	1440-RAMPA	8	05:45AM	<1.3
	1240-C/F.E.	8	05:30PM	<1.3
	1365-6720	8	05:35PM	<1.3
	1365-6650	8	05:40PM	<1.3
	1190-SERVICIOS	9	05:30AM	<1.3
	1340-6600	9	05:35AM	<1.3
	1190-C/F.O.R.E.	9	05:40AM	<1.3
	1240-C/F.O.	9	05:45AM	<1.3
	1365-C/F.O.	9	05:50AM	<1.3
	1365-6870	9	05:30PM	<1.3
	1365-C/F.O.R.E.	9	05:35PM	<1.3
	1140-SERVICIOS	9	05:40PM	<1.3
	1240-6700	9	05:45PM	<1.3
	1190-C/F.O.R.E.	9	05:50PM	<1.3
	1340-6740	9	05:55PM	<1.3
	1190-SERVICIO	10	05:30AM	<1.3
	1215-C/F.O.	10	05:35AM	<1.3
	1240-C/F.O.	10	05:40AM	<1.3
	1430-RAMPA	10	05:45AM	<1.3
	1290-6370	10	05:30PM	<1.3
	1315-6650	10	05:35PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1365-6720	10	05:40PM	<1.3
	1430-RAMPA	10	05:45PM	<1.3
	1440-RAMPA	10	05:50PM	<1.3
	1190-C/F.E.R.E.	11	05:30AM	<1.3
	1190-SERVICIOS	11	05:35AM	<1.3
	1430-RAMPA	11	05:40AM	<1.3
	1440-RAMPA	11	05:45AM	<1.3
	1340-6600	11	05:50AM	<1.3
	1290-6820	11	05:30PM	<1.3
	1340-6740	11	05:35PM	<1.3
	1365-C/F.E.	11	05:40PM	<1.3
	1365-6880	11	05:45PM	<1.3
	1315-6650	11	05:50PM	<1.3
	1215-C/F.O.	11	05:55PM	<1.3
	1215-DESGUINCHE	11	06:00PM	<1.3
	1190-C/F.R.O.	12	05:30AM	<1.3
	1190-6540	12	05:35AM	<1.3
	1365-6770	12	05:40AM	<1.3
	1430-RAMPA	12	05:45AM	<1.3
	1440-RAMPA	12	05:50AM	<1.3
	1365-C/F.E.	12	05:30PM	<1.3
	1365-6700	12	05:35PM	<1.3
	1240-C/F.E.	12	05:40PM	<1.3
	1240-C/F.O.	12	05:45PM	<1.3
	1240-6720	12	05:50PM	<1.3
	1290-6820	12	05:55PM	<1.3
	1340-6740	12	06:00PM	<1.3
	1240-C/F.O.	13	05:30AM	<1.3
	1215-6320	13	05:35AM	<1.3
	1365-C/F.O.	13	05:40AM	<1.3
1440-RAMPA	13	05:45AM	<1.3	
1290-6820	13	05:50AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1215-C/F.E	13	05:30PM	<1.3
	1215-6900	13	05:35PM	<1.3
	1365-C/F.E.	13	05:40PM	<1.3
	1365-6900	13	05:45PM	<1.3
	1315-6650	13	05:50PM	<1.3
	1340-6600	13	05:55PM	<1.3
	1430-RAMPA	14	05:30AM	<1.3
	1440-RAMPA	14	05:35AM	<1.3
	1315-6660	14	05:40AM	<1.3
	1190-C/F.E	14	05:45AM	<1.3
	1240-C/F.O.	14	05:50AM	<1.3
	1290-6820	14	05:55AM	<1.3
	1290-670	14	05:30PM	<1.3
	1190-C/F.O.	14	05:35PM	<1.3
	1190-SERVICIO	14	05:40PM	<1.3
	1240-6720	14	05:45PM	<1.3
	1290-6650	15	05:30AM	<1.3
	1430-RAMPA	15	05:35AM	<1.3
	1215-C/F	15	05:40AM	<1.3
	1440-RAMPA	15	05:45AM	<1.3
	1340-6740	15	05:50AM	<1.3
	1365-C/F.O.	15	05:30PM	<1.3
	1365-6700	15	05:35PM	<1.3
	1265-6990	15	05:40PM	<1.3
	1365-C/F.E.	15	05:45PM	<1.3
	1240-C/F.O.	15	05:50PM	<1.3
	1340-6740	15	05:55PM	<1.3
	1215-6320	15	06:00PM	<1.3
	1240-6500	16	05:30AM	<1.3
	1240-SERVICIOS	16	05:35AM	<1.3
1240-C/F.O.	16	05:40AM	<1.3	
1365-C/F.E.R.E.	16	05:45AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1290-6370	16	05:50AM	<1.3
	1365-6700	16	05:55am	<1.3
	1215-C/F.E.	16	06:00:AM	<1.3
	1265-6820	16	06:05AM	<1.3
	1190-C/F.O.E.	16	05:30PM	<1.3
	1190-SERVICIOS	16	05:35PM	<1.3
	1190-C/F.O.	16	05:40PM	<1.3
	1265-6990	16	05:45PM	<1.3
	125-6670	16	05:50PM	<1.3
	1290-6650	17	05:30AM	<1.3
	1215-C/F.E.	17	05:35AM	<1.3
	1365-6800	17	05:40AM	<1.3
	1430-RAMPA	17	05:30PM	<1.3
	1365-C/F,O.	17	05:35PM	<1.3
	1190/C/F.E.	17	05:40PM	<1.3
	1365-6800	17	05:45PM	<1.3
	1290-6820	17	05:50PM	<1.3
	1215-6900	18	05:30AM	<1.3
	1190-6540	18	05:35AM	<1.3
	1215-6520	18	05:40AM	<1.3
	1365-6900	18	05:45AM	<1.3
	1265-6670	18	05:50AM	<1.3
	1265-6990	18	05:55AM	<1.3
	135-6800	18	06:00:AM	<1.3
	1365-C.F.E	18	05:30PM	<1.3
	1430-RAMPA	18	05:35PM	<1.3
	1440-RAMPA	18	05:40PM	<1.3
	1240-C.F.E.	18	05:45PM	<1.3
	1240-6720	18	05:50PM	<1.3
	1215-6320	18	05:55PM	<1.3
1290-6820	18	06:00PM	<1.3	
1365-6990	19	05:30AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1365C/F.O.	19	05:35AM	<1.3
	1215-6320	19	05:40AM	<1.3
	12156880	19	05:45AM	<1.3
	1430-RAMPA	19	05:50AM	<1.3
	1365-6800	19	05:55AM	<1.3
	1190-C/F.O.R.E.	19	05:30PM	<1.3
	1190-C/F.E.R,O.	19	05:35PM	<1.3
	1215-C/F.E.R.E.	19	05:40PM	<1.3
	1440-RAMPA	19	05:45PM	<1.3
	1290-6820	20	05:30AM	<1.3
	1365-6800	20	05:35AM	<1.3
	1240-SERVICIOS	20	05:40AM	<1.3
	1365-6700	20	05:45AM	<1.3
	1265-6490	20	05:50AM	<1.3
	1240-6720	20	05:55am	<1.3
	1240-SERVICIOS	20	06:00:AM	<1.3
	1365-C/F.E.	20	05:30PM	<1.3
	1460-RAMPA	20	05:35PM	<1.3
	1240-C/F.E.	20	05:40PM	<1.3
	1215-SERVICIOS	20	05:45PM	<1.3
	1290-6820	20	05:50PM	<1.3
	1240-6500	21	05:30AM	<1.3
	1240-C/F.O.	21	05:35AM	<1.3
	1215-6880	21	05:40AM	<1.3
	1190-C/F.O.	21	05:45AM	<1.3
	1365-C/F.E.	21	05:50AM	<1.3
	1265-6670	21	05:30PM	<1.3
	1290-6960	21	05:35PM	<1.3
	1265-6990	21	05:40PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1190-6520	21	05:45PM	<1.3
	1190-6540	21	05:50PM	<1.3
	1365-6800	21	05:55PM	<1.3
	1290-6820	22	05:30AM	<1.3
	1240-SERVICIOS	22	05:35AM	<1.3
	1365-C/F.O.	22	05:40AM	<1.3
	1265-6490	22	05:45AM	<1.3
	1215-C/F.E.	22	05:30PM	<1.3
	1215-6900	22	05:35PM	<1.3
	1430-RAMPA	22	05:40PM	<1.3
	1460-ACCESO	22	05:45PM	<1.3
	1365-6800	22	05:50PM	<1.3
	1290-6880	22	05:55PM	<1.3
	1190-C/F.E.	23	05:30AM	<1.3
	1215-6520	23	05:35AM	<1.3
	1430-RAMPA	23	05:40AM	<1.3
	1440-ACCESO	23	05:45AM	<1.3
	1190-C/F.E.	23	05:30PM	<1.3
	1265-6440	23	05:35PM	<1.3
	1265-6660	23	05:40PM	<1.3
	1265-6660	23	05:45PM	<1.3
	1365-C/F.E.	23	05:50PM	<1.3
	1190-C/F.E.	24	05:30AM	<1.3
	1190-6540	24	05:35AM	<1.3
	1190-6560	24	05:40AM	<1.3
	1215-6900	24	05:30PM	<1.3
	1215-6800	24	05:35PM	<1.3
	1240-6500	24	05:40PM	<1.3
	1240-servicio	24	05:45PM	<1.3
	1440-RAMPA	24	05:50PM	<1.3
1265-6670	25	05:30AM	<1.3	
1365-C/F.E.	25	05:35AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1365-6920	25	05:40AM	<1.3
	1190-C/F.E.	25	05:45AM	<1.3
	1190-6520	25	05:50AM	<1.3
	1215-6520	25	05:30PM	<1.3
	1215-SERVICIO	25	05:35PM	<1.3
	1240-6700	25	05:40PM	<1.3
	135-6900	25	05:45PM	<1.3
	1430-RAMPA	25	05:50PM	<1.3
	1315-6880	25	05:55PM	<1.3
	1215-C/F.E.	26	05:30AM	<1.3
	1215-6900	26	05:35AM	<1.3
	1215-6880	26	05:40AM	<1.3
	1265-6990	26	05:45AM	<1.3
	1440-RAMPA	26	05:50AM	<1.3
	1365-6700	26	05:55AM	<1.3
	1315-6880	26	06:00:AM	<1.3
	1240-SERVICIO	26	05:30PM	<1.3
	1315-6880	26	05:35PM	<1.3
	1365-C/F.O.	26	05:40PM	<1.3
	1430-RAMPA	26	05:45PM	<1.3
	1240-C/F.E.	26	05:50PM	<1.3
	1240-6720	26	05:55PM	<1.3
	1190-6520	27	05:30AM	<1.3
	1190-6540	27	05:35AM	<1.3
	1215-6520	27	05:40AM	<1.3
	1265-6490	27	05:45AM	<1.3
	1315-6920	27	05:50AM	<1.3
	1430-RAMPA	27	05:30PM	<1.3
	1460-ACCESO	27	05:35PM	<1.3
	1290-6990	27	05:40PM	<1.3
1240-C/F.O.	27	05:45PM	<1.3	
1240-SERVICIO	27	05:50PM	<1.3	
1240-6500	27	05:55PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1265-6370	27	06:00PM	<1.3
	1315-6880	27	06:05PM	<1.3
	1440-RAMPA	28	05:30AM	<1.3
	1240-C/F,E.	28	05:35AM	<1.3
	1240-SERVICIOS	28	05:40AM	<1.3
	1240-6700	28	05:45AM	<1.3
	1190-C/F.E.	28	05:50AM	<1.3
	1260-6870	28	05:55AM	<1.3
	1315-6920	28	06:00:AM	<1.3
	1460-RAMPA	28	05:30PM	<1.3
	1365-C/F.O.	28	05:35PM	<1.3
	1240-SERVICIOS	28	05:40PM	<1.3
	1190-C/F.O.	28	05:45PM	<1.3
	1365-C/F.E.	28	05:50PM	<1.3
	1215-C/F.E.	29	05:30AM	<1.3
	1215-6920	29	05:35AM	<1.3
	1190-C/F.O.	29	05:40AM	<1.3
	1460-ADST	29	05:45AM	<1.3
	1365-6420	29	05:50AM	<1.3
	1265-6490	29	05:55AM	<1.3
	1315-6920	29	06:00:AM	<1.3
	1265-6450	29	05:30PM	<1.3
	1430-RAMPA	29	05:35PM	<1.3
	1240-C/F.O.	29	05:40PM	<1.3
	1240-6480	29	05:45PM	<1.3
	1215-C/F.E.	29	05:50PM	<1.3
	1215-6880	29	05:55PM	<1.3
	1240-6700	30	05:30AM	<1.3
	1240-6500	30	05:35AM	<1.3
	1290-6370	30	05:40AM	<1.3
1290-6990	30	05:45AM	<1.3	
1430-RAMPA	30	05:50AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)	
Marzo	1430-ACCESO	30	05:50AM	<1.3	
	1190-C/F.O.	30	05:30PM	<1.3	
	1190-6560	30	05:35PM	<1.3	
	1365-6680	30	05:40PM	<1.3	
	1365-C/F.O.	30	05:45PM	<1.3	
	1315-6920	30	05:50PM	<1.3	
	1190-C/F.E.	31	05:30AM	<1.3	
	1240-SERVICIOS	31	05:35AM	<1.3	
	1290-6370	31	05:40AM	<1.3	
	1265-6450	31	05:30PM	<1.3	
	1265-6990	31	05:35PM	<1.3	
	1215-6880	31	05:40PM	<1.3	
	1190-6520	31	05:45PM	<1.3	
	1315-6920	31	05:50PM	<1.3	
	1386-1455	31	05:55PM	<1.3	
	Abril	1265-6670	1	05:30AM	<1.3
		1240-6700	1	05:35AM	<1.3
		1240-6720	1	05:40AM	<1.3
		1455-ACCESO-Z.E	1	05:45AM	<1.3
		1340-6920	1	05:50AM	<1.3
1340-6920		1	05:55AM	<1.3	
1265-6490		1	06:00:AM	<1.3	
1290-6370		1	06:05AM	<1.3	
1440-RAMPA		1	05:30PM	<1.3	
1365-6900		1	05:35PM	<1.3	
1365-6920		1	05:40PM	<1.3	
1190-C/F.E.		1	05:45PM	<1.3	
1240-C/F.E.		1	05:50PM	<1.3	
1315-6920		1	05:55PM	<1.3	
1140-RAMPA		2	05:30AM	<1.3	
1265-6990		2	05:35AM	<1.3	
1265-6450	2	05:40AM	<1.3		

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1190-C/F.E.	2	05:45AM	<1.3
	1190-6560	2	05:50AM	<1.3
	1215-SERVICIOS	2	05:55AM	<1.3
	1340-6920	2	06:00:AM	<1.3
	1315-6920	2	06:05AM	<1.3
	1365-6840	2	05:30PM	<1.3
	1430-RAMPA	2	05:35PM	<1.3
	1430-ACCESO	2	05:40PM	<1.3
	1240-6520	2	05:45PM	<1.3
	1190-6630	2	05:50PM	<1.3
	1455-ACCESO	3	05:30AM	<1.3
	1340-C/F.O.	3	05:35AM	<1.3
	1265-6990	3	05:40AM	<1.3
	1215-6920	3	05:45AM	<1.3
	1240-6700	3	05:50AM	<1.3
	1240-C/F.E.	3	05:55AM	<1.3
	1190-C/F.E.	3	06:00:AM	<1.3
	1315-6500	3	05:30PM	<1.3
	1290-6990	3	05:35PM	<1.3
	1265-6670	3	05:40PM	<1.3
	1265-6490	3	05:45PM	<1.3
	1215-C/F.E.	3	05:50PM	<1.3
	1215-6880	3	05:55PM	<1.3
	1190-6520	4	05:30AM	<1.3
	1190-6560	4	05:35AM	<1.3
	1190-C/F.E.	4	05:40AM	<1.3
	1265-6450	4	05:45AM	<1.3
	1430-RAMPA	4	05:50AM	<1.3
	1315-6500	4	05:55AM	<1.3
	1240-SERVICIOS E.	4	05:30PM	<1.3
	1240-SERVICIOS O.	4	05:35PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1240-6480	4	05:40PM	<1.3
	1240-C/F.E.	4	05:45PM	<1.3
	1365-6680	4	05:50PM	<1.3
	1365-6900	4	05:55PM	<1.3
	1365-C/F.E.	4	06:00PM	<1.3
	1315-6500	4	06:05PM	<1.3
	1240-6740	5	05:30AM	<1.3
	1240-6700	5	05:35AM	<1.3
	1215-C/F.E.	5	05:40AM	<1.3
	1440-RAMPA	5	05:45AM	<1.3
	1430-RAMPA	5	05:50AM	<1.3
	1440-C/F.E.	5	05:55AM	<1.3
	1315-6820	5	06:00:AM	<1.3
	1290-6990	5	06:05AM	<1.3
	1190-C/F.E.	5	05:30PM	<1.3
	1190-6520	5	05:35PM	<1.3
	1215-6880	5	05:40PM	<1.3
	1365-6920	5	05:45PM	<1.3
	1365-6840	5	05:50PM	<1.3
	1455-acceso	5	05:55PM	<1.3
	1315-6500	5	06:00PM	<1.3
	1190-6520	6	05:30AM	<1.3
	1240-6480	6	05:35AM	<1.3
	1215-6880	6	05:40AM	<1.3
	1430-ACCESO	6	05:45AM	<1.3
	1430-RAMPA	6	05:50AM	<1.3
	1240-C/F.O.	6	05:30PM	<1.3
	1190-C/F.O.	6	05:35PM	<1.3
	1340-6620	6	05:40PM	<1.3
	1365-C/F.O.	6	05:45PM	<1.3
	1215-SERVICIOS	7	05:30AM	<1.3
	1365-6680	7	05:30PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1215-C/F.E.	7	05:35PM	<1.3
	1215-6920	7	05:40PM	<1.3
	1340-6620	7	05:45PM	<1.3
	1265-6670	8	05:30AM	<1.3
	1365-6880	8	05:35AM	<1.3
	1340-C/F.O.	8	05:40AM	<1.3
	1240-6520	8	05:45AM	<1.3
	1240-6700	8	05:50AM	<1.3
	1265-6450	8	05:55AM	<1.3
	1340-6600	8	06:00:AM	<1.3
	1190-c/f.o.	8	05:30PM	<1.3
	1190-c/f.e.	8	05:35PM	<1.3
	1265-6490	8	05:40PM	<1.3
	1455-ACCESO	8	05:45PM	<1.3
	1365-6920	8	05:50PM	<1.3
	1365-C/F.E.	8	05:55PM	<1.3
	1340-6600	8	06:00PM	<1.3
	1365-6680	9	05:30AM	<1.3
	1265-6900	9	05:35AM	<1.3
	1290-6900	9	05:40AM	<1.3
	1240-C/F.E.	9	05:45AM	<1.3
	1240-6740	9	05:50AM	<1.3
	1265-6490	9	05:55AM	<1.3
	1440-RAMPA	9	05:30PM	<1.3
	1365-6840	9	05:35PM	<1.3
	1265-6990	9	05:40PM	<1.3
	1190-6520	9	05:45PM	<1.3
	1215-6880	9	05:50PM	<1.3
	1240-C/F.O.	9	05:55PM	<1.3
	1340-6620	9	06:00PM	<1.3
	1265-6420	9	06:05PM	<1.3
	12340-6620	10	05:30AM	<1.3
1190-C/F.E.	10	05:35AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1190-C/FO.	10	05:40AM	<1.3
	1190-6560	10	05:45AM	<1.3
	1430-RAMPA	10	05:50AM	<1.3
	1430-ACCESO	10	05:55AM	<1.3
	1455-ACCESO	10	06:00:AM	<1.3
	1215-C/F.E.	10	05:30PM	<1.3
	1215-6920	10	05:35PM	<1.3
	1240-6520	10	05:40PM	<1.3
	1265-6900	10	05:45PM	<1.3
	1265-6900	10	05:50PM	<1.3
	1340-6520	10	05:55PM	<1.3
	1340-6880	10	06:00PM	<1.3
	1365-C/F.O.	10	06:05PM	<1.3
	1440-RAMPA	11	05:30AM	<1.3
	1265-6400	11	05:35AM	<1.3
	1455-ACCESO	11	05:40AM	<1.3
	1240-6480	11	05:45AM	<1.3
	1240-C/F.E.	11	05:50AM	<1.3
	1365-6880	11	05:55AM	<1.3
	1190-6520	11	05:30PM	<1.3
	1215-6880	11	05:35PM	<1.3
	1240-6700	11	05:40PM	<1.3
	1290-6990	11	05:45PM	<1.3
	1365-C/F.O.	11	05:50PM	<1.3
	1365-6840	11	05:55PM	<1.3
	1315-6690	11	06:00PM	<1.3
	1315-6460	11	06:05PM	<1.3
	1215-C/F.E.	12	05:30AM	<1.3
	1215-6920	12	05:35AM	<1.3
	1315-6460	12	05:40AM	<1.3
	1430-RAMPA	12	05:45AM	<1.3
	1240-C/F.E.	12	05:30PM	<1.3
1240-6740	12	05:35PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1265-6450	12	05:40PM	<1.3
	1365-6840	12	05:45PM	<1.3
	1340-C/F,E,	12	05:50PM	<1.3
	1365-C/F.E.	12	05:55PM	<1.3
	1315-6460	12	06:00PM	<1.3
	1430-RAMPA	13	05:30AM	<1.3
	1290-6990	13	05:35AM	<1.3
	1190-C/F.E.	13	05:40AM	<1.3
	1190-6700	13	05:45AM	<1.3
	1290-6420	13	05:50AM	<1.3
	1190-C/F.E.	13	05:30PM	<1.3
	1190-6520	13	05:35PM	<1.3
	1315-6690	13	05:40PM	<1.3
	1365-6880	13	05:45PM	<1.3
	1240-6480	14	05:30AM	<1.3
	1365-6660	14	05:30PM	<1.3
	1365-C/F.O	14	05:35PM	<1.3
	1340-C/F.E.	14	05:40PM	<1.3
	1215-6880	14	05:45PM	<1.3
	1240-C/F.E.	14	05:50PM	<1.3
	1365-6920	15	05:30AM	<1.3
	1365-6880	15	05:35AM	<1.3
	1440-RAMPA	15	05:40AM	<1.3
	1265-640	15	05:45AM	<1.3
	1240-C/F.E.	15	05:50AM	<1.3
	1265-6880	15	05:55AM	<1.3
	1430-RAMPA	15	05:30PM	<1.3
	1455-ACCESO	15	05:35PM	<1.3
	1190-C/F.E.	15	05:40PM	<1.3
	1265-6670	15	05:45PM	<1.3
	1240-6700	15	05:50PM	<1.3
	1290-6420	15	05:55PM	<1.3
1190-C/F.E.	16	05:30AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1190-6700	16	05:35AM	<1.3
	1240-6520	16	05:40AM	<1.3
	1365-6940	16	05:45AM	<1.3
	1290-6860	16	05:50AM	<1.3
	1315-6340	16	05:55AM	<1.3
	1290-6420	16	06:00:AM	<1.3
	1365-6840	16	05:30PM	<1.3
	1190-6560	16	05:35PM	<1.3
	1240-servicios	16	05:40PM	<1.3
	1190-6520	16	05:45PM	<1.3
	1290-6860	16	05:50PM	<1.3
	1315-6340	16	05:55PM	<1.3
	1290-6420	16	06:00PM	<1.3
	1455-ACCESO	17	05:30AM	<1.3
	1240-C/F.E.	17	05:35AM	<1.3
	1240-C/F.O..	17	05:40AM	<1.3
	1240-6740	17	05:45AM	<1.3
	1365-6880	17	05:50AM	<1.3
	1290-6990	17	05:55AM	<1.3
	1315-6340	17	06:00:AM	<1.3
	1340-6500	17	06:05AM	<1.3
	1265-6940	17	05:30PM	<1.3
	1265-6450	17	05:35PM	<1.3
	1340-6690	17	05:40PM	<1.3
	1430-RAMPA	17	05:45PM	<1.3
	1430-ACCESO	17	05:50PM	<1.3
	1440-RAMPA	17	05:55PM	<1.3
	1340-6500	17	06:00PM	<1.3
	1365-C/F.O.	18	05:30AM	<1.3
	1365-6660	18	05:35AM	<1.3
	1365-6940	18	05:40AM	<1.3
	1365-C/F.E.	18	05:45AM	<1.3
1240-6460	18	05:50AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1240-6700	18	05:55AM	<1.3
	1265-6860	18	06:00:AM	<1.3
	1315-6340	18	06:05AM	<1.3
	1265-6490	18	05:30PM	<1.3
	125-6670	18	05:35PM	<1.3
	1190-C/F.E.	18	05:40PM	<1.3
	1315-6660	18	05:45PM	<1.3
	1340-C/F.E.	18	05:50PM	<1.3
	1430-RAMPA	19	05:30AM	<1.3
	1365-6680	19	05:35AM	<1.3
	1315-6690	19	05:40AM	<1.3
	1215-6880	19	05:45AM	<1.3
	1240-C/F.E.	19	05:50AM	<1.3
	05:30AM	19	05:30PM	<1.3
	05:35AM	19	05:35PM	<1.3
	1190-C/F.O.	19	05:40PM	<1.3
	1190-6700	19	05:45PM	<1.3
	1190-6580	19	05:50PM	<1.3
	1430-ACCESO	20	05:30AM	<1.3
	1340-C/F.E.	20	05:35AM	<1.3
	1315-6840	20	05:40AM	<1.3
	1265-6490	20	05:45AM	<1.3
	1265-6860	20	05:50AM	<1.3
	1190-6520	20	05:55AM	<1.3
	1315-6340	20	06:00:AM	<1.3
	1240-ACCESO	20	05:30PM	<1.3
	1265-6450	20	05:35PM	<1.3
	1265-6900	20	05:40PM	<1.3
	1365-6840	20	05:45PM	<1.3
	1430-ACCESO	20	05:50PM	<1.3
1340-6500	20	05:55PM	<1.3	
1430-RAMPA	21	05:30AM	<1.3	
1365-6660	21	05:35AM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1190-C/F.O.	21	05:40AM	<1.3
	1190-SERVICIOS	21	05:45AM	<1.3
	1340-6880	21	05:50AM	<1.3
	1240-6520	21	05:30PM	<1.3
	1240-6740	21	05:35PM	<1.3
	1190-6700	21	05:40PM	<1.3
	1315-6690	21	05:45PM	<1.3
	1340-C/F.O.	21	05:50PM	<1.3
	1365-C/F.E.	21	05:55PM	<1.3
	1340-6880	21	06:00PM	<1.3
	1240-C/F.O.	22	05:30AM	<1.3
	1240-6460	22	05:35AM	<1.3
	1240-6860	22	05:40AM	<1.3
	1430-ACCESO	22	05:45AM	<1.3
	1365-C/F.E.	22	05:50AM	<1.3
	1290-6860	22	05:55AM	<1.3
	1365-6940	22	06:00:AM	<1.3
	1265-6990-T	22	05:30PM	<1.3
	136-6880	22	05:35PM	<1.3
	1190-6520	23	05:30AM	<1.3
	1190-6580	23	05:35AM	<1.3
	1190-C/F.E.	23	05:40AM	<1.3
	1430-RAMPA	23	05:45AM	<1.3
	1440-RAMPA	23	05:50AM	<1.3
	1365-6880	23	05:55AM	<1.3
	1365-6840	23	06:00:AM	<1.3
	1340-6880	23	06:05AM	<1.3
	1215-C/F.E.	23	05:30PM	<1.3
	1215-6940	23	05:35PM	<1.3
	1215-6880	23	05:40PM	<1.3
1340-C/F.E.	23	05:45PM	<1.3	
1455-ACCESO	23	05:50PM	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1265-6670	24	05:30AM	<1.3
	1240-6700	24	05:35AM	<1.3
	1365-C/F.E.	24	05:40AM	<1.3
	1365-6660	24	05:45AM	<1.3
	1455-ACCESO	24	05:50AM	<1.3
	1290-6990	24	05:30PM	<1.3
	1365-6880	24	05:35PM	<1.3
	1440-rampa	24	05:40PM	<1.3
	1265-6860	24	05:45PM	<1.3
	1265-4490	24	05:50PM	<1.3
	1340-C/F.E.	25	05:30AM	<1.3
	1365-6940	25	05:35AM	<1.3
	1190-6700	25	05:40AM	<1.3
	1240-6460	25	05:45AM	<1.3
	1430-RAMPA	25	05:50AM	<1.3
	1290-6900	25	05:55AM	<1.3
	1265-6450	25	05:30PM	<1.3
	1190-C/F.E.	25	05:35PM	<1.3
	1290-6990	25	05:40PM	<1.3
	1240-6760	25	05:45PM	<1.3
	1430-ACCESO	25	05:50PM	<1.3
	1365-C/F.E.	26	05:30AM	<1.3
	1215-6940	26	05:35AM	<1.3
	1240-C/F.E.	26	05:30PM	<1.3
	1240-6460	26	05:35PM	<1.3
	1340-C/F.E.	26	05:40PM	<1.3
	1365-6660	26	05:45PM	<1.3
	1315-6690	26	05:50PM	<1.3
	1190-6900	26	05:55PM	<1.3
	1290-SERVICIOS	27	05:30AM	<1.3
	1430-ACCESO	27	05:35AM	<1.3
	1340-6920	27	05:40AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1190-C/F.E.	27	05:45AM	<1.3
	1190-6580	27	05:50AM	<1.3
	1190-6600	27	05:55AM	<1.3
	1315-6600	27	06:00:AM	<1.3
	1248-REFUGIO	27	06:05AM	<1.3
	1430-RAMPA	27	05:30PM	<1.3
	1365-C/F.E.	27	05:35PM	<1.3
	1190-C/F.E.	27	05:40PM	<1.3
	1190-SERVICIOS	27	05:45PM	<1.3
	1265-6490	27	05:50PM	<1.3
	1215-6880	28	05:30AM	<1.3
	1190-6520	28	05:35AM	<1.3
	1265-6450	28	05:40AM	<1.3
	1265-6490	28	05:45AM	<1.3
	1265-6670	28	05:50AM	<1.3
	1290-6900	28	05:55AM	<1.3
	1240-C/F.O.	28	05:30PM	<1.3
	1240-6460	28	05:35PM	<1.3
	1215-6440	28	05:40PM	<1.3
	1290-7460	28	05:45PM	<1.3
	1215-6560	28	05:50PM	<1.3
	1215-6900	28	05:55PM	<1.3
	1215-6880	29	05:30AM	<1.3
	1190-6520	29	05:35AM	<1.3
	1265-6450	29	05:40AM	<1.3
	1265-6490	29	05:45AM	<1.3
	1265-6670	29	05:50AM	<1.3
	1290-6900	29	05:55AM	<1.3
	1240-C/F.O.	29	05:30PM	<1.3
	1240-6460	29	05:35PM	<1.3
	1215-6440	29	05:40PM	<1.3
	1290-7460	29	05:45PM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1215-6560	29	05:50PM	<1.3
	1215-6900	29	05:55PM	<1.3
	1190-C/F.E.	30	05:30AM	<1.3
	1190-6580	30	05:35AM	<1.3
	1190-6480	30	05:40AM	<1.3
	1340-C/F,E.	30	05:45AM	<1.3
	1315-6690	30	05:50AM	<1.3
	1430-RAMPA	30	05:55AM	<1.3
	1340-6920	30	06:00:AM	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1215-6480	30	05:30PM	<1.3
	1215-6700	30	05:35PM	<1.3
	1215-C/F.E.	30	05:40PM	<1.3
	1290-6490	30	05:45PM	<1.3
	1430-ACCESO	30	05:50PM	<1.3
	1340-C/F.E.	30	05:55PM	<1.3

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

8 Geoquímica de Roca Estéril

8.1 Sitios de Monitoreo

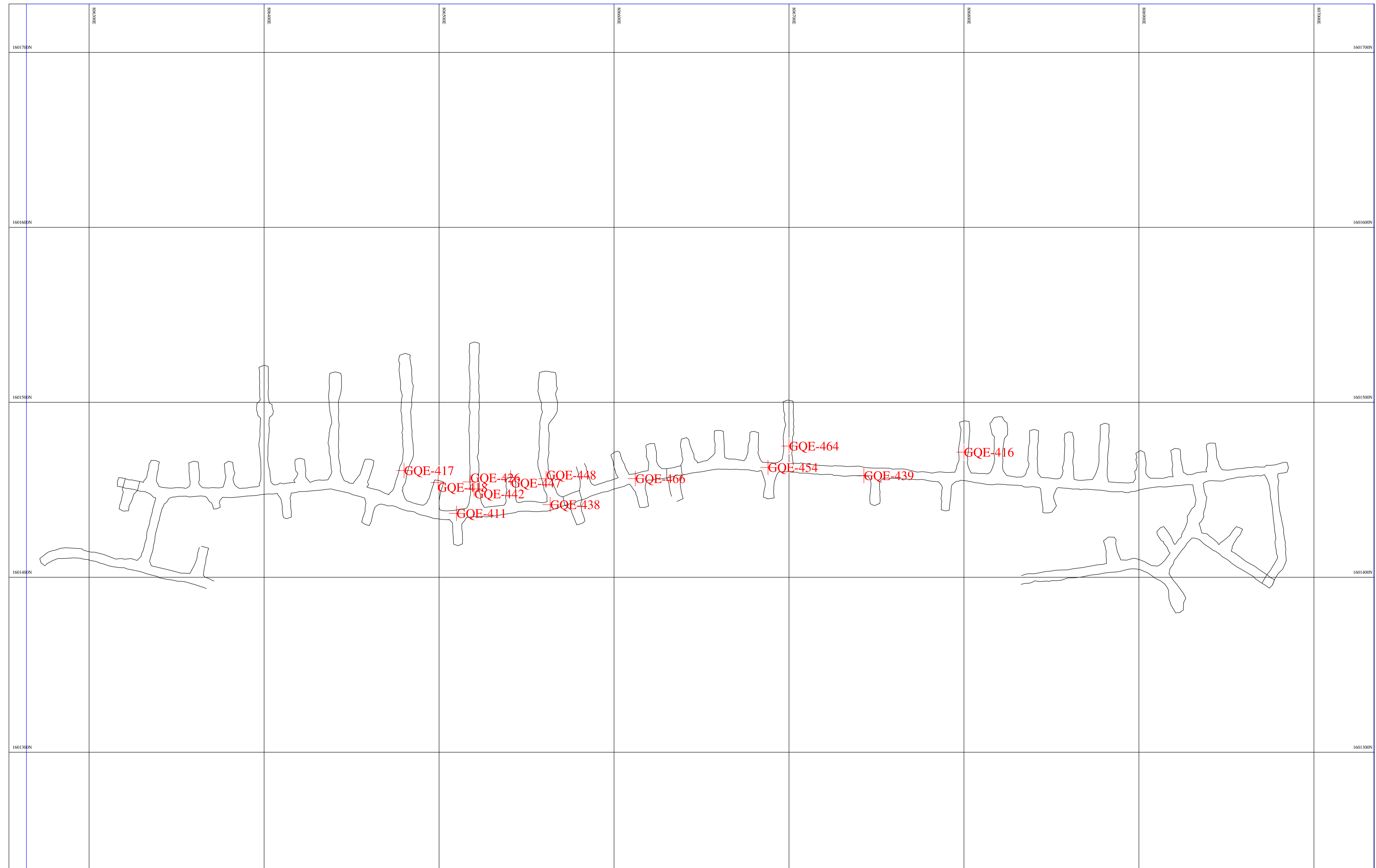
En el Cuadro 8-1 se enlistan las muestras analizadas de material extraído de los túneles del proyecto, rampa oeste y rampa este, durante los meses de Febrero a Abril de 2015. La ubicación de la extracción de las muestras se presenta en la Figura 8-1, Figura 8-2, Figura 8-3, Figura 8-4, Figura 8-5 y Figura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

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

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-409	1240-6660-EC	806660	1601425	1241
GQE-410	1240-6560-EC	806560	1601429	1241
GQE-411	1190-CFTE-OC	806510	1601436.5	1194
GQE-412	1215-6380-OC	806379	1601464.5	1218
GQE-413	1365-6840-EC	806840	1601384	1367
GQE-414	1365-6760-EC	806760.5	1601375	1367
GQE-415	1215-6840-EC	806839.5	1601443.5	1220
GQE-416	1190-6800-EC	806800	1601471.5	1193
GQE-417	1190-6480-OC	806480	1601461	1194
GQE-418	1190-6500-OC	806499.5	1601454.1	1192
GQE-419	1240-6680-EC	806680	1601427.9	1242
GQE-420	1215-6860-EC	806860	1601441.4	1217
GQE-421	1215-CFTE-EC	806890	1601425.4	1217
GQE-422	1215-CFTO-OC	806327.5	1601448.5	1219
GQE-423	1215-6360-OC	806360	1601466	1219
GQE-424	1365-6860-EC	806861	1601389.5	1368
GQE-425	1365-6740-EC	806741.5	1601372	1368
GQE-426	1190-6520-OC	806517.75	1601454.5	1195
GQE-427	1215-6340-OC	806340.05	1601465.26	1217
GQE-428	1240-6520-OC	806520	1601431.5	1242
GQE-429	1365-6880-EC	806881.15	1601396.62	1368
GQE-430	1430-RAMP-ZE	807327.07	1601519.54	1434
GQE-431	1440-RAMP-ZE	807483.32	1601528.28	1449
GQE-432	1365-CFTE-EC	806844.11	1601364.3	1368
GQE-433	1365-CFTE-EC	806904.7	1601387.47	1368
GQE-434	1440-RAMP-ZE	807528.18	1601547.27	1454

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-435	1215-6880-EC	806881.2	1601436.39	1217
GQE-436	1365-6700-Ec	806700.4	1601354.07	1369
GQE-437	1440-AMP-ZE	807549.81	1601583.59	1462
GQE-438	1190-CFTE-OC	806563.5	1601441.5	1191
GQE-439	1190-CFTO-EC	806742.8	1601458.1	1191
GQE-440	1240-CFTO	806484.3	1601411.8	1242
GQE-441	1240-CFTE	806737	1601414	1242
GQE-442	1190-6540-OC	806520	1601450.5	1195
GQE-443	1240-6700-EC	806700	1601428.25	1240
GQE-444	1365-6700-EC	806700	1601364.75	1369
GQE-445	1215-6900-EC	806900.9	1601443.75	1217
GQE-446	1240-6500-OC	8066500	1601427	1242
GQE-447	1190-6540-OC	806540.9	1601457	1192
GQE-448	1190-6560-OC	806561.2	1601456.3	1192
GQE-449	1240-6580-OC	806580	1601430.5	1242
GQE-450	1240-6700-EC	806700	1601435.4	1242
GQE-451	1365-6900-EC	806902	1601398.5	1369
GQE-452	1430-RAMP-ZE	807363.45	1601546.92	1427
GQE-453	1365-6920-EC	806920	1601401	1369
GQE-454	1190-CFTO-EC	806688	1601462.75	1192
GQE-455	1365-6680-EC	806681	1601361.5	1370
GQE-456	1215-CFTE-EC	806940	1601436.4	1217
GQE-457	1240-6740-EC	806740	1601428	1241
GQE-458	1365-CFTO-EC	806636.5	1601343.5	1372
GQE-459	1365-6660-EC	806662	1601354.5	1372
GQE-460	1215-CFTE-EC	806940	1601436.4	1217
GQE-461	1365-CFTE-EC	806962	1601391.5	1369
GQE-462	1240-6480-OC	806480	1601431.65	1242
GQE-463	1240-6720-EC	806722.2	1601428.5	1241
GQE-464	1190-6700-EC	806700	1601475	1195
GQE-465	1240-CFTO-OC	806437.65	1601422.8	1242
GQE-466	1190-CFTE-OC	806612.16	1601456.41	1195

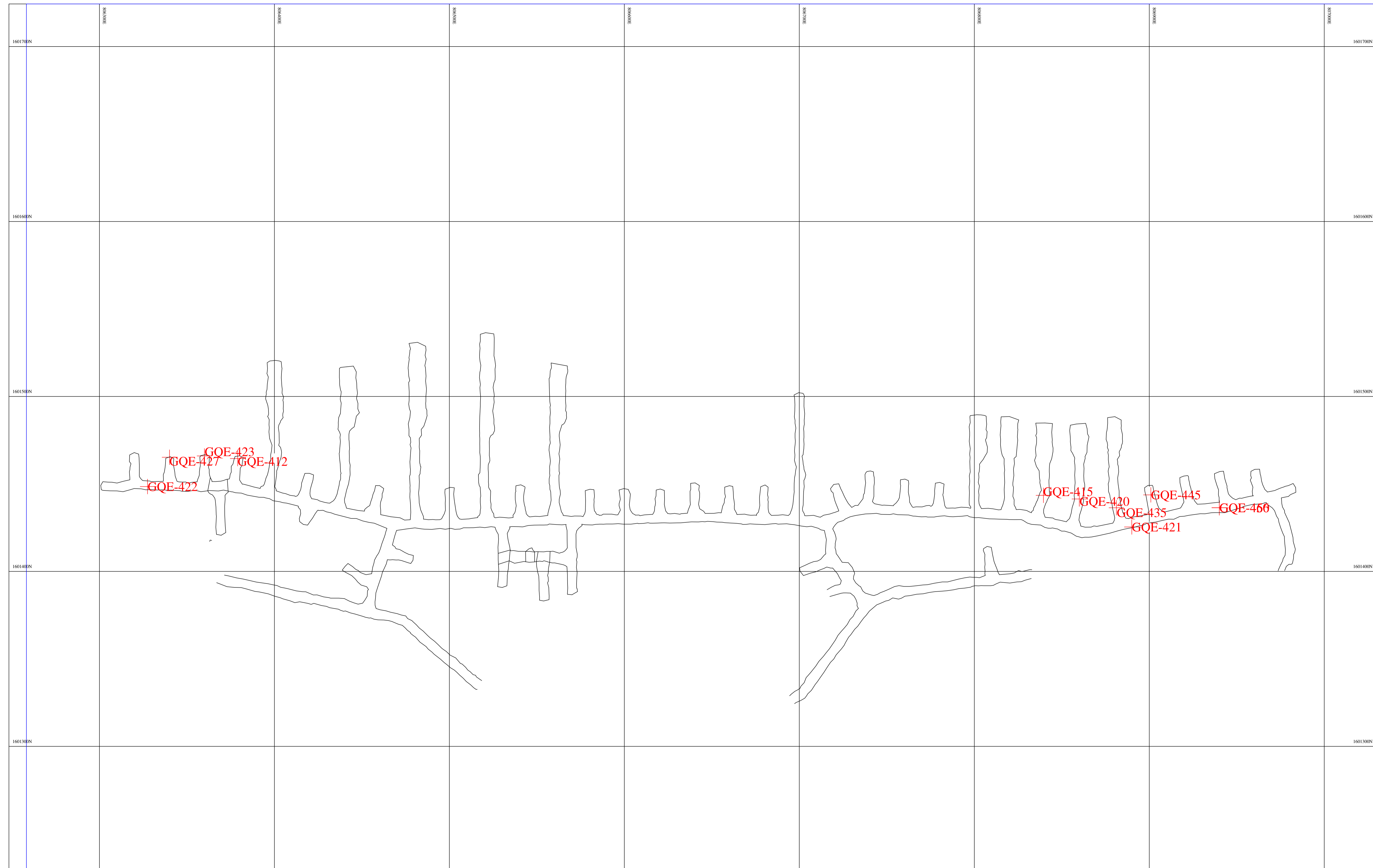
Fuente: MSR, 2015.



Plano ARD Nivel 1190

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

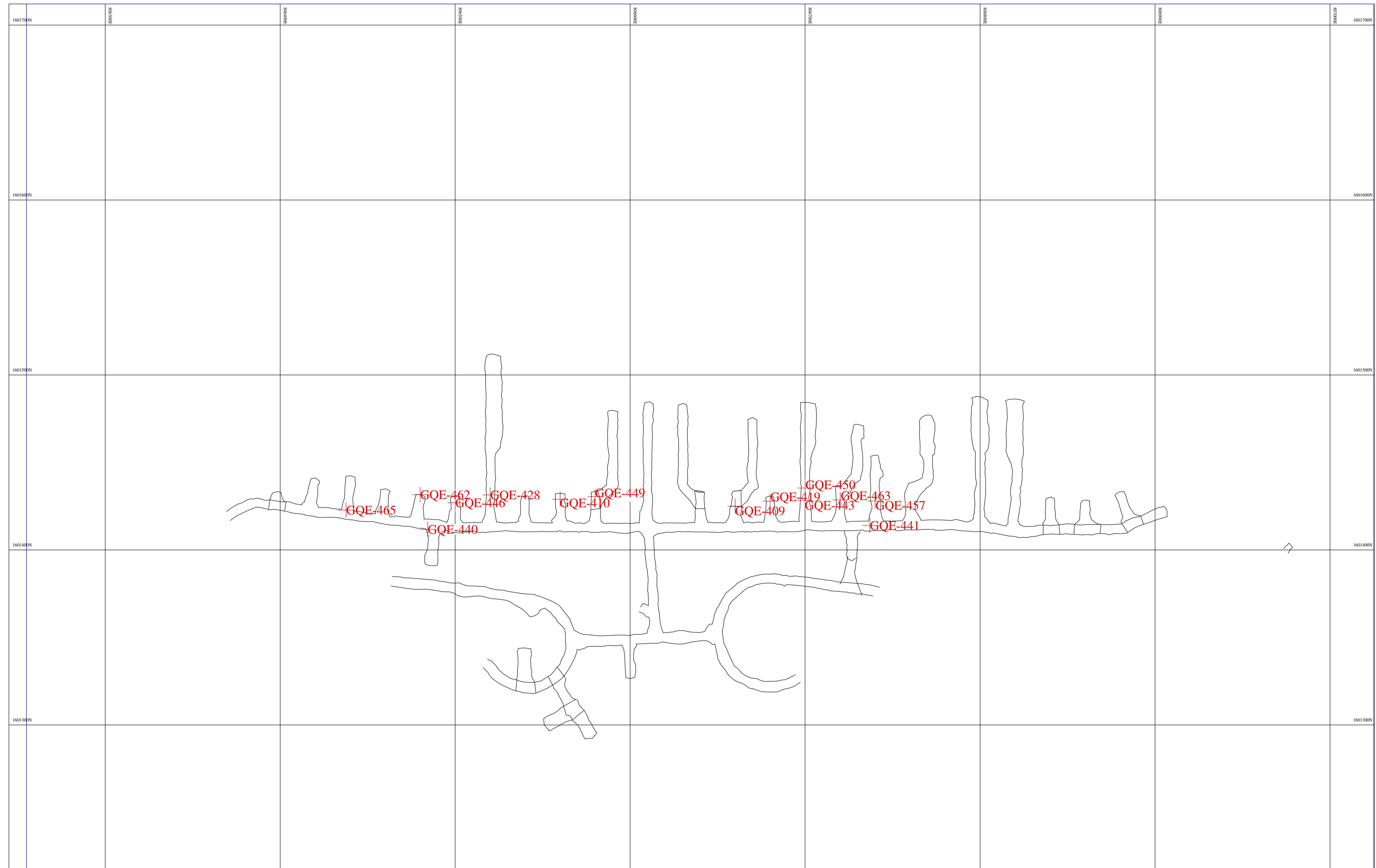
febrero-abril 2015



Plano ARD Nivel 1215

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

febrero-abril_2015

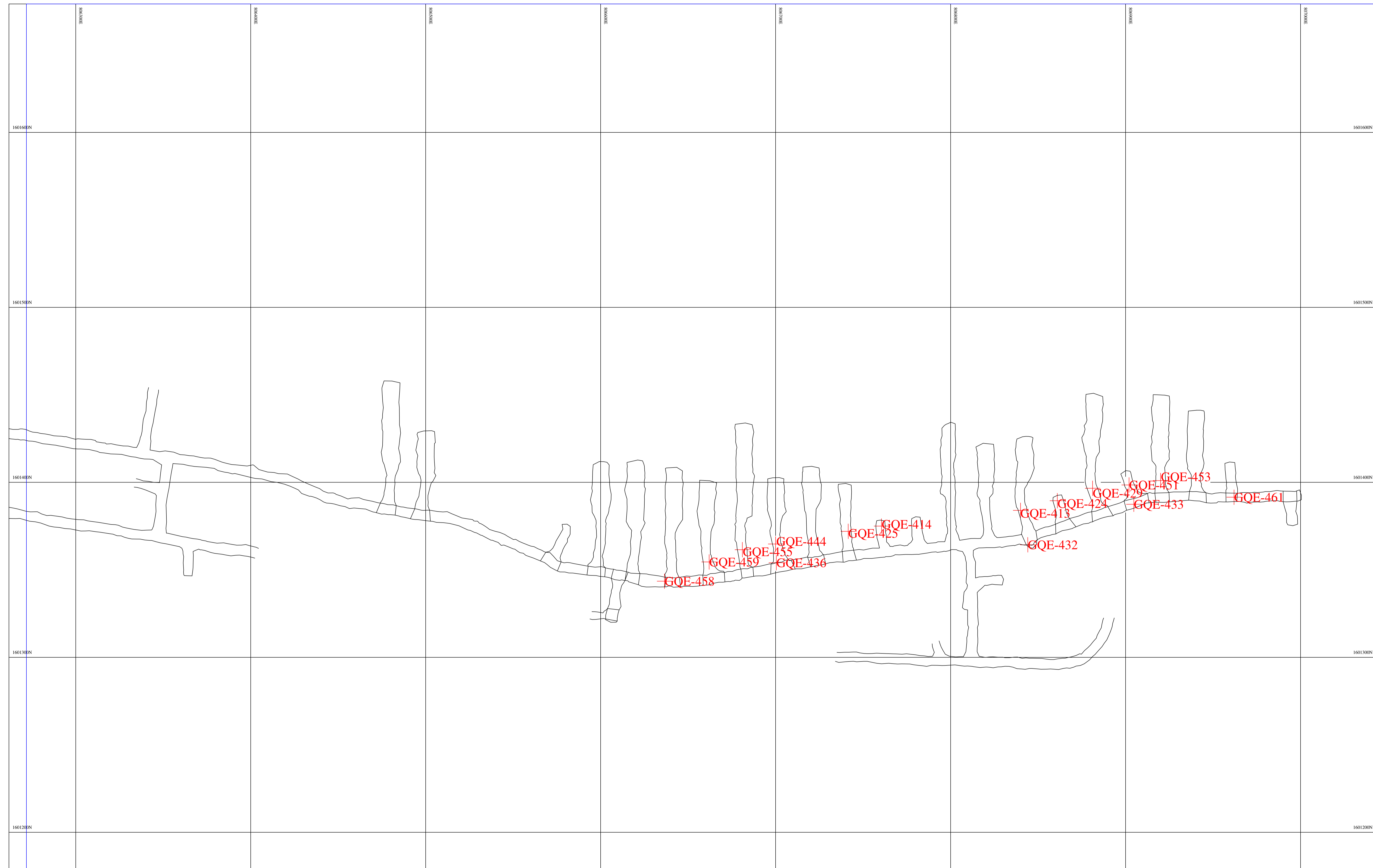


febrero-abril_2015_01



Plano ARD Nivel 1240

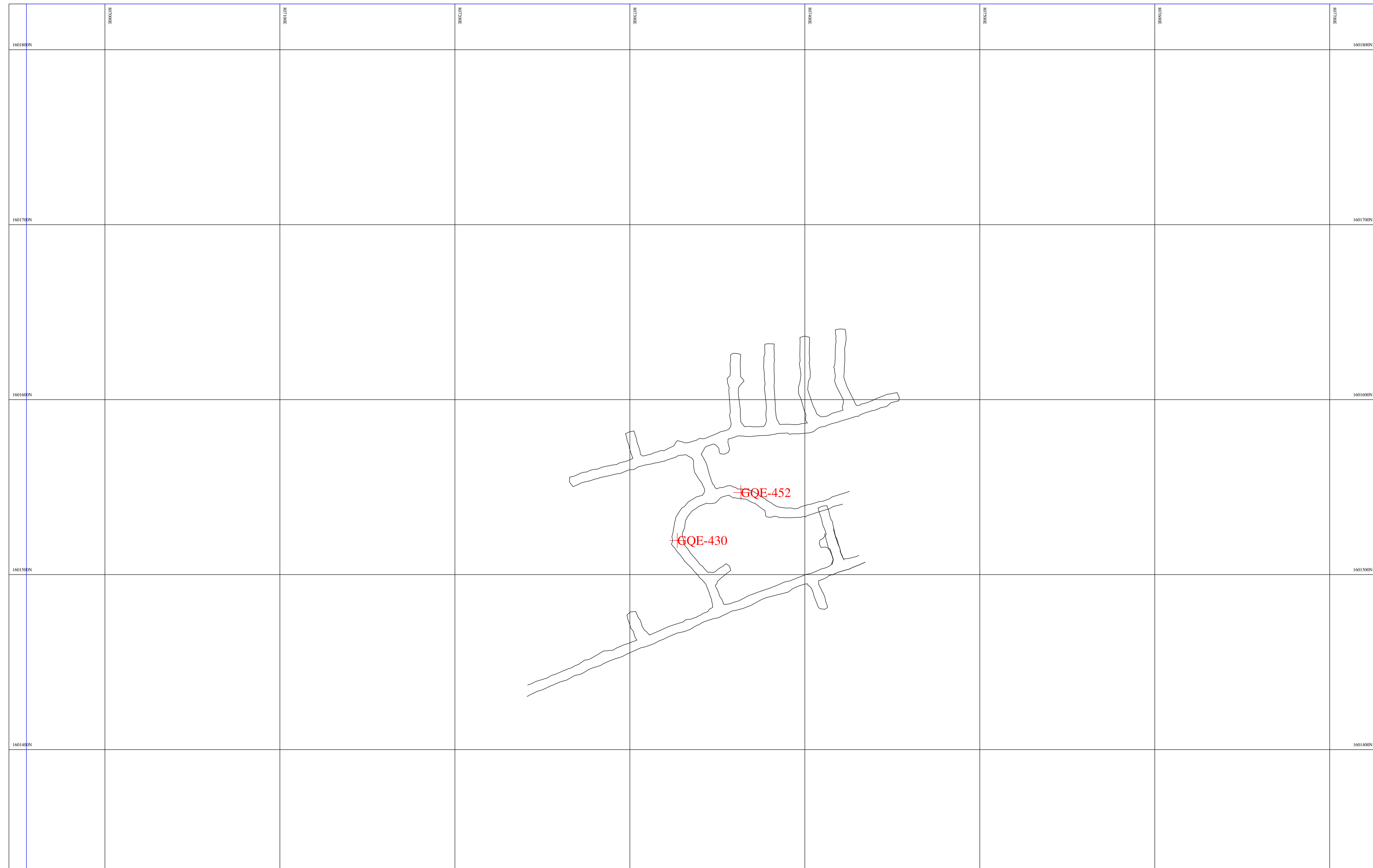
DEPARTAMENTO:	REALIZO:	DIBUJO:	AUTORIZO:	FECHA:	ESCALA:
GEOLOGIA MINA	RT/HC/WY/NH GL/BL	HC	RICHARD YANCEY	Febrero-Abril 2015	1:1000



Plano ARD Nivel 1365

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

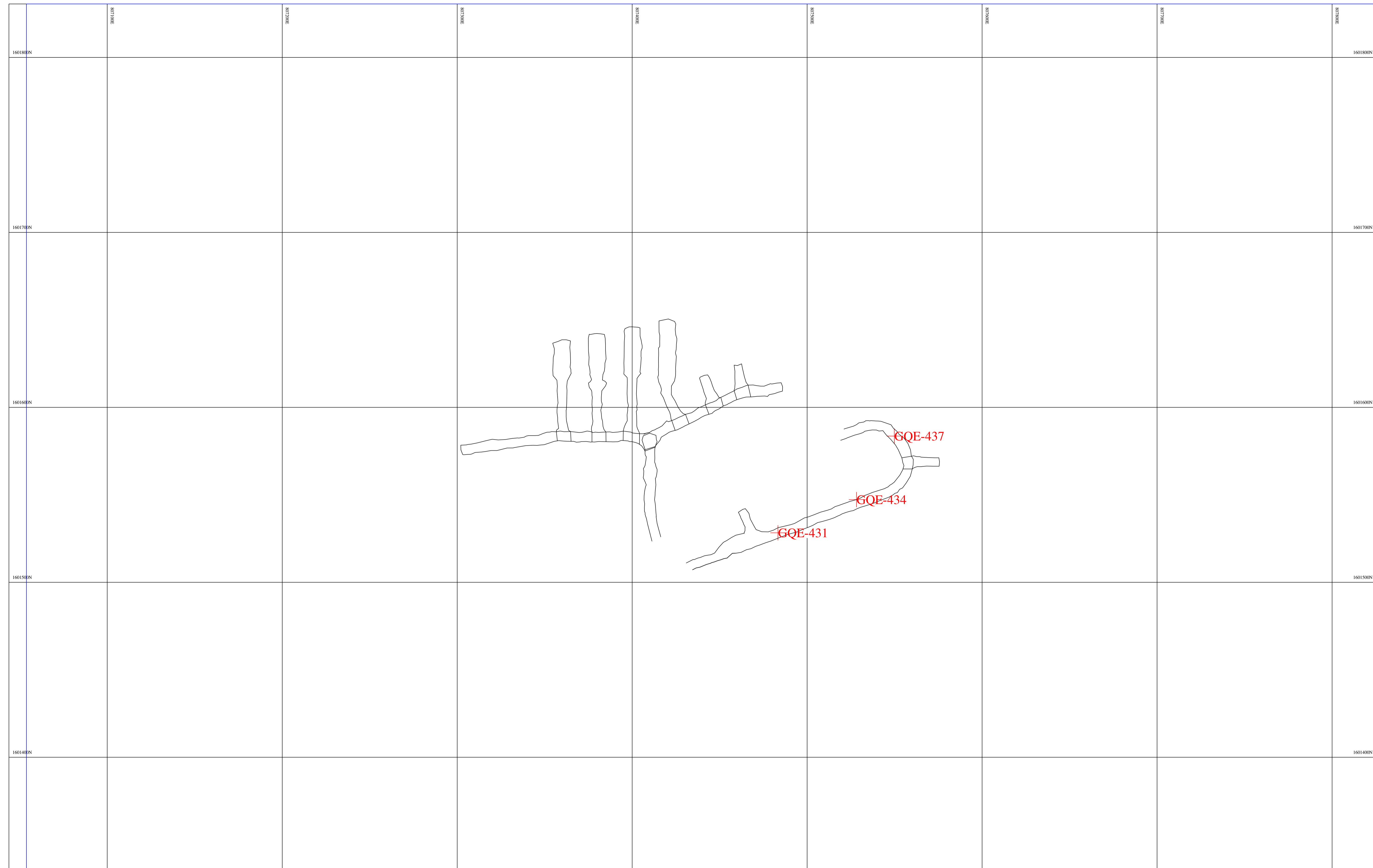
febrero-abril_2015_02



Plano ARD Rampa Nivel 1430

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

febrero-abril_2015_03



Plano ARD Rampa ZE Nivel 1460

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

febrero-abril_2015_04

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 8.13 a 10.30 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-409	02/02/2015	11/02/2015	9.16	18.3
GQE-410	02/02/2015	11/02/2015	8.45	18.5
GQE-411	07/02/2015	11/02/2015	8.41	19.4
GQE-412	07/02/2015	11/02/2015	8.5	19.1
GQE-413	07/02/2015	11/02/2015	8.39	20.4
GQE-414	08/02/2015	11/02/2015	8.79	19.9
GQE-415	08/02/2015	11/02/2015	8.5	20.5
GQE-416	10/02/2015	11/02/2015	8.57	20.8

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-417	17/02/2015	22/02/2015	8.8	22.3
GQE-418	19/02/2015	22/02/2015	8.89	22.3
GQE-419	20/02/2015	22/02/2015	9.82	22.6
GQE-420	20/02/2015	22/02/2015	8.78	22.3
GQE-421	20/02/2015	22/02/2015	9.64	22.4
GQE-422	21/02/2015	22/02/2015	8.59	21.1
GQE-423	21/02/2015	22/02/2015	8.66	21.4
GQE-424	01/03/2015	02/03/2015	8.65	20.1
GQE-425	01/03/2015	02/03/2015	9.1	20.1
GQE-426	08/03/2015	15/03/2015	8.97	18.0
GQE-427	12/03/2015	15/03/2015	8.8	18.1
GQE-428	13/03/2015	15/03/2015	8.79	18.0
GQE-429	13/03/2015	15/03/2015	8.97	17.9
GQE-430	13/03/2015	15/03/2015	9.05	17.9
GQE-431	13/03/2015	15/03/2015	9.01	17.6
GQE-432	13/03/2015	15/03/2015	8.83	16.9
GQE-433	13/03/2015	15/03/2015	9.22	16.7
GQE-434	13/03/2015	15/03/2015	9.33	16.2
GQE-435	13/03/2015	15/03/2015	9.09	16.1
GQE-436	14/03/2015	15/03/2015	8.86	16.0
GQE-437	19/03/2015	25/03/2015	8.78	18.6
GQE-438	20/03/2015	25/03/2015	8.79	18.7
GQE-439	20/03/2015	25/03/2015	8.65	19.0
GQE-440	20/03/2015	25/03/2015	8.49	18.5
GQE-441	22/03/2015	25/03/2015	9.1	18.6
GQE-442	01/04/2015	02/04/2015	8.93	20.1
GQE-443	01/04/2015	02/04/2015	9.12	18.6
GQE-444	01/04/2015	02/04/2015	8.44	18.3
GQE-445	01/04/2015	02/04/2015	8.91	19.3
GQE-446	02/04/2015	12/04/2015	8.92	17.5
GQE-447	11/04/2015	12/04/2015	9.65	16.8
GQE-448	11/04/2015	12/04/2015	8.66	16.9
GQE-449	11/04/2015	12/04/2015	9.07	15.9
GQE-450	11/04/2015	12/04/2015	8.91	14.9
GQE-451	12/04/2015	17/04/2015	8.62	17.3
GQE-452	12/04/2015	17/04/2015	8.87	17.3
GQE-453	13/04/2015	17/04/2015	8.61	16.4
GQE-454	15/04/2015	17/04/2015	8.92	15.1

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-455	16/04/2015	17/04/2015	8.73	15.1
GQE-456	16/04/2015	17/04/2015	10.3	16.2
GQE-457	21/04/2015	27/04/2015	8.63	19.7
GQE-458	23/04/2015	27/04/2015	8.36	19.5
GQE-459	23/04/2015	27/04/2015	8.13	22.3
GQE-460	23/04/2015	27/04/2015	8.73	23.2
GQE-461	24/04/2015	27/04/2015	8.54	23.2
GQE-462	25/04/2015	27/04/2015	8.69	22.8
GQE-463	25/04/2015	27/04/2015	8.78	21.9
GQE-464	25/04/2015	27/04/2015	8.47	22.2
GQE-465	25/04/2015	27/04/2015	8.84	21.7
GQE-466	26/04/2015	27/04/2015	8.66	20.8

Fuente: MSR, 2015.

9 Mediciones de Seguridad Industrial y Salud Ocupacional

9.1 Presión Sonora

La medición de Presión Sonora en el trimestre de Febrero a Abril 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 sugeridos por la norma 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	Feb	Mar	Abr
Fecha	01/02/15	10/03/15	14/03/15
Hora Inicio	7:00	7:00	7:00
Duración	11h	11h	11h
Lmax dBA	92,6	87,2	91,8
Lmin dBA	90,1	86	91,3
Prom. Diurno dBA	91,35	86,6	91,55
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	91,35	86,6	91,55
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	76,85	72,1	77,05
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - MOLINO	2015		
Mes	Feb	Mar	Abr
Fecha	03/02/15	09/03/15	14/04/15
Hora Inicio	7:00	7:00	7:00
Duración	11h	11h	11h
Lmax dBA	98,5	99,2	93,4
Lmin dBA	98,2	98,1	93,1
Prom. Diurno dBA	98,35	98,65	93,25
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	98,35	98,65	93,25
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	83,85	84,15	78,75
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - FILTROS	2015		
Mes	Feb	Mar	Abr
Fecha	03/02/15	12/03/15	13/04/15
Hora Inicio	7:00	7:00	7:00
Duración	11h	11h	11h
Lmax dBA	86,7	87,2	90,3
Lmin dBA	86,2	86,8	90,1
Prom. Diurno dBA	86,45	87	90,2
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	86,45	87	90,2
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	71,95	72,5	75,7
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Puesto de Operador de Scoop	2015		
Mes	Feb	Mar	Abr
Fecha	02/02/15	10/03/15	07/04/15
Hora Inicio	7:00	7:00	7:00
Duración	10h 30min	10h 30min	10h 30min
Lmax dBA	93	94	93,3
Lmin dBA	91	92	90
Prom. Diurno dBA	92	93	91,65
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	92	93	91,65
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	77,5	78,5	77,15
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Puesto de Operador de Jumbo	2015		
Mes	Feb	Mar	Abr
Fecha	03/02/15	10/03/15	01/04/15
Hora Inicio	7:00	7:00	7:00
Duración	10h 30min	10h 30min	10h 30min
Lmax dBA	104	94	102,5
Lmin dBA	101	92	98
Prom. Diurno dBA	102,5	93	100,25
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	102,5	93	100,25
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	88	78,5	85,75
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Puesto de Operador de Boltec	2015		
Mes	Feb	Mar	Abr
Fecha	04/02/15	05/03/15	01/04/15
Hora Inicio	7:00	7:00	7:00
Duración	10h 30min	10h 30min	10h 30min
Lmax dBA	103,2	90,3	90,1
Lmin dBA	100,6	88,5	86
Prom. Diurno dBA	101,9	89,4	88,05
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86
Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	101,9	89,4	88,05
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	87,4	74,9	73,55
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							XIII				
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		Febrero	Marzo	Abril		
Fecha					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	20/02/2015	28/03/2015	30/04/2015
Hora Inicio									7:00	7:00	7:00
Duración									11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄	mg/m³	5	16667	150	150	50	0,053	0,014	0,021		
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,169	0,029	0,105		

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							XIII				
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		Febrero	Marzo	Abril		
Fecha					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	20/02/2015	28/03/2015	30/04/2015
Hora Inicio									7:00	7:00	7:00
Duración									11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄	mg/m³	5	16667	150	150	50	0,013	0,011	0,146		
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,006	0,012	0,146		

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							XIII				
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		Febrero	Marzo	Abril		
Fecha					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	11/11/2014	28/03/2015	30/04/2015
Hora Inicio									7:00	7:00	7:00
Duración									11 h	11 h	11 h
OSHA Fraccion Respirable PM ₄	mg/m³	5	16667	150	150	50	0,081	0,018	0,022		
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,143	0,068	0,071		

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							XIII				
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		Febrero	Marzo	Abril		
Fecha					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	19/02/2015	21/03/2015	25/04/2015
Hora Inicio									7:00	7:00	7:00
Duración									10h 30min	10h 30min	10h 30min
OSHA Fraccion Respirable PM ₄	mg/m³	5	16667	150	150	50	0,38	0,844	0,769		
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,66	2,45	0,893		

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							XIII				
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		Febrero	Marzo	Abril		
Fecha					OSHA	USEPA¹	BANCO MUNDIAL²	OMS³	13/11/2014	21/03/2015	25/04/2015
Hora Inicio									7:00	7:00	7:00
Duración									10h 30min	10h 30min	10h 30min
OSHA Fraccion Respirable PM ₄	mg/m³	5	16667	150	150	50	0,133	0,259	0,406		
OSHA Polvo Total @ PM ₁₀	mg/m³	15	50000	150	150	50	0,527	0,823	0,584		

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

Fuente: MSR, 2015.

9.3 Mediciones de Gas

Las mediciones de Gas, se hacen en forma rutinaria (turno a turno) y debido a que no se ha rebasado los límites permisibles cuando se encuentra maquinaria presente trabajando en las áreas según norma OSHA (Tabla Z1 1910.100 Límites para aires contaminados), los sistemas de ventilación se mantienen trabajando de manera normal. Como se puede apreciar en el Cuadro 9-3 se siguió monitoreando la no presencia de Ácido Sulfhídrico - Sulfuro de Hidrógeno (H_2S) y se omitirá hasta detectarse la primera vez. Para el presente monitoreo, 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 IV trimestre 2013, acorde a procedimiento de tomar la primera etapa del ciclo que aparezca.

FECHA	Lugar	Maquinaria	Etapa de Ciclo	CO (PPM)	H2S (PPM)	Hora	Turno	Reportado por
				Límite Máximo Turno 25ppm, Exposición Breve 50 ppm	Límite 10ppm, Valores mayores a 1ppm alertar.			
01-feb-15	1215 CFTE	Ninguna	Medición posterior a voladura	29	0	7:18	Diurno	Ludyn Lima
	1190 6480 OC	Ninguna	Medición posterior a voladura	15	0	7:25		
	1190 CFTE OC	Ninguna	Medición posterior a voladura	15	0	7:25		
	1440 Ramp ZE	Ninguna	Medición posterior a voladura	9	0	6:49		
	1290 6650 EC	Ninguna	Medición posterior a voladura	14	0	7:05		
	1265 6650 EC	Ninguna	Medición posterior a voladura	3	0	7:11		
	1340 Vent E.C	Ninguna	Medición posterior a voladura	12	0	6:58		
01-mar-15	1240 CFTE E.C	Ninguna	Medición posterior a voladura	14	0	7:15	Diurno	Marvin López
	1240 6880 E.C	Ninguna	Medición posterior a voladura	14	0	7:15		
	1290 6460 Producción	Ninguna	Medición posterior a voladura	22	0	7:10		
	1435 Ramp ZE	Ninguna	Medición posterior a voladura	18	0	6:55		
	1365 6800 E.C	Ninguna	Medición posterior a voladura	15	0	7:00		
	1265 6460 Producción	Ninguna	Medición posterior a voladura	0	0	7:10		
	1340 6620 E.C	Ninguna	Cargando explosivos tiro largo	7	0	14:00		
	Taller móvil	HT, JD 02	Reparación de camion y de Jumbo	0	0	15:00		
	01-abr-15	1240-SERV.EC	Ninguna	Medición posterior a voladura	17	0		
1190-CFTE.OC		Ninguna	Medición posterior a voladura	16	0	7:19		
1290-8370.OC		Ninguna	Medición posterior a voladura	39	0	7:00		
1265-6370.OC		Ninguna	Medición posterior a voladura	0	0	7:05		
1240-6720.EC		RB-06	Reparación de Boltec	15	0	8:45		
1240-CFTE.EC		JD-05	Perforación	0	0	11:00		

Fuente: MSR, 2015.

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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 y OMS (**SO₂ y NO₂**). Los niveles de **PM₁₀** se encontraron dentro de los valores máximos y mínimos registrados durante el establecimiento de la línea base, a excepción de la estación EA-4A y la concentración de metales registrada durante el presente trimestre, es similar a lo reportado en 2014.

10.2 Mediciones del agua, sedimentos y efluentes en el ambiente

- 2) Del control de calidad (blancos de campo) realizado a los dos laboratorios subcontratados (Laboratorio Ecosistemas Proyectos Ambientales S.A. y ACZ Laboratories, Inc.) para el análisis de agua superficial y efluentes, se obtuvieron resultados confiables tanto en la manipulación de las muestras como en los resultados de los análisis.
- 3) El agua superficial (**SW**), subterránea (**GW**) y los pozos de monitoreo (**MW**) presentaron un pH alcalino y dentro del rango establecido por la USEPA para la salud humana. No se detectó mercurio y cianuro total en ninguna categoría de agua (SW, GW y MW). Se registraron sólidos suspendidos totales en SW, GW y MW y los resultados encontrados están por debajo de lo establecido por las guías del banco mundial (50 mg/L). Se detectaron cloruros 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 y MW en concentraciones por debajo de lo sugerido por la USEPA y por debajo del rango de lo establecido durante la línea base. Los sólidos disueltos totales y sulfatos totales se detectaron en MW, GW y SW en concentraciones por debajo de lo establecido por la USEPA y de lo registrado durante el establecimiento de la línea base respectivamente.
- 4) El efluente (**WW9**) de la planta de tratamiento de aguas residuales de tipo especial del proceso de minado cumple con el Acuerdo Gubernativo 236-2006 para entes generadores nuevos para todas las muestras tomadas durante Febrero a Abril 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 P100 Homologación NIOSH.

11 Anexos

11.1 Caudal Bombeado de Túneles a Planta de Tratamiento y su Descarga Hacia la Quebrada El Escobal

En las siguientes tablas se presentan las lecturas diarias realizadas a los flujómetros instalados en las cuatro tuberías provenientes de los portales (2 tuberías por portal) y el flujómetro instalado en el clarificador de la Planta de tratamiento de aguas residuales especiales, así como los cálculos del volumen bombeado durante el día de medición y el caudal proyectado por día en cada una de estas tuberías.

El volumen bombeado por día se determinó restando el volumen acumulado del día anterior al volumen acumulado de ese día. El caudal proyectado se determinó suponiendo que el bombeo de agua es constante durante las 24 horas del día (caudal = volumen/tiempo).

Los flujómetros instalados son de tipo ultrasónicos o de efecto Doppler, los cuales tienen la característica de medir el flujo en dos direcciones. Las bombas empleadas para descargar agua procedente de los sumideros ubicados en los portales trabajan a nivel, por tanto se descartan las lecturas de caudal instantáneo ya que los flujómetros instalados registran tanto el caudal instantáneo de ida (signo positivo) como el caudal instantáneo de retorno (signo negativo), lo que conllevaría a reportar caudales menores a los observados en campo.

Febrero 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
LECTURA FLUJÓMETRO (m³)																												
Portal Este (tubería 6")	572717	574416	575903	577167	578988	581164	583471	586150	587286	588031	588511	588737	589727	590709	591591	592453	592512	592550	592847	593179	593446	593446	593446	593446	593446	593455	594003	594663
Total Este (tubería 8")	402248	NL	NL	NL	NL	NL	401.27	401.27	10204.4	54710.3	58856	58884	184575	184575	184575	184575	184839	186182	209361	267365	403858	556652	764638	853048	914135	943664	943664	943694
Portal Oeste (tubería 6")	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220736	220750	220750	220750	220750	220750	220750	220750	220750	220750	220750	220750	220750	220750	220750	220750
Portal Oeste (tubería 8")	1539626	1541895	1544408	1546759	1548645	1550295	1551973	1554263	1555810	1558114	1560962	1563575	1565532	1568325	1570166	1572361	1575812	1579187	1581764	1584433	1587562	1590953	1594480	1597608	1601374	1604881	1608250	1612514
Clarificador	2865952	2869091	2872721	2875868	2879033	2882687	2885914	2888431	2892128	2895115	2898237	2900988	2903813	2907596	2910493	2913469	2916967	2920494	2924019	2927626	2930993	2933983	2936895	2939773	2943213	2946490	2950332	2956305
VOLUMEN BOMBEADO (m³)																												
Portal Este (tubería 6")	1556	1699	1487	1264	1821	2176	2307	2679	1136	745	480	226	990	982	882	862	59	38	297	332	267	0	0	0	0	9	548	660
Total Este (tubería 8")	250089	NL	NL	NL	NL	NL	401	0	9803	44506	4146	28	125691	0	0	0	264	1343	23179	58004	136493	152794	207986	88410	61087	29529	0	30
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	2472	2269	2513	2351	1886	1650	1678	2290	1547	2304	2848	2613	1957	2793	1841	2195	3451	3375	2577	2669	3129	3391	3527	3128	3766	3507	3369	4264
Clarificador	3684	3139	3630	3147	3165	3654	3227	2517	3697	2987	3122	2751	2825	3783	2897	2976	3498	3527	3525	3607	3367	2990	2912	2878	3440	3277	3842	5973
CAUDAL PROYECTADO (gpm)																												
Portal Este (tubería 6")	285	311	273	232	334	399	423	491	208	137	88	41	182	180	162	158	11	7	54	61	49	0	0	0	0	2	100	121
Total Este (tubería 8")	45850	NL	NL	NL	NL	NL	74	0	1797	8159	760	5	23043	0	0	0	48	246	4249	10634	25024	28012	38131	16209	11199	5414	0	6
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portal Oeste (tubería 8")	453	416	461	431	346	303	308	420	284	422	522	479	359	512	338	402	633	619	472	489	574	622	647	573	690	643	618	782
Clarificador	675	575	666	577	580	670	592	461	678	548	572	504	518	694	531	546	641	647	646	661	617	548	534	528	631	601	704	1095

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

Marzo 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")	594873	594888	0.11	-0.028	588.35	693.34	808.97	1427.79	1881.25	2028.93	2472.55	3446.68	4420.19	4932.46	5056.57	5377.14	5876.27	6303.85	7108.44	7968.21	9000.86	9407.27	10080.1	10841.4	11895.4	12578.5	13280.7	14001.5	14265.9	14486.6	15048.1
Total Este (tubería 8")	943694	943717	0	0	147.527	147.52	147.527	147.527	147.527	283.26	302.65	302.65	302.65	19179.1	19353.1	20953.1	44782	82586	82586	104772	105070	107898	175877	176614	182487	186633	199378	309541	309541	325396	325431
Portal Oeste (tubería 6")	220733	220817	19.8	331.8	416.6	879.7	1003	1299.3	2330.8	220869	221020	221021	221869	222889	223759	224712	220740	220738	220740	220740	220740	220738	220738	220738	220738	220738	220738	220741	221690	222759	
Portal Oeste (tubería 8")	1615541	1618841	3278.9	6909.4	9981.4	13432.8	17120.3	19647.5	22998.5	26493	29650.7	32618.1	35936.8	39552.3	42820.6	45955.7	49837.3	53590.6	57099.7	60562.1	63928.9	67243.4	70591.5	73903.5	76588.5	79815.1	82532.5	85682.9	88349.8	91497.3	94130.4
Clarificador	2958800	2962260	2965472	2968954	2972712	2976596	2980929	2984080	2988146	2991287	2995491	2998838	3001875	3005816	3009421	3013251	3017406	3021226	3024747	3028455	3032420	3036029	3039267	3044061	3047440	3050956	3054475	3058340	3061735	3065039	3068159
VOLUMEN BOMBEADO (m³)																															
Portal Este (tubería 6")	210	15	-594888	0	588	105	116	619	453	148	444	974	974	512	124	321	499	428	805	860	1033	406	673	761	1054	683	702	721	264	221	562
Total Este (tubería 8")	0	23	-943717	0	148	0	0	0	0	136	19	0	0	18876	174	1600	23829	37804	0	22186	298	2828	67979	737	5873	4146	12745	110163	0	15855	35
Portal Oeste (tubería 6")	-17	84	-220797	312	85	463	123	296	1032	218538	151	1	848	1020	870	953	-3972	-2	2	0	0	0	-2	0	0	0	0	0	3	949	1069
Portal Oeste (tubería 8")	3027	3300	-1615562	3631	3072	3451	3688	2527	3351	3495	3158	2967	3319	3616	3268	3135	3882	3753	3509	3462	3367	3314	3348	3312	2685	3227	2717	3150	2667	3148	2633
Clarificador	2495	3460	3212	3482	3758	3884	4333	3151	4066	3141	4204	3347	3037	3941	3605	3830	4155	3820	3521	3708	3965	3609	3238	4794	3379	3516	3519	3865	3395	3304	3120
CAUDAL PROYECTADO (gpm)																															
Portal Este (tubería 6")	39	3	-109063	0	108	19	21	113	83	27	81	179	178	94	23	59	92	78	148	158	189	75	123	140	193	125	129	132	48	40	103
Total Este (tubería 8")	0	4	-173015	0	27	0	0	0	0	25	4	0	0	3461	32	293	4369	6931	0	4067	55	518	12463	135	1077	760	2337	20197	0	2907	6
Portal Oeste (tubería 6")	-3	15	-40479	57	16	85	23	54	189	40065	28	0	155	187	160	175	-728	0	0	0	0	0	0	0	0	0	0	1	174	196	
Portal Oeste (tubería 8")	555	605	-296186	666	563	633	676	463	614	641	579	544	608	663	599	575	712	688	643	635	617	608	614	607	492	592	498	578	489	577	483
Clarificador	457	634	589	638	689	712	794	578	745	576	771	614	557	723	661	702	762	700	646	680	727	662	594	879	619	645	645	709	622	606	572

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

Abril 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")	15448.6	15948.9	16186.8	16909.5	17275	17447.7	17688.2	17857.5	17978.3	18052.7	18194	18490.3	18661.8	18944.4	19008.5	19070.2	19171.1	19374.3	19874.9	20487.1	21025.8	21970.9	22859	23666.9	24542.4	25198.4	26067	26711.4	27363.6	28431.7
Total Este (tubería 8")	325452	380490	409744	409806	409806	413372	413399	415254	415254	415254	415254	483940	642524	642524	803859	859769	893348	893692	895847	897483	898801	899001	900404	912248	923814	927101	931934	1130914	1136469	
Portal Oeste (tubería 6")	220738	220739	221323	221954	222754.9	223113	224228	224721	225872	227134	228370	229582	230181	230238	220739	220744	221417	222504	223441	224331	225286	226290	227260	227725	220743	220739	220741	221354	221921	220989
Portal Oeste (tubería 8")	97352.4	100884	104241	106799	109947	112951	115562	119285	122637	125858	128715	131333	134357	137300	140351	143490	146738	149693	152770	155946	158856	161812	164661	167223	170075	172994	175611	177975	180601	183692
Clarificador	3073334	3075683	3079802	3083077	3087172	3089971	3092857	3096261	3099697	3102979	3106099	3108316	3111597	3114976	3118015	3121219	3124420	3127657	3130476	3134548	3137904	3141758	3146114	3148981	3152999	3156557	3160216	3164000	3167379	3170961
VOLUMEN BOMBEADO (m³)																														
Portal Este (tubería 6")	401	500	238	723	366	173	241	169	121	74	141	296	172	283	64	62	101	203	501	612	539	945	888	808	876	656	869	644	652	1068
Total Este (tubería 8")	21	55038	29254	62	0	3566	27	1855	0	0	0	0	68686	158584	0	161335	55910	33579	344	2155	1636	1318	200	1403	11844	11566	3287	4833	198980	5555
Portal Oeste (tubería 6")	-2021	1	584	631	800.9	358	1115	493	1151	1262	1236	1212	599	57	-9499	5	673	1087	937	890	955	1004	970	465	-6982	-4	2	613	567	-932
Portal Oeste (tubería 8")	3222	3531.6	3357	2558	3148	3004	2611	3723	3352	3221	2857	2618	3024	2943	3051	3139	3248	2955	3077	3176	2910	2956	2849	2562	2852	2919	2617	2364	2626	3091
Clarificador	5175	2349	4119	3275	4095	2799	2886	3404	3436	3282	3120	2217	3281	3379	3039	3204	3201	3237	2819	4072	3356	3854	4356	2867	4018	3558	3659	3784	3379	3582
CAUDAL PROYECTADO (gpm)																														
Portal Este (tubería 6")	73	92	44	132	67	32	44	31	22	14	26	54	31	52	12	11	18	37	92	112	99	173	163	148	161	120	159	118	120	196
Total Este (tubería 8")	4	10090	5363	11	0	654	5	340	0	0	0	0	12592	29074	0	29578	10250	6156	63	395	300	242	37	257	2171	2120	603	886	36480	1018
Portal Oeste (tubería 6")	-371	0	107	116	147	66	162	90	211	231	227	222	110	10	-1741	1	123	199	172	163	175	184	178	85	-1280	-1	0	112	104	-171
Portal Oeste (tubería 8")	591	647	615	469	577	551	479	683	615	591	524	480	554	540	559	575	595	542	564	582	534	542	522	470	523	535	480	433	481	567
Clarificador	949	431	755	600	751	513	529	624	630	602	572	406	602	619	557	587	587	593	517	747	615	707	799	526	737	652	671	694	619	657

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

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

Febrero 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
Efluente Planta de Tratamiento Agua de Túneles (WW9)																													
pH	u.e.	7.66	7.47	7.66	7.5	7.54	7.5	7.54	7.43	7.32	7.24	7.55	7.27	7.3	7.66	7.56	8.71	7.22	7.49	7.28	7.55	7.58	7.44	7.26	7.43	6.98	7.28	7.45	7.72
Temperatura	°C	24.4	25.8	24.1	24.5	24.4	22.7	23.4	24.9	25.3	25.8	24.5	26.5	23.9	23.4	23.7	24.1	24.7	25.1	24.1	24.7	24.08	25.4	25.1	25	25.5	25.2	24.1	26.1
Conductividad	µS/cm	2084	2101	2120	2114	2030	2132	2095	2122	2360	2019	2104	2071	2071	2111	2117	2064	2078	2039	2028	2052	2019	2075	1907	1901	1732	1969	1396	2019
Turbidez	NTU	22.9	15.2	15	8.74	9.72	8.8	4.99	7.22	7.1	13.4	3.19	7.18	4.96	7.84	9.45	7.3	NA	5.26	2.98	5.58	9.04	11.1	5.64	17.4	10.1	7.28	8.6	7.5
kit CN	mg/L	0.003	0.004	0.004	0.004	0.000	0.003	0.003	0.001	0.003	0.004	0.003	0.005	0.002	0.000	0.000	0.003	0.010	0.009	0.004	0.005	0.003	0.001	0.006	0.005	0.005	0.005	0.004	0.003
CN Total		NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	<0.003	NA	NA	NA	NA	<0.003	NA	NA	NA	<0.003	NA	<0.003	NA	<0.003
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																													
pH	u.e.	Pileta sin agua																											
Temperatura	°C																												
Conductividad	µS/cm																												
Turbidez	NTU																												
Kit CN	mg/L																												
CN Total																													

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

Marzo 2015																																		
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
Efluente Planta de Tratamiento Agua de Túneles (WW9)																																		
pH	u.e.	7.55	7.15	7.67	7.75	7.53	7.42	7.37	7.5	7.2	7.62	7.31	8.92	7.58	7.57	7.17	7.68	7.37	7.75	7.45	6.76	7.41	7.55	7.52	7.54	7.44	7.82	7.79	7.79	7.08	7.65	7.62		
Temperatura	°C	24.2	25.3	24.7	24	26.1	25.3	24	24.1	27.9	24.1	26	25.4	25.5	24.8	24.9	24.9	24.4	26.8	25.2	24.9	25.6	26.8	26.2	26	24.5	26.3	25.8	25.7	26.3	23.4	18		
Conductividad	µS/cm	2069	1969	2228	2217	1854	1867	1836	1891	1899	1795	2026	2081	1998	2037	1884	1852	1770	1804	1777	1973	1787	1853	1642	1905	1913	1819	1774	2107	2004	1946	1989		
Turbidez	NTU	7.2	7.62	6.5	10.6	6.39	25.3	4.68	24	6.88	3.53	10.4	7.45	12.2	6.84	5.2	5.53	7.12	6.58	10.1	9.58	6.29	12.9	11.7	9.33	5.91	12.1	10.7	14.7	5.75	10.3	17.3		
kit CN	mg/L	0.003	0.002	0.009	0.005	0.002	0.022	0.012	0.002	0.003	0.008	0.004	0.005	0.003	0.004	0.004	0.003	0.005	0.003	0.002	0.006	0.002	0.000	0.003	0.003	0.004	0.001	0.003	0.000	0.007	0.004	0.000		
CN Total		<0.003	NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	NA	<0.03	NA	<0.003	NA	NA	NA	NA	<0.003	NA	0.004	<0.003	NA	
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																																		
pH	u.e.	Pileta sin agua																		7.65	7.44	7.57	7.58	8.41	9.21	9.44	Pileta sin agua				8.07	8.32	7.6	8.59
Temperatura	°C																			18.8	19.3	18.3	19.9	19.8	19.1	18.8					18	18.9	18.6	19.1
Conductividad	µS/cm																			4342	343.4	777	1017	755.8	970.3	1002					1048	1020	755.2	896.1
Turbidez	NTU																			9.89	123	17	3.01	35.7	13.4	11.7					20.2	15.9	14.6	9.7
Kit CN	mg/L																			0.001	0.000	0.000	0.007	0.000	0.000	0.000					NA	0.016	0.005	0.001
CN Total																				NA	NA	NA	NA	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.

Abril 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.	7.63	6.94	7.54	7.43	7.57	7.92	7.56	7.33	7.38	7.52	7.88	7.37	7.77	7.75	7.55	7.99	7.7	8.62	7.44	6.87	6.99	7.88	7.44	7.14	7.1	7.06	7.24	7.28	7.47	7.54
Temperatura	°C	26	26.9	26.9	26.8	26.5	25.6	25	24.4	26	25.5	28.6	26	27.9	27	26.9	27.3	27.2	625.6	27.6	26.9	26.5	27.3	27.4	26.6	27.5	27.6	28	27	27.8	29.9
Conductividad	µS/cm	1732	1847	189.2	186.3	1905	1989	2237	1865	2509	2001	2042	2032	1949	2012	1991	2047	2211	2162	2034	2007	1904	1995	1915	1843	1956	2002	2192	1943	1909	2665
Turbidez	NTU	6.43	5.59	5.46	5.38	9.28	10.7	8.03	6.84	7.01	5.31	10.4	5.1	4.48	5.56	6.9	7.59	2.92	3.94	4.71	2.19	2.19	3.3	6.02	3.44	9.2	3.84	2.2	4.96	8.9	14
kit CN	mg/L	0.003	0.004	0.004	0.003	0.005	0.000	0.000	0.000	0.002	0.002	0.001	0.001	0.004	0.003	0.004	0.004	0.001	0.004	0.002	0.003	0.005	0.003	0.004	0.004	0.005	0.001	0.004	0.007	0.002	0.004
CN Total		NA	NA	0.004	NA	0.004	NA	NA	NA	NA	NA	0.004	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	0.004	NA	NA	0.003	NA	NA	NA	NA
Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)																															
pH	u.e.	NA	NA	8.07	NA	7.85	8.22	8.19	7.68	7.42	7.22	7.47	7.42	7.89	7.85	7.57	6.47	7.71	7.78	8.3	8.44	9.3	9.93	10.24	10.3	10.38	10.07	10.27	10.15	8.11	9.28
Temperatura	°C	NA	NA	19.1	NA	19.7	17	15.8	17.8	18.3	19.7	21.4	18	22.1	20.5	22.1	22.3	22.7	22.7	22.6	23.1	23.6	23.1	22	24	24.8	25.9	24.1	24.5	21.3	22.5
Conductividad	µS/cm	NA	NA	876.3	NA	1046	1390	1471	1408	1445	1468	1458	1568	284.1	164	205.1	1123	847.9	668.3	188.9	183	186.5	210.3	202.1	216.4	218.9	213.2	288.7	224	105.3	174
Turbidez	NTU	NA	NA	19.4	NA	35.9	58	75.2	114	91.1	71.4	55.1	48.8	123	155	130	110	116	96	108	97.6	97.4	94.9	72.9	54.5	44.7	40.9	37.1	31	19.2	153
kit CN	mg/L	0.002	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.002	0.000	0.001	0.000	0.009	0.001	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.002	0.000
CN Total		NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	NA	NA	0.003	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA

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

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

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

11.3 Resultados crudos de calidad de aire

11.3.1 Material Particulado (PM₁₀)

BGI PQ200 Air Sampling System

Downloaded February 2015

Job Details:

Job Name: EA-1A
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	652	646	649	mmHg
TA	29.7	15.3	19.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	3-Feb-15	14:23:00
Stop:	4-Feb-15	14:23:00

Mass Concentration Data:

Filter ID:	2563-0717
Final Wt:	147.200 mg
Initial Wt:	146.660 mg
Delta Wt:	0.540 mg
Total Vol:	20.91 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 25.83 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded February 2015

Job Details:

Job Name: EA-1B
Version: PQ200
Serial No: 2.00
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	654	648	652	mmHg
TA	23.2	15.5	18.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Feb-15	15:50:00
Stop:	13-Feb-15	15:50:00

Mass Concentration Data:

Filter ID:	2583-0101
Final Wt:	147.200 mg
Initial Wt:	146.660 mg
Delta Wt:	0.540 mg
Total Vol:	21.11 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 25.58 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded February 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	635	630	632	mmHg
TA	24.5	13.6	16.7	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	5-Feb-15	15:26:00
Stop:	6-Feb-15	15:26:00

Mass Concentration Data:

Filter ID:	2564-1410
Final Wt:	146.950 mg
Initial Wt:	146.180 mg
Delta Wt:	0.770 mg
Total Vol:	20.57 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 37.43 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 February 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	627	622	625	mmHg
TA	27.9	11.7	16.5	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Feb-15	14:10:00
Stop:	11-Feb-15	14:10:00

Mass Concentration Data:

Filter ID:	2580-1515
Final Wt:	148.200 mg
Initial Wt:	147.390 mg
Delta Wt:	0.810 mg
Total Vol:	20.36 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 39.79 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 February 2015

Job Details:

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

Job Code: EA-3A
Site Name: Aldea El Fucío
Station Code:
Operators: EvQ
User1: NA
User2: NA

	Max	Min	Avg	Units
BP	646	641	644	mmHg
TA	24.9	13.5	17.1	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Feb-15	15:10:00
Stop:	13-Feb-15	15:10:00

Mass Concentration Data:

Filter ID:	2582-1740
Final Wt:	148.810 mg
Initial Wt:	147.570 mg
Delta Wt:	1.240 mg
Total Vol:	20.94 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 59.20 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 February 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	652	646	650	mmHg
TA	26.6	13.5	18.7	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Feb-15	15:10:00
Stop:	13-Feb-15	15:10:00

Mass Concentration Data:

Filter ID:	2536-0515
Final Wt:	151.650 mg
Initial Wt:	147.230 mg
Delta Wt:	4.420 mg
Total Vol:	21.02 m ³

QCV NA %

Max overheat NA °C
occured NA

ET: 23:59:00

Mass Conc: 210.23 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 February 2015

Job Details:

Job Name: EA-5A
Version: PQ200
Serial No: 3.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	655	650	652	mmHg
TA	29.5	12.0	19.9	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	17-Feb-15	09:45:00
Stop:	18-Feb-15	09:45:00

Mass Concentration Data:

Filter ID:	2584-0202
Final Wt:	148.310 mg
Initial Wt:	146.370 mg
Delta Wt:	1.940 mg
Total Vol:	21.00 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 92.37 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 February 2015

Job Details:

Job Name: EA-6
Version: PQ200
Serial No: 2.00
Pump Time:
Flags: NA

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

	Max	Min	Avg	Units
BP	646	641	643	mmHg
TA	31.1	14.7	20.4	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	17-Feb-15	10:20:00
Stop:	18-Feb-15	10:20:00

Mass Concentration Data:

Filter ID:	2585-0303
Final Wt:	148.880 mg
Initial Wt:	147.840 mg
Delta Wt:	1.040 mg
Total Vol:	20.68 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 50.30 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 February 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	652	647	650	mmHg
TA	29.5	15.0	19.8	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	3-Feb-15	13:55:00
Stop:	4-Feb-15	13:55:00

Mass Concentration Data:

Filter ID:	2562-0606
Final Wt:	147.750 mg
Initial Wt:	147.250 mg
Delta Wt:	0.500 mg
Total Vol:	20.95 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 23.87 µg/m³

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

Notes 2: Minera San Rafael, S.A.

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-055 (El Escobal)
Análisis de muestras: Marzo 09 al 10 de 2015
Emisión del reporte: Marzo, 10 de 2015

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

Análisis: Gravimetría de partículas en filtro de calidad del aire.

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

Acreditado ISO 17025 según resolución OGA-LE-050-12.

No.	Identificación de la muestra	Código de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
LDM			0.00005	
1	EA-1A	2563-0717	0.14666	0.14720
2	EA-1B	2583-0101	0.14526	0.14674
3	EA-2A	2564-1410	0.14618	0.14695
4	EA-3	2580-1515	0.14739	0.14820
5	EA-3A	2581-1616	0.14757	0.14881
6	EA-4A	2582-1740	0.14723	0.15165
7	EA-5A	2584-0202	0.14637	0.14831
8	EA-6	2585-0303	0.14787	0.14888
9	EA-7A	2562-0606	0.14725	0.14775
10	EA-10	2587-0525	0.14745	0.14753

¹: Código asignado por Laboratorio Ambiental, S.A. *: corresponde a los pesos iniciales indicados en reportes analíticos RA-14-11290 y RA-15-11302.

Anexos:

Anexo 1. Cadena de Custodia R-02-000484

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Marzo, 10/15	E.M.	Marzo, 10/15	A.G.J.	Marzo, 11/15	01

BGI PQ200 Air Sampling System

Downloaded January 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	650	646	648	mmHg
TA	33.2	16.6	22.7	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Mar-15	10:54:00
Stop:	11-Mar-15	10:54:00

Mass Concentration Data:

Filter ID:	2608-0929
Final Wt:	147.210 mg
Initial Wt:	146.280 mg
Delta Wt:	0.930 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 38.69 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded January 2015

Job Details:

Job Name: EA-2A
Version: PQ200
Serial No: 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	629	631	mmHg
TA	30.1	15.2	19.2	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Mar-15	12:32:00
Stop:	13-Mar-15	12:32:00

Mass Concentration Data:

Filter ID:	2610-1151
Final Wt:	145.860 mg
Initial Wt:	145.560 mg
Delta Wt:	0.300 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 12.48 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded January 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	627	623	625	mmHg
TA	27.1	13.8	18.4	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	12-Mar-15	13:15:00
Stop:	13-Mar-15	13:15:00

Mass Concentration Data:

Filter ID:	2611-1232
Final Wt:	146.040 mg
Initial Wt:	145.570 mg
Delta Wt:	0.470 mg
Total Vol:	20.22 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 23.24 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded January 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	651	647	651	mmHg
TA	31.8	16.5	22.2	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Mar-15	11:13:00
Stop:	11-Mar-15	11:13:00

Mass Concentration Data:

Filter ID:	2609-1030
Final Wt:	149.450 mg
Initial Wt:	148.410 mg
Delta Wt:	1.040 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured	NA	

ET: 23:59:00

Mass Conc: 43.26 µg/m³

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

Reporte Analítico RA-15-11323

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: Abril, 07 al 08 de 2015.
Emisión de reporte: Abril, 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 según resolución OGA-LE-050-12.

No.	Identificación de la muestra	Código de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2608-0929	0.14628	0.14721
2	EA-2A	2610-1151	0.14556	0.14586
3	EA-3	2611-1232	0.14557	0.14604
4	EA-7	2609-1030	0.14841	0.14945

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11310.

Reporte Analítico RA-15-11323

Anexos:

Anexo 1. Cadena de Custodia R-02-000487.

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Abril, 10/15	E.M.	Abril, 10/15	A.G.J.	Abril, /15	02

BGI PQ200 Air Sampling System

Downloaded April 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	649	644	647	mmHg
TA	32.0	18.7	23.2	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	28-Apr-15	16:12:00
Stop:	29-Apr-15	16:12:00

Mass Concentration Data:

Filter ID:	2613-1434
Final Wt:	146.740 mg
Initial Wt:	145.390 mg
Delta Wt:	1.350 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 56.16 µg/m³

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

BGI PQ200 Air Sampling System

Downloaded April 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	633	628	631	mmHg
TA	30.7	18.7	22.2	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	28-Apr-15	16:55:00
Stop:	29-Apr-15	16:55:00

Mass Concentration Data:

Filter ID:	2620-0303
Final Wt:	148.520 mg
Initial Wt:	147.260 mg
Delta Wt:	1.260 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 52.41 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 April 2015

Job Details:

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

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

	Max	Min	Avg	Units
BP	628	622	626	mmHg
TA	27.3	16.6	19.3	°C
Q	---	---	16.70	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	30-Apr-15	14:43:00
Stop:	1-May-15	14:43:00

Mass Concentration Data:

Filter ID:	2615-1636
Final Wt:	147.210 mg
Initial Wt:	146.800 mg
Delta Wt:	0.410 mg
Total Vol:	20.19 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 20.30 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 April 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	647	649	mmHg
TA	31.8	19.6	23.3	°C
Q	---	---	16.71	Lpm

Timer Information:

	Date	Time
	dd-mmm	hh:mm:ss
Start:	28-Apr-15	15:48:00
Stop:	29-Apr-15	15:48:00

Mass Concentration Data:

Filter ID:	2617-1773
Final Wt:	148.570 mg
Initial Wt:	147.250 mg
Delta Wt:	1.320 mg
Total Vol:	24.04 m ³

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 54.91 µg/m³

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

Reporte Analítico RA-15-11337

Cliente: Minera San Rafael
Dirección: Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV
Proyecto: 178-055 (El Escobal)
Análisis de muestras: Mayo, 08 al 11 de 2015.
Emisión de reporte: Mayo, 12 de 2015.

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

Análisis: Gravimetría en filtros.

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

Acreditado ISO 17025 según resolución OGA-LE-050-12.

No.	Identificación de la muestra	Código de filtro ¹	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2613-1434	0.14539	0.14674
2	EA-2A	2620-0303	0.14726	0.14852
3	EA-3	2615-1636	0.14680	0.14721
4	EA-7A	2617-1773	0.14725	0.14857

¹: Código de filtro asignado por Laboratorio Ambiental, S.A. *: Corresponde a los pesos iniciales indicado en reporte analítico RA-15-11311 y RA-15-11326.

Reporte Analítico RA-15-11337

Anexos:

Anexo 1. Cadena de Custodia R-02-000489.

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Mayo, 12/15	E.M.	Mayo, 12/15	A.G.J.	Mayo, /15	01

11.3.2 Informe de Metales en PM₁₀

Reporte Analítico RA-15-11312

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: Marzo, 25 a 26 de 2015
Emisión del reporte: Marzo, 31 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		2583-0101	2564-1410	2581-1616	2582-1740	2584-0202	2585-0303	2562-0606	2587-0525
Aluminio (Al)	5.0	15.1	16.3	94.8	83.0	30.8	16.1	6.8	< 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	67.4	20.1	101	71.6	50.9	47.0	13.2	< 2.5
Bario (Ba)	0.10	0.33	0.35	0.78	1.65	0.74	0.33	0.22	< 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	0.83	< 0.60	1.03	0.70	0.86	0.62	< 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	28.2	30.6	346	46.9	32.3	20.5	15.1	7.5
Cromo (Cr)	0.50	< 0.50	0.61	8.48	0.75	0.58	0.64	0.55	0.58
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	3.6	< 1.0	< 1.0	1.0
Estroncio (Sr)	0.10	< 0.1	< 0.1	0.40	0.28	0.14	< 0.10	< 0.10	< 0.10
Fósforo (P)	2.5	14.0	14.7	19.4	17.3	15.5	15.6	14.8	15.1
Hierro (Fe)	5.0	15.7	14.9	46.3	74.4	31.6	14.3	7.2	< 5.0

Reporte Analítico RA-15-11312

*Parámetros	LDM (µg)	Estación							
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A	EA-10
Código de filtro		2583-0101	2564-1410	2581-1616	2582-1740	2584-0202	2585-0303	2562-0606	2587-0525
Magnesio (Mg)	5.0	6.0	5.1	14.6	18.7	9.5	5.7	< 5.0	< 5.0
Manganeso (Mn)	0.10	0.58	1.09	1.92	3.20	1.41	0.56	0.34	< 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	2.64	< 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	0.59	0.72	0.55	< 0.30	< 0.30	< 0.30	< 0.30
Potasio (K)	10.0	< 10.0	< 10.0	46.0	24.0	20.0	13.0	< 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	18.9	14.0	20.4	23.6	21.1	11.9	10.8	6.5
Sodio (Na)	5.0	49.7	46.1	92.9	50.0	54.5	54.6	54.0	45.5
Talio (Tl)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanio (Ti)	0.10	0.87	0.86	0.97	4.17	1.67	0.92	0.34	< 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	1.09	4.74	1.43	0.67	< 0.50	< 0.50	< 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.

Anexos:

Anexo 1. Cadena de Custodia R-02-000484

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Marzo, 31/15	A.G.J	Marzo, 31/15	A.G.J.	Marzo, 31/15	01

11.3.3 Informe sobre PST y Gases de Combustión.



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

Marzo – Abril 2015

San Rafael Las Flores, Santa Rosa, Guatemala

Mayo de 2015

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

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

El monitoreo fue realizado por Consultoría y Tecnología Ambiental, S.A. (**CTA**) entre el 09 y 10 y del 18 al 20 de marzo de 2015 para gases de combustión y del 09 de marzo al 09 de abril para partículas sedimentables totales (PST). Las estaciones de medición se presentan en el Cuadro 1 y la metodología utilizada para el muestreo y análisis se presentan en el Cuadro 2.

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

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

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

Cuadro 2: Metodologías utilizadas para SO₂ y NO₂ y PST

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

Fuente: CTA, 2015.

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en marzo de 2015; y en el Cuadro 4 se presentan los resultados de la medición de PST para el período de 30 días de marzo 09 a abril 09 de 2015.

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

Estaciones de Muestreo	LDM	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guías del Banco
SO₂	13	<13	<13	<13	<13	<13	<13	<13	20 $\mu\text{g}/\text{m}^3$
NO₂	9	12	11	9	13	11	< 9	< 9	*40 $\mu\text{g}/\text{m}^3$

SO₂: dióxido de azufre. NO₂: dióxido de nitrógeno. *: Promedio anual. LDM: Limite de detección del método Guías del Banco Mundial (**el Banco**)¹, tomadas de International Finance Corporation (IFC) Industry Sector Guidelines for Mining, December 10, 2007 y General Environment Health and Safety Guidelines, December 19/2008.

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

Cuadro 4: Resultados de la medición de PST g/ ($\text{m}^2 \times 30$ días)

Parámetros	LDM	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía de BC
Sólidos Insolubles	0.0019	12.54	9.50	12.09	24.49	9.19	2.69	2.93	NA
Sólidos Solubles	0.017	2.17	2.25	1.81	2.09	1.96	2.59	1.73	
Sólidos Totales	0.019	14.71	11.74	13.90	26.58	11.15	5.28	4.66	
Partículas sedimentables totales mg/($\text{dm}^2 \cdot \text{día}$)	0.006	4.90	3.91	4.63	8.86	3.72	1.76	1.55	°2.90

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

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

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

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

Gases de Combustión

Como se puede apreciar en el Cuadro 3, el SO₂ se presentó por debajo del límite de detección del método analítico utilizado en todas las estaciones monitoreadas. Mientras que el NO₂ se presentó por debajo del límite de detección del método analítico en las estaciones EA-6 y EA-7A. Las estaciones que presentaron lecturas detectables de NO₂ fueron la EA-1C (12 µg/m³), EA-2B (11 µg/m³), EA-3B (9 µg/m³), EA-4A (13 µg/m³) y EA-5A (11 µg/m³), todas presentan valores que se encuentran por debajo del valor sugerido por la guía de referencia utilizada para comparación.

Partículas Sedimentables Totales

Cinco de las siete estaciones presentan valores de PST que superan el valor guía. La estación que presentó la mayor concentración de PST fue la EA-4A (8.86mg/(dm² x día), en esta estación se están realizando trabajos de construcción. Las estaciones EA-1C, EA-2B, EA-3B y EA-5A, presentan concentraciones entre los 3.72 y 4.90 mg/(dm² x día); esto puede atribuirse parcialmente a que estas estaciones de muestreo se encuentran cerca de caminos de terracería en los que el paso de vehículos (especialmente motos y picops) es frecuente.

Las estaciones que presentaron la menor concentración de PST durante el período de monitoreo y que se encuentran por debajo del valor guía utilizado, fueron la EA-6 y EA-7A con 1.76mg/(dm²x día) y 1.55 mg/(dm² x día) respectivamente. En el caso de la estación EA-7A la baja concentración de PST se puede atribuir a las medidas que toman dentro del Proyecto para reducir el polvo, consistente en el riego de caminos de terracería.

Cabe mencionar que durante el período de muestreo tanto para gases de combustión como para partículas sedimentables se observó que en varios lugares se llevaba a cabo la roza (quema de vegetación seca en tierras para cultivos) de terrenos, sin embargo no se observó influencia significativa de esta en los resultados obtenidos.

Anexos

Anexo 1-1: Reportes analíticos

Cliente: Consultoría y Tecnología Ambiental, S.A.
Dirección: Tronco I, sector E, lote 14, el Encinal Z. 7 de Mixco.
Proyecto: 178-057
Fecha de muestreo: Marzo, 09 – 10 y marzo, 18 - 20 de 2015
Fecha de análisis: Abril, 08 y 10 de 2015
Emisión del reporte: Abril, 16 de 2015

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

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

Métodos analíticos:

- SO₂: 40 CFR, parte 50, Apéndice A-2, EPA. Reference Method for the determination of Sulfur Dioxide in the atmosphere (Pararosaniline Method).

- NO₂: EPA Designated Equivalent Method No. EQN-1277-026. Sodium Arsenite method for the determination of Nitrogen Dioxide in the atmosphere.

Cuadro 1: Ubicación de estaciones de muestreo

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-1C	Frente a Escuela San Rafael	E (m): 803,887 N (m): 1,601,801		Casa dentro del pueblo, caminos pavimentados con flujo de vehículos medio, vientos fuertes. Campo de fútbol de tierra frente a la casa. Fecha de muestreo: 19/03/2015 – 20/03/2015

EA-2B	Aldea La Cuchilla	E (m): 806,470 N (m): 1,601,796		Camino de terracería poco tráfico vehicular, transitan especialmente motos. Construcción de casas con adobe en los alrededores, uso de leña para cocinar en la vivienda y en casas cercanas. El día que se retiro el equipo se observo quema de vegetación (roza) a aproximadamente 750 m. Fecha de muestreo: 18/03/15 – 19/03/15
EA-3B	Aldea El Fucío	E (m): 806,538 N (m): 1,600,367		Camino de terracería cercano al terreno, tráfico vehicular moderado. El día que se coloco el equipo se observo quema de vegetación (roza) a aproximadamente 500 m. Fecha de muestreo: 18/03/15 – 19/03/15
EA-4A	Aldea La Puerta de Los Ángeles	E (m): 805,142 N (m): 1,599,903		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan cantidades considerables de polvo. Evidencia de quema de leña para cocinar. Fecha de muestreo: 18/03/15 – 19/03/15
EA-5A	Aldea Sábana Redonda	E (m): 804,352 N (m): 1,600,404		El terreno está cerca de la carretera principal, está en campo abierto y cercano a una fábrica de block. Fecha de muestreo: 19/03/15 – 20/03/15
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). El día que se retiro el equipo se observo quema de vegetación (roza) a aproximadamente 250 m. Fecha de muestreo: 19/03/15 – 20/03/15

EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	E (m): 805,425 N (m): 1,601,523		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino. El día que se coloco el equipo se observo quema de vegetación (roza) a aproximadamente 1500 m. Fecha de muestreo: 09/03/15 – 10/03/15
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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-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A
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	12	11	9	13	11	< 9	< 9
	ppm	0.005	0.007	0.006	0.005	0.007	0.006	<0.005	<0.005

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

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

Parámetro	Control con duplicado			CDL		
	Unidades	DEA-5A	DEA-4A	Unidades	Teórica	Real
SO ₂	µg/m ³	NA	<13	µg	15.54	15.52
	ppm	NA	<0.005			
NO ₂	µg/m ³	11	NA	µg/mL	1.00	0.98
	ppm	0.006	NA			

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

Anexos:

Anexo 1. Cadena de custodia R-02-000605.

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Abril, 15/15	E.M.	Abril, 16/15	A.G.J.	Abril, /15	01

Cliente: Consultoría y Tecnología Ambiental, S.A.
Dirección: Tronco I, sector E, lote 14, el Encinal zona 7 de Mixco
Proyecto: 178-057
Fecha de muestreo: Marzo 09– Abril09 de 2015
Lugar de muestreo: San Rafael las Flores, Santa Rosa, Guatemala
Fecha de análisis: Abril, 13 al 14 de 2015
Emisión del reporte: Abril, 16 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 según resolución OGA-LE-050-12.**

Cuadro 1: Ubicación de estaciones de muestreo

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

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

Estación	Ubicación	Fotografía	Factores ambientales ²
EA-3B	Aldea El Fucío		Camino de terracería cercano al terreno, tráfico vehicular moderado.
EA-4A	Aldea La Puerta de Los Ángeles		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan cantidades considerables de polvo. Evidencia de quema de leña para cocinar, se estaban realizando trabajos de construcción.
EA-5A	Aldea Sabana Redonda		El terreno está cerca de la carretera principal (asfaltada), está en campo abierto y cercano a una fábrica de block.
EA-6	Norte del proyecto, ruta a Mataquesuintla		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno.
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino.

²: Factores ambientales que pueden influir en los resultados.

Cuadro 2: Resultados Partículas Sedimentables Totales (Tasa sedimentable)

No.	Identificación de la muestra	Tasa de sedimentación			
		Material insoluble en agua	Material soluble en agua	Total* para un período de 30 días [g/(m ² ·30 días)].	Total* para un período de 1 día [mg/(dm ² · día)].
	LDM	0.0019	0.017	0.019	0.006
1	EA-1C	12.54	2.17	14.71	4.90
2	EA-2B	9.50	2.25	11.74	3.91
3	EA-3A	12.09	1.81	13.90	4.63
4	EA-4A	24.49	2.09	26.58	8.86
5	EA-5A	9.19	1.96	11.15	3.72
6	EA-6	2.69	2.59	5.28	1.76
7	EA-7A	2.93	1.73	4.66	1.55

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

Anexos:

Anexo 1. Cadena de Custodia R-02-000608

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

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Abril, 15/15	E.M.	Abril, 16/15	A.G.J.	Abril, /15	01

11.3.4 Presión Sonora

ER-1

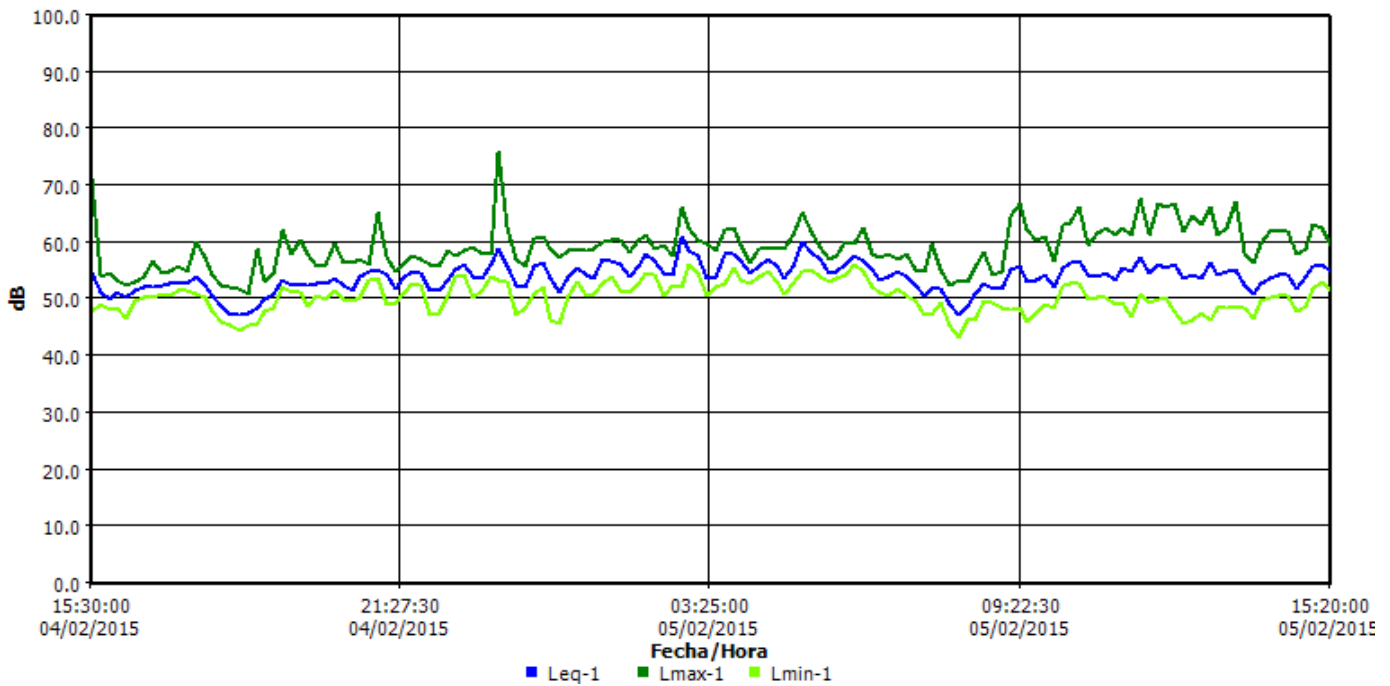
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes
Nombre ER-1
Sesión padre S175
Hora de inicio Miércoles, 04 de Febrero de 2015 15:20:00
Hora de paro Jueves, 05 de Febrero de 2015 15:20:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	43.3 dB	Lmax	1	76.1 dB
Lpk	1	104.5 dB	Leq	1	54.6 dB

Gráfica de datos de registro



ER-1A

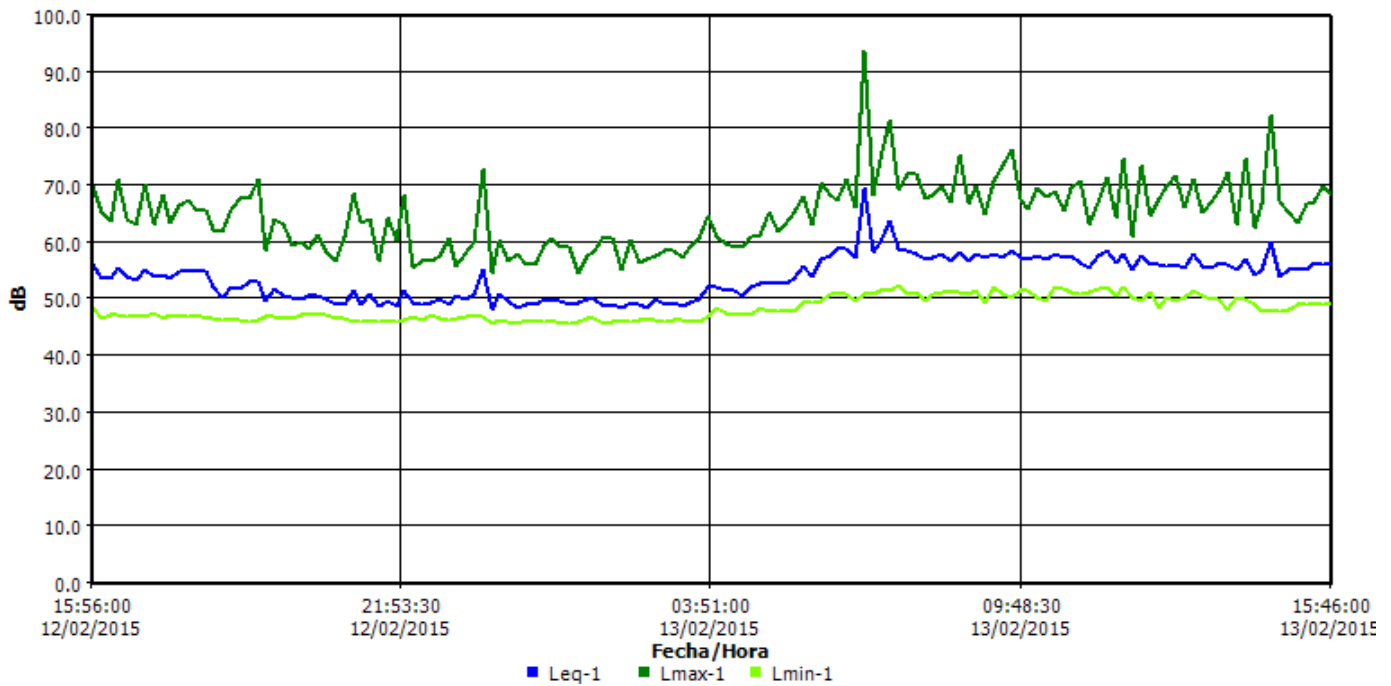
Panel de información

Ubicación San Rafael Las Flores
Nombre ER-1A
Sesión padre S177
Hora de inicio Jueves, 12 de Febrero de 2015 15:46:00
Hora de paro Viernes, 13 de Febrero de 2015 15:46:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	45.6 dB	Lmax	1	93.8 dB
Lpk	1	113.1 dB	Leq	1	55.7 dB

Gráfica de datos de registro



ER-2

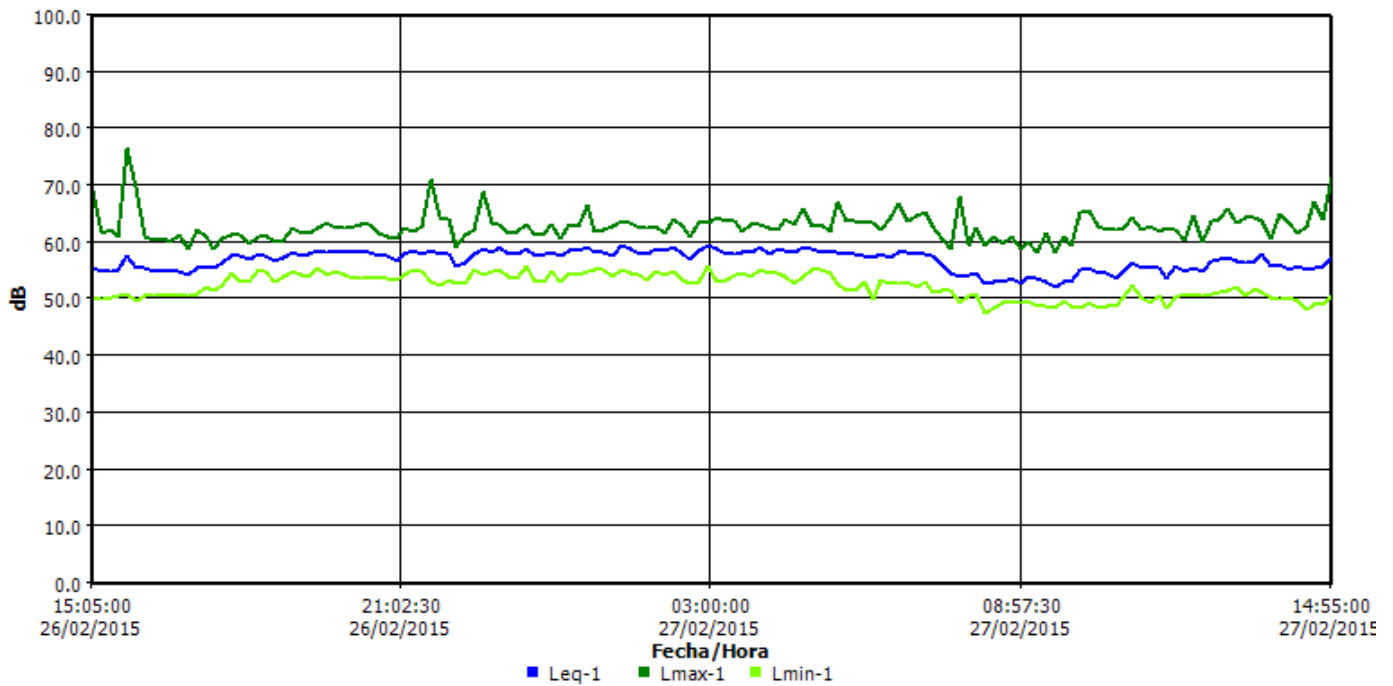
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S179
Hora de inicio Jueves, 26 de Febrero de 2015 14:55:00
Hora de paro Viernes, 27 de Febrero de 2015 14:55:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	47.6 dB	Lmax	1	76.6 dB
Lpk	1	99.1 dB	Leq	1	57.1 dB

Gráfica de datos de registro



ER-3

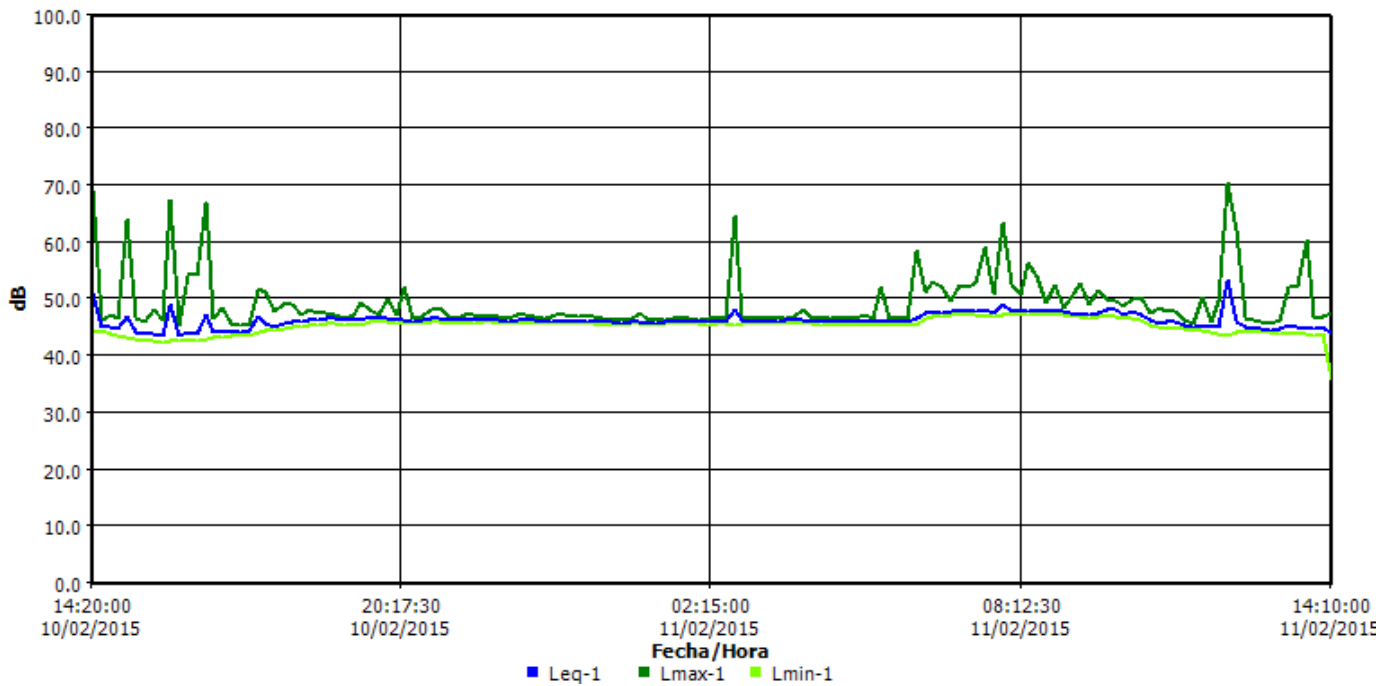
Panel de información

Ubicación Aledaño a Aldea El Fucío
Nombre ER-3
Sesión padre S078
Hora de inicio Martes, 10 de Febrero de 2015 14:10:00
Hora de paro Miércoles, 11 de Febrero de 2015 14:10:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	35.5 dB	Lmax	1	70.6 dB
Lpk	1	98 dB	Leq	1	46.4 dB

Gráfica de datos de registro



ER-3A

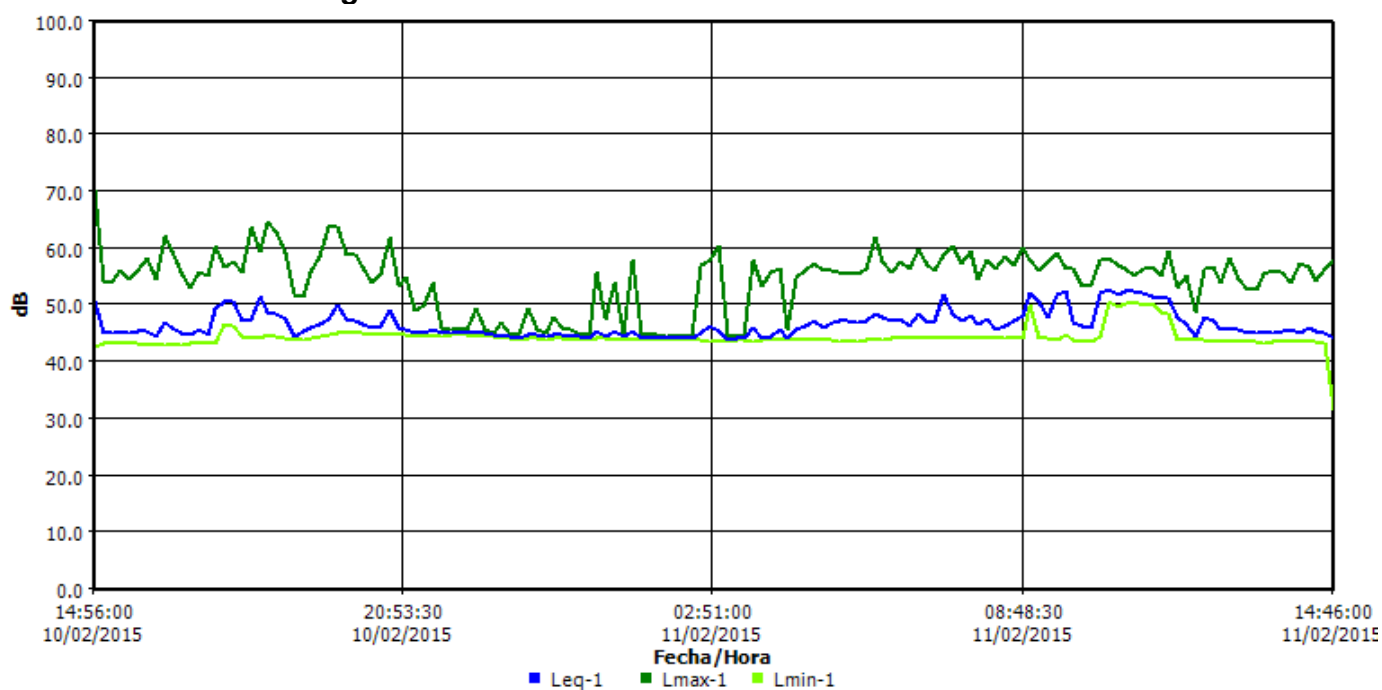
Panel de información

Ubicación Aledaño a aldea El Fucío
Nombre ER-3A
Sesión padre S176
Hora de inicio Martes, 10 de Febrero de 2015 14:46:00
Hora de paro Miércoles, 11 de Febrero de 2015 14:46:00
Nombre del usuario

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	31.3 dB	Lmax	1	70.2 dB
Lpk	1	100 dB	Leq	1	47.3 dB

Gráfica de datos de registro



ER-4A

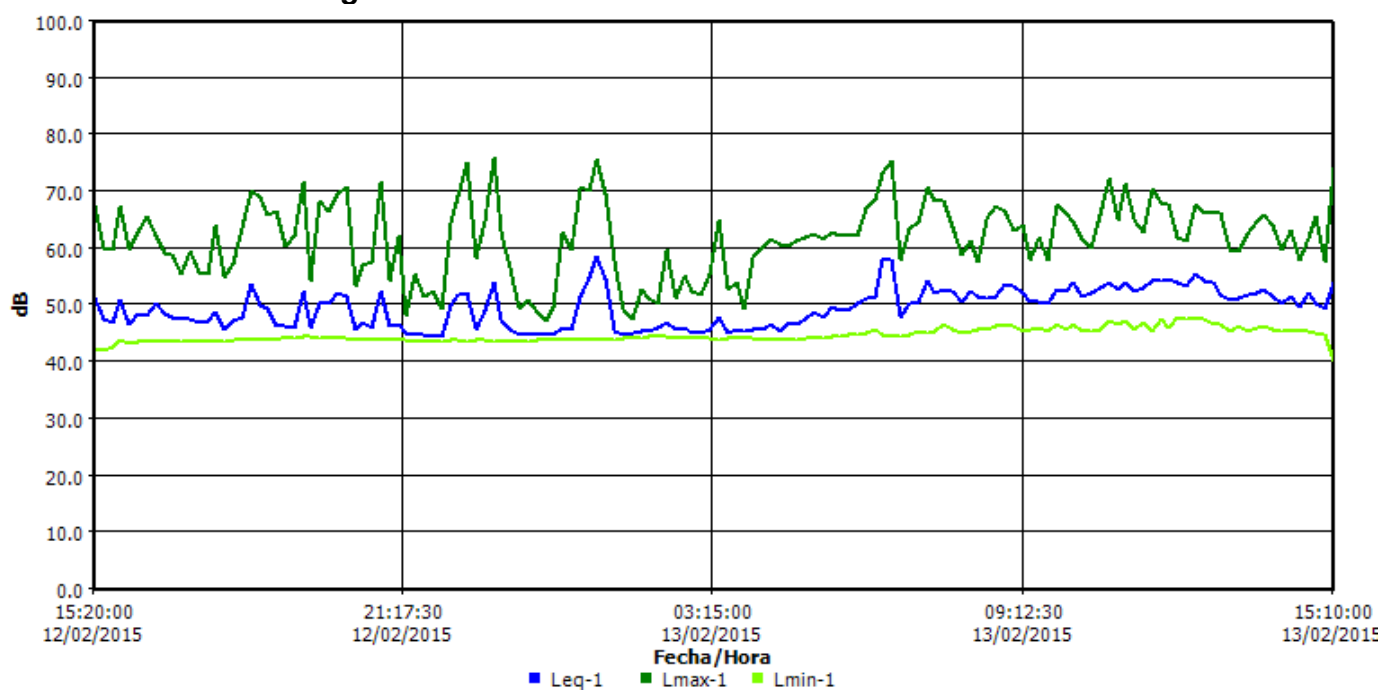
Panel de información

Ubicación Caserío El Portón de los Ángeles
Nombre ER-4A
Sesión padre S079
Hora de inicio Jueves, 12 de Febrero de 2015 15:10:00
Hora de paro Viernes, 13 de Febrero 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	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	40.3 dB	Lmax	1	76 dB
Lpk	1	102.1 dB	Leq	1	50.8 dB

Gráfica de datos de registro



ER-5A

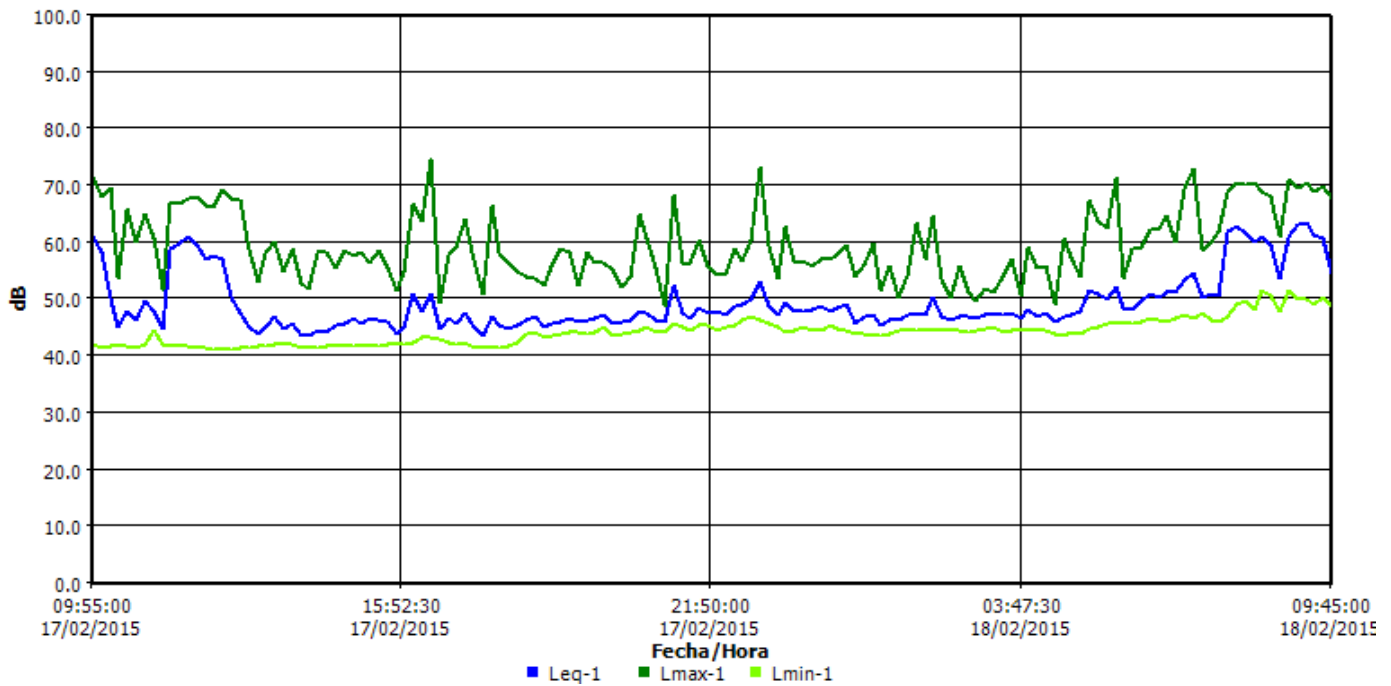
Panel de información

Ubicación Aldea Sabana Redonda
Nombre ER-5A
Sesión padre S080
Hora de inicio Martes, 17 de Febrero de 2015 09:45:00
Hora de paro Miércoles, 18 de Febrero de 2015 09:45:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	41.1 dB	Lmax	1	74.9 dB
Lpk	1	98.4 dB	Leq	1	53.4 dB

Gráfica de datos de registro



ER-6

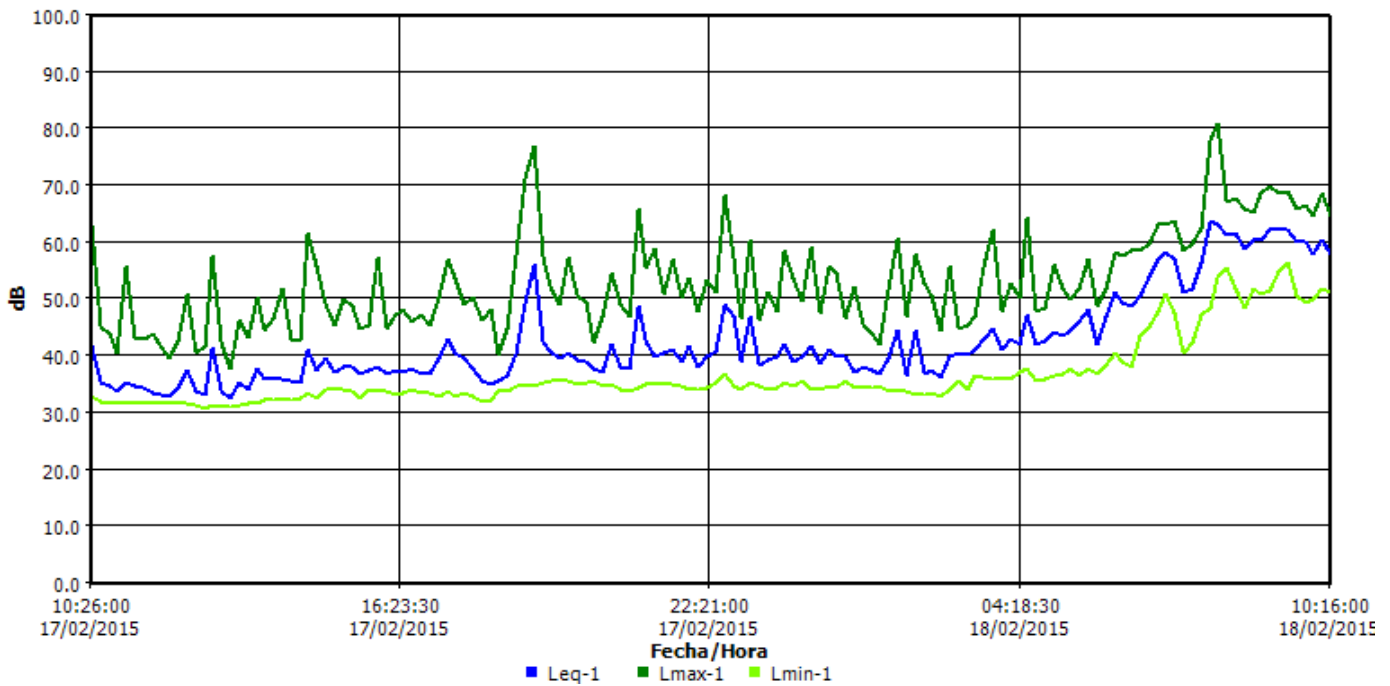
Panel de información

Ubicación Al norte del Proyecto, ruta a Mataquesuintla
Nombre ER-6
Sesión padre S178
Hora de inicio Martes, 17 de Febrero de 2015 10:16:00
Hora de paro Miércoles, 18 de Febrero de 2015 10:16:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	30.8 dB	Lmax	1	81 dB
Lpk	1	97.2 dB	Leq	1	52.3 dB

Gráfica de datos de registro



ER-7A

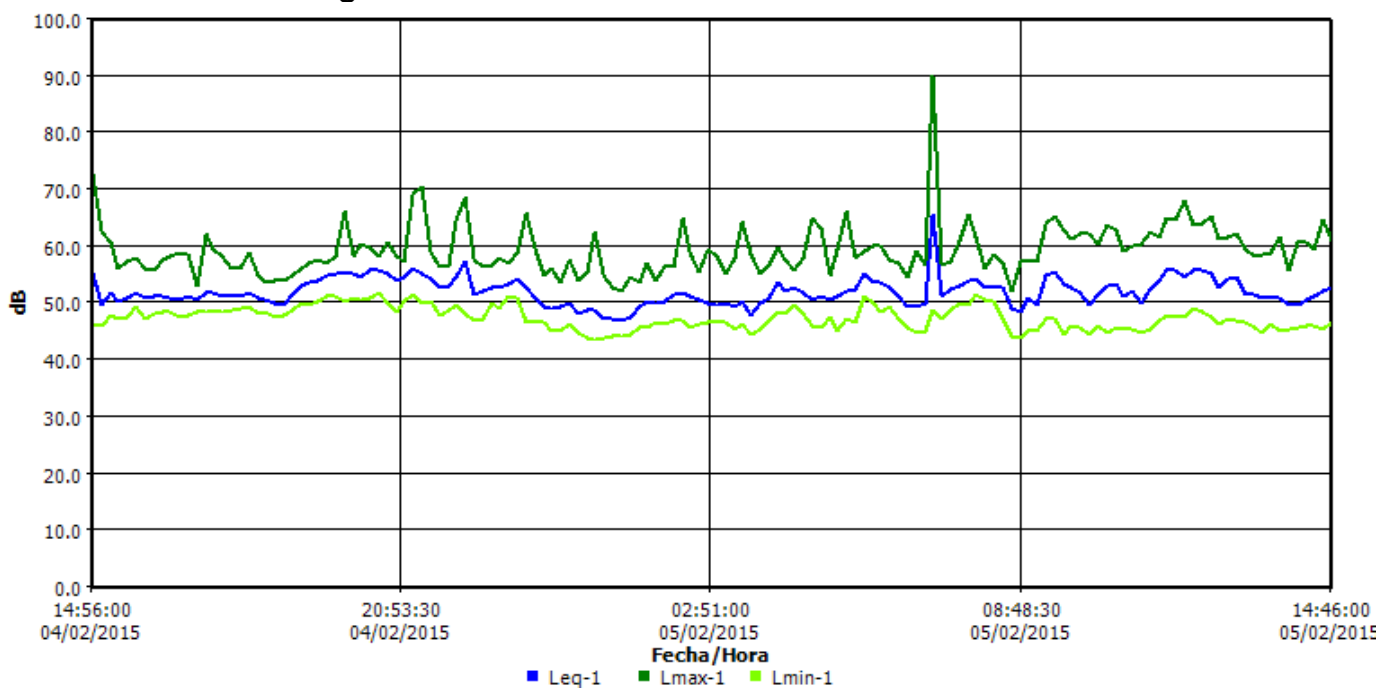
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S077
Hora de inicio Miércoles, 04 de Febrero de 2015 14:46:00
Hora de paro Jueves, 05 de Febrero de 2015 14:46:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	43.7 dB	Lmax	1	90.1 dB
Lpk	1	104.5 dB	Leq	1	53 dB

Gráfica de datos de registro



ER-7A

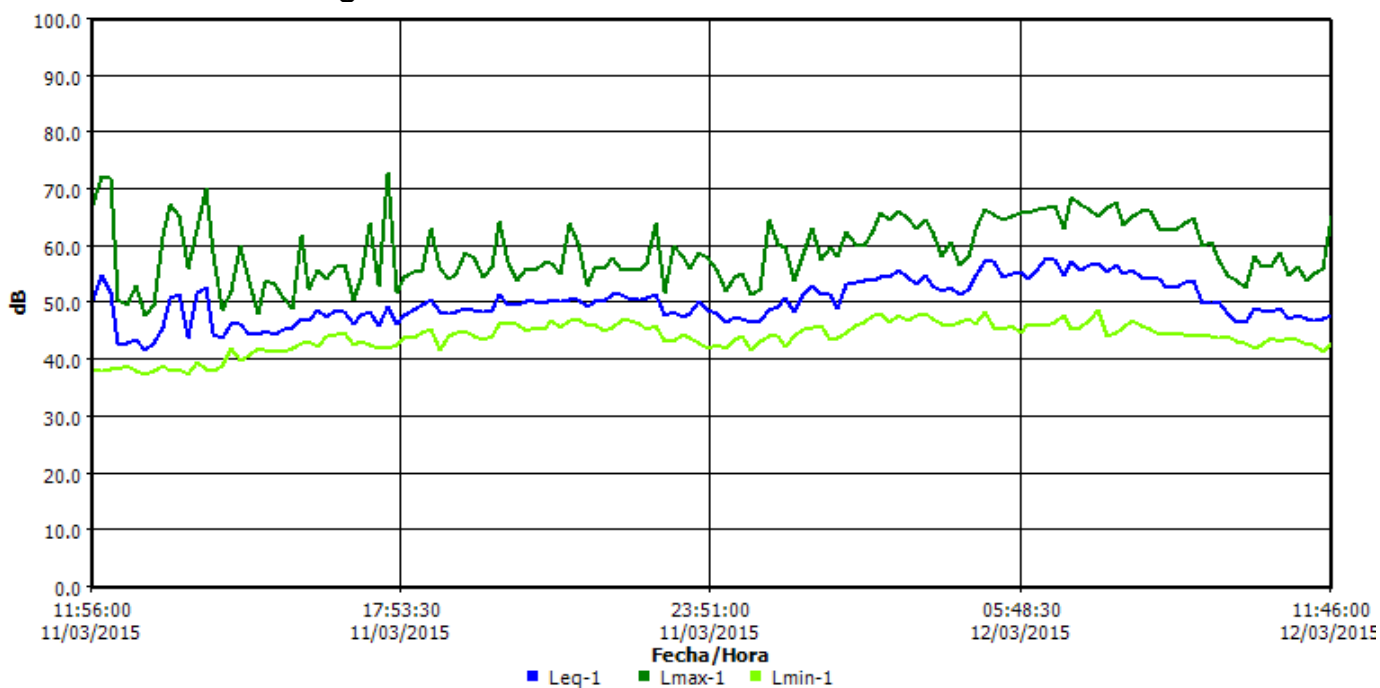
Panel de información

Ubicación Aledaño a aldea Los Planes.
Nombre ER-7A
Sesión padre S180
Hora de inicio Miércoles, 11 de Marzo de 2015 11:46:00
Hora de paro Jueves, 12 de Marzo de 2015 11:46:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	37.5 dB	Lmax	1	72.9 dB
Lpk	1	102.5 dB	Leq	1	51.7 dB

Gráfica de datos de registro



ER-3

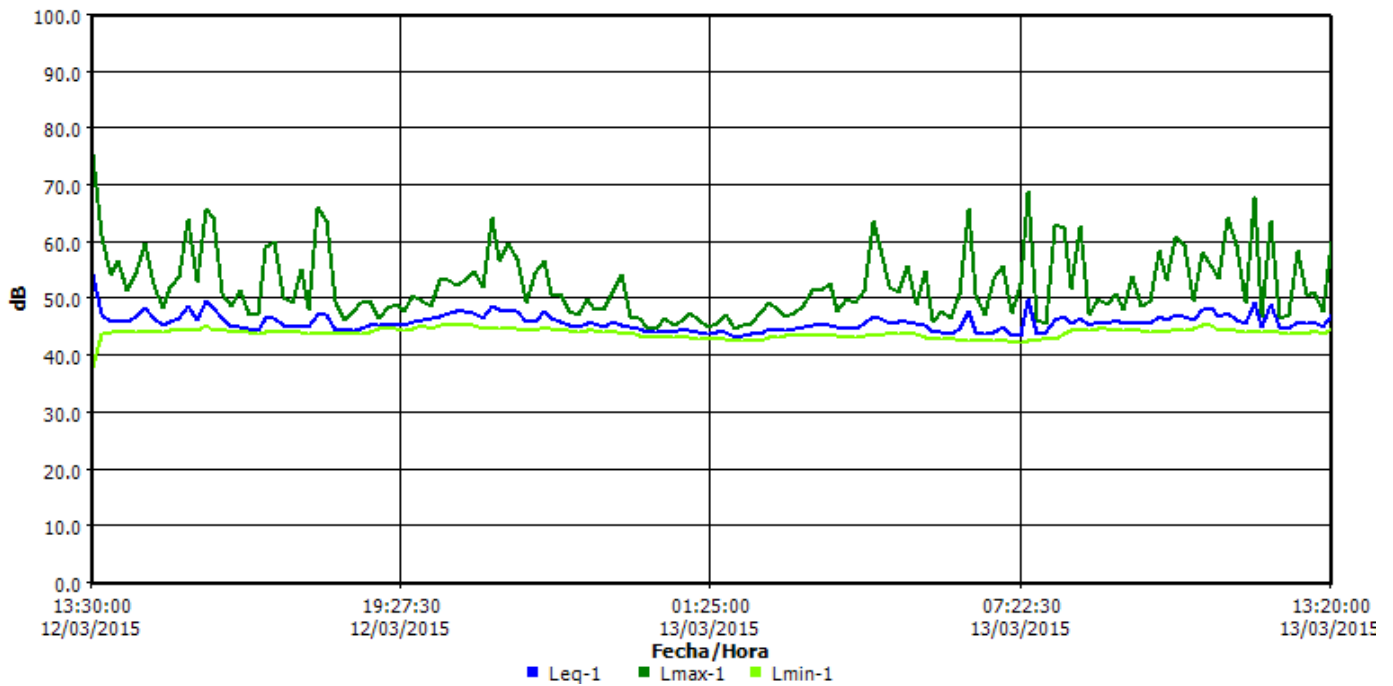
Panel de información

Ubicación Aledaño a Aldea El Fucío
Nombre ER-3
Sesión padre S162
Hora de inicio Jueves, 12 de Marzo de 2015 13:20:00
Hora de paro Viernes, 13 de Marzo de 2015 13:20:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	38.1 dB	Lmax	1	75.4 dB
Lpk	1	98.4 dB	Leq	1	46.2 dB

Gráfica de datos de registro



ER-2

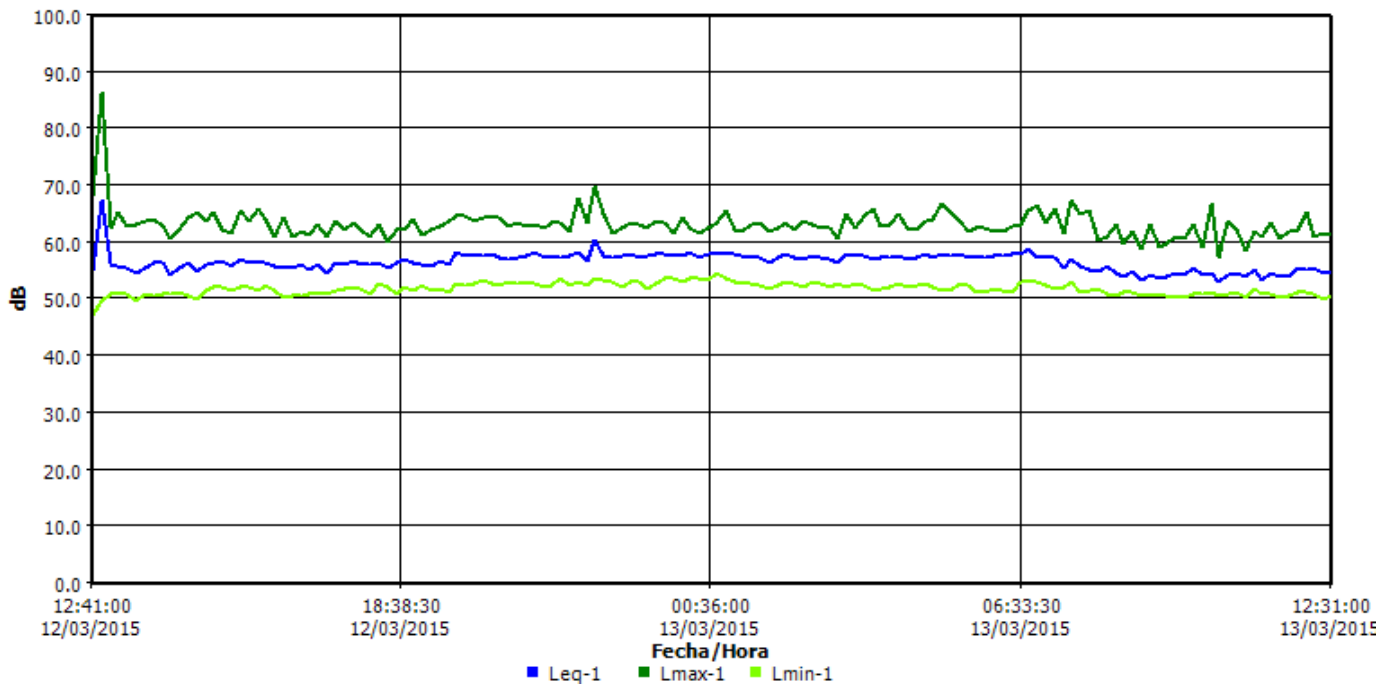
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S181
Hora de inicio Jueves, 12 de Marzo de 2015 12:31:00
Hora de paro Viernes, 13 de Marzo de 2015 12:31:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	47.2 dB	Lmax	1	86.4 dB
Lpk	1	119.1 dB	Leq	1	56.9 dB

Gráfica de datos de registro



ER-1

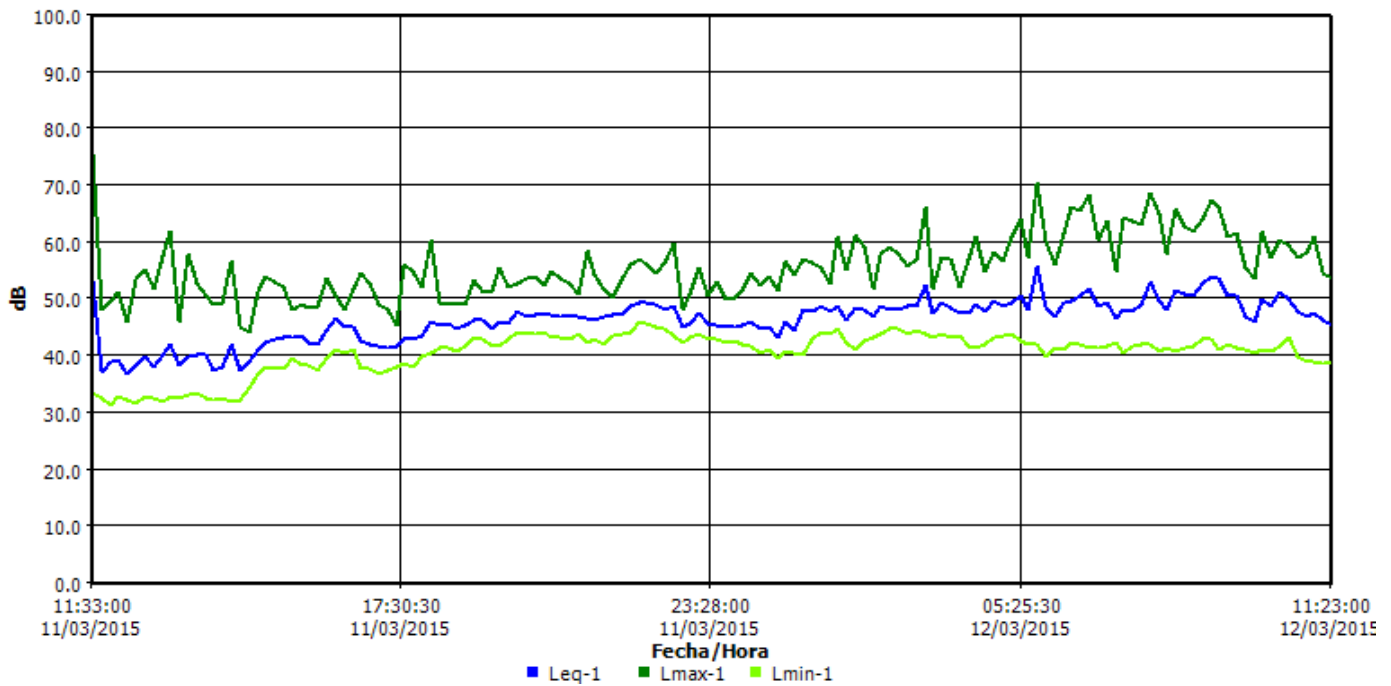
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S083
Hora de inicio Miércoles, 11 de Marzo de 2015 11:23:00
Hora de paro Jueves, 12 de Marzo de 2015 11:23:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	SLOW
Lmin	1	31.4 dB	Lmax	1	75.8 dB
Lpk	1	101.7 dB	Leq	1	47.7 dB

Gráfica de datos de registro



ER-7A

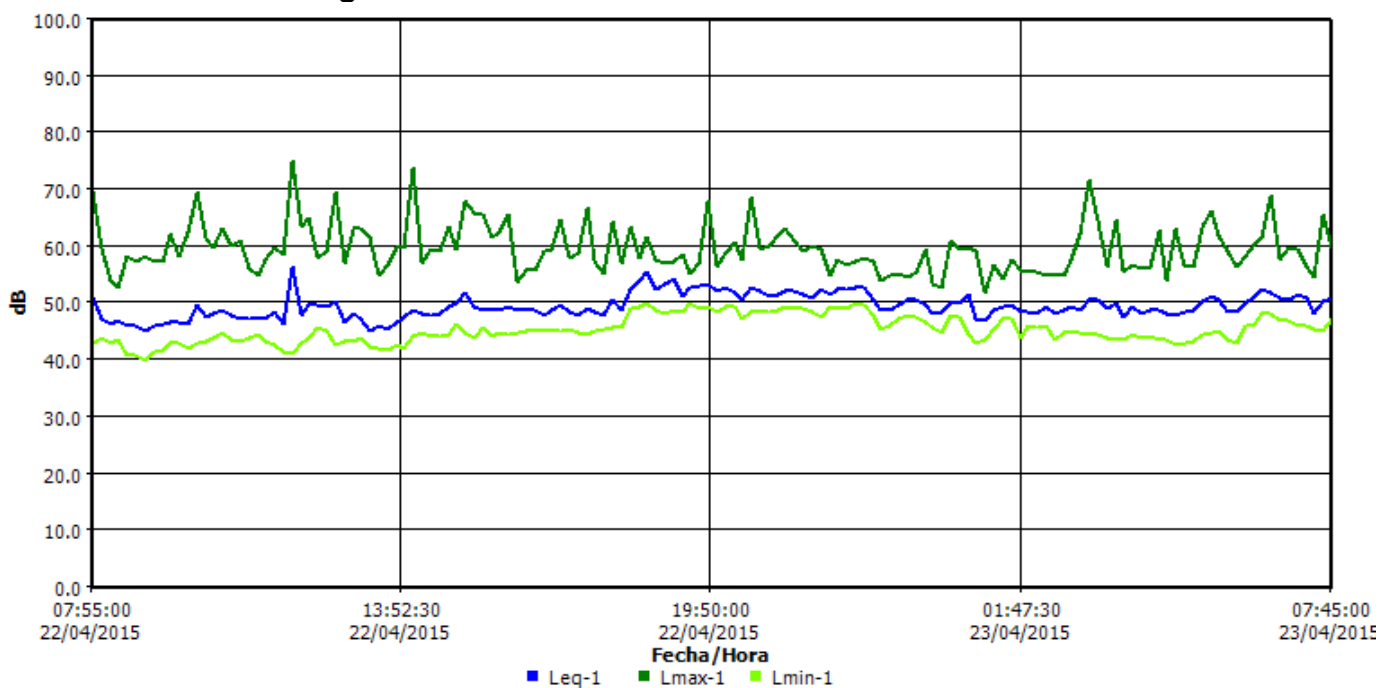
Panel de información

Ubicación Aledaño a aldea Los Planes
Nombre ER-7A
Sesión padre S089
Hora de inicio Miércoles, 22 de Abril de 2015 07:45:00
Hora de paro Jueves, 23 de Abril de 2015 07:45:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	40 dB	Lmax	1	75.1 dB
Lpk	1	93.7 dB	Leq	1	50 dB

Gráfica de datos de registro



ER-3

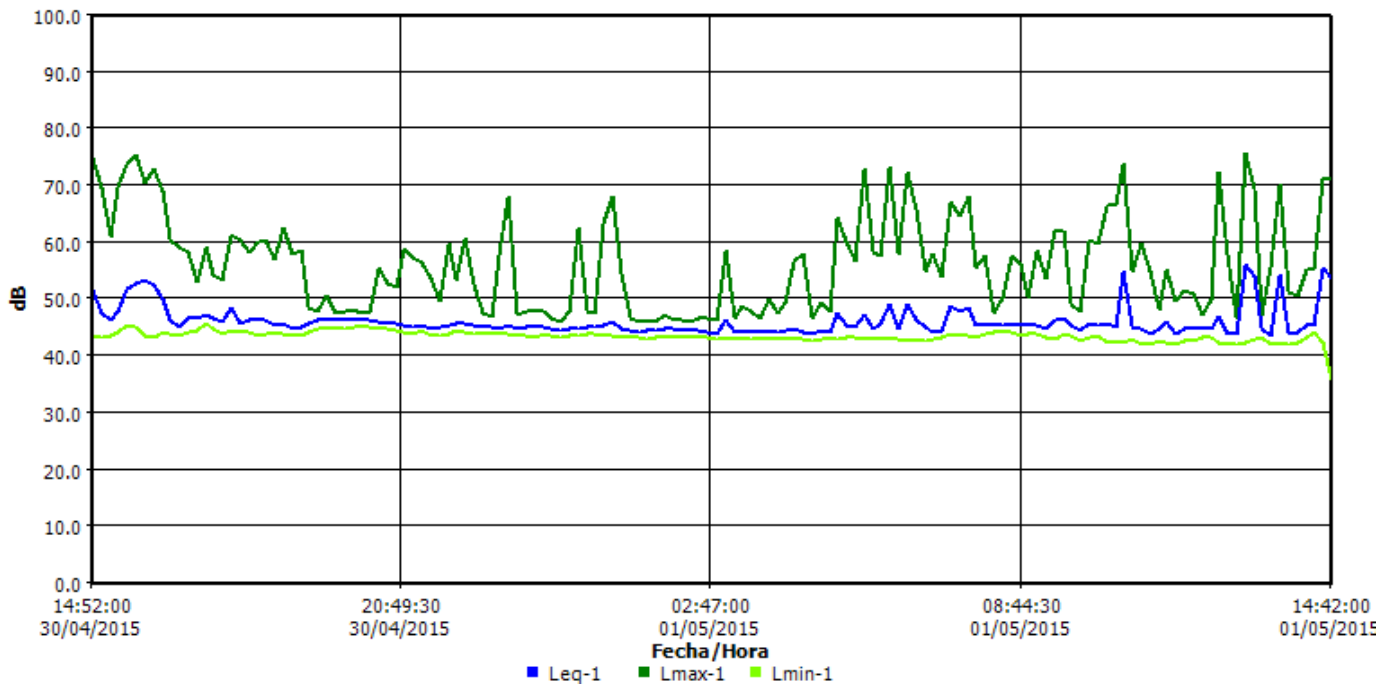
Panel de información

Ubicación Aledaño a Aldea El Fucío
Nombre ER-3
Sesión padre S091
Hora de inicio Jueves, 30 de Abril de 2015 14:42:00
Hora de paro Viernes, 01 de Mayo de 2015 14:42:00
Nombre del usuario EvQ

Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	35.5 dB	Lmax	1	75.7 dB
Lpk	1	92.1 dB	Leq	1	47.1 dB

Gráfica de datos de registro



ER-2

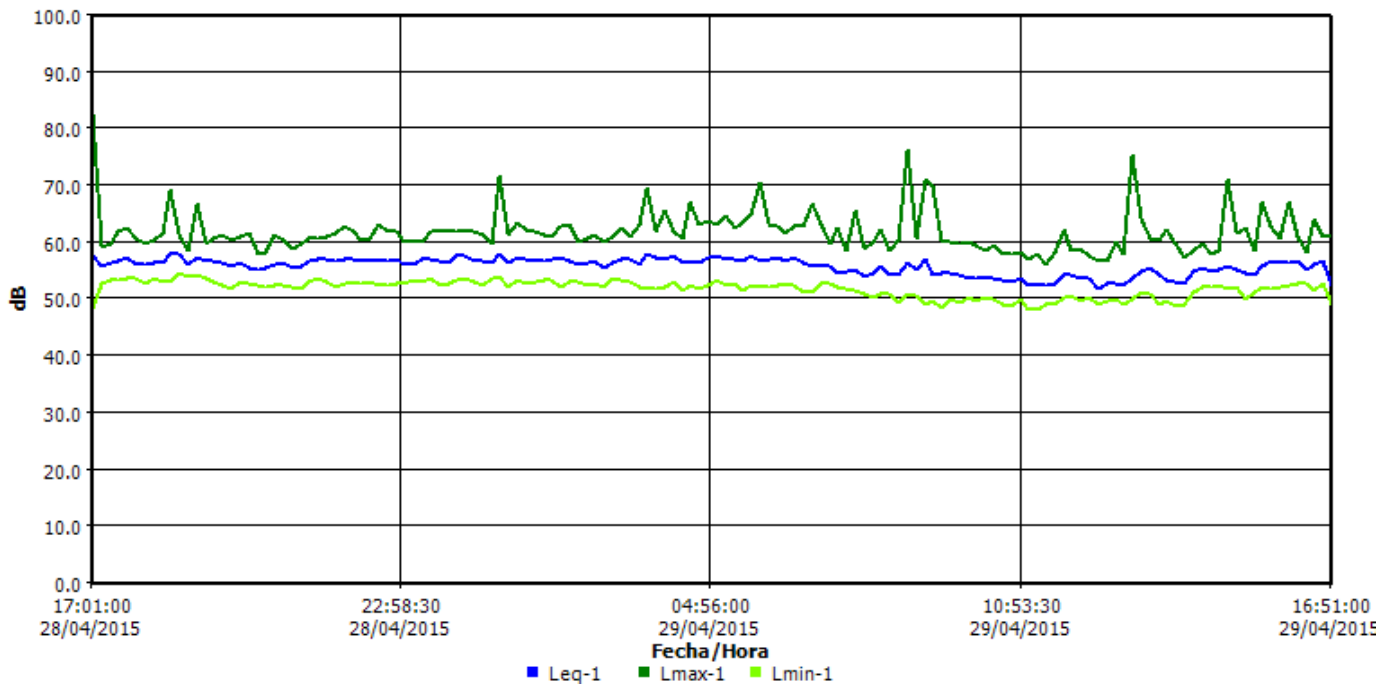
Panel de información

Ubicación Aldea La Cuchilla
Nombre ER-2
Sesión padre S090
Hora de inicio Martes, 28 de Abril de 2015 16:51:00
Hora de paro Miércoles, 29 de Abril 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	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	48.1 dB	Lmax	1	82.5 dB
Lpk	1	101.5 dB	Leq	1	55.9 dB

Gráfica de datos de registro



ER-1

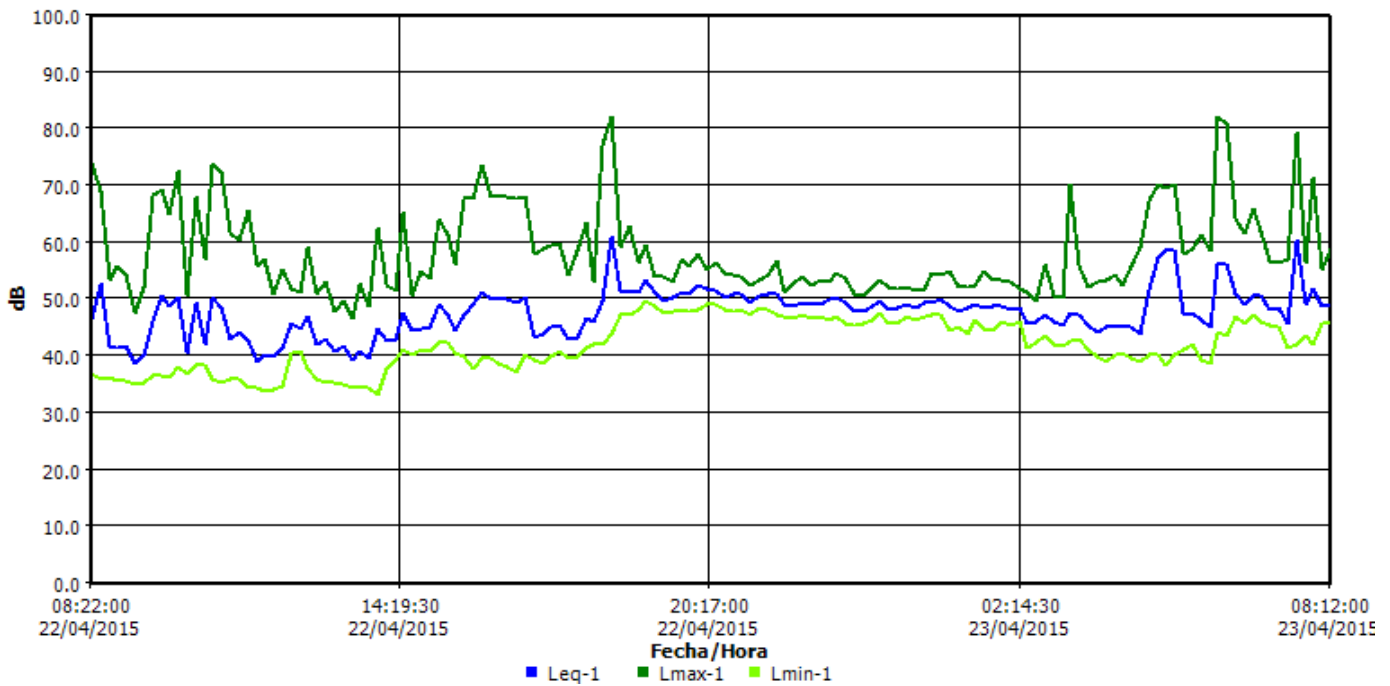
Panel de información

Ubicación Depósito de suelos, a inmediaciones de la aldea Los Planes.
Nombre ER-1
Sesión padre S184
Hora de inicio Miércoles, 22 de Abril de 2015 08:12:00
Hora de paro Jueves, 23 de Abril de 2015 08:12:00
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	33.1 dB	Lmax	1	82.1 dB
Lpk	1	99.3 dB	Leq	1	50 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



Certificate of Calibration

Certificate No: 5504965BGK080007

Submitted By: CTA SA
TRONCO 1 LOT 14E
EL EMCINAL ZONA 7 DE MIXCO, GUATEMALA

Serial Number: BGK080007 Date Received: 4/1/2014
Customer ID: N/A Date Issued: 4/4/2014
Model: SOUNDPRO DL-2 SLM Valid Until: 4/4/2015

Test Conditions: Model Conditions:
Temperature: 18°C to 29°C As Found: OUT OF TOLERANCE
Humidity: 20% to 80% As Left: IN TOLERANCE
Barometric Pressure: 890 mbar to 1050 mbar

SubAssemblies:

Description:	Serial Number:
TYPE 2 PREAMP	0811 6065
MICROPHONE QE 7052 1/2 IN. ELECTRET	44610

Calibration Procedure: 53V899

Reference Standard(s):

I.D. Number	Device	Last Calibration Date	Calibration Due
EF000176	QUEST-CAL	12/16/2013	12/16/2014
ET0000556	B&K ENSEMBLE	5/10/2013	5/10/2014

Measurement Uncertainty:

+/- 2.2% ACOUSTIC (0.19DB)
Estimated at 95% Confidence Level (k=2)

Calibrated By: Brian X. Bayer 4/4/2014
BRIAN BAYER Service Technician

Reviewed/Approved By: [Signature] 4/4/2014
Technical Manager/Deputy

This report certifies that all calibration equipment used in the test is traceable to NIST or other NMI, and applies only to the unit identified under equipment above. This report must not be reproduced except in its entirety without the written approval of 3M Detection Solutions.

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

11.5.1 Muestras de Agua Superficial (SW)

December 15, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21802

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 03, 2014. This project has been assigned to ACZ's project number, L21802. 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 L21802. 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.

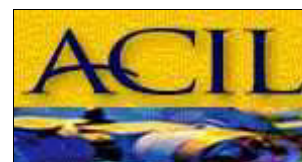
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 14, 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.

December 15, 2014

Project ID: Escobal

ACZ Project ID: L21802

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on December 3, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21802. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

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

Sample Analysis

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

1. For the DRO value flagged with an "N1", the value was above the PQL but did not have a hydrocarbon peak pattern. There is a single peak that looked more like a heavy acid.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L21802-01**
Date Sampled: 12/01/14 11:40
Date Received: 12/03/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 13:43	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 11:26	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/05/14 12:01	tcd
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 15:48	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:48	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/05/14 18:48	pmc
Total Hot Plate Digestion	M200.2 ICP								12/11/14 11:15	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L21802-01**

Date Sampled: 12/01/14 11:40

Date Received: 12/03/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/05/14 14:51	jjc
Aluminum, total	M200.7 ICP	1	0.30			mg/L	0.03	0.2	12/12/14 14:42	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/08/14 19:12	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/08/14 14:32	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0018			mg/L	0.0002	0.001	12/08/14 19:12	msh
Arsenic, total	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	12/08/14 14:32	msh
Barium, dissolved	M200.7 ICP	1	0.086			mg/L	0.003	0.02	12/05/14 14:51	jjc
Barium, total	M200.7 ICP	1	0.091			mg/L	0.003	0.02	12/12/14 10:30	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:51	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:30	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/05/14 14:51	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 10:30	jjc
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/08/14 13:36	jjc
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/12/14 10:30	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:12	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:32	msh
Calcium, dissolved	M200.7 ICP	1	23.1			mg/L	0.1	0.5	12/05/14 14:51	jjc
Calcium, total	M200.7 ICP	1	22.6			mg/L	0.1	0.5	12/12/14 10:30	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:51	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:30	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:51	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:30	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:51	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:30	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/05/14 14:51	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 10:30	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	12/05/14 14:51	jjc
Iron, total	M200.7 ICP	1	0.14			mg/L	0.02	0.05	12/12/14 10:30	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:12	msh
Lead, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	12/08/14 14:32	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:51	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:30	jjc
Magnesium, dissolved	M200.7 ICP	1	3			mg/L	0.2	1	12/05/14 14:51	jjc
Magnesium, total	M200.7 ICP	1	3.1			mg/L	0.2	1	12/12/14 10:30	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/05/14 14:51	jjc
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 10:30	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/05/14 12:37	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 13:42	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/05/14 14:51	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 10:30	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:51	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:30	jjc
Potassium, dissolved	M200.7 ICP	1	4.1			mg/L	0.2	1	12/05/14 14:51	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW1-E

ACZ Sample ID: **L21802-01**

Date Sampled: 12/01/14 11:40

Date Received: 12/03/14

Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	4.3		mg/L	0.2	1	12/12/14 10:30	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/05/14 14:51	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 10:30	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/08/14 19:12	msh
Selenium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	12/08/14 14:32	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 19:12	msh
Silver, total	M200.8 ICP-MS	1	0.00010	B	mg/L	0.00005	0.0003	12/08/14 14:32	msh
Sodium, dissolved	M200.7 ICP	1	8		mg/L	0.2	1	12/05/14 14:51	jjc
Sodium, total	M200.7 ICP	1	8.7		mg/L	0.2	1	12/12/14 10:30	jjc
Strontium, dissolved	M200.7 ICP	1	0.116	*	mg/L	0.005	0.03	12/05/14 14:51	jjc
Strontium, total	M200.7 ICP	1	0.129		mg/L	0.005	0.03	12/12/14 10:30	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 19:12	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 14:32	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/05/14 14:51	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 10:30	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/05/14 14:51	jjc
Titanium, total	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/12/14 10:30	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 19:12	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 14:32	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/05/14 14:51	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 10:30	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/05/14 14:51	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 10:30	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW1-E

ACZ Sample ID: **L21802-01**
 Date Sampled: 12/01/14 11:40
 Date Received: 12/03/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	62.8		*	mg/L	2	20	12/03/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/14 0:00	abd
Total Alkalinity		1	62.8		*	mg/L	2	20	12/03/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.7			%			12/15/14 14:21	calc
Sum of Anions			1.8			meq/L			12/15/14 14:21	calc
Sum of Cations			1.9			meq/L			12/15/14 14:21	calc
Chemical Oxygen Demand	M410.4	1	13	B	*	mg/L	10	20	12/10/14 9:30	id
Chloride	SM4500Cl-E	1	5.7		*	mg/L	0.5	2	12/09/14 13:35	mpb
Conductivity @25C	SM2510B	1	189		*	umhos/cm	1	10	12/03/14 23:07	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:30	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:54	pjb
Fluoride	SM4500F-C	1	0.11	B	*	mg/L	0.05	0.3	12/05/14 17:05	enb
Hardness as CaCO3	SM2340B - Calculation		70			mg/L	0.8	4	12/15/14 14:21	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.16		*	mg/L	0.02	0.1	12/11/14 23:27	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 16:59	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/06/14 11:57	tcd
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	12/03/14 0:00	abd
pH measured at		1	19.3		*	C	0.1	0.1	12/03/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	12/15/14 14:21	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	12/09/14 13:45	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/04/14 18:35	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	12/09/14 13:13	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	144		*	mg/L	10	20	12/03/14 14:47	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/14 13:41	eea
Residue, Total (TS) @ 105C	SM2540B	1	172		*	mg/L	10	20	12/03/14 14:04	enb
Sulfate	D516-02/-07 - Turbidimetric	1	18.7		*	mg/L	1	5	12/08/14 17:40	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 16:10	eea
TDS (calculated)	Calculation		101			mg/L			12/15/14 14:21	calc
TDS (ratio - measured/calculated)	Calculation		1.43						12/15/14 14:21	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L21802-02**
Date Sampled: 12/01/14 10:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 13:50	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 11:33	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/05/14 12:02	tcd
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 15:54	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:54	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/05/14 18:59	pmc
Total Hot Plate Digestion	M200.2 ICP								12/11/14 11:27	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L21802-02**
Date Sampled: 12/01/14 10:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	12/05/14 14:54	jjc
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 14:45	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0092			mg/L	0.0004	0.002	12/08/14 19:15	msh
Antimony, total	M200.8 ICP-MS	1	0.0095			mg/L	0.0004	0.002	12/08/14 14:34	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0084			mg/L	0.0002	0.001	12/08/14 19:15	msh
Arsenic, total	M200.8 ICP-MS	1	0.0090			mg/L	0.0002	0.001	12/08/14 14:34	msh
Barium, dissolved	M200.7 ICP	1	0.052			mg/L	0.003	0.02	12/05/14 14:54	jjc
Barium, total	M200.7 ICP	1	0.051			mg/L	0.003	0.02	12/12/14 10:33	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:54	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:33	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/05/14 14:54	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 10:33	jjc
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	12/08/14 13:39	jjc
Boron, total	M200.7 ICP	1	0.11			mg/L	0.01	0.05	12/12/14 10:33	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:15	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:34	msh
Calcium, dissolved	M200.7 ICP	1	376			mg/L	0.1	0.5	12/05/14 14:54	jjc
Calcium, total	M200.7 ICP	1	378			mg/L	0.1	0.5	12/12/14 10:33	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:54	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:33	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:54	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:33	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:54	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:33	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/05/14 14:54	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 10:33	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	12/05/14 14:54	jjc
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 10:33	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/08/14 19:15	msh
Lead, total	M200.8 ICP-MS	1	0.0014			mg/L	0.0001	0.0005	12/08/14 14:34	msh
Lithium, dissolved	M200.7 ICP	1	0.086			mg/L	0.008	0.04	12/05/14 14:54	jjc
Lithium, total	M200.7 ICP	1	0.089			mg/L	0.008	0.04	12/12/14 10:33	jjc
Magnesium, dissolved	M200.7 ICP	1	20.6			mg/L	0.2	1	12/05/14 14:54	jjc
Magnesium, total	M200.7 ICP	1	21.5			mg/L	0.2	1	12/12/14 10:33	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/05/14 14:54	jjc
Manganese, total	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	12/12/14 10:33	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/05/14 12:39	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 13:45	mfm
Molybdenum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	12/05/14 14:54	jjc
Molybdenum, total	M200.7 ICP	1	0.04	B		mg/L	0.02	0.1	12/12/14 10:33	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:54	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:33	jjc
Potassium, dissolved	M200.7 ICP	1	14.5			mg/L	0.2	1	12/05/14 14:54	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2-E

ACZ Sample ID: **L21802-02**
Date Sampled: 12/01/14 10:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	15.5		mg/L	0.2	1	12/12/14 10:33	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/05/14 14:54	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 10:33	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0011		mg/L	0.0001	0.0003	12/08/14 19:15	msh
Selenium, total	M200.8 ICP-MS	1	0.0012		mg/L	0.0001	0.0003	12/08/14 14:34	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 19:15	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 14:34	msh
Sodium, dissolved	M200.7 ICP	1	70.3		mg/L	0.2	1	12/05/14 14:54	jjc
Sodium, total	M200.7 ICP	1	76.8		mg/L	0.2	1	12/12/14 10:33	jjc
Strontium, dissolved	M200.7 ICP	1	3.910	*	mg/L	0.005	0.03	12/05/14 14:54	jjc
Strontium, total	M200.7 ICP	1	4.320		mg/L	0.005	0.03	12/12/14 10:33	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 19:15	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 14:34	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/05/14 14:54	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 10:33	jjc
Titanium, dissolved	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	12/05/14 14:54	jjc
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 10:33	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 19:15	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 14:34	msh
Vanadium, dissolved	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/05/14 14:54	jjc
Vanadium, total	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	12/12/14 10:33	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/05/14 14:54	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 10:33	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2-E

ACZ Sample ID: **L21802-02**
 Date Sampled: 12/01/14 10:30
 Date Received: 12/03/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	30.2		*	mg/L	2	20	12/03/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/14 0:00	abd
Total Alkalinity		1	30.2		*	mg/L	2	20	12/03/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.1			%			12/15/14 14:21	calc
Sum of Anions			23			meq/L			12/15/14 14:21	calc
Sum of Cations			24			meq/L			12/15/14 14:21	calc
Chemical Oxygen Demand	M410.4	1	15	B	*	mg/L	10	20	12/10/14 9:32	id
Chloride	SM4500Cl-E	1	70.5		*	mg/L	0.5	2	12/09/14 13:41	mpb
Conductivity @25C	SM2510B	1	1960		*	umhos/cm	1	10	12/03/14 23:16	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:31	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:55	pjb
Fluoride	SM4500F-C	1	1.35		*	mg/L	0.05	0.3	12/05/14 17:12	enb
Hardness as CaCO3	SM2340B - Calculation		1020			mg/L	0.8	4	12/15/14 14:21	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.66		*	mg/L	0.06	0.3	12/11/14 23:55	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.35		*	mg/L	0.05	0.2	12/09/14 15:18	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.6		*	mg/L	0.1	0.5	12/06/14 12:00	tcd
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	12/03/14 0:00	abd
pH measured at		1	19.3		*	C	0.1	0.1	12/03/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	12/15/14 14:21	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/09/14 13:46	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/04/14 18:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/09/14 13:14	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	1670		*	mg/L	10	20	12/03/14 14:50	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/14 13:42	eea
Residue, Total (TS) @ 105C	SM2540B	1	1740		*	mg/L	10	20	12/03/14 14:06	enb
Sulfate	D516-02/-07 - Turbidimetric	100	964		*	mg/L	100	500	12/08/14 17:57	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 16:17	eea
TDS (calculated)	Calculation		1540			mg/L			12/15/14 14:21	calc
TDS (ratio - measured/calculated)	Calculation		1.08						12/15/14 14:21	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L21802-03**
Date Sampled: 12/01/14 09:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 13:57	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 11:40	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/05/14 12:02	tcd
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:06	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 17:00	mss2
Total Hot Plate Digestion	M200.2 ICP								12/11/14 11:39	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								12/05/14 19:10	pmc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L21802-03**
Date Sampled: 12/01/14 09:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	12/05/14 14:57	jjc
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 14:48	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0100			mg/L	0.0004	0.002	12/08/14 19:17	msh
Antimony, total	M200.8 ICP-MS	1	0.0104			mg/L	0.0004	0.002	12/08/14 14:37	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0079			mg/L	0.0002	0.001	12/08/14 19:17	msh
Arsenic, total	M200.8 ICP-MS	1	0.0081			mg/L	0.0002	0.001	12/08/14 14:37	msh
Barium, dissolved	M200.7 ICP	1	0.054			mg/L	0.003	0.02	12/05/14 14:57	jjc
Barium, total	M200.7 ICP	1	0.055			mg/L	0.003	0.02	12/12/14 10:36	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:57	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:36	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/05/14 14:57	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 10:36	jjc
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	12/08/14 13:42	jjc
Boron, total	M200.7 ICP	1	0.11			mg/L	0.01	0.05	12/12/14 10:36	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:17	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:37	msh
Calcium, dissolved	M200.7 ICP	1	383			mg/L	0.1	0.5	12/05/14 14:57	jjc
Calcium, total	M200.7 ICP	1	389			mg/L	0.1	0.5	12/12/14 10:36	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:57	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:36	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:57	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:36	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:57	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:36	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/05/14 14:57	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 10:36	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/05/14 14:57	jjc
Iron, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	12/12/14 10:36	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/08/14 19:17	msh
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	12/08/14 14:37	msh
Lithium, dissolved	M200.7 ICP	1	0.088			mg/L	0.008	0.04	12/05/14 14:57	jjc
Lithium, total	M200.7 ICP	1	0.091			mg/L	0.008	0.04	12/12/14 10:36	jjc
Magnesium, dissolved	M200.7 ICP	1	20.3			mg/L	0.2	1	12/05/14 14:57	jjc
Magnesium, total	M200.7 ICP	1	21.3			mg/L	0.2	1	12/12/14 10:36	jjc
Manganese, dissolved	M200.7 ICP	1	0.030			mg/L	0.005	0.03	12/05/14 14:57	jjc
Manganese, total	M200.7 ICP	1	0.040			mg/L	0.005	0.03	12/12/14 10:36	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/05/14 12:42	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 13:47	mfm
Molybdenum, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	12/05/14 14:57	jjc
Molybdenum, total	M200.7 ICP	1	0.03	B		mg/L	0.02	0.1	12/12/14 10:36	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:57	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:36	jjc
Potassium, dissolved	M200.7 ICP	1	13.3			mg/L	0.2	1	12/05/14 14:57	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L21802-03**
Date Sampled: 12/01/14 09:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	14.2		mg/L	0.2	1	12/12/14 10:36	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/05/14 14:57	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 10:36	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0008		mg/L	0.0001	0.0003	12/08/14 19:17	msh
Selenium, total	M200.8 ICP-MS	1	0.0007		mg/L	0.0001	0.0003	12/08/14 14:37	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 19:17	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 14:37	msh
Sodium, dissolved	M200.7 ICP	1	72.1		mg/L	0.2	1	12/05/14 14:57	jjc
Sodium, total	M200.7 ICP	1	79.7		mg/L	0.2	1	12/12/14 10:36	jjc
Strontium, dissolved	M200.7 ICP	1	4.080		mg/L	0.005	0.03	12/05/14 14:57	jjc
Strontium, total	M200.7 ICP	1	4.480		mg/L	0.005	0.03	12/12/14 10:36	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 19:17	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 14:37	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/05/14 14:57	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 10:36	jjc
Titanium, dissolved	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	12/05/14 14:57	jjc
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 10:36	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 19:17	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 14:37	msh
Vanadium, dissolved	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/05/14 14:57	jjc
Vanadium, total	M200.7 ICP	1	0.010	B	mg/L	0.005	0.03	12/12/14 10:36	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/05/14 14:57	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 10:36	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2B-E

ACZ Sample ID: **L21802-03**
Date Sampled: 12/01/14 09:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	29.7		*	mg/L	2	20	12/03/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/14 0:00	abd
Total Alkalinity		1	29.7		*	mg/L	2	20	12/03/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/15/14 14:21	calc
Sum of Anions			24			meq/L			12/15/14 14:21	calc
Sum of Cations			24			meq/L			12/15/14 14:21	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/10/14 9:34	id
Chloride	SM4500Cl-E	1	71.5		*	mg/L	0.5	2	12/09/14 13:41	mpb
Conductivity @25C	SM2510B	1	2000		*	umhos/cm	1	10	12/03/14 23:24	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:32	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:56	pjb
Fluoride	SM4500F-C	1	1.33		*	mg/L	0.05	0.3	12/05/14 17:20	enb
Hardness as CaCO3	SM2340B - Calculation		1040			mg/L	0.8	4	12/15/14 14:21	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	5	5		*	mg/L	0.1	0.5	12/11/14 23:56	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.17	B	*	mg/L	0.05	0.2	12/09/14 15:19	bsu
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	12/06/14 12:02	tcd
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	12/03/14 0:00	abd
pH measured at		1	19.3		*	C	0.1	0.1	12/03/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	12/15/14 14:21	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/09/14 13:48	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/04/14 18:37	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/09/14 13:15	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	1700		*	mg/L	10	20	12/03/14 14:55	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	12/03/14 13:43	eea
Residue, Total (TS) @ 105C	SM2540B	1	1770		*	mg/L	10	20	12/03/14 14:10	enb
Sulfate	D516-02/-07 - Turbidimetric	100	1010		*	mg/L	100	500	12/08/14 17:57	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 16:25	eea
TDS (calculated)	Calculation		1590			mg/L			12/15/14 14:21	calc
TDS (ratio - measured/calculated)	Calculation		1.07						12/15/14 14:21	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. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21802-01	WG375666	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375578	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375797	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG375578	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375665	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375578	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375985	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).
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375721	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).
	WG375578	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375817	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).
	WG375648	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).
	WG375802	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG375575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375571	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).
	WG375574	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG375764	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).
	WG375747	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).
	WG375578	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21802-02	WG375666	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375578	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375797	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG375578	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375665	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375578	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375985	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).
	WG375825	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375721	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).
	WG375578	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375817	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).
	WG375648	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).
	WG375802	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG375575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375571	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).
	WG375574	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG375764	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).
	WG375747	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).
	WG375578	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21802-03	WG375578	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375797	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG375578	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375665	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	SM4500F-C		Q6	Sample was received above recommended temperature.	
	WG375578	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375985	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.
			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).
	WG375825	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375721	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).
	WG375578	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375817	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).
	WG375648	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.
	WG375802	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG375575	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375571	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).
WG375574	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG375764	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).	
WG375747	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

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).
	WG375578	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L21802-01**
Date Sampled: 12/01/14 11:40
Date Received: 12/03/14
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG375852Analyst: itk
Extract Date: 12/08/14 14:16
Analysis Date: 12/09/14 23:16

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		1.3		1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.3		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW1-EACZ Sample ID: **L21802-01**
Date Sampled: 12/01/14 11:40
Date Received: 12/03/14
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG375863

Analyst: DRH

Extract Date:

Analysis Date: 12/10/14 13:49

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: **L21802-02**
Date Sampled: 12/01/14 10:30
Date Received: 12/03/14
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG375852

Analyst: itk
Extract Date: 12/08/14 14:17
Analysis Date: 12/09/14 23:42

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	79.5		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2-EACZ Sample ID: **L21802-02**
Date Sampled: 12/01/14 10:30
Date Received: 12/03/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG375863

Analyst: DRH

Extract Date:

Analysis Date: 12/10/14 14:03

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: SW2B-E

ACZ Sample ID: **L21802-03**

Date Sampled: 12/01/14 9:30

Date Received: 12/03/14

Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**

Extract Method: **M3520**

Workgroup: WG375852

Analyst: itk

Extract Date: 12/08/14 14:19

Analysis Date: 12/10/14 0:08

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	79		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2B-EACZ Sample ID: **L21802-03**

Date Sampled: 12/01/14 9:30

Date Received: 12/03/14

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

Extract Method:

Workgroup: WG375863

Analyst: DRH

Extract Date:

Analysis Date: 12/10/14 14:18

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

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21802-01	WG375852	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375863	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L21802-02	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			WG375863	Oil and Grease	1664A - Gravimetric
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
	L21802-03	WG375852	*All Compounds*	M8015D GC/FID	Q6
M8015D GC/FID				Q9	Insufficient sample received to meet method QC requirements.
WG375863				Oil and Grease	1664A - Gravimetric
WG375751		*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21802**

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: L21802
 Date Received: 12/03/2014 10:01
 Received By: ear
 Date Printed: 12/4/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3512	8.8	15	N/A

Was ice present in the shipment container(s)?

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

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



Laboratories, Inc.

L21802

CHAIN of CUSTODY

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

Report to:

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

Address: Bulevar Los procesos 18 calle 24-69 Zona 10
Empresarial Zona pradera, Torre IV Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources Inc.

E-mail: CMuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

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

REMARKS

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

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

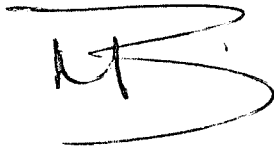
Guatemala December 1st, 2014

To whom it may concern:

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

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

Best regards,

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

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

December 16, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Charlie Muerhoff

Tahoe Resources, Inc.

5310 Kietzke Lane

Suite 200

Reno, NV 89511

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21826

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 04, 2014. This project has been assigned to ACZ's project number, L21826. 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 L21826. 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.

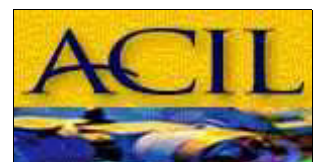
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 16, 2014

Project ID: Escobal

ACZ Project ID: L21826

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on December 4, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21826. 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 (HE, H2), received either too close to the hold time or requiring re-analysis after the hold time had expired.

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L21826-01**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 15:09	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 12:52	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/11/14 23:46	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 17:00	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 12:37	bsu
Total Hot Plate Digestion	M200.2 ICP								12/11/14 16:53	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								12/11/14 13:36	scp

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L21826-01**

Date Sampled: 12/02/14 11:30

Date Received: 12/04/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/08/14 11:33	aeb
Aluminum, total	M200.7 ICP	1	0.06	B	*	mg/L	0.03	0.2	12/12/14 12:16	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0095			mg/L	0.0004	0.002	12/08/14 21:04	msh
Antimony, total	M200.8 ICP-MS	1	0.0100			mg/L	0.0004	0.002	12/13/14 4:25	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0072			mg/L	0.0002	0.001	12/08/14 21:04	msh
Arsenic, total	M200.8 ICP-MS	1	0.0078			mg/L	0.0002	0.001	12/13/14 4:25	pmc
Barium, dissolved	M200.7 ICP	1	0.057			mg/L	0.003	0.02	12/08/14 11:33	aeb
Barium, total	M200.7 ICP	1	0.059			mg/L	0.003	0.02	12/12/14 12:16	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:33	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:16	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/08/14 16:12	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 12:16	jjc
Boron, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	12/08/14 11:33	aeb
Boron, total	M200.7 ICP	1	0.09			mg/L	0.01	0.05	12/12/14 12:16	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 21:04	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 4:25	pmc
Calcium, dissolved	M200.7 ICP	1	370			mg/L	0.1	0.5	12/08/14 11:33	aeb
Calcium, total	M200.7 ICP	1	380			mg/L	0.1	0.5	12/12/14 12:16	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:33	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:16	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:33	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:16	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:33	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:16	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 11:33	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 12:16	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/08/14 11:33	aeb
Iron, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	12/12/14 12:16	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/08/14 21:04	msh
Lead, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	12/13/14 4:25	pmc
Lithium, dissolved	M200.7 ICP	1	0.091			mg/L	0.008	0.04	12/08/14 11:33	aeb
Lithium, total	M200.7 ICP	1	0.085			mg/L	0.008	0.04	12/12/14 12:16	jjc
Magnesium, dissolved	M200.7 ICP	1	19.7			mg/L	0.2	1	12/08/14 11:33	aeb
Magnesium, total	M200.7 ICP	1	19.3			mg/L	0.2	1	12/12/14 12:16	jjc
Manganese, dissolved	M200.7 ICP	1	0.020	B		mg/L	0.005	0.03	12/08/14 11:33	aeb
Manganese, total	M200.7 ICP	1	0.028	B		mg/L	0.005	0.03	12/12/14 12:16	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:39	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 11:39	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 11:33	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 12:16	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:33	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 12:16	jjc
Potassium, dissolved	M200.7 ICP	1	10.3			mg/L	0.2	1	12/08/14 11:33	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L21826-01**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	10.4		mg/L	0.2	1	12/12/14 12:16	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 11:33	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 12:16	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	12/08/14 21:04	msh
Selenium, total	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	12/13/14 4:25	pmc
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 21:04	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/13/14 4:25	pmc
Sodium, dissolved	M200.7 ICP	1	66.9		mg/L	0.2	1	12/08/14 11:33	aeb
Sodium, total	M200.7 ICP	1	68		mg/L	0.2	1	12/12/14 12:16	jjc
Strontium, dissolved	M200.7 ICP	1	4.040	*	mg/L	0.005	0.03	12/08/14 11:33	aeb
Strontium, total	M200.7 ICP	1	4.120		mg/L	0.005	0.03	12/12/14 12:16	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 21:04	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/13/14 4:25	pmc
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 11:33	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 12:16	jjc
Titanium, dissolved	M200.7 ICP	1	0.016	B	mg/L	0.005	0.03	12/08/14 11:33	aeb
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 12:16	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/08/14 21:04	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/13/14 4:25	pmc
Vanadium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	12/08/14 11:33	aeb
Vanadium, total	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	12/12/14 12:16	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 11:33	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 12:16	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW2A-E

ACZ Sample ID: **L21826-01**
 Date Sampled: 12/02/14 11:30
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	50.3		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	50.3		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.1			%			12/16/14 10:19	calc
Sum of Anions			24			meq/L			12/16/14 10:19	calc
Sum of Cations			23			meq/L			12/16/14 10:19	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/10/14 10:02	id
Chloride	SM4500Cl-E	1	65.2		*	mg/L	0.5	2	12/11/14 16:26	jif
Conductivity @25C	SM2510B	1	1910		*	umhos/cm	1	10	12/05/14 21:31	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:43	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:06	pjb
Fluoride	SM4500F-C	1	1.18		*	mg/L	0.05	0.3	12/10/14 14:20	abd
Hardness as CaCO3	SM2340B - Calculation		1010			mg/L	0.8	4	12/16/14 10:19	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.49		*	mg/L	0.02	0.1	12/12/14 23:33	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.19	B	*	mg/L	0.05	0.2	12/08/14 17:17	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	12/15/14 13:10	mss2
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.3		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	12/16/14 10:19	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/09/14 14:01	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/04/14 18:52	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/10/14 23:46	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1610		*	mg/L	10	20	12/04/14 16:26	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/05/14 10:43	id
Residue, Total (TS) @ 105C	SM2540B	1	1680		*	mg/L	10	20	12/08/14 11:20	id
Sulfate	D516-02/-07 - Turbidimetric	30	1010		*	mg/L	30	150	12/09/14 17:45	mpb
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/09/14 13:45	eea
TDS (calculated)	Calculation		1580			mg/L			12/16/14 10:19	calc
TDS (ratio - measured/calculated)	Calculation		1.02						12/16/14 10:19	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L21826-02**
Date Sampled: 12/02/14 11:00
Date Received: 12/04/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 15:16	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 13:00	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/12/14 0:20	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/14 10:14	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 12:46	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								12/11/14 13:43	scp
Total Hot Plate Digestion	M200.2 ICP								12/11/14 17:05	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW3-E

ACZ Sample ID: **L21826-02**

Date Sampled: 12/02/14 11:00

Date Received: 12/04/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.03	0.2	12/08/14 11:37	aeb
Aluminum, total	M200.7 ICP	1	0.91		*	mg/L	0.03	0.2	12/12/14 12:19	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/08/14 21:06	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/13/14 4:29	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0112			mg/L	0.0002	0.001	12/08/14 21:06	msh
Arsenic, total	M200.8 ICP-MS	1	0.0112			mg/L	0.0002	0.001	12/13/14 4:29	pmc
Barium, dissolved	M200.7 ICP	1	0.069			mg/L	0.003	0.02	12/08/14 11:37	aeb
Barium, total	M200.7 ICP	1	0.079			mg/L	0.003	0.02	12/12/14 12:19	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:37	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:19	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/08/14 16:15	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 12:19	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:37	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:19	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 21:06	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 4:29	pmc
Calcium, dissolved	M200.7 ICP	1	21.9			mg/L	0.1	0.5	12/08/14 11:37	aeb
Calcium, total	M200.7 ICP	1	22.9			mg/L	0.1	0.5	12/12/14 12:19	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:37	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:19	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:37	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:19	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:37	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:19	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 11:37	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 12:19	jjc
Iron, dissolved	M200.7 ICP	1	0.05			mg/L	0.02	0.05	12/08/14 11:37	aeb
Iron, total	M200.7 ICP	1	0.40			mg/L	0.02	0.05	12/12/14 12:19	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 21:06	msh
Lead, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	12/13/14 4:29	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:37	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 12:19	jjc
Magnesium, dissolved	M200.7 ICP	1	1.8			mg/L	0.2	1	12/08/14 11:37	aeb
Magnesium, total	M200.7 ICP	1	1.9			mg/L	0.2	1	12/12/14 12:19	jjc
Manganese, dissolved	M200.7 ICP	1	0.024	B		mg/L	0.005	0.03	12/08/14 11:37	aeb
Manganese, total	M200.7 ICP	1	0.038			mg/L	0.005	0.03	12/12/14 12:19	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:42	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 11:41	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 11:37	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 12:19	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:37	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 12:19	jjc
Potassium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	12/08/14 11:37	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW3-E

ACZ Sample ID: **L21826-02**
Date Sampled: 12/02/14 11:00
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.3		mg/L	0.2	1	12/12/14 12:19	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 11:37	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 12:19	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/08/14 21:06	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/13/14 4:29	pmc
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 21:06	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/13/14 4:29	pmc
Sodium, dissolved	M200.7 ICP	1	8.8		mg/L	0.2	1	12/08/14 11:37	aeb
Sodium, total	M200.7 ICP	1	9.1		mg/L	0.2	1	12/12/14 12:19	jjc
Strontium, dissolved	M200.7 ICP	1	0.146		mg/L	0.005	0.03	12/08/14 11:37	aeb
Strontium, total	M200.7 ICP	1	0.155		mg/L	0.005	0.03	12/12/14 12:19	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 21:06	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/13/14 4:29	pmc
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 11:37	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 12:19	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:37	aeb
Titanium, total	M200.7 ICP	1	0.021	B	mg/L	0.005	0.03	12/12/14 12:19	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 21:06	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/13/14 4:29	pmc
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:37	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 12:19	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 11:37	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 12:19	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW3-E

ACZ Sample ID: **L21826-02**
 Date Sampled: 12/02/14 11:00
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	69.6		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	69.6		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.9			%			12/16/14 10:20	calc
Sum of Anions			1.8			meq/L			12/16/14 10:20	calc
Sum of Cations			1.7			meq/L			12/16/14 10:20	calc
Chemical Oxygen Demand	M410.4	1	29		*	mg/L	10	20	12/10/14 10:08	id
Chloride	SM4500Cl-E	1	2.4		*	mg/L	0.5	2	12/11/14 16:26	jif
Conductivity @25C	SM2510B	1	173		*	umhos/cm	1	10	12/05/14 21:39	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:44	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:07	pjb
Fluoride	SM4500F-C	1	0.17	B	*	mg/L	0.05	0.3	12/10/14 14:25	abd
Hardness as CaCO3	SM2340B - Calculation		62			mg/L	0.8	4	12/16/14 10:20	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.32		*	mg/L	0.02	0.1	12/12/14 23:35	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 17:18	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/15/14 13:12	mss2
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.3		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	12/16/14 10:20	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/11/14 17:23	mpb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	12/04/14 18:54	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	12/10/14 23:47	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	154		*	mg/L	10	20	12/04/14 16:29	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/05/14 10:44	id
Residue, Total (TS) @ 105C	SM2540B	1	168		*	mg/L	10	20	12/08/14 11:23	id
Sulfate	D516-02/-07 - Turbidimetric	1	17.1		*	mg/L	1	5	12/09/14 17:36	mpb
Sulfide as S	SM4500S2-D	3.75		UH	*	mg/L	0.08	0.4	12/11/14 14:45	enb
TDS (calculated)	Calculation		98			mg/L			12/16/14 10:20	calc
TDS (ratio - measured/calculated)	Calculation		1.57						12/16/14 10:20	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L21826-03**
Date Sampled: 12/02/14 10:35
Date Received: 12/04/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 15:24	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 15:23	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/12/14 0:53	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/14 10:28	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 12:56	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								12/11/14 14:04	scp
Total Hot Plate Digestion	M200.2 ICP								12/11/14 17:16	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L21826-03**
Date Sampled: 12/02/14 10:35
Date Received: 12/04/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/08/14 11:40	aeb
Aluminum, total	M200.7 ICP	1	0.20		*	mg/L	0.03	0.2	12/12/14 12:22	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0036			mg/L	0.0004	0.002	12/08/14 21:08	msh
Antimony, total	M200.8 ICP-MS	1	0.0037			mg/L	0.0004	0.002	12/13/14 4:38	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0060			mg/L	0.0002	0.001	12/08/14 21:08	msh
Arsenic, total	M200.8 ICP-MS	1	0.0060			mg/L	0.0002	0.001	12/13/14 4:38	pmc
Barium, dissolved	M200.7 ICP	1	0.120			mg/L	0.003	0.02	12/08/14 11:40	aeb
Barium, total	M200.7 ICP	1	0.127			mg/L	0.003	0.02	12/12/14 12:22	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:40	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:22	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/08/14 16:25	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 12:22	jjc
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/08/14 11:40	aeb
Boron, total	M200.7 ICP	1	0.05			mg/L	0.01	0.05	12/12/14 12:22	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 21:08	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 4:38	pmc
Calcium, dissolved	M200.7 ICP	1	193			mg/L	0.1	0.5	12/08/14 11:40	aeb
Calcium, total	M200.7 ICP	1	202			mg/L	0.1	0.5	12/12/14 12:22	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:40	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:22	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:40	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:22	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:40	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 12:22	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 11:40	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 12:22	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/08/14 11:40	aeb
Iron, total	M200.7 ICP	1	0.17			mg/L	0.02	0.05	12/12/14 12:22	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 21:08	msh
Lead, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	12/13/14 4:38	pmc
Lithium, dissolved	M200.7 ICP	1	0.038	B		mg/L	0.008	0.04	12/08/14 11:40	aeb
Lithium, total	M200.7 ICP	1	0.036	B		mg/L	0.008	0.04	12/12/14 12:22	jjc
Magnesium, dissolved	M200.7 ICP	1	12.4			mg/L	0.2	1	12/08/14 11:40	aeb
Magnesium, total	M200.7 ICP	1	12.6			mg/L	0.2	1	12/12/14 12:22	jjc
Manganese, dissolved	M200.7 ICP	1	0.160			mg/L	0.005	0.03	12/08/14 11:40	aeb
Manganese, total	M200.7 ICP	1	0.171			mg/L	0.005	0.03	12/12/14 12:22	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:44	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 11:48	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 11:40	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 12:22	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:40	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 12:22	jjc
Potassium, dissolved	M200.7 ICP	1	7.9			mg/L	0.2	1	12/08/14 11:40	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4A-E

ACZ Sample ID: **L21826-03**
Date Sampled: 12/02/14 10:35
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	8.1		mg/L	0.2	1	12/12/14 12:22	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 11:40	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 12:22	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	12/08/14 21:08	msh
Selenium, total	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	12/13/14 4:38	pmc
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 21:08	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/13/14 4:38	pmc
Sodium, dissolved	M200.7 ICP	1	37.3		mg/L	0.2	1	12/08/14 11:40	aeb
Sodium, total	M200.7 ICP	1	39.1		mg/L	0.2	1	12/12/14 12:22	jjc
Strontium, dissolved	M200.7 ICP	1	1.870	*	mg/L	0.005	0.03	12/08/14 11:40	aeb
Strontium, total	M200.7 ICP	1	1.970		mg/L	0.005	0.03	12/12/14 12:22	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 21:08	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/13/14 4:38	pmc
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 11:40	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 12:22	jjc
Titanium, dissolved	M200.7 ICP	1	0.014	B	mg/L	0.005	0.03	12/08/14 11:40	aeb
Titanium, total	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	12/12/14 12:22	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 21:08	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/13/14 4:38	pmc
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:40	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 12:22	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 11:40	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 12:22	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4A-E

ACZ Sample ID: **L21826-03**
 Date Sampled: 12/02/14 10:35
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	74.3		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	74.3		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/16/14 10:20	calc
Sum of Anions			13			meq/L			12/16/14 10:20	calc
Sum of Cations			13			meq/L			12/16/14 10:20	calc
Chemical Oxygen Demand	M410.4	1	18	B	*	mg/L	10	20	12/10/14 10:11	id
Chloride	SM4500Cl-E	1	35.9		*	mg/L	0.5	2	12/11/14 16:26	jif
Conductivity @25C	SM2510B	1	1160		*	umhos/cm	1	10	12/05/14 21:47	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:46	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/10/14 0:01	pjb
Fluoride	SM4500F-C	1	0.62		*	mg/L	0.05	0.3	12/10/14 14:32	abd
Hardness as CaCO3	SM2340B - Calculation		533			mg/L	0.8	4	12/16/14 10:20	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.69		*	mg/L	0.02	0.1	12/12/14 23:36	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 17:19	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/15/14 13:13	mss2
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.4		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	12/16/14 10:20	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/11/14 17:25	mpb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	12/04/14 18:56	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	12/10/14 23:48	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	926		*	mg/L	10	20	12/05/14 14:25	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/05/14 10:46	id
Residue, Total (TS) @ 105C	SM2540B	1	930		*	mg/L	10	20	12/08/14 11:26	id
Sulfate	D516-02/-07 - Turbidimetric	30	490		*	mg/L	30	150	12/09/14 17:49	mpb
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/09/14 13:59	eea
TDS (calculated)	Calculation		824			mg/L			12/16/14 10:20	calc
TDS (ratio - measured/calculated)	Calculation		1.12						12/16/14 10:20	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. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21826**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21826-01	WG376005	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375726	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375964	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375706	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375817	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).
	WG375648	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.
	WG375906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG375637	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375667	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).
	WG375732	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L21826**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG375842	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.
	WG375816	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).
	WG375706	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21826**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21826-02	WG376005	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375726	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375964	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG375706	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG375978	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).	
WG375648	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).	
WG375906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG375637	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG375667	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: **L21826**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG375732		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG375842		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.
WG375962		Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.
			SM4500S2-D	H2	Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
			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).
WG375706		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21826**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21826-03	WG376005	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375726	Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375964	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375847	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
	WG375706	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375978	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).
	WG375648	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).
	WG375906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG375700	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375667	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).	
WG375732	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG375842	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike	

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Tahoe Resources, Inc.

ACZ Project ID: **L21826**

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.
WG375816		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).
WG375706		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW2A-E

ACZ Sample ID: **L21826-01**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

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

Workgroup: WG375852

Analyst: itk
Extract Date: 12/08/14 14:27
Analysis Date: 12/10/14 3:11

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW2A-EACZ Sample ID: **L21826-01**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 11:57

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L21826-02**
Date Sampled: 12/02/14 11:00
Date Received: 12/04/14
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG375852Analyst: itk
Extract Date: 12/08/14 14:28
Analysis Date: 12/10/14 3:37

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	79.7		1.02	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW3-EACZ Sample ID: **L21826-02**
Date Sampled: 12/02/14 11:00
Date Received: 12/04/14
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 12:09

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L21826-03**
Date Sampled: 12/02/14 10:35
Date Received: 12/04/14
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG375852Analyst: itk
Extract Date: 12/08/14 14:30
Analysis Date: 12/10/14 4:04

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	77.6		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4A-EACZ Sample ID: **L21826-03**
Date Sampled: 12/02/14 10:35
Date Received: 12/04/14
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 12:20

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

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21826**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21826-01	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L21826-02	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L21826-03	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21826**

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: L21826
 Date Received: 12/04/2014 09:42
 Received By: ddp
 Date Printed: 12/4/2014

Receipt Verification

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

Samples/Containers

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

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4289	7.6	20	N/A

Was ice present in the shipment container(s)?

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

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



Laboratories, Inc.

L21826

CHAIN of CUSTODY

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

Report to:

Name: Miguel Beranza
Company: Tahoe Resources Inc.
E-mail: MBeranza@Sanrafael.com.gt

Address: Bulevar Los Proceres 18 calle 24-69 zona 10
In Reserial Zona Platera Tercera V Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources Inc.

E-mail: CMuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Beranza
Company: Tahoe Resources Inc.
E-mail: MBeranza@Sanrafael.com.gt

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis columns. Includes entries for SW2A-E, SW3-E, and SW4A-E.

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

REMARKS

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

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

L21826 Chain of Custody

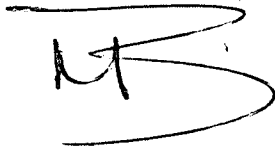
Guatemala December 2nd, 2014

To whom it may concern:

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

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

Best regards,

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

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

December 15, 2014

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21799

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 03, 2014. This project has been assigned to ACZ's project number, L21799. 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 L21799. 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.

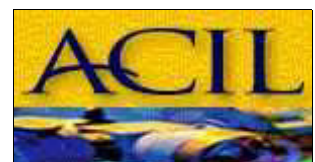
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 14, 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: SW4-E

ACZ Sample ID: **L21799-01**
Date Sampled: 12/01/14 08:45
Date Received: 12/03/14
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/08/14 11:51	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 11:04	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/05/14 12:01	tcd
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 15:30	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:30	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/05/14 18:16	pmc
Total Hot Plate Digestion	M200.2 ICP								12/11/14 10:40	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L21799-01**

Date Sampled: 12/01/14 08:45

Date Received: 12/03/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/05/14 14:36	jjc
Aluminum, total	M200.7 ICP	1	0.21			mg/L	0.03	0.2	12/12/14 14:26	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0019	B		mg/L	0.0004	0.002	12/08/14 19:00	msh
Antimony, total	M200.8 ICP-MS	1	0.0019	B		mg/L	0.0004	0.002	12/08/14 14:20	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0049			mg/L	0.0002	0.001	12/08/14 19:00	msh
Arsenic, total	M200.8 ICP-MS	1	0.0055			mg/L	0.0002	0.001	12/08/14 14:20	msh
Barium, dissolved	M200.7 ICP	1	0.138			mg/L	0.003	0.02	12/05/14 14:36	jjc
Barium, total	M200.7 ICP	1	0.140			mg/L	0.003	0.02	12/12/14 10:14	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:36	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:14	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/05/14 14:36	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 10:14	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/08/14 13:20	jjc
Boron, total	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/12/14 10:14	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:00	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:20	msh
Calcium, dissolved	M200.7 ICP	1	124			mg/L	0.1	0.5	12/05/14 14:36	jjc
Calcium, total	M200.7 ICP	1	123			mg/L	0.1	0.5	12/12/14 10:14	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:36	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:14	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:36	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:14	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:36	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:14	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/05/14 14:36	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 10:14	jjc
Iron, dissolved	M200.7 ICP	1	0.03	B	*	mg/L	0.02	0.05	12/05/14 14:36	jjc
Iron, total	M200.7 ICP	1	0.29			mg/L	0.02	0.05	12/12/14 10:14	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:00	msh
Lead, total	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	12/08/14 14:20	msh
Lithium, dissolved	M200.7 ICP	1	0.018	B		mg/L	0.008	0.04	12/05/14 14:36	jjc
Lithium, total	M200.7 ICP	1	0.018	B		mg/L	0.008	0.04	12/12/14 10:14	jjc
Magnesium, dissolved	M200.7 ICP	1	9.4			mg/L	0.2	1	12/05/14 14:36	jjc
Magnesium, total	M200.7 ICP	1	9.7			mg/L	0.2	1	12/12/14 10:14	jjc
Manganese, dissolved	M200.7 ICP	1	0.221			mg/L	0.005	0.03	12/05/14 14:36	jjc
Manganese, total	M200.7 ICP	1	0.226			mg/L	0.005	0.03	12/12/14 10:14	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/05/14 12:30	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 13:36	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/05/14 14:36	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 10:14	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:36	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:14	jjc
Potassium, dissolved	M200.7 ICP	1	6.9			mg/L	0.2	1	12/05/14 14:36	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW4-E

ACZ Sample ID: **L21799-01**
Date Sampled: 12/01/14 08:45
Date Received: 12/03/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	7.2			mg/L	0.2	1	12/12/14 10:14	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/05/14 14:36	jjc
Scandium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 10:14	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	12/08/14 19:00	msh
Selenium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	12/08/14 14:20	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/08/14 19:00	msh
Silver, total	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/08/14 14:20	msh
Sodium, dissolved	M200.7 ICP	1	26.3			mg/L	0.2	1	12/05/14 14:36	jjc
Sodium, total	M200.7 ICP	1	28.2			mg/L	0.2	1	12/12/14 10:14	jjc
Strontium, dissolved	M200.7 ICP	1	1.080		*	mg/L	0.005	0.03	12/05/14 14:36	jjc
Strontium, total	M200.7 ICP	1	1.180			mg/L	0.005	0.03	12/12/14 10:14	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:00	msh
Thallium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:20	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/05/14 14:36	jjc
Tin, total	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 10:14	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/05/14 14:36	jjc
Titanium, total	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	12/12/14 10:14	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/08/14 19:00	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/08/14 14:20	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/05/14 14:36	jjc
Vanadium, total	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 10:14	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:36	jjc
Zinc, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:14	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW4-E

ACZ Sample ID: **L21799-01**
 Date Sampled: 12/01/14 08:45
 Date Received: 12/03/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	81.4			mg/L	2	20	12/03/14 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	12/03/14 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	12/03/14 0:00	abd
Total Alkalinity		1	81.4			mg/L	2	20	12/03/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/15/14 14:14	calc
Sum of Anions			8.4			meq/L			12/15/14 14:14	calc
Sum of Cations			8.4			meq/L			12/15/14 14:14	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/10/14 9:23	id
Chloride	SM4500Cl-E	1	23			mg/L	0.5	2	12/09/14 13:35	mpb
Conductivity @25C	SM2510B	1	788			umhos/cm	1	10	12/03/14 22:44	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U		mg/L	0.003	0.01	12/08/14 15:18	bsu
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:50	pjb
Fluoride	SM4500F-C	1	0.37		*	mg/L	0.05	0.3	12/05/14 16:45	enb
Hardness as CaCO3	SM2340B - Calculation		348			mg/L	0.8	4	12/15/14 14:14	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.77		*	mg/L	0.02	0.1	12/11/14 23:23	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 16:54	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B		mg/L	0.1	0.5	12/06/14 11:54	tcd
pH (lab)	SM4500H+ B									
pH		1	8.0	H		units	0.1	0.1	12/03/14 0:00	abd
pH measured at		1	19.4			C	0.1	0.1	12/03/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.03	0.2	12/15/14 14:14	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.01	0.05	12/09/14 13:42	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	12/04/14 18:29	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09			mg/L	0.01	0.05	12/09/14 13:07	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	608			mg/L	10	20	12/03/14 14:39	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/14 13:37	eea
Residue, Total (TS) @ 105C	SM2540B	1	632			mg/L	10	20	12/03/14 13:58	enb
Sulfate	D516-02/-07 - Turbidimetric	20	292			mg/L	20	100	12/08/14 16:15	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 15:17	eea
TDS (calculated)	Calculation		533			mg/L			12/15/14 14:14	calc
TDS (ratio - measured/calculated)	Calculation		1.14						12/15/14 14:14	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L21799-02**
Date Sampled: 12/01/14 08:00
Date Received: 12/03/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/08/14 12:00	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 11:12	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/05/14 12:01	tcd
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 15:36	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:36	mss2
Total Hot Plate Digestion	M200.2 ICP								12/11/14 10:52	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								12/05/14 18:26	pmc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L21799-02**

Date Sampled: 12/01/14 08:00

Date Received: 12/03/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/05/14 14:39	jjc
Aluminum, total	M200.7 ICP	1	2.49			mg/L	0.03	0.2	12/12/14 14:36	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	12/08/14 19:03	msh
Antimony, total	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	12/08/14 14:22	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0034			mg/L	0.0002	0.001	12/08/14 19:03	msh
Arsenic, total	M200.8 ICP-MS	1	0.0043			mg/L	0.0002	0.001	12/08/14 14:22	msh
Barium, dissolved	M200.7 ICP	1	0.055			mg/L	0.003	0.02	12/05/14 14:39	jjc
Barium, total	M200.7 ICP	1	0.078			mg/L	0.003	0.02	12/12/14 10:23	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:39	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:23	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/05/14 14:39	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 10:23	jjc
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/08/14 13:23	jjc
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/12/14 10:23	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:03	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:22	msh
Calcium, dissolved	M200.7 ICP	1	11.7			mg/L	0.1	0.5	12/05/14 14:39	jjc
Calcium, total	M200.7 ICP	1	12			mg/L	0.1	0.5	12/12/14 10:23	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:39	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:23	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:39	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:23	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:39	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:23	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/05/14 14:39	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 10:23	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	12/05/14 14:39	jjc
Iron, total	M200.7 ICP	1	1.08			mg/L	0.02	0.05	12/12/14 10:23	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:03	msh
Lead, total	M200.8 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	12/08/14 14:22	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:39	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:23	jjc
Magnesium, dissolved	M200.7 ICP	1	2.2			mg/L	0.2	1	12/05/14 14:39	jjc
Magnesium, total	M200.7 ICP	1	2.4			mg/L	0.2	1	12/12/14 10:23	jjc
Manganese, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	12/05/14 14:39	jjc
Manganese, total	M200.7 ICP	1	0.052			mg/L	0.005	0.03	12/12/14 10:23	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/05/14 12:33	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 13:38	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/05/14 14:39	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 10:23	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:39	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:23	jjc
Potassium, dissolved	M200.7 ICP	1	3			mg/L	0.2	1	12/05/14 14:39	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW7-E

ACZ Sample ID: **L21799-02**
Date Sampled: 12/01/14 08:00
Date Received: 12/03/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.4		mg/L	0.2	1	12/12/14 10:23	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/05/14 14:39	jjc
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 10:23	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/08/14 19:03	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/08/14 14:22	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 19:03	msh
Silver, total	M200.8 ICP-MS	1	0.00006	B	mg/L	0.00005	0.0003	12/08/14 14:22	msh
Sodium, dissolved	M200.7 ICP	1	7.2		mg/L	0.2	1	12/05/14 14:39	jjc
Sodium, total	M200.7 ICP	1	7.9		mg/L	0.2	1	12/12/14 10:23	jjc
Strontium, dissolved	M200.7 ICP	1	0.083	*	mg/L	0.005	0.03	12/05/14 14:39	jjc
Strontium, total	M200.7 ICP	1	0.098		mg/L	0.005	0.03	12/12/14 10:23	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 19:03	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 14:22	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/05/14 14:39	jjc
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 10:23	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/05/14 14:39	jjc
Titanium, total	M200.7 ICP	1	0.074		mg/L	0.005	0.03	12/12/14 10:23	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 19:03	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 14:22	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/05/14 14:39	jjc
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 10:23	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/05/14 14:39	jjc
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 10:23	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW7-E

ACZ Sample ID: **L21799-02**
 Date Sampled: 12/01/14 08:00
 Date Received: 12/03/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	45.1			mg/L	2	20	12/03/14 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	12/03/14 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	12/03/14 0:00	abd
Total Alkalinity		1	45.1			mg/L	2	20	12/03/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/15/14 14:15	calc
Sum of Anions			1.2			meq/L			12/15/14 14:15	calc
Sum of Cations			1.2			meq/L			12/15/14 14:15	calc
Chemical Oxygen Demand	M410.4	1	20	B	*	mg/L	10	20	12/10/14 9:25	id
Chloride	SM4500Cl-E	1	2.6			mg/L	0.5	2	12/09/14 13:35	mpb
Conductivity @25C	SM2510B	1	121			umhos/cm	1	10	12/03/14 22:52	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U		mg/L	0.003	0.01	12/08/14 15:20	bsu
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:52	pjb
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	12/05/14 16:50	enb
Hardness as CaCO3	SM2340B - Calculation		38			mg/L	0.8	4	12/15/14 14:15	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.36		*	mg/L	0.02	0.1	12/11/14 23:24	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 16:55	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B		mg/L	0.1	0.5	12/06/14 11:55	tcd
pH (lab)	SM4500H+ B									
pH		1	7.9	H		units	0.1	0.1	12/03/14 0:00	abd
pH measured at		1	19.3			C	0.1	0.1	12/03/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	12/15/14 14:15	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/09/14 13:43	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	12/04/14 18:30	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06			mg/L	0.01	0.05	12/09/14 13:08	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	120			mg/L	10	20	12/03/14 14:42	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	13.0	B	*	mg/L	5	20	12/03/14 13:38	eea
Residue, Total (TS) @ 105C	SM2540B	1	158			mg/L	10	20	12/03/14 14:00	enb
Sulfate	D516-02/-07 - Turbidimetric	1	9.3			mg/L	1	5	12/08/14 16:00	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 15:40	eea
TDS (calculated)	Calculation		63.7			mg/L			12/15/14 14:15	calc
TDS (ratio - measured/calculated)	Calculation		1.88						12/15/14 14:15	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L21799-03**
Date Sampled: 12/01/14 12:00
Date Received: 12/03/14
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/08/14 12:09	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 11:19	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/05/14 12:01	tcd
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 15:42	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:42	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/05/14 18:37	pmc
Total Hot Plate Digestion	M200.2 ICP								12/11/14 11:03	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L21799-03**
Date Sampled: 12/01/14 12:00
Date Received: 12/03/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/05/14 14:48	jjc
Aluminum, total	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 14:39	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/08/14 19:10	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/08/14 14:25	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	12/08/14 19:10	msh
Arsenic, total	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	12/08/14 14:25	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	12/05/14 14:48	jjc
Barium, total	M200.7 ICP	1		U		mg/L	0.003	0.02	12/12/14 10:26	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:48	jjc
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:26	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/05/14 14:48	jjc
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 10:26	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 13:32	jjc
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:26	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:10	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:25	msh
Calcium, dissolved	M200.7 ICP	1		U		mg/L	0.1	0.5	12/05/14 14:48	jjc
Calcium, total	M200.7 ICP	1		U		mg/L	0.1	0.5	12/12/14 10:26	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:48	jjc
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:26	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:48	jjc
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:26	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/05/14 14:48	jjc
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 10:26	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/05/14 14:48	jjc
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 10:26	jjc
Iron, dissolved	M200.7 ICP	1		U	*	mg/L	0.02	0.05	12/05/14 14:48	jjc
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 10:26	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 19:10	msh
Lead, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 14:25	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:48	jjc
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:26	jjc
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/05/14 14:48	jjc
Magnesium, total	M200.7 ICP	1		U		mg/L	0.2	1	12/12/14 10:26	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/05/14 14:48	jjc
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 10:26	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/05/14 12:35	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 13:40	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/05/14 14:48	jjc
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 10:26	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/05/14 14:48	jjc
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 10:26	jjc
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/05/14 14:48	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L21799-03**
Date Sampled: 12/01/14 12:00
Date Received: 12/03/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	U	mg/L	0.2	1	12/12/14 10:26	jjc
Scandium, dissolved	M200.7 ICP	1	U *	mg/L	0.1	0.5	12/05/14 14:48	jjc
Scandium, total	M200.7 ICP	1	U *	mg/L	0.1	0.5	12/12/14 10:26	jjc
Selenium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0003	12/08/14 19:10	msh
Selenium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0003	12/08/14 14:25	msh
Silver, dissolved	M200.8 ICP-MS	1	U	mg/L	0.00005	0.0003	12/08/14 19:10	msh
Silver, total	M200.8 ICP-MS	1	U	mg/L	0.00005	0.0003	12/08/14 14:25	msh
Sodium, dissolved	M200.7 ICP	1	U	mg/L	0.2	1	12/05/14 14:48	jjc
Sodium, total	M200.7 ICP	1	U	mg/L	0.2	1	12/12/14 10:26	jjc
Strontium, dissolved	M200.7 ICP	1	U *	mg/L	0.005	0.03	12/05/14 14:48	jjc
Strontium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	12/12/14 10:26	jjc
Thallium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	12/08/14 19:10	msh
Thallium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	12/08/14 14:25	msh
Tin, dissolved	M200.7 ICP	1	U	mg/L	0.04	0.2	12/05/14 14:48	jjc
Tin, total	M200.7 ICP	1	U	mg/L	0.04	0.2	12/12/14 10:26	jjc
Titanium, dissolved	M200.7 ICP	1	U	mg/L	0.005	0.03	12/05/14 14:48	jjc
Titanium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	12/12/14 10:26	jjc
Uranium, dissolved	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	12/08/14 19:10	msh
Uranium, total	M200.8 ICP-MS	1	U	mg/L	0.0001	0.0005	12/08/14 14:25	msh
Vanadium, dissolved	M200.7 ICP	1	U	mg/L	0.005	0.03	12/05/14 14:48	jjc
Vanadium, total	M200.7 ICP	1	U	mg/L	0.005	0.03	12/12/14 10:26	jjc
Zinc, dissolved	M200.7 ICP	1	U	mg/L	0.01	0.05	12/05/14 14:48	jjc
Zinc, total	M200.7 ICP	1	U	mg/L	0.01	0.05	12/12/14 10:26	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW10-E

ACZ Sample ID: **L21799-03**

Date Sampled: 12/01/14 12:00

Date Received: 12/03/14

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U		mg/L	2	20	12/03/14 0:00	abd
Carbonate as CaCO3		1		U		mg/L	2	20	12/03/14 0:00	abd
Hydroxide as CaCO3		1		U		mg/L	2	20	12/03/14 0:00	abd
Total Alkalinity		1		U		mg/L	2	20	12/03/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/15/14 14:15	calc
Sum of Anions			N/A			meq/L			12/15/14 14:15	calc
Sum of Cations				U		meq/L			12/15/14 14:15	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/10/14 9:28	id
Chloride	SM4500Cl-E	1		U		mg/L	0.5	2	12/09/14 13:35	mpb
Conductivity @25C	SM2510B	1	1.9	B		umhos/cm	1	10	12/03/14 22:58	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U		mg/L	0.003	0.01	12/08/14 15:21	bsu
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:53	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	12/05/14 16:57	enb
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	12/15/14 14:15	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/11/14 23:26	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 16:56	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U		mg/L	0.1	0.5	12/06/14 11:56	tcd
pH (lab)	SM4500H+ B									
pH		1	6.4	H		units	0.1	0.1	12/03/14 0:00	abd
pH measured at		1	19.2			C	0.1	0.1	12/03/14 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	12/15/14 14:15	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/09/14 13:44	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	12/04/14 18:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U		mg/L	0.01	0.05	12/09/14 13:09	tcd
Residue, Filterable (TDS) @180C	SM2540C	1		U		mg/L	10	20	12/03/14 14:45	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/14 13:39	eea
Residue, Total (TS) @ 105C	SM2540B	1		U		mg/L	10	20	12/03/14 14:02	enb
Sulfate	D516-02/-07 - Turbidimetric	1		U		mg/L	1	5	12/08/14 16:00	tcd
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 16:02	eea
TDS (calculated)	Calculation					mg/L			12/15/14 14:15	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/15/14 14:15	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21799**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21799-01	WG375666	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375854	Chemical Oxygen Demand	M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375665	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375985	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375817	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375648	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375571	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375747	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L21799**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21799-02	WG375666	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375854	Chemical Oxygen Demand	M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375665	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375985	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375817	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375648	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time.
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375571	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375747	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L21799**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21799-03	WG375666	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375854	Chemical Oxygen Demand	M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375665	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG375985	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375817	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375648	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375571	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375747	Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L21799-01**

Date Sampled: 12/01/14 8:45

Date Received: 12/03/14

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG375852

Analyst: itk

Extract Date: 12/08/14 14:12

Analysis Date: 12/09/14 21:31

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	80.3		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW4-EACZ Sample ID: **L21799-01**

Date Sampled: 12/01/14 8:45

Date Received: 12/03/14

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

Extract Method:

Workgroup: WG375863

Analyst: DRH

Extract Date:

Analysis Date: 12/10/14 13:06

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW7-EACZ Sample ID: **L21799-02**

Date Sampled: 12/01/14 8:00

Date Received: 12/03/14

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG375852

Analyst: itk

Extract Date: 12/08/14 14:13

Analysis Date: 12/09/14 22:24

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.3		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SW7-E

ACZ Sample ID: **L21799-02**

Date Sampled: 12/01/14 8:00

Date Received: 12/03/14

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

Extract Method:

Workgroup: WG375863

Analyst: DRH

Extract Date:

Analysis Date: 12/10/14 13:20

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW10-E

ACZ Sample ID: **L21799-03**
Date Sampled: 12/01/14 12:00
Date Received: 12/03/14
Sample Matrix: *Surface Water*

Diesel Range Organics (C10-C28)

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

Workgroup: WG375852

Analyst: itk
Extract Date: 12/08/14 14:15
Analysis Date: 12/09/14 22:50

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	77.7		1.01	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW10-EACZ Sample ID: **L21799-03**
Date Sampled: 12/01/14 12:00
Date Received: 12/03/14
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG375863

Analyst: DRH

Extract Date:

Analysis Date: 12/10/14 13:35

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. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21799**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21799-01	WG375852	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375751		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21799-02	WG375852	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375751		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21799-03	WG375852	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375751		M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21799**

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: L21799
 Date Received: 12/03/2014 10:00
 Received By: ear
 Date Printed: 12/3/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3201	5.5	18	Yes

Was ice present in the shipment container(s)?

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

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



Laboratories, Inc.

L21799

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard los placeres 18 calle 24-69 Zona-10
Empresarial Zona pradera Torre IV Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Mueihoff
Company: Tahoe Resources inc.

E-mail: cmueihoff@tahoeresourcesinc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Water Quality
PO#: Escobal

Reporting state for compliance testing:

Check box if samples include NRC licensed material?

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results for samples SW4-E, SW7-E, and SW10-E.

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

REMARKS

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

Table for Relinquished and Received by, including names, dates, and times.



Guatemala December 1st, 2014

To whom it may concern:

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

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

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together.

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

December 16, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21824

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 04, 2014. This project has been assigned to ACZ's project number, L21824. 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 L21824. 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.

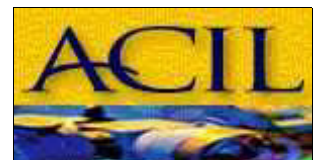
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 16, 2014

Project ID: Escobal

ACZ Project ID: L21824

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on December 4, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21824. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

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

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L21824-01**
Date Sampled: 12/02/14 07:40
Date Received: 12/04/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 14:19	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 12:16	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/11/14 20:56	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:30	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 15:10	bsu
Total Hot Plate Digestion	M200.2 ICP								12/11/14 13:24	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								12/08/14 20:23	pmc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L21824-01**

Date Sampled: 12/02/14 07:40

Date Received: 12/04/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/08/14 11:11	aeb
Aluminum, total	M200.7 ICP	1	0.59			mg/L	0.03	0.2	12/12/14 15:20	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/08/14 20:42	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/14 14:53	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0014			mg/L	0.0002	0.001	12/08/14 20:42	msh
Arsenic, total	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	12/09/14 14:53	msh
Barium, dissolved	M200.7 ICP	1	0.034			mg/L	0.003	0.02	12/08/14 11:11	aeb
Barium, total	M200.7 ICP	1	0.044			mg/L	0.003	0.02	12/12/14 11:10	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:11	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:10	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/08/14 15:56	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 11:10	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:11	aeb
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:10	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:42	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/14 14:53	msh
Calcium, dissolved	M200.7 ICP	1	6.2			mg/L	0.1	0.5	12/08/14 11:11	aeb
Calcium, total	M200.7 ICP	1	5.9			mg/L	0.1	0.5	12/12/14 11:10	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:11	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:10	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:11	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:10	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:11	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:10	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 11:11	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 11:10	jjc
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	12/08/14 11:11	aeb
Iron, total	M200.7 ICP	1	0.46			mg/L	0.02	0.05	12/12/14 11:10	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:42	msh
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/09/14 14:53	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:11	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 11:10	jjc
Magnesium, dissolved	M200.7 ICP	1	1.2			mg/L	0.2	1	12/08/14 11:11	aeb
Magnesium, total	M200.7 ICP	1	1.4			mg/L	0.2	1	12/12/14 11:10	jjc
Manganese, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	12/08/14 11:11	aeb
Manganese, total	M200.7 ICP	1	0.021	B		mg/L	0.005	0.03	12/12/14 11:10	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:24	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 14:09	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 11:11	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 11:10	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:11	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 11:10	jjc
Potassium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	12/08/14 11:11	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW5-E

ACZ Sample ID: **L21824-01**
Date Sampled: 12/02/14 07:40
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	2.7		mg/L	0.2	1	12/12/14 11:10	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 11:11	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 11:10	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/08/14 20:42	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/09/14 14:53	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 20:42	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/09/14 14:53	msh
Sodium, dissolved	M200.7 ICP	1	4.4		mg/L	0.2	1	12/08/14 11:11	aeb
Sodium, total	M200.7 ICP	1	4.8		mg/L	0.2	1	12/12/14 11:10	jjc
Strontium, dissolved	M200.7 ICP	1	0.049		mg/L	0.005	0.03	12/08/14 11:11	aeb
Strontium, total	M200.7 ICP	1	0.060		mg/L	0.005	0.03	12/12/14 11:10	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:42	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:53	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 11:11	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 11:10	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:11	aeb
Titanium, total	M200.7 ICP	1	0.018	B	mg/L	0.005	0.03	12/12/14 11:10	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:42	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:53	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:11	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 11:10	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 11:11	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 11:10	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW5-E

ACZ Sample ID: **L21824-01**
 Date Sampled: 12/02/14 07:40
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	22.7		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	22.7		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.5			%			12/16/14 9:57	calc
Sum of Anions			0.688			meq/L			12/16/14 9:57	calc
Sum of Cations			0.668			meq/L			12/16/14 9:57	calc
Chemical Oxygen Demand	M410.4	1	10	B	*	mg/L	10	20	12/10/14 9:50	id
Chloride	SM4500Cl-E	1	1.6	B	*	mg/L	0.5	2	12/11/14 16:05	jif
Conductivity @25C	SM2510B	1	72.5		*	umhos/cm	1	10	12/05/14 20:17	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:36	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:00	pjb
Fluoride	SM4500F-C	1	0.08	B	*	mg/L	0.05	0.3	12/10/14 13:18	abd
Hardness as CaCO3	SM2340B - Calculation		20			mg/L	0.8	4	12/16/14 9:57	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.11		*	mg/L	0.02	0.1	12/12/14 23:25	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 17:08	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/15/14 13:03	mss2
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.5		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	12/16/14 9:57	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/09/14 13:55	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	12/04/14 18:44	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/09/14 16:34	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	74		*	mg/L	10	20	12/04/14 16:14	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/05/14 10:36	id
Residue, Total (TS) @ 105C	SM2540B	1	88		*	mg/L	10	20	12/08/14 11:03	id
Sulfate	D516-02/-07 - Turbidimetric	1	8.8		*	mg/L	1	5	12/09/14 17:39	mpb
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 17:10	eea
TDS (calculated)	Calculation		38.6			mg/L			12/16/14 9:57	calc
TDS (ratio - measured/calculated)	Calculation		1.92						12/16/14 9:57	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L21824-02**
Date Sampled: 12/02/14 08:00
Date Received: 12/04/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 14:26	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 12:24	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/11/14 21:30	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:36	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 15:20	bsu
Total Hot Plate Digestion	M200.2 ICP								12/11/14 13:36	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								12/08/14 20:34	pmc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L21824-02**
Date Sampled: 12/02/14 08:00
Date Received: 12/04/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.05	B		mg/L	0.03	0.2	12/08/14 11:21	aeb
Aluminum, total	M200.7 ICP	1	0.57			mg/L	0.03	0.2	12/12/14 15:24	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/08/14 20:45	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/14 14:55	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0018			mg/L	0.0002	0.001	12/08/14 20:45	msh
Arsenic, total	M200.8 ICP-MS	1	0.0021			mg/L	0.0002	0.001	12/09/14 14:55	msh
Barium, dissolved	M200.7 ICP	1	0.040			mg/L	0.003	0.02	12/08/14 11:21	aeb
Barium, total	M200.7 ICP	1	0.049			mg/L	0.003	0.02	12/12/14 11:13	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:21	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:13	jjc
Bismuth, dissolved	M200.7 ICP	1	0.04	B	*	mg/L	0.04	0.2	12/08/14 15:59	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 11:13	jjc
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	12/08/14 11:21	aeb
Boron, total	M200.7 ICP	1	0.06			mg/L	0.01	0.05	12/12/14 11:13	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:45	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/14 14:55	msh
Calcium, dissolved	M200.7 ICP	1	8.7			mg/L	0.1	0.5	12/08/14 11:21	aeb
Calcium, total	M200.7 ICP	1	8.7			mg/L	0.1	0.5	12/12/14 11:13	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:21	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:13	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:21	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:13	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:21	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:13	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 11:21	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 11:13	jjc
Iron, dissolved	M200.7 ICP	1	0.05			mg/L	0.02	0.05	12/08/14 11:21	aeb
Iron, total	M200.7 ICP	1	0.43			mg/L	0.02	0.05	12/12/14 11:13	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:45	msh
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/09/14 14:55	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/08/14 11:21	aeb
Lithium, total	M200.7 ICP	1	0.020	B		mg/L	0.008	0.04	12/12/14 11:13	jjc
Magnesium, dissolved	M200.7 ICP	1	1.8			mg/L	0.2	1	12/08/14 11:21	aeb
Magnesium, total	M200.7 ICP	1	2			mg/L	0.2	1	12/12/14 11:13	jjc
Manganese, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	12/08/14 11:21	aeb
Manganese, total	M200.7 ICP	1	0.021	B		mg/L	0.005	0.03	12/12/14 11:13	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:31	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 14:11	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 11:21	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 11:13	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:21	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 11:13	jjc
Potassium, dissolved	M200.7 ICP	1	2.9			mg/L	0.2	1	12/08/14 11:21	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW6-E

ACZ Sample ID: **L21824-02**
Date Sampled: 12/02/14 08:00
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.2		mg/L	0.2	1	12/12/14 11:13	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 11:21	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 11:13	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/08/14 20:45	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/09/14 14:55	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 20:45	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/09/14 14:55	msh
Sodium, dissolved	M200.7 ICP	1	9		mg/L	0.2	1	12/08/14 11:21	aeb
Sodium, total	M200.7 ICP	1	9.9		mg/L	0.2	1	12/12/14 11:13	jjc
Strontium, dissolved	M200.7 ICP	1	0.065		mg/L	0.005	0.03	12/08/14 11:21	aeb
Strontium, total	M200.7 ICP	1	0.078		mg/L	0.005	0.03	12/12/14 11:13	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:45	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:55	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 11:21	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 11:13	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:21	aeb
Titanium, total	M200.7 ICP	1	0.020	B	mg/L	0.005	0.03	12/12/14 11:13	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:45	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:55	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:21	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 11:13	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 11:21	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 11:13	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW6-E

ACZ Sample ID: **L21824-02**
 Date Sampled: 12/02/14 08:00
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	33.6		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	33.6		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/16/14 9:57	calc
Sum of Anions			1.1			meq/L			12/16/14 9:57	calc
Sum of Cations			1.1			meq/L			12/16/14 9:57	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/10/14 9:53	id
Chloride	SM4500Cl-E	1	6.7		*	mg/L	0.5	2	12/11/14 16:10	jif
Conductivity @25C	SM2510B	1	114		*	umhos/cm	1	10	12/05/14 20:25	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:37	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:03	pjb
Fluoride	SM4500F-C	1	0.10	B	*	mg/L	0.05	0.3	12/10/14 13:25	abd
Hardness as CaCO3	SM2340B - Calculation		29			mg/L	0.8	4	12/16/14 9:57	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.16		*	mg/L	0.02	0.1	12/12/14 23:26	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 17:12	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/15/14 13:04	mss2
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.6		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	12/16/14 9:57	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/09/14 13:56	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/04/14 18:47	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/09/14 16:35	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	102		*	mg/L	10	20	12/04/14 16:16	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/05/14 10:38	id
Residue, Total (TS) @ 105C	SM2540B	1	120		*	mg/L	10	20	12/08/14 11:06	id
Sulfate	D516-02/-07 - Turbidimetric	1	11.5		*	mg/L	1	5	12/09/14 17:39	mpb
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 17:17	eea
TDS (calculated)	Calculation		61.4			mg/L			12/16/14 9:57	calc
TDS (ratio - measured/calculated)	Calculation		1.66						12/16/14 9:57	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L21824-03**
Date Sampled: 12/02/14 09:20
Date Received: 12/04/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 14:33	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 12:31	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/11/14 22:04	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:42	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 15:30	bsu
Total Hot Plate Digestion	M200.2 ICP								12/11/14 13:47	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								12/08/14 20:45	pmc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L21824-03**
Date Sampled: 12/02/14 09:20
Date Received: 12/04/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/08/14 11:24	aeb
Aluminum, total	M200.7 ICP	1	0.18	B		mg/L	0.03	0.2	12/12/14 15:27	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0011	B		mg/L	0.0004	0.002	12/08/14 20:52	msh
Antimony, total	M200.8 ICP-MS	1	0.0011	B		mg/L	0.0004	0.002	12/09/14 14:58	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0041			mg/L	0.0002	0.001	12/08/14 20:52	msh
Arsenic, total	M200.8 ICP-MS	1	0.0043			mg/L	0.0002	0.001	12/09/14 14:58	msh
Barium, dissolved	M200.7 ICP	1	0.107			mg/L	0.003	0.02	12/08/14 11:24	aeb
Barium, total	M200.7 ICP	1	0.120			mg/L	0.003	0.02	12/12/14 11:16	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:24	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:16	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/08/14 16:03	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 11:16	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/08/14 11:24	aeb
Boron, total	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/12/14 11:16	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:52	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/14 14:58	msh
Calcium, dissolved	M200.7 ICP	1	70.3			mg/L	0.1	0.5	12/08/14 11:24	aeb
Calcium, total	M200.7 ICP	1	72.9			mg/L	0.1	0.5	12/12/14 11:16	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:24	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:16	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:24	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:16	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:24	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:16	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 11:24	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 11:16	jjc
Iron, dissolved	M200.7 ICP	1	0.18			mg/L	0.02	0.05	12/08/14 11:24	aeb
Iron, total	M200.7 ICP	1	0.58			mg/L	0.02	0.05	12/12/14 11:16	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/08/14 20:52	msh
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	12/09/14 14:58	msh
Lithium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.008	0.04	12/08/14 11:24	aeb
Lithium, total	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/12/14 11:16	jjc
Magnesium, dissolved	M200.7 ICP	1	6.3			mg/L	0.2	1	12/08/14 11:24	aeb
Magnesium, total	M200.7 ICP	1	6.6			mg/L	0.2	1	12/12/14 11:16	jjc
Manganese, dissolved	M200.7 ICP	1	0.149			mg/L	0.005	0.03	12/08/14 11:24	aeb
Manganese, total	M200.7 ICP	1	0.178			mg/L	0.005	0.03	12/12/14 11:16	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:33	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 14:14	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 11:24	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 11:16	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:24	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 11:16	jjc
Potassium, dissolved	M200.7 ICP	1	7.4			mg/L	0.2	1	12/08/14 11:24	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW8-E

ACZ Sample ID: **L21824-03**
Date Sampled: 12/02/14 09:20
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	8		mg/L	0.2	1	12/12/14 11:16	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 11:24	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 11:16	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	12/08/14 20:52	msh
Selenium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	12/09/14 14:58	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 20:52	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/09/14 14:58	msh
Sodium, dissolved	M200.7 ICP	1	23.1		mg/L	0.2	1	12/08/14 11:24	aeb
Sodium, total	M200.7 ICP	1	25.8		mg/L	0.2	1	12/12/14 11:16	jjc
Strontium, dissolved	M200.7 ICP	1	0.698		mg/L	0.005	0.03	12/08/14 11:24	aeb
Strontium, total	M200.7 ICP	1	0.812		mg/L	0.005	0.03	12/12/14 11:16	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:52	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:58	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 11:24	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 11:16	jjc
Titanium, dissolved	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	12/08/14 11:24	aeb
Titanium, total	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	12/12/14 11:16	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:52	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:58	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 11:24	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 11:16	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 11:24	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 11:16	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW8-E

ACZ Sample ID: **L21824-03**
 Date Sampled: 12/02/14 09:20
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	78.4		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	78.4		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.9			%			12/16/14 9:58	calc
Sum of Anions			5.5			meq/L			12/16/14 9:58	calc
Sum of Cations			5.3			meq/L			12/16/14 9:58	calc
Chemical Oxygen Demand	M410.4	1	19	B	*	mg/L	10	20	12/10/14 9:55	id
Chloride	SM4500Cl-E	1	17.6		*	mg/L	0.5	2	12/11/14 16:26	jif
Conductivity @25C	SM2510B	1	557		*	umhos/cm	1	10	12/05/14 20:33	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:38	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:04	pjb
Fluoride	SM4500F-C	1	0.30		*	mg/L	0.05	0.3	12/10/14 13:33	abd
Hardness as CaCO3	SM2340B - Calculation		201			mg/L	0.8	4	12/16/14 9:58	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.27		*	mg/L	0.02	0.1	12/12/14 23:28	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.92		*	mg/L	0.05	0.2	12/08/14 17:13	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2		*	mg/L	0.1	0.5	12/15/14 13:05	mss2
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.8		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.68			mg/L	0.03	0.2	12/16/14 9:58	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.22		*	mg/L	0.01	0.05	12/09/14 13:57	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.17	H	*	mg/L	0.01	0.05	12/04/14 18:48	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.31		*	mg/L	0.01	0.05	12/09/14 16:36	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	414		*	mg/L	10	20	12/04/14 16:19	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	12/05/14 10:39	id
Residue, Total (TS) @ 105C	SM2540B	1	440		*	mg/L	10	20	12/08/14 11:10	id
Sulfate	D516-02/-07 - Turbidimetric	5	163		*	mg/L	5	25	12/09/14 17:43	mpb
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/08/14 17:25	eea
TDS (calculated)	Calculation		338			mg/L			12/16/14 9:58	calc
TDS (ratio - measured/calculated)	Calculation		1.22						12/16/14 9:58	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21824**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21824-01	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375964	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.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375706	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG375817	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).
	WG375648	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.
	WG375838	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).
	WG375637	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375667	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).
	WG375732	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG375842	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375747	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: **L21824**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG375706	Total Alkalinity	SM2320B - Titration		accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21824**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21824-02	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	Chemical Oxygen Demand	M410.4 M410.4	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).
	WG375964	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	Cyanide, total	M335.4 - Colorimetric w/ distillation M335.4 - Colorimetric w/ distillation	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation SM4500-CN I-Colorimetric w/ distillation	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).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate M350.1 - Automated Phenate	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).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester M351.2 - TKN by Block Digester M351.2 - TKN by Block Digester	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable. 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).
	WG375706	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375817	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	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).
	WG375648	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid M365.1 - Automated Ascorbic Acid	H3	Sample was received and analyzed past holding time. Q6 Sample was received above recommended temperature.
	WG375838	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest) M365.1 - Auto Ascorbic Acid (digest)	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).
	WG375637	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375667	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	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).
	WG375732	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG375842	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375747	Sulfide as S	SM4500S2-D SM4500S2-D	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).
	WG375706	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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Tahoe Resources, Inc.

ACZ Project ID: **L21824**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21824-03	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375964	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375706	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375817	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).
	WG375648	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.
	WG375838	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).
	WG375637	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375667	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).
	WG375732	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG375842	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.
	WG375747	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21824**

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).
	WG375706	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L21824-01**

Date Sampled: 12/02/14 7:40

Date Received: 12/04/14

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG375852

Analyst: itk

Extract Date: 12/08/14 14:23

Analysis Date: 12/10/14 1:27

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	77.7		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW5-EACZ Sample ID: **L21824-01**

Date Sampled: 12/02/14 7:40

Date Received: 12/04/14

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

Extract Method:

Workgroup: WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 10:58

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L21824-02**

Date Sampled: 12/02/14 8:00

Date Received: 12/04/14

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG375852

Analyst: itk

Extract Date: 12/08/14 14:24

Analysis Date: 12/10/14 1:53

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	77.5		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW6-EACZ Sample ID: **L21824-02**

Date Sampled: 12/02/14 8:00

Date Received: 12/04/14

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

Extract Method:

Workgroup: WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 11:10

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: **L21824-03**

Date Sampled: 12/02/14 9:20

Date Received: 12/04/14

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG375852

Analyst: itk

Extract Date: 12/08/14 14:25

Analysis Date: 12/10/14 2:19

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	73.1		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW8-EACZ Sample ID: **L21824-03**

Date Sampled: 12/02/14 9:20

Date Received: 12/04/14

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

Extract Method:

Workgroup: WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 11:22

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



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21824**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21824-01	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L21824-02	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L21824-03	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21824**

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: L21824
 Date Received: 12/04/2014 09:41
 Received By: ddp
 Date Printed: 12/4/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2397	9.2	17	N/A

Was ice present in the shipment container(s)?

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

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



Laboratories, Inc.

L21824

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: Pulevas Los Pinces 18 calle 2469 Zona 10
Empresarial Zona Pradera Tiro IV Oficina 1401
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 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 multiple columns for analyses requested. Includes handwritten 'SW' and checkmarks.

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix. Includes rows for SWS-E, SW6-E, SW8-E.

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

REMARKS

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

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

L21824 Chain of Custody

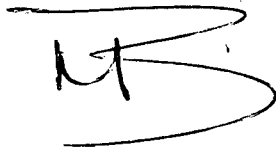
Guatemala December 2nd, 2014

To whom it may concern:

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

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

Best regards,

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

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

December 16, 2014

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21823

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 04, 2014. This project has been assigned to ACZ's project number, L21823. 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 L21823. 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.

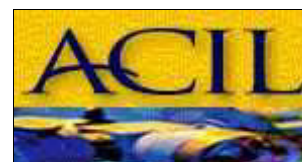
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 16, 2014

Project ID: Escobal

ACZ Project ID: L21823

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 2 miscellaneous samples from Tahoe Resources, Inc. on December 4, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21823. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

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

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L21823-01**
Date Sampled: 12/02/14 08:40
Date Received: 12/04/14
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 14:04	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 11:55	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/11/14 19:15	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:18	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 14:51	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								12/08/14 20:01	pmc
Total Hot Plate Digestion	M200.2 ICP								12/11/14 13:01	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L21823-01**

Date Sampled: 12/02/14 08:40

Date Received: 12/04/14

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/08/14 10:59	aeb
Aluminum, total	M200.7 ICP	1	0.39			mg/L	0.03	0.2	12/12/14 15:14	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	12/08/14 20:37	msh
Antimony, total	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	12/09/14 14:48	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0034			mg/L	0.0002	0.001	12/08/14 20:37	msh
Arsenic, total	M200.8 ICP-MS	1	0.0034			mg/L	0.0002	0.001	12/09/14 14:48	msh
Barium, dissolved	M200.7 ICP	1	0.072			mg/L	0.003	0.02	12/08/14 10:59	aeb
Barium, total	M200.7 ICP	1	0.081			mg/L	0.003	0.02	12/12/14 11:04	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 10:59	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:04	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/08/14 15:50	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 11:04	jjc
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	12/08/14 10:59	aeb
Boron, total	M200.7 ICP	1	0.07			mg/L	0.01	0.05	12/12/14 11:04	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:37	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/14 14:48	msh
Calcium, dissolved	M200.7 ICP	1	38.2			mg/L	0.1	0.5	12/08/14 10:59	aeb
Calcium, total	M200.7 ICP	1	38.3			mg/L	0.1	0.5	12/12/14 11:04	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 10:59	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:04	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 10:59	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:04	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 10:59	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:04	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 10:59	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 11:04	jjc
Iron, dissolved	M200.7 ICP	1	0.06			mg/L	0.02	0.05	12/08/14 10:59	aeb
Iron, total	M200.7 ICP	1	0.37			mg/L	0.02	0.05	12/12/14 11:04	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:37	msh
Lead, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/09/14 14:48	msh
Lithium, dissolved	M200.7 ICP	1	0.021	B		mg/L	0.008	0.04	12/08/14 10:59	aeb
Lithium, total	M200.7 ICP	1	0.024	B		mg/L	0.008	0.04	12/12/14 11:04	jjc
Magnesium, dissolved	M200.7 ICP	1	5.2			mg/L	0.2	1	12/08/14 10:59	aeb
Magnesium, total	M200.7 ICP	1	5.4			mg/L	0.2	1	12/12/14 11:04	jjc
Manganese, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.005	0.03	12/08/14 10:59	aeb
Manganese, total	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	12/12/14 11:04	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:20	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 14:04	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 10:59	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 11:04	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 10:59	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 11:04	jjc
Potassium, dissolved	M200.7 ICP	1	5.3			mg/L	0.2	1	12/08/14 10:59	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW9-E

ACZ Sample ID: **L21823-01**
Date Sampled: 12/02/14 08:40
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.8		mg/L	0.2	1	12/12/14 11:04	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 10:59	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 11:04	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	12/08/14 20:37	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/09/14 14:48	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 20:37	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/09/14 14:48	msh
Sodium, dissolved	M200.7 ICP	1	18.2		mg/L	0.2	1	12/08/14 10:59	aeb
Sodium, total	M200.7 ICP	1	20		mg/L	0.2	1	12/12/14 11:04	jjc
Strontium, dissolved	M200.7 ICP	1	0.335		mg/L	0.005	0.03	12/08/14 10:59	aeb
Strontium, total	M200.7 ICP	1	0.388		mg/L	0.005	0.03	12/12/14 11:04	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:37	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:48	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 10:59	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 11:04	jjc
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 10:59	aeb
Titanium, total	M200.7 ICP	1	0.017	B	mg/L	0.005	0.03	12/12/14 11:04	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/08/14 20:37	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/09/14 14:48	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/08/14 10:59	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/12/14 11:04	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 10:59	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 11:04	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW9-E

ACZ Sample ID: **L21823-01**
 Date Sampled: 12/02/14 08:40
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	64.8		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	64.8		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.5			%			12/16/14 9:48	calc
Sum of Anions			3.4			meq/L			12/16/14 9:48	calc
Sum of Cations			3.3			meq/L			12/16/14 9:48	calc
Chemical Oxygen Demand	M410.4	1	14	B	*	mg/L	10	20	12/10/14 9:41	id
Chloride	SM4500Cl-E	1	15.4		*	mg/L	0.5	2	12/11/14 16:04	jif
Conductivity @25C	SM2510B	1	359		*	umhos/cm	1	10	12/05/14 20:00	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:33	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:58	pjb
Fluoride	SM4500F-C	1	0.23	B	*	mg/L	0.05	0.3	12/10/14 13:03	abd
Hardness as CaCO3	SM2340B - Calculation		117			mg/L	0.8	4	12/16/14 9:48	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	1.24		*	mg/L	0.02	0.1	12/12/14 23:21	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/08/14 17:22	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.7		*	mg/L	0.1	0.5	12/15/14 12:59	mss2
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.5		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.31			mg/L	0.03	0.2	12/16/14 9:48	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.10		*	mg/L	0.01	0.05	12/09/14 13:51	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	12/04/14 18:42	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.11		*	mg/L	0.01	0.05	12/09/14 16:31	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	268		*	mg/L	10	20	12/04/14 16:08	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/05/14 10:33	id
Residue, Total (TS) @ 105C	SM2540B	1	302		*	mg/L	10	20	12/08/14 10:56	id
Sulfate	D516-02/-07 - Turbidimetric	5	79.3		*	mg/L	5	25	12/09/14 17:41	mpb
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/09/14 13:18	eea
TDS (calculated)	Calculation		202			mg/L			12/16/14 9:48	calc
TDS (ratio - measured/calculated)	Calculation		1.33						12/16/14 9:48	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L21823-02**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/14 14:12	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/09/14 12:09	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/11/14 20:23	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/08/14 16:24	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/09/14 15:01	bsu
Total Hot Plate Digestion	M200.2 ICP								12/11/14 13:12	jjc
Total Hot Plate Digestion	M200.2 ICP-MS								12/08/14 20:12	pmc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L21823-02**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/08/14 11:08	aeb
Aluminum, total	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	12/12/14 15:17	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0095			mg/L	0.0004	0.002	12/08/14 20:40	msh
Antimony, total	M200.8 ICP-MS	1	0.0088			mg/L	0.0004	0.002	12/09/14 14:50	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0072			mg/L	0.0002	0.001	12/08/14 20:40	msh
Arsenic, total	M200.8 ICP-MS	1	0.0067			mg/L	0.0002	0.001	12/09/14 14:50	msh
Barium, dissolved	M200.7 ICP	1	0.058			mg/L	0.003	0.02	12/08/14 11:08	aeb
Barium, total	M200.7 ICP	1	0.061			mg/L	0.003	0.02	12/12/14 11:07	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:08	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:07	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/08/14 15:53	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 11:07	jjc
Boron, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	12/08/14 11:08	aeb
Boron, total	M200.7 ICP	1	0.10			mg/L	0.01	0.05	12/12/14 11:07	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/08/14 20:40	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/14 14:50	msh
Calcium, dissolved	M200.7 ICP	1	371			mg/L	0.1	0.5	12/08/14 11:08	aeb
Calcium, total	M200.7 ICP	1	369			mg/L	0.1	0.5	12/12/14 11:07	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:08	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:07	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:08	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:07	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/08/14 11:08	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 11:07	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/08/14 11:08	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 11:07	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/08/14 11:08	aeb
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 11:07	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/08/14 20:40	msh
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	12/09/14 14:50	msh
Lithium, dissolved	M200.7 ICP	1	0.093			mg/L	0.008	0.04	12/08/14 11:08	aeb
Lithium, total	M200.7 ICP	1	0.091			mg/L	0.008	0.04	12/12/14 11:07	jjc
Magnesium, dissolved	M200.7 ICP	1	19.9			mg/L	0.2	1	12/08/14 11:08	aeb
Magnesium, total	M200.7 ICP	1	20			mg/L	0.2	1	12/12/14 11:07	jjc
Manganese, dissolved	M200.7 ICP	1	0.020	B		mg/L	0.005	0.03	12/08/14 11:08	aeb
Manganese, total	M200.7 ICP	1	0.027	B		mg/L	0.005	0.03	12/12/14 11:07	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/09/14 10:22	mfm
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/08/14 14:07	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/08/14 11:08	aeb
Molybdenum, total	M200.7 ICP	1	0.02	B		mg/L	0.02	0.1	12/12/14 11:07	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/08/14 11:08	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 11:07	jjc
Potassium, dissolved	M200.7 ICP	1	10.3			mg/L	0.2	1	12/08/14 11:08	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SW11-E

ACZ Sample ID: **L21823-02**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.1		mg/L	0.2	1	12/12/14 11:07	jjc
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/08/14 11:08	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/12/14 11:07	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	12/08/14 20:40	msh
Selenium, total	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	12/09/14 14:50	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/08/14 20:40	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/09/14 14:50	msh
Sodium, dissolved	M200.7 ICP	1	67		mg/L	0.2	1	12/08/14 11:08	aeb
Sodium, total	M200.7 ICP	1	74		mg/L	0.2	1	12/12/14 11:07	jjc
Strontium, dissolved	M200.7 ICP	1	3.980		mg/L	0.005	0.03	12/08/14 11:08	aeb
Strontium, total	M200.7 ICP	1	4.510		mg/L	0.005	0.03	12/12/14 11:07	jjc
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/08/14 20:40	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/09/14 14:50	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/08/14 11:08	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/12/14 11:07	jjc
Titanium, dissolved	M200.7 ICP	1	0.016	B	mg/L	0.005	0.03	12/08/14 11:08	aeb
Titanium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	12/12/14 11:07	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/08/14 20:40	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/09/14 14:50	msh
Vanadium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	12/08/14 11:08	aeb
Vanadium, total	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	12/12/14 11:07	jjc
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/08/14 11:08	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/12/14 11:07	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SW11-E

ACZ Sample ID: **L21823-02**
 Date Sampled: 12/02/14 11:30
 Date Received: 12/04/14
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.8		*	mg/L	2	20	12/05/14 0:00	eea
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/05/14 0:00	eea
Total Alkalinity		1	39.8		*	mg/L	2	20	12/05/14 0:00	eea
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.0			%			12/16/14 9:48	calc
Sum of Anions			25			meq/L			12/16/14 9:48	calc
Sum of Cations			24			meq/L			12/16/14 9:48	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/10/14 9:44	id
Chloride	SM4500Cl-E	1	64.5		*	mg/L	0.5	2	12/11/14 16:04	jif
Conductivity @25C	SM2510B	1	1900		*	umhos/cm	1	10	12/05/14 20:08	eea
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 23:35	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/14 22:59	pjb
Fluoride	SM4500F-C	1	1.18		*	mg/L	0.05	0.3	12/10/14 13:10	abd
Hardness as CaCO3	SM2340B - Calculation		1010			mg/L	0.8	4	12/16/14 9:48	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.54		*	mg/L	0.02	0.1	12/12/14 23:23	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.19	B	*	mg/L	0.05	0.2	12/08/14 17:06	mpb
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	12/15/14 13:01	mss2
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	12/05/14 0:00	eea
pH measured at		1	19.5		*	C	0.1	0.1	12/05/14 0:00	eea
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	12/16/14 9:48	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/09/14 13:52	tcd
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/04/14 18:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/09/14 16:33	tcd
Residue, Filterable (TDS) @180C	SM2540C	1	1620		*	mg/L	10	20	12/04/14 16:11	enb
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/05/14 10:34	id
Residue, Total (TS) @ 105C	SM2540B	1	1700		*	mg/L	10	20	12/08/14 11:00	id
Sulfate	D516-02/-07 - Turbidimetric	30	1050		*	mg/L	30	150	12/09/14 17:45	mpb
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/09/14 13:25	eea
TDS (calculated)	Calculation		1610			mg/L			12/16/14 9:48	calc
TDS (ratio - measured/calculated)	Calculation		1.01						12/16/14 9:48	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21823**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21823-01	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375964	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.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375706	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375817	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).
	WG375648	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.
	WG375838	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).
	WG375637	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375667	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).
	WG375732	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG375842	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375816	Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.
			SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21823**

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).
	WG375706	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21823**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21823-02	WG375706	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG375854	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).
	WG375964	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.
	WG375706	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG375845	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).
	WG375844	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375866	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG375706	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376059	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG375749	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376083	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M351.2 - TKN by Block Digester	Q6	Sample was received above recommended temperature.
			M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375706	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG375817	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).
	WG375648	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.
	WG375838	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).
	WG375637	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375667	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).
	WG375732	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG375842	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375816	Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.

Tahoe Resources, Inc.

ACZ Project ID: **L21823**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG375706	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L21823-01**

Date Sampled: 12/02/14 8:40

Date Received: 12/04/14

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG375852

Analyst: itk

Extract Date: 12/08/14 14:20

Analysis Date: 12/10/14 0:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	77.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW9-EACZ Sample ID: **L21823-01**

Date Sampled: 12/02/14 8:40

Date Received: 12/04/14

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

Extract Method:

Workgroup: WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 10:35

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: **L21823-02**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: Surface Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG375852

Analyst: itk
Extract Date: 12/08/14 14:21
Analysis Date: 12/10/14 1:01

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	79.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SW11-EACZ Sample ID: **L21823-02**
Date Sampled: 12/02/14 11:30
Date Received: 12/04/14
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**
Extract Method:**Workgroup:** WG375927

Analyst: DRH

Extract Date:

Analysis Date: 12/11/14 10:46

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



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21823**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21823-01	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.
L21823-02	WG375852	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375927	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
	WG375751	*All Compounds*	M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21823**

Metals Analysis

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

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

Wet Chemistry

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

Sulfide as S	SM4500S2-D
--------------	------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21823
 Date Received: 12/04/2014 09:43
 Received By: ddp
 Date Printed: 12/4/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2818	9.2	18	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.



Laboratories, Inc.

L21823

CHAIN of CUSTODY

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

Report to:

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

Address: Boulevard los procesos 18 calle 2da. by zona la
Empresarial zona pradera, torre W oficina 1400
Telephone: (502) 59 51 52 48

Copy of Report to:

Name: charlie muerhoff
Company: Tahoe Resources Inc.

E-mail: cmurhoffa@tahoeresources.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers. Rows include SW9-E and SW11-E.

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.

21823 Chain of Custody

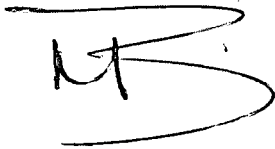
Guatemala December 2nd, 2014

To whom it may concern:

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

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

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together.

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

REG 016 Resultados de Análisis

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: 011214
 Fecha de ingreso de muestras: 011214
 Fecha de análisis: 011214-111214
 Fecha de informe: 111214

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)
3165	SW1-E	17	< 1	< 10	< 25	N.D.	49
3166	SW2-E	< 1	< 1	< 10	< 25	N.D.	23
3167	SW2B-E	< 1	< 1	< 10	< 25	N.D.	49
3168	SW4-E	17	< 1	< 10	< 25	N.D.	1.6 x 10 ⁴
3169	SW7-E	84	13	< 10	< 25	N.D.	2.4 x 10 ³
3172	SW10-E	< 1	< 1	< 10	< 25	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas Proyectos Ambientales.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04*

*** Análisis referido.*



Ing. Fernando Fuentes
Gerente Técnico

REG 016 Resultados de Análisis

Muestra: 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: 021214
Fecha de ingreso de muestras: 021214
Fecha de análisis: 021214-121214
Fecha de informe: 121214

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)
3180	SW2A-E	< 1	< 1	< 10	< 25	N.D.	240
3181	SW3-E	41	< 1	< 10	< 25	N.D.	70
3182	SW4A-E	< 1	< 1	< 10	< 25	N.D.	2.4 x 10 ³
3183	SW5-E	31	< 1	< 10	< 25	N.D.	5.4 x 10 ³
3184	SW6-E	29	< 1	< 10	< 25	N.D.	2.4 x 10 ³
3185	SW8-E	60	< 1	< 10	< 25	N.D.	1.6 x 10 ⁴
3186	SW9-E	27	< 1	< 10	< 25	N.D.	3.5 x 10 ³
3187	SW11-E	< 1	< 1	< 10	<25	N.D.	23

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas Proyectos Ambientales.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977 .

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04*

*** Análisis referido.*


Ing. Fernando Fuentes
Gerente Técnico

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

December 22, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21965

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 11, 2014. This project has been assigned to ACZ's project number, L21965. 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 L21965. 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.

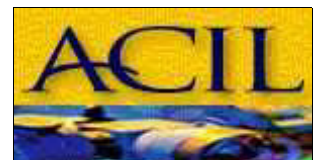
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 22, 2014

Project ID: Escobal

ACZ Project ID: L21965

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 5 ground water samples from Tahoe Resources, Inc. on December 11, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21965. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with an "HE", received too close to the hold time.

Sample Analysis

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

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.
2. For the DRO values flagged with an "N1", the value was less than the MDL but the peaks in the chromatogram were not what would be considered normal hydrocarbon peaks.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-1A

ACZ Sample ID: **L21965-05**
Date Sampled: 12/09/14 05:30
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 10:24	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:27	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 15:11	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 16:19	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:47	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.10	B		mg/L	0.03	0.2	12/12/14 17:37	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:36	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	12/16/14 20:36	msh
Barium, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.003	0.02	12/12/14 17:37	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:37	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:37	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:37	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:36	msh
Calcium, dissolved	M200.7 ICP	1	2.9			mg/L	0.1	0.5	12/12/14 17:37	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:37	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:37	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:37	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:37	jjc
Iron, dissolved	M200.7 ICP	1	0.05			mg/L	0.02	0.05	12/12/14 17:37	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:36	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:37	jjc
Magnesium, dissolved	M200.7 ICP	1	1.4			mg/L	0.2	1	12/12/14 17:37	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:37	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:48	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:37	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:37	jjc
Potassium, dissolved	M200.7 ICP	1	4.9			mg/L	0.2	1	12/12/14 17:37	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:37	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/16/14 20:36	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:36	msh
Sodium, dissolved	M200.7 ICP	1	13.1			mg/L	0.2	1	12/12/14 17:37	jjc
Strontium, dissolved	M200.7 ICP	1	0.022	B		mg/L	0.005	0.03	12/12/14 17:37	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:36	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:37	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:37	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:36	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:37	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:37	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-1A

ACZ Sample ID: **L21965-05**
 Date Sampled: 12/09/14 05:30
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	24.4		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	24.4		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.2			%			12/22/14 15:13	calc
Sum of Anions			0.936			meq/L			12/22/14 15:13	calc
Sum of Cations			0.978			meq/L			12/22/14 15:13	calc
Chloride	SM4500Cl-E	1	10.5		*	mg/L	0.5	2	12/18/14 10:47	mpb
Conductivity @25C	SM2510B	1	114		*	umhos/cm	1	10	12/13/14 5:03	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:54	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:29	mss2
Fluoride	SM4500F-C	1	0.09	B	*	mg/L	0.05	0.3	12/16/14 13:56	abd
Hardness as CaCO3	SM2340B - Calculation		13			mg/L	0.8	4	12/22/14 15:13	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.55		*	mg/L	0.02	0.1	12/20/14 13:52	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:17	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.7		*	mg/L	0.1	0.5	12/17/14 14:07	tcd
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.8		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	12/22/14 15:13	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/18/14 12:24	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	12/11/14 21:10	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/18/14 12:54	mss2
Residue, Filterable (TDS) @180C	SM2540C	1	210		*	mg/L	10	20	12/12/14 19:52	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	6.0	B	*	mg/L	5	20	12/15/14 10:35	id
Residue, Total (TS) @ 105C	SM2540B	1	206		*	mg/L	10	20	12/12/14 18:40	eea
Sulfate	D516-02/-07 - Turbidimetric	1	7.1		*	mg/L	1	5	12/19/14 12:08	jlf
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	12/11/14 15:54	enb
TDS (calculated)	Calculation		55			mg/L			12/22/14 15:13	calc
TDS (ratio - measured/calculated)	Calculation		3.82						12/22/14 15:13	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21965-05	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376361	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	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

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG376013	Total Alkalinity	SM2320B - Titration		accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-1AACZ Sample ID: **L21965-05**
Date Sampled: 12/09/14 5:30
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376417Analyst: itk
Extract Date: 12/16/14 15:20
Analysis Date: 12/18/14 15:22

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	80.7		1	*	%	70	130

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21965-01	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21965-02	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21965-03	WG376417	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21965-04	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21965-05	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

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: L21965
 Date Received: 12/11/2014 10:09
 Received By: ddp
 Date Printed: 12/11/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4473	11.3	16	Yes

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.



Laboratories, Inc.

21965

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 384-5493

Report to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: mberganza@sankofuel.com.gt

Address: Boulevard Los Pinos, Proceso 13 Calle 24-69 Zona 10
Empresarial, Zona Pradera, Torre III oficina 1406
Telephone: (502) 5951 5242

Copy of Report to:

Name: Charlie Muechoff
Company: Tahoe Resources inc.

E-mail: Cmuechoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources inc.
E-mail: mberganza@sankofuel.com.gt

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

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

REMARKS

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

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

Handwritten signatures and dates for Relinquished and Received by.



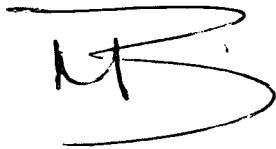
Guatemala December 9th, 2014

To whom it may concern:

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

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

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected by a horizontal line.

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

December 22, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21934

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 10, 2014. This project has been assigned to ACZ's project number, L21934. 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 L21934. 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.

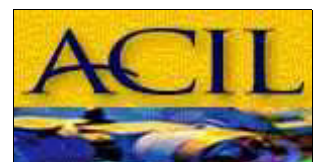
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 22, 2014

Project ID: Escobal

ACZ Project ID: L21934

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on December 10, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21934. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

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

Sample Analysis

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

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L21934-01**
Date Sampled: 12/08/14 08:50
Date Received: 12/10/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/14 10:20	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 14:28	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 12:13	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/14 12:45	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/14 18:23	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.16	B		mg/L	0.03	0.2	12/12/14 19:20	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	12/13/14 3:22	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0063			mg/L	0.0002	0.001	12/13/14 3:22	pmc
Barium, dissolved	M200.7 ICP	1	0.091			mg/L	0.003	0.02	12/12/14 19:20	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:20	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:20	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/14 15:41	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:22	pmc
Calcium, dissolved	M200.7 ICP	1	13.7			mg/L	0.1	0.5	12/12/14 19:20	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:20	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:20	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:20	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 17:54	jjc
Iron, dissolved	M200.7 ICP	1	0.06			mg/L	0.02	0.05	12/12/14 19:20	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:22	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:20	aeb
Magnesium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	12/12/14 19:20	aeb
Manganese, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.005	0.03	12/12/14 19:20	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:30	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:20	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:20	aeb
Potassium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	12/12/14 19:20	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:20	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/13/14 3:22	pmc
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/13/14 3:22	pmc
Sodium, dissolved	M200.7 ICP	1	8.3			mg/L	0.2	1	12/12/14 19:20	aeb
Strontium, dissolved	M200.7 ICP	1	0.105			mg/L	0.005	0.03	12/12/14 19:20	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:22	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:20	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:20	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:22	pmc
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:20	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:20	aeb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-2

ACZ Sample ID: **L21934-01**
Date Sampled: 12/08/14 08:50
Date Received: 12/10/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	51.2		*	mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1	51.2		*	mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.7			%			12/22/14 10:01	calc
Sum of Anions			1.4			meq/L			12/22/14 10:01	calc
Sum of Cations			1.3			meq/L			12/22/14 10:01	calc
Chloride	SM4500Cl-E	1	2.9		*	mg/L	0.5	2	12/16/14 14:41	mpb
Conductivity @25C	SM2510B	1	132		*	umhos/cm	1	10	12/12/14 21:02	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 16:58	tcd
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:10	mss2
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	12/15/14 15:32	abd
Hardness as CaCO3	SM2340B - Calculation		45			mg/L	0.8	4	12/22/14 10:01	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.05	B	*	mg/L	0.02	0.1	12/19/14 0:29	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 11:58	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	12/17/14 13:37	tcd
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	18.6		*	C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	12/22/14 10:01	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/11/14 17:51	mpb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/10/14 22:35	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	12/17/14 0:57	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	162		*	mg/L	10	20	12/12/14 19:31	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	12/11/14 17:23	eea
Residue, Total (TS) @ 105C	SM2540B	1	166		*	mg/L	10	20	12/10/14 15:51	eea
Sulfate	D516-02/-07 - Turbidimetric	1	11.6		*	mg/L	1	5	12/17/14 16:35	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/11/14 13:10	enb
TDS (calculated)	Calculation		73.1			mg/L			12/22/14 10:01	calc
TDS (ratio - measured/calculated)	Calculation		2.22						12/22/14 10:01	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-3

ACZ Sample ID: **L21934-02**
Date Sampled: 12/08/14 11:20
Date Received: 12/10/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/14 10:40	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 14:41	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 12:22	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/14 12:52	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/14 18:30	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	12/12/14 19:23	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	12/13/14 3:25	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0025			mg/L	0.0002	0.001	12/13/14 3:25	pmc
Barium, dissolved	M200.7 ICP	1	0.085			mg/L	0.003	0.02	12/12/14 19:23	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:23	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:23	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/14 15:45	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:25	pmc
Calcium, dissolved	M200.7 ICP	1	50.3			mg/L	0.1	0.5	12/12/14 19:23	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:23	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:23	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:23	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 17:57	jjc
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	12/12/14 19:23	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:25	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:23	aeb
Magnesium, dissolved	M200.7 ICP	1	10			mg/L	0.2	1	12/12/14 19:23	aeb
Manganese, dissolved	M200.7 ICP	1	0.050			mg/L	0.005	0.03	12/12/14 19:23	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:32	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:23	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:23	aeb
Potassium, dissolved	M200.7 ICP	1	7.1			mg/L	0.2	1	12/12/14 19:23	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:23	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	12/13/14 3:25	pmc
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/13/14 3:25	pmc
Sodium, dissolved	M200.7 ICP	1	17.6			mg/L	0.2	1	12/12/14 19:23	aeb
Strontium, dissolved	M200.7 ICP	1	0.270			mg/L	0.005	0.03	12/12/14 19:23	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:25	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:23	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:23	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:25	pmc
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:23	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:23	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-3

ACZ Sample ID: **L21934-02**
 Date Sampled: 12/08/14 11:20
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	74.9		*	mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1	74.9		*	mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/22/14 10:01	calc
Sum of Anions			4.3			meq/L			12/22/14 10:01	calc
Sum of Cations			4.3			meq/L			12/22/14 10:01	calc
Chloride	SM4500Cl-E	1	6.2		*	mg/L	0.5	2	12/16/14 14:41	mpb
Conductivity @25C	SM2510B	1	442		*	umhos/cm	1	10	12/12/14 21:09	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 17:00	tcd
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:11	mss2
Fluoride	SM4500F-C	1	0.17	B	*	mg/L	0.05	0.3	12/15/14 15:40	abd
Hardness as CaCO3	SM2340B - Calculation		167			mg/L	0.8	4	12/22/14 10:01	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.83		*	mg/L	0.02	0.1	12/19/14 0:30	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 11:59	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/17/14 13:39	tcd
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	18.6		*	C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	12/22/14 10:01	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/11/14 17:52	mpb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	12/10/14 22:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/17/14 0:58	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	366		*	mg/L	10	20	12/12/14 19:33	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/11/14 17:25	eea
Residue, Total (TS) @ 105C	SM2540B	1	366		*	mg/L	10	20	12/10/14 15:53	eea
Sulfate	D516-02/-07 - Turbidimetric	5	126		*	mg/L	5	25	12/17/14 16:45	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/11/14 13:15	enb
TDS (calculated)	Calculation		263			mg/L			12/22/14 10:01	calc
TDS (ratio - measured/calculated)	Calculation		1.39						12/22/14 10:01	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-4

ACZ Sample ID: **L21934-03**
Date Sampled: 12/08/14 09:55
Date Received: 12/10/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/14 11:01	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 14:54	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 12:30	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/14 13:00	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/14 18:37	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.84			mg/L	0.03	0.2	12/12/14 19:26	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/13/14 3:28	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	12/13/14 3:28	pmc
Barium, dissolved	M200.7 ICP	1	0.242			mg/L	0.003	0.02	12/12/14 19:26	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:26	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:26	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/14 15:54	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:28	pmc
Calcium, dissolved	M200.7 ICP	1	4.9			mg/L	0.1	0.5	12/12/14 19:26	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:26	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:26	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:26	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 18:06	jjc
Iron, dissolved	M200.7 ICP	1	0.57			mg/L	0.02	0.05	12/12/14 19:26	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0024			mg/L	0.0001	0.0005	12/13/14 3:28	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:26	aeb
Magnesium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	12/12/14 19:26	aeb
Manganese, dissolved	M200.7 ICP	1	0.058			mg/L	0.005	0.03	12/12/14 19:26	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:34	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:26	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:26	aeb
Potassium, dissolved	M200.7 ICP	1	4.9			mg/L	0.2	1	12/12/14 19:26	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:26	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/13/14 3:28	pmc
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/13/14 3:28	pmc
Sodium, dissolved	M200.7 ICP	1	10.1			mg/L	0.2	1	12/12/14 19:26	aeb
Strontium, dissolved	M200.7 ICP	1	0.052			mg/L	0.005	0.03	12/12/14 19:26	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:28	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:26	aeb
Titanium, dissolved	M200.7 ICP	1	0.029	B		mg/L	0.005	0.03	12/12/14 19:26	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	12/13/14 3:28	pmc
Vanadium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.005	0.03	12/12/14 19:26	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/12/14 19:26	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-4

ACZ Sample ID: **L21934-03**
 Date Sampled: 12/08/14 09:55
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.0		*	mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1	39.0		*	mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.3			%			12/22/14 10:01	calc
Sum of Anions			1.1			meq/L			12/22/14 10:01	calc
Sum of Cations			1.2			meq/L			12/22/14 10:01	calc
Chloride	SM4500Cl-E	1	2		*	mg/L	0.5	2	12/16/14 14:41	mpb
Conductivity @25C	SM2510B	1	105		*	umhos/cm	1	10	12/12/14 21:50	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 17:02	tcd
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:13	mss2
Fluoride	SM4500F-C	1	0.07	B	*	mg/L	0.05	0.3	12/15/14 15:45	abd
Hardness as CaCO3	SM2340B - Calculation		25			mg/L	0.8	4	12/22/14 10:01	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.02	B	*	mg/L	0.02	0.1	12/19/14 0:32	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 12:00	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.7		*	mg/L	0.1	0.5	12/17/14 13:40	tcd
pH (lab)	SM4500H+ B									
pH		1	7.1	H	*	units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	18.5		*	C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	12/22/14 10:01	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/11/14 17:53	mpb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	12/10/14 22:37	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/17/14 0:59	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	596		*	mg/L	10	20	12/12/14 19:35	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/11/14 17:27	eea
Residue, Total (TS) @ 105C	SM2540B	1	592		*	mg/L	10	20	12/10/14 15:54	eea
Sulfate	D516-02/-07 - Turbidimetric	1	11.3		*	mg/L	1	5	12/17/14 16:36	jlf
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	12/11/14 13:21	enb
TDS (calculated)	Calculation		61.7			mg/L			12/22/14 10:01	calc
TDS (ratio - measured/calculated)	Calculation		9.66						12/22/14 10:01	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-5

ACZ Sample ID: **L21934-04**
Date Sampled: 12/08/14 10:30
Date Received: 12/10/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/14 11:11	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 15:01	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 12:38	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 13:46	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/14 18:45	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.25			mg/L	0.03	0.2	12/12/14 19:35	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/13/14 3:31	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0002	0.001	12/13/14 3:31	pmc
Barium, dissolved	M200.7 ICP	1	0.066			mg/L	0.003	0.02	12/12/14 19:35	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:35	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:35	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/14 15:57	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:31	pmc
Calcium, dissolved	M200.7 ICP	1	4.4			mg/L	0.1	0.5	12/12/14 19:35	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:35	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:35	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:35	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 18:16	jjc
Iron, dissolved	M200.7 ICP	1	0.09			mg/L	0.02	0.05	12/12/14 19:35	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/13/14 3:31	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:35	aeb
Magnesium, dissolved	M200.7 ICP	1	2.6			mg/L	0.2	1	12/12/14 19:35	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:35	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:36	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:35	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:35	aeb
Potassium, dissolved	M200.7 ICP	1	5.5			mg/L	0.2	1	12/12/14 19:35	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:35	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	12/13/14 3:31	pmc
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/13/14 3:31	pmc
Sodium, dissolved	M200.7 ICP	1	10.1			mg/L	0.2	1	12/12/14 19:35	aeb
Strontium, dissolved	M200.7 ICP	1	0.039			mg/L	0.005	0.03	12/12/14 19:35	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:31	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:35	aeb
Titanium, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	12/12/14 19:35	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/13/14 3:31	pmc
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	12/12/14 19:35	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:35	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-5

ACZ Sample ID: **L21934-04**
 Date Sampled: 12/08/14 10:30
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	36.0		*	mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1	36.0		*	mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/22/14 10:02	calc
Sum of Anions			1.1			meq/L			12/22/14 10:02	calc
Sum of Cations			1.1			meq/L			12/22/14 10:02	calc
Chloride	SM4500Cl-E	1	3.7		*	mg/L	0.5	2	12/16/14 14:41	mpb
Conductivity @25C	SM2510B	1	105		*	umhos/cm	1	10	12/12/14 21:58	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 17:03	tcd
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:14	mss2
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	12/15/14 15:51	abd
Hardness as CaCO3	SM2340B - Calculation		22			mg/L	0.8	4	12/22/14 10:02	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.41		*	mg/L	0.02	0.1	12/19/14 0:34	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 12:01	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.6		*	mg/L	0.1	0.5	12/17/14 13:41	tcd
pH (lab)	SM4500H+ B									
pH		1	7.4	H	*	units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	18.6		*	C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	12/22/14 10:02	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/18/14 12:02	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	12/10/14 22:41	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	12/17/14 1:00	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	476		*	mg/L	10	20	12/12/14 19:37	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/11/14 17:29	eea
Residue, Total (TS) @ 105C	SM2540B	1	478		*	mg/L	10	20	12/10/14 15:55	eea
Sulfate	D516-02/-07 - Turbidimetric	1	14.9		*	mg/L	1	5	12/17/14 16:36	jlf
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	12/11/14 13:51	enb
TDS (calculated)	Calculation		63.7			mg/L			12/22/14 10:02	calc
TDS (ratio - measured/calculated)	Calculation		7.47						12/22/14 10:02	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21934-01	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376179	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376401	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376413	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375978	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).
	WG375898	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).
	WG376219	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375975	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).
	WG375890	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376281	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375946	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

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	validation because the sample concentration is too low for accurate evaluation (< 10x MDL). Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21934-02	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376179	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376401	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376413	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375978	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).
	WG375898	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).
	WG376219	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375975	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).
	WG375890	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376281	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375946	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21934-03	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376179	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG376401	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376413	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG375978	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).
	WG375898	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).
	WG376219	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375975	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).
	WG375890	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376281	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG375946		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	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376013		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RP	The duplicate originally assigned to this sample could not be used for precision assessment because the titrant normality was too weak or too strong for the sample alkalinity. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.
			SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21934-04	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376179	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG376401	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376413	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375898	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).
	WG376219	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375975	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).
	WG375890	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376281	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG375946		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	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376013		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RP	The duplicate originally assigned to this sample could not be used for precision assessment because the titrant normality was too weak or too strong for the sample alkalinity. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.
			SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-2

ACZ Sample ID: **L21934-01**

Date Sampled: 12/08/14 8:50

Date Received: 12/10/14

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG376065

Analyst: itk

Extract Date: 12/11/14 16:48

Analysis Date: 12/13/14 16:16

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	75.4		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-3

ACZ Sample ID: **L21934-02**

Date Sampled: 12/08/14 11:20

Date Received: 12/10/14

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG376065

Analyst: itk

Extract Date: 12/11/14 16:50

Analysis Date: 12/13/14 16:42

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	77.6		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: GW-4

ACZ Sample ID: **L21934-03**

Date Sampled: 12/08/14 9:55

Date Received: 12/10/14

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG376065

Analyst: itk

Extract Date: 12/11/14 16:52

Analysis Date: 12/13/14 17:08

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.6		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-5

ACZ Sample ID: **L21934-04**
Date Sampled: 12/08/14 10:30
Date Received: 12/10/14
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG376065

Analyst: itk
Extract Date: 12/11/14 16:54
Analysis Date: 12/13/14 17:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	76.9		1	*	%	70	130



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21934-01	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21934-02	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21934-03	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21934-04	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947	M3520	Q9	Insufficient sample received to meet method QC requirements.	

Tahoe Resources, Inc.

ACZ Project ID: **L21934**

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: L21934
 Date Received: 12/10/2014 10:35
 Received By: ddp
 Date Printed: 12/10/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3428	10.8	18	N/A

Was ice present in the shipment container(s)?
 Yes - Gel ice was present in the shipment container(s) but was thawed by receipt at ACZ.
 Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.



Laboratories, Inc.

L21934

CHAIN of CUSTODY

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

Report to:

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

Address: Bulevar Los Proceres 18 calle 24-69 zona 10
Empresarial, 20120 pradera, Torre 14 Oficina 1406
Telephone: (502) 59515248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources inc

E-mail: cmuerhoff@tahoeresourcesinc
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results for samples GW-2, GW-3, GW-4, GW-5.

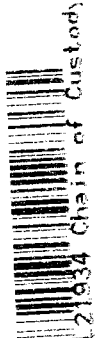
Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

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

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

Handwritten signatures and dates for Relinquished and Received by.



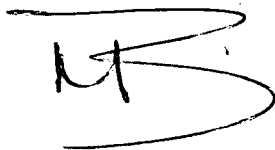
Guatemala December 8th, 2014

To whom it may concern:

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

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

Best regards,

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

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

December 22, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21932

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 10, 2014. This project has been assigned to ACZ's project number, L21932. 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 L21932. 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.

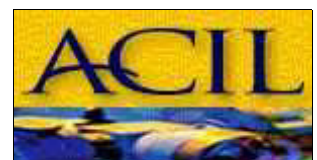
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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: GW-10

ACZ Sample ID: **L21932-01**
 Date Sampled: 12/08/14 12:00
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/12/14 14:19	jif
Cyanide, WAD	SM4500-CN I- distillation								12/16/14 15:12	tcd/mp b
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 12:05	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/14 12:16	mpb
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/14 18:16	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	12/12/14 19:08	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/13/14 3:02	pmc
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	12/13/14 3:02	pmc
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	12/12/14 19:08	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:08	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:08	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/14 15:22	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:02	pmc
Calcium, dissolved	M200.7 ICP	1		U		mg/L	0.1	0.5	12/12/14 19:08	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:08	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:08	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:08	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 17:41	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 19:08	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:02	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:08	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/12/14 19:08	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:08	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:17	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:08	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:08	aeb
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/12/14 19:08	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:08	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/13/14 3:02	pmc
Silver, dissolved	M200.8 ICP-MS	1	0.00007	B		mg/L	0.00005	0.0003	12/13/14 3:02	pmc
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/12/14 19:08	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:08	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:02	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:08	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:08	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/13/14 3:02	pmc
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:08	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:08	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-10

ACZ Sample ID: **L21932-01**
 Date Sampled: 12/08/14 12:00
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U		mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U		mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U		mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1		U		mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/22/14 9:49	calc
Sum of Anions			N/A			meq/L			12/22/14 9:49	calc
Sum of Cations				U		meq/L			12/22/14 9:49	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	12/16/14 14:36	mpb
Conductivity @25C	SM2510B	1	5.8	B		umhos/cm	1	10	12/12/14 20:29	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/14 22:23	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/16/14 17:45	mpb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	12/15/14 14:44	abd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	12/22/14 9:49	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U		mg/L	0.02	0.1	12/19/14 0:46	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 11:48	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 13:36	tcd
pH (lab)	SM4500H+ B									
pH		1	6.7	H		units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	18.7			C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	12/22/14 9:49	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/11/14 17:44	mpb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	12/10/14 22:29	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/17/14 0:56	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U		mg/L	10	20	12/11/14 16:22	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/11/14 17:18	eea
Residue, Total (TS) @ 105C	SM2540B	1		U		mg/L	10	20	12/10/14 15:48	eea
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	12/17/14 15:52	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/11/14 12:46	enb
TDS (calculated)	Calculation					mg/L			12/22/14 9:49	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/22/14 9:49	calc



Report Header Explanations

Table with 2 columns: Term and Definition. Includes terms like Batch, Found, Limit, Lower, MDL, PCN/SCN, PQL, QC, Rec, RPD, Upper, and Sample.

QC Sample Types

Table with 4 columns: Code, Description, Code, Description. Lists various QC sample types such as AS, ASD, CCB, CCV, DUP, ICB, ICV, ICSAB, LCSS, LCSSD, LCSW, LCSWD, LFB, LFM, LFMD, LRB, MS, MSD, PBS, PBW, PQV, and SDL.

QC Sample Type Explanations

Table with 2 columns: Sample Type and Explanation. Explains Blanks, Control Samples, Duplicates, Spikes/Fortified Matrix, and Standard.

ACZ Qualifiers (Qual)

Table with 2 columns: Qualifier and Description. Lists B, H, L, and U with their respective meanings.

Method References

- List of 5 method references including EPA 600/4-83-020, EPA 600/R-93-100, EPA 600/R-94-111, EPA SW-846, and Standard Methods for the Examination of Water and Wastewater.

Comments

- List of 5 comments regarding QC results, reporting basis (dry weight vs as received), asterisks in XQ column, and MDL/PQL reporting.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21932**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21932-01	WG376179	Chloride	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).
	WG376056	Cyanide, total	M335.4 - Colorimetric w/ distillation	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG376211	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375978	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375898	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M365.1 - Automated Ascorbic Acid	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376219	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375975	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376279	Sulfate	D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG375946	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			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: GW-10

ACZ Sample ID: **L21932-01**
Date Sampled: 12/08/14 12:00
Date Received: 12/10/14
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG376065

Analyst: itk
Extract Date: 12/11/14 16:41
Analysis Date: 12/13/14 14:05

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	80.1		1.01	*	%	70	130

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21932**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21932-01	WG376065	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947		M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21932**

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: L21932
 Date Received: 12/10/2014 10:34
 Received By: ddp
 Date Printed: 12/10/2014

Receipt Verification

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

Samples/Containers

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

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4472	4.9	17	Yes

Was ice present in the shipment container(s)?

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

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



Laboratories, Inc. LC 1932

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources
E-mail: mBerganza@santofael.com.gt

Address: Bulevar los proceres 12 calle 24-69 Zona 10
Empresarial, Zona moderna, Torre Oficinas 1406
Telephone: (502) 595 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
E-mail: mBerganza@santofael.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: LC Sampler's Site Information State Zip code Time Zone

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers										
Quote #: <u>Water Quality</u>													
PO#: <u>Escobar</u>													
Reporting state for compliance testing:													
Check box if samples include NRC licensed material?													
<u>GW-6</u>	<u>07/12/14 14:10</u>	<u>GW</u>	<u>8</u>	<u>/</u>									
<u>GW-7</u>	<u>07/12/14 15:30</u>	<u>GW</u>	<u>8</u>	<u>/</u>									
<u>GW-8</u>	<u>07/12/14 14:55</u>	<u>GW</u>	<u>8</u>	<u>/</u>									
<u>GW-10</u>	<u>08/12/14 12:00</u>	<u>GW</u>	<u>8</u>	<u>/</u>									

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

REMARKS

Present results of GW6, GW7 and GW8 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

[Signature] 14:43 8/12/14 [Signature] 14:43 8/12/14
12/10/14 1034



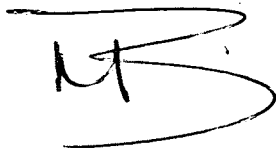
Guatemala December 8th, 2014

To whom it may concern:

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

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

Best regards,

A handwritten signature in black ink, appearing to be the initials 'MB' enclosed within a large, stylized loop.

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

December 22, 2014

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21937

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 10, 2014. This project has been assigned to ACZ's project number, L21937. 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 L21937. 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.

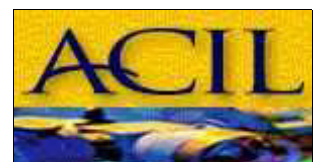
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 22, 2014

Project ID: Escobal

ACZ Project ID: L21937

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 ground water samples from Tahoe Resources, Inc. on December 10, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21937. 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-11

ACZ Sample ID: **L21937-01**
Date Sampled: 12/08/14 11:00
Date Received: 12/10/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/12/14 15:45	jif
Cyanide, WAD	SM4500-CN I- distillation								12/17/14 16:04	mpb
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 13:10	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:06	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:18	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 19:48	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	12/17/14 1:18	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	12/17/14 1:18	pmc
Barium, dissolved	M200.7 ICP	1	0.085			mg/L	0.003	0.02	12/12/14 19:48	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:48	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:48	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/14 16:04	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/14 1:18	pmc
Calcium, dissolved	M200.7 ICP	1	50.7			mg/L	0.1	0.5	12/12/14 19:48	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:48	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:48	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:48	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 18:22	jjc
Iron, dissolved	M200.7 ICP	1	0.05			mg/L	0.02	0.05	12/12/14 19:48	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/14 1:18	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:48	aeb
Magnesium, dissolved	M200.7 ICP	1	10			mg/L	0.2	1	12/12/14 19:48	aeb
Manganese, dissolved	M200.7 ICP	1	0.051			mg/L	0.005	0.03	12/12/14 19:48	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:49	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:48	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:48	aeb
Potassium, dissolved	M200.7 ICP	1	7.1			mg/L	0.2	1	12/12/14 19:48	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:48	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/17/14 1:18	pmc
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/14 1:18	pmc
Sodium, dissolved	M200.7 ICP	1	17.7			mg/L	0.2	1	12/12/14 19:48	aeb
Strontium, dissolved	M200.7 ICP	1	0.273			mg/L	0.005	0.03	12/12/14 19:48	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/14 1:18	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:48	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:48	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/14 1:18	pmc
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:48	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:48	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: GW-11

ACZ Sample ID: **L21937-01**
 Date Sampled: 12/08/14 11:00
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	74.8		*	mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1	74.8		*	mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/22/14 10:15	calc
Sum of Anions			4.3			meq/L			12/22/14 10:15	calc
Sum of Cations			4.3			meq/L			12/22/14 10:15	calc
Chloride	SM4500Cl-E	1	6.3		*	mg/L	0.5	2	12/16/14 14:41	mpb
Conductivity @25C	SM2510B	1	442		*	umhos/cm	1	10	12/12/14 22:15	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/14 22:35	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 16:45	tcd
Fluoride	SM4500F-C	1	0.17	B	*	mg/L	0.05	0.3	12/15/14 15:59	abd
Hardness as CaCO3	SM2340B - Calculation		168			mg/L	0.8	4	12/22/14 10:15	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.80		*	mg/L	0.02	0.1	12/19/14 0:41	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 12:03	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/17/14 13:45	tcd
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	18.9		*	C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	12/22/14 10:15	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/18/14 12:05	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	12/10/14 22:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	12/17/14 23:59	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	354		*	mg/L	10	20	12/12/14 19:38	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/11/14 14:48	abd
Residue, Total (TS) @ 105C	SM2540B	1	368		*	mg/L	10	20	12/10/14 15:57	eea
Sulfate	D516-02/-07 - Turbidimetric	5	125		*	mg/L	5	25	12/17/14 16:45	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/11/14 14:02	enb
TDS (calculated)	Calculation		263			mg/L			12/22/14 10:15	calc
TDS (ratio - measured/calculated)	Calculation		1.35						12/22/14 10:15	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21937-01	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376179	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376056	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG376398	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376413	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375898	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).
	WG376322	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375961	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).
	WG375890	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376281	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375946	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

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG376013	Total Alkalinity	SM2320B - Titration		accurate evaluation (< 10x MDL).
			SM2320B - Titration	Q6	Sample was received above recommended temperature.
				RP	The duplicate originally assigned to this sample could not be used for precision assessment because the titrant normality was too weak or too strong for the sample alkalinity. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: GW-11ACZ Sample ID: **L21937-01**
Date Sampled: 12/08/14 11:00
Date Received: 12/10/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376065Analyst: itk
Extract Date: 12/11/14 16:56
Analysis Date: 12/13/14 18:01

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	76.9		1	*	%	70	130

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21937-01	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21937-02	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21937-03	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947		M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

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
--------------	------------

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21937
 Date Received: 12/10/2014 10:35
 Received By: ddp
 Date Printed: 12/10/2014

Receipt Verification

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

Samples/Containers

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

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2634	9.7	16	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L21937
Date Received: 12/10/2014 10:35
Received By: ddp
Date Printed: 12/10/2014



Laboratories, Inc.

621937

CHAIN of CUSTODY

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

Report to:

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

Address: Bivieros Los Pájaros 12 calle 24-64 zona 10
Empresarial Zona Pradera Torre IV oficina 1406
Telephone: (502) 5951 5242

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources Inc

E-mail: cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc
E-mail: mberganza@sonrafael.com.gt

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION:

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, GW + TPH, AUTOM CN. Includes handwritten entries for various samples like GW-11, PSA-SR, HW-1, etc.

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 HW-1 and 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.



REG 016 Resultados de Análisis

Muestras: 13 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: 091214
Fecha de ingreso de muestras: 091214
Fecha de análisis: 091214-020115
Fecha de informe: 020115

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)
3280	MW-2	6665	98	N.D.	< 2
3281	MW-3	< 1	< 1	N.D.	< 2
3282	MW-4	< 1	< 1	N.D.	4.5
3283	MW-5	< 1	< 1	N.D.	< 2
3284	MW-6	< 1	< 1	N.D.	< 2
3285	MW-7	< 1	< 1	N.D.	49
3286	MW-8	< 1	< 1	N.D.	< 2
3287	MW-9	493	117	N.D.	< 2
3288	MW-11	178	< 1	N.D.	< 2
3289	MW-20	< 1	< 1	N.D.	< 2
3290	MW-21	78	42	N.D.	< 2
3291	PSA-1	250	< 1	N.D.	49
3292	GW-1A	166	62	N.D.	4.5

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

Se trabajaron diluciones.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Fernando Fuentes
Gerente Técnico

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

REG 016 Resultados de Análisis

Muestras: 6 muestras de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 081214
Fecha de ingreso de muestras: 081214
Fecha de análisis: 081214-191214
Fecha de informe: 191214

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)
3249	GW-2	153	10	N.D.	240
3250	GW-3	< 1	< 1	N.D.	< 2
3251	GW-4	1263	782	N.D.	< 2
3252	GW-5	882	561	N.D.	< 2
3257	GW-11	< 1	< 1	N.D.	< 2
3258	RW-1	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

Se trabajaron diluciones.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Fernando Fuentes
Gerente Técnico

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 081214
Fecha de ingreso de muestras: 081214
Fecha de análisis: 081214-191214
Fecha de informe: 191214

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)
3256	GW-10	< 1	< 1	< 10	< 25	N.D.	< 2

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas Proyectos Ambientales.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04*

*** Análisis referido.*



Ing. Fernando Fuentes
Gerente Técnico

December 22, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21964

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 11, 2014. This project has been assigned to ACZ's project number, L21964. 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 L21964. 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.

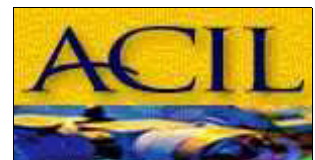
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 22, 2014

Project ID: Escobal

ACZ Project ID: L21964

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on December 11, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21964. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with an "HE", received too close to the hold time.

Sample Analysis

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

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.
2. For the DRO values flagged with an "N1", the value was less than the MDL but the peaks in the chromatogram were not what would be considered normal hydrocarbon peaks.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-2

ACZ Sample ID: **L21964-01**

Date Sampled: 12/09/14 13:34

Date Received: 12/11/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/14 13:44	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 15:34	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 13:34	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:37	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:06	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.74			mg/L	0.03	0.2	12/12/14 17:00	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:08	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0010			mg/L	0.0002	0.001	12/16/14 20:08	msh
Barium, dissolved	M200.7 ICP	1	0.120			mg/L	0.003	0.02	12/12/14 17:00	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:00	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:00	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:00	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:08	msh
Calcium, dissolved	M200.7 ICP	1	8.1			mg/L	0.1	0.5	12/12/14 17:00	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:00	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:00	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:00	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:00	jjc
Iron, dissolved	M200.7 ICP	1	1.16			mg/L	0.02	0.05	12/12/14 17:00	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0030			mg/L	0.0001	0.0005	12/16/14 20:08	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:00	jjc
Magnesium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	12/12/14 17:00	jjc
Manganese, dissolved	M200.7 ICP	1	0.820			mg/L	0.005	0.03	12/12/14 17:00	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:21	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:00	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:00	jjc
Potassium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	12/12/14 17:00	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:00	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	12/16/14 20:08	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/16/14 20:08	msh
Sodium, dissolved	M200.7 ICP	1	14.8			mg/L	0.2	1	12/12/14 17:00	jjc
Strontium, dissolved	M200.7 ICP	1	0.058			mg/L	0.005	0.03	12/12/14 17:00	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:08	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:00	jjc
Titanium, dissolved	M200.7 ICP	1	0.027	B		mg/L	0.005	0.03	12/12/14 17:00	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	12/16/14 20:08	msh
Vanadium, dissolved	M200.7 ICP	1	0.021	B		mg/L	0.005	0.03	12/12/14 17:00	jjc
Zinc, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/12/14 17:00	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-2

ACZ Sample ID: **L21964-01**
 Date Sampled: 12/09/14 13:34
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	46.3		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	46.3		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			10.3			%			12/22/14 15:03	calc
Sum of Anions			1.3			meq/L			12/22/14 15:03	calc
Sum of Cations			1.6			meq/L			12/22/14 15:03	calc
Chloride	SM4500Cl-E	1	6.1		*	mg/L	0.5	2	12/18/14 10:39	mpb
Conductivity @25C	SM2510B	1	136		*	umhos/cm	1	10	12/13/14 3:49	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 17:18	tcd
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:20	mss2
Fluoride	SM4500F-C	1	0.40		*	mg/L	0.05	0.3	12/16/14 12:58	abd
Hardness as CaCO3	SM2340B - Calculation		31			mg/L	0.8	4	12/22/14 15:03	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.67		*	mg/L	0.02	0.1	12/20/14 13:38	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.06	B	*	mg/L	0.05	0.2	12/17/14 13:03	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.9		*	mg/L	0.1	0.5	12/17/14 13:51	tcd
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.6		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	12/22/14 15:03	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	12/18/14 12:10	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	12/11/14 20:56	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.33		*	mg/L	0.01	0.05	12/18/14 0:49	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	268		*	mg/L	10	20	12/15/14 13:12	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	4	476		*	mg/L	20	80	12/15/14 10:24	id
Residue, Total (TS) @ 105C	SM2540B	1	896		*	mg/L	10	20	12/12/14 18:32	eea
Sulfate	D516-02/-07 - Turbidimetric	1	10.3		*	mg/L	1	5	12/19/14 11:41	jlf
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	12/11/14 14:51	enb
TDS (calculated)	Calculation		76.4			mg/L			12/22/14 15:03	calc
TDS (ratio - measured/calculated)	Calculation		3.51						12/22/14 15:03	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-3

ACZ Sample ID: **L21964-02**
Date Sampled: 12/09/14 10:00
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/14 14:04	bsu
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 15:40	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 13:42	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:47	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:12	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 17:04	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:10	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0024			mg/L	0.0002	0.001	12/16/14 20:10	msh
Barium, dissolved	M200.7 ICP	1	0.035			mg/L	0.003	0.02	12/12/14 17:04	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:04	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:04	jjc
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	12/12/14 17:04	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:10	msh
Calcium, dissolved	M200.7 ICP	1	77.9			mg/L	0.1	0.5	12/12/14 17:04	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:04	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:04	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:04	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:04	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 17:04	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:10	msh
Lithium, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.008	0.04	12/12/14 17:04	jjc
Magnesium, dissolved	M200.7 ICP	1	9.5			mg/L	0.2	1	12/12/14 17:04	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:04	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:23	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:04	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:04	jjc
Potassium, dissolved	M200.7 ICP	1	4.1			mg/L	0.2	1	12/12/14 17:04	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:04	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/16/14 20:10	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/16/14 20:10	msh
Sodium, dissolved	M200.7 ICP	1	27.8			mg/L	0.2	1	12/12/14 17:04	jjc
Strontium, dissolved	M200.7 ICP	1	0.727			mg/L	0.005	0.03	12/12/14 17:04	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:10	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:04	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:04	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/16/14 20:10	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:04	jjc
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/12/14 17:04	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-3

ACZ Sample ID: **L21964-02**
 Date Sampled: 12/09/14 10:00
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	82.2		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	82.2		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.7			%			12/22/14 15:03	calc
Sum of Anions			5.8			meq/L			12/22/14 15:03	calc
Sum of Cations			6.0			meq/L			12/22/14 15:03	calc
Chloride	SM4500Cl-E	1	16.2		*	mg/L	0.5	2	12/18/14 10:41	mpb
Conductivity @25C	SM2510B	1	594		*	umhos/cm	1	10	12/13/14 3:58	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 17:20	tcd
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:21	mss2
Fluoride	SM4500F-C	1	0.70		*	mg/L	0.05	0.3	12/16/14 13:04	abd
Hardness as CaCO3	SM2340B - Calculation		234			mg/L	0.8	4	12/22/14 15:03	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.43		*	mg/L	0.02	0.1	12/20/14 13:39	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:04	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 13:52	tcd
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.7		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.28			mg/L	0.03	0.2	12/22/14 15:03	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.01	0.05	12/18/14 12:11	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	12/11/14 20:59	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	12/18/14 0:50	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	476		*	mg/L	10	20	12/15/14 13:14	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/14 10:25	id
Residue, Total (TS) @ 105C	SM2540B	1	490		*	mg/L	10	20	12/12/14 18:33	eea
Sulfate	D516-02/-07 - Turbidimetric	5	175		*	mg/L	5	25	12/19/14 11:48	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/11/14 14:56	enb
TDS (calculated)	Calculation		362			mg/L			12/22/14 15:03	calc
TDS (ratio - measured/calculated)	Calculation		1.31						12/22/14 15:03	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-4

ACZ Sample ID: **L21964-03**

Date Sampled: 12/09/14 10:40

Date Received: 12/11/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 8:28	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 15:47	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 13:50	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:57	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:18	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 17:07	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:13	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0026			mg/L	0.0002	0.001	12/16/14 20:13	msh
Barium, dissolved	M200.7 ICP	1	0.031			mg/L	0.003	0.02	12/12/14 17:07	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:07	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:07	jjc
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	12/12/14 17:07	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:13	msh
Calcium, dissolved	M200.7 ICP	1	81.7			mg/L	0.1	0.5	12/12/14 17:07	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:07	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:07	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:07	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:07	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 17:07	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:13	msh
Lithium, dissolved	M200.7 ICP	1	0.012	B		mg/L	0.008	0.04	12/12/14 17:07	jjc
Magnesium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	12/12/14 17:07	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:07	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:25	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:07	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:07	jjc
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	12/12/14 17:07	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:07	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/16/14 20:13	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/16/14 20:13	msh
Sodium, dissolved	M200.7 ICP	1	27.4			mg/L	0.2	1	12/12/14 17:07	jjc
Strontium, dissolved	M200.7 ICP	1	0.744			mg/L	0.005	0.03	12/12/14 17:07	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:13	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:07	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:07	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/16/14 20:13	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:07	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:07	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-4

ACZ Sample ID: **L21964-03**
 Date Sampled: 12/09/14 10:40
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	88.8		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	88.8		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.8			%			12/22/14 15:03	calc
Sum of Anions			6.1			meq/L			12/22/14 15:03	calc
Sum of Cations			6.2			meq/L			12/22/14 15:03	calc
Chloride	SM4500Cl-E	1	16		*	mg/L	0.5	2	12/18/14 10:41	mpb
Conductivity @25C	SM2510B	1	611		*	umhos/cm	1	10	12/13/14 4:05	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:45	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:22	mss2
Fluoride	SM4500F-C	1	0.82		*	mg/L	0.05	0.3	12/16/14 13:28	abd
Hardness as CaCO3	SM2340B - Calculation		241			mg/L	0.8	4	12/22/14 15:03	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	2	2.59		*	mg/L	0.04	0.2	12/20/14 14:07	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:05	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 13:53	tcd
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.9		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.03	0.2	12/22/14 15:03	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.01	0.05	12/18/14 12:12	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.01	0.05	12/11/14 21:01	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/18/14 0:51	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	494		*	mg/L	10	20	12/15/14 13:16	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/14 10:26	id
Residue, Total (TS) @ 105C	SM2540B	1	500		*	mg/L	10	20	12/12/14 18:34	eea
Sulfate	D516-02/-07 - Turbidimetric	5	182		*	mg/L	5	25	12/19/14 11:49	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/11/14 15:01	enb
TDS (calculated)	Calculation		376			mg/L			12/22/14 15:03	calc
TDS (ratio - measured/calculated)	Calculation		1.31						12/22/14 15:03	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-5

ACZ Sample ID: **L21964-04**
Date Sampled: 12/09/14 09:10
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 8:57	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 15:54	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 13:59	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 15:07	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:24	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 17:10	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:15	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0010			mg/L	0.0002	0.001	12/16/14 20:15	msh
Barium, dissolved	M200.7 ICP	1	0.043			mg/L	0.003	0.02	12/12/14 17:10	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:10	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:10	jjc
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/12/14 17:10	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:15	msh
Calcium, dissolved	M200.7 ICP	1	137			mg/L	0.1	0.5	12/12/14 17:10	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:10	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:10	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:10	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:10	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 17:10	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:15	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:10	jjc
Magnesium, dissolved	M200.7 ICP	1	18.4			mg/L	0.2	1	12/12/14 17:10	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:10	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:27	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:10	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:10	jjc
Potassium, dissolved	M200.7 ICP	1	8			mg/L	0.2	1	12/12/14 17:10	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:10	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0003	12/16/14 20:15	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:15	msh
Sodium, dissolved	M200.7 ICP	1	30.4			mg/L	0.2	1	12/12/14 17:10	jjc
Strontium, dissolved	M200.7 ICP	1	0.484			mg/L	0.005	0.03	12/12/14 17:10	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:15	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:10	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:10	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	12/16/14 20:15	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:10	jjc
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/12/14 17:10	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-5

ACZ Sample ID: **L21964-04**
Date Sampled: 12/09/14 09:10
Date Received: 12/11/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	102		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	102		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/22/14 15:04	calc
Sum of Anions			9.9			meq/L			12/22/14 15:04	calc
Sum of Cations			9.9			meq/L			12/22/14 15:04	calc
Chloride	SM4500Cl-E	1	24		*	mg/L	0.5	2	12/18/14 10:41	mpb
Conductivity @25C	SM2510B	1	928		*	umhos/cm	1	10	12/13/14 4:14	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:47	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:23	mss2
Fluoride	SM4500F-C	1	0.22	B	*	mg/L	0.05	0.3	12/16/14 13:32	abd
Hardness as CaCO3	SM2340B - Calculation		418			mg/L	0.8	4	12/22/14 15:04	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	7.40		*	mg/L	0.08	0.4	12/20/14 14:10	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:07	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 13:54	tcd
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.7		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	12/22/14 15:04	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/18/14 12:13	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.04	BH	*	mg/L	0.01	0.05	12/11/14 21:02	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	12/18/14 0:52	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	746		*	mg/L	10	20	12/15/14 13:17	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	7.0	B	*	mg/L	5	20	12/15/14 10:28	id
Residue, Total (TS) @ 105C	SM2540B	1	754		*	mg/L	10	20	12/12/14 18:35	eea
Sulfate	D516-02/-07 - Turbidimetric	20	341		*	mg/L	20	100	12/19/14 12:07	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/11/14 15:06	enb
TDS (calculated)	Calculation		622			mg/L			12/22/14 15:04	calc
TDS (ratio - measured/calculated)	Calculation		1.20						12/22/14 15:04	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION	
L21964-01	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
	WG376338	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.	
	WG376013	Conductivity @25C		SM2510B	Q6	Sample was received above recommended temperature.
				SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG376401	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).
	WG376453	Cyanide, WAD		SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
				SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.	
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
	WG376482	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).
	WG376237	Nitrogen, ammonia		M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
				M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH		SM4500H+ B	Q6	Sample was received above recommended temperature.
				SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
	WG376353	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).
	WG375982	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.
	WG376323	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.
				M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.		
WG376072	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).	
WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.		
WG376437	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike		

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

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.
	WG375962	Sulfide as S	SM4500S2-D	DF	Sample required dilution due to high sediment.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21964-02	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376401	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	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).
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376323	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.
			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).
	WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.
			SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21964-03	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376323	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.
			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).
	WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	Sulfide as S	SM4500S2-D	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
			SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21964-04	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376323	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.
			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).
	WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG375962	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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-2

ACZ Sample ID: **L21964-01**
Date Sampled: 12/09/14 13:34
Date Received: 12/11/14
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG376417

Analyst: itk
Extract Date: 12/16/14 15:05
Analysis Date: 12/18/14 11:16

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-3ACZ Sample ID: **L21964-02**
Date Sampled: 12/09/14 10:00
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376417Analyst: itk
Extract Date: 12/16/14 15:07
Analysis Date: 12/18/14 11:43

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-4ACZ Sample ID: **L21964-03**
Date Sampled: 12/09/14 10:40
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup: WG376417**Analyst: itk
Extract Date: 12/16/14 15:09
Analysis Date: 12/18/14 12:11

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.1	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.3		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: MW-5

ACZ Sample ID: **L21964-04**

Date Sampled: 12/09/14 9:10

Date Received: 12/11/14

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG376417

Analyst: itk

Extract Date: 12/16/14 15:11

Analysis Date: 12/18/14 12:38

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

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21964-01	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21964-02	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21964-03	WG376417	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21964-04	WG376417	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	

Tahoe Resources, Inc.

ACZ Project ID: **L21964**

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: L21964
 Date Received: 12/11/2014 10:10
 Received By: ddp
 Date Printed: 12/11/2014

Receipt Verification

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

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? L21964-03 Container B1540302 (TAN): Added 1 mls 5N sodium hydroxide and 1 mls zinc acetate to the sub-sample to adjust the pH to the appropriate range.		X	
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA20921	11.1	19	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: L21964
Date Received: 12/11/2014 10:10
Received By: ddp
Date Printed: 12/11/2014



Laboratories, Inc.

21964

CHAIN of CUSTODY

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

Report to:

Name: Miguel Beranza
Company: Tahoe Resources Inc.
E-mail: Mberanza@sanrafael.com.gt

Address: Bulvar Los Proceres 18 calle 24-69 zona 10
Empresarial zona padero Torre IV Oficina 1406
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources Inc.

E-mail: cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Beranza
Company: Tahoe Resources Inc.
E-mail: Mberanza@sanrafael.com.gt

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results. Includes handwritten entries for MW-2, MW-3, MW-4, MW-5 and 'GW + HT'.

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

REMARKS

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

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

21964 Chain of Custody

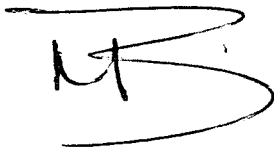
Guatemala December 9th, 2014

To whom it may concern:

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

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

Best regards,

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

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

December 22, 2014

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21966

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 11, 2014. This project has been assigned to ACZ's project number, L21966. 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 L21966. 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.

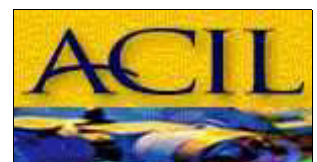
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 22, 2014

Project ID: Escobal

ACZ Project ID: L21966

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on December 11, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21966. 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, HE, HC), received either after the hold time expired or too close to the hold time.

Sample Analysis

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

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.
2. For the DRO values flagged with an "N1", the value was less than the MDL but the peaks in the chromatogram were not what would be considered normal hydrocarbon peaks.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-6

ACZ Sample ID: **L21966-01**
Date Sampled: 12/09/14 08:25
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 10:38	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:33	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 15:19	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 16:29	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 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	12/12/14 17:40	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:39	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	12/16/14 20:39	msh
Barium, dissolved	M200.7 ICP	1	0.115			mg/L	0.003	0.02	12/12/14 17:40	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:40	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:40	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/12/14 17:40	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:39	msh
Calcium, dissolved	M200.7 ICP	1	174			mg/L	0.1	0.5	12/12/14 17:40	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:40	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:40	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:40	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:40	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 17:40	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:39	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:40	jjc
Magnesium, dissolved	M200.7 ICP	1	19.8			mg/L	0.2	1	12/12/14 17:40	jjc
Manganese, dissolved	M200.7 ICP	1	0.007	B		mg/L	0.005	0.03	12/12/14 17:40	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:50	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:40	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:40	jjc
Potassium, dissolved	M200.7 ICP	1	8.8			mg/L	0.2	1	12/12/14 17:40	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:40	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0012			mg/L	0.0001	0.0003	12/16/14 20:39	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:39	msh
Sodium, dissolved	M200.7 ICP	1	26.5			mg/L	0.2	1	12/12/14 17:40	jjc
Strontium, dissolved	M200.7 ICP	1	0.710			mg/L	0.005	0.03	12/12/14 17:40	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:39	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:40	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:40	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	12/16/14 20:39	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:40	jjc
Zinc, dissolved	M200.7 ICP	1	0.07			mg/L	0.01	0.05	12/12/14 17:40	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-6

ACZ Sample ID: **L21966-01**
 Date Sampled: 12/09/14 08:25
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	92.9		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	92.9		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.3			%			12/22/14 0:00	calc
Sum of Anions			11			meq/L			12/22/14 0:00	calc
Sum of Cations			12			meq/L			12/22/14 0:00	calc
Chloride	SM4500Cl-E	1	19.9		*	mg/L	0.5	2	12/18/14 10:47	mpb
Conductivity @25C	SM2510B	1	1100		*	umhos/cm	1	10	12/13/14 5:11	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:54	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:30	mss2
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	12/16/14 14:00	abd
Hardness as CaCO3	SM2340B - Calculation		516			mg/L	0.8	4	12/22/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	10	18.2		*	mg/L	0.2	1	12/20/14 14:12	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:18	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 14:08	tcd
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.9		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	12/22/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/18/14 12:25	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/11/14 21:11	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/18/14 12:55	mss2
Residue, Filterable (TDS) @180C	SM2540C	1	886		*	mg/L	10	20	12/15/14 13:19	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/14 10:37	id
Residue, Total (TS) @ 105C	SM2540B	1	930		*	mg/L	10	20	12/12/14 18:41	eea
Sulfate	D516-02/-07 - Turbidimetric	20	404		*	mg/L	20	100	12/19/14 12:11	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/11/14 15:59	enb
TDS (calculated)	Calculation		711			mg/L			12/22/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.25						12/22/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-7

ACZ Sample ID: **L21966-02**
Date Sampled: 12/09/14 07:50
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 10:52	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:40	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 15:27	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 16:39	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 15:07	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	12/12/14 17:43	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	12/16/14 20:41	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0018			mg/L	0.0002	0.001	12/16/14 20:41	msh
Barium, dissolved	M200.7 ICP	1	0.427			mg/L	0.003	0.02	12/12/14 17:43	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:43	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:43	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:43	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:41	msh
Calcium, dissolved	M200.7 ICP	1	29.1			mg/L	0.1	0.5	12/12/14 17:43	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:43	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:43	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:43	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:43	jjc
Iron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	12/12/14 17:43	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/16/14 20:41	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:43	jjc
Magnesium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	12/12/14 17:43	jjc
Manganese, dissolved	M200.7 ICP	1	0.020	B		mg/L	0.005	0.03	12/12/14 17:43	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:52	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:43	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:43	jjc
Potassium, dissolved	M200.7 ICP	1	8.5			mg/L	0.2	1	12/12/14 17:43	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:43	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/16/14 20:41	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:41	msh
Sodium, dissolved	M200.7 ICP	1	18.6			mg/L	0.2	1	12/12/14 17:43	jjc
Strontium, dissolved	M200.7 ICP	1	0.202			mg/L	0.005	0.03	12/12/14 17:43	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:41	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:43	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:43	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:41	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:43	jjc
Zinc, dissolved	M200.7 ICP	1	0.24			mg/L	0.01	0.05	12/12/14 17:43	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-7

ACZ Sample ID: **L21966-02**
 Date Sampled: 12/09/14 07:50
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	76.5		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	76.5		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.5			%			12/22/14 0:00	calc
Sum of Anions			3.2			meq/L			12/22/14 0:00	calc
Sum of Cations			3.3			meq/L			12/22/14 0:00	calc
Chloride	SM4500Cl-E	1	13.1		*	mg/L	0.5	2	12/18/14 10:47	mpb
Conductivity @25C	SM2510B	1	352		*	umhos/cm	1	10	12/13/14 5:19	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:55	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:31	mss2
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	12/16/14 14:08	abd
Hardness as CaCO3	SM2340B - Calculation		111			mg/L	0.8	4	12/22/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.38		*	mg/L	0.02	0.1	12/20/14 13:54	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:19	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	12/17/14 14:09	tcd
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	20.0		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.03	0.2	12/22/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	12/18/14 12:26	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	12/11/14 21:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	12/18/14 12:56	mss2
Residue, Filterable (TDS) @180C	SM2540C	1	306		*	mg/L	10	20	12/15/14 13:21	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/14 10:38	id
Residue, Total (TS) @ 105C	SM2540B	1	304		*	mg/L	10	20	12/12/14 18:42	eea
Sulfate	D516-02/-07 - Turbidimetric	5	62.5		*	mg/L	5	25	12/19/14 12:07	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/11/14 16:04	enb
TDS (calculated)	Calculation		188			mg/L			12/22/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.63						12/22/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-8

ACZ Sample ID: **L21966-03**
Date Sampled: 12/09/14 08:50
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 11:07	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:53	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 15:36	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 16:49	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 15:28	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	12/12/14 17:47	jjc
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	12/16/14 20:44	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0014			mg/L	0.0002	0.001	12/16/14 20:44	msh
Barium, dissolved	M200.7 ICP	1	0.080			mg/L	0.003	0.02	12/12/14 17:47	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:47	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:47	jjc
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/12/14 17:47	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:44	msh
Calcium, dissolved	M200.7 ICP	1	120			mg/L	0.1	0.5	12/12/14 17:47	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:47	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:47	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:47	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:47	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 17:47	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:44	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:47	jjc
Magnesium, dissolved	M200.7 ICP	1	18.8			mg/L	0.2	1	12/12/14 17:47	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:47	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:54	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:47	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:47	jjc
Potassium, dissolved	M200.7 ICP	1	7			mg/L	0.2	1	12/12/14 17:47	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:47	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	12/16/14 20:44	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:44	msh
Sodium, dissolved	M200.7 ICP	1	27.9			mg/L	0.2	1	12/12/14 17:47	jjc
Strontium, dissolved	M200.7 ICP	1	0.437			mg/L	0.005	0.03	12/12/14 17:47	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:44	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:47	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:47	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/16/14 20:44	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:47	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:47	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-8

ACZ Sample ID: **L21966-03**
 Date Sampled: 12/09/14 08:50
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	81.1		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	81.1		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.1			%			12/22/14 0:00	calc
Sum of Anions			8.8			meq/L			12/22/14 0:00	calc
Sum of Cations			9			meq/L			12/22/14 0:00	calc
Chloride	SM4500Cl-E	1	22.7		*	mg/L	0.5	2	12/18/14 10:47	mpb
Conductivity @25C	SM2510B	1	864		*	umhos/cm	1	10	12/13/14 5:27	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:56	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:32	mss2
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	12/16/14 14:23	abd
Hardness as CaCO3	SM2340B - Calculation		377			mg/L	0.8	4	12/22/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.75		*	mg/L	0.06	0.3	12/20/14 14:13	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:21	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 14:10	tcd
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.9		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.03	0.2	12/22/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	12/18/14 12:27	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/11/14 21:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	12/18/14 12:58	mss2
Residue, Filterable (TDS) @180C	SM2540C	1	704		*	mg/L	10	20	12/15/14 13:22	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/14 10:39	id
Residue, Total (TS) @ 105C	SM2540B	1	704		*	mg/L	10	20	12/12/14 18:43	eea
Sulfate	D516-02/-07 - Turbidimetric	20	313		*	mg/L	20	100	12/19/14 12:11	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/11/14 16:09	enb
TDS (calculated)	Calculation		559			mg/L			12/22/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.26						12/22/14 0:00	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-9

ACZ Sample ID: **L21966-04**
Date Sampled: 12/09/14 11:30
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 11:21	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/19/14 8:28	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 15:44	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 17:00	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 15:48	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	12/12/14 17:50	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:46	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0016			mg/L	0.0002	0.001	12/16/14 20:46	msh
Barium, dissolved	M200.7 ICP	1	0.056			mg/L	0.003	0.02	12/12/14 17:50	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:50	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:50	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/12/14 17:50	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:46	msh
Calcium, dissolved	M200.7 ICP	1	50.3			mg/L	0.1	0.5	12/12/14 17:50	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:50	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:50	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:50	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:50	jjc
Iron, dissolved	M200.7 ICP	1	7.50			mg/L	0.02	0.05	12/12/14 17:50	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:46	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	12/12/14 17:50	jjc
Magnesium, dissolved	M200.7 ICP	1	8.6			mg/L	0.2	1	12/12/14 17:50	jjc
Manganese, dissolved	M200.7 ICP	1	0.109			mg/L	0.005	0.03	12/12/14 17:50	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:57	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:50	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:50	jjc
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	12/12/14 17:50	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:50	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/16/14 20:46	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:46	msh
Sodium, dissolved	M200.7 ICP	1	26.4			mg/L	0.2	1	12/12/14 17:50	jjc
Strontium, dissolved	M200.7 ICP	1	0.379			mg/L	0.005	0.03	12/12/14 17:50	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:46	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:50	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:50	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:46	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:50	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:50	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-9

ACZ Sample ID: **L21966-04**
Date Sampled: 12/09/14 11:30
Date Received: 12/11/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	145		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	145		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.0			%			12/22/14 0:00	calc
Sum of Anions			5.0			meq/L			12/22/14 0:00	calc
Sum of Cations			4.9			meq/L			12/22/14 0:00	calc
Chloride	SM4500Cl-E	1	8.6		*	mg/L	0.5	2	12/18/14 10:47	mpb
Conductivity @25C	SM2510B	1	457		*	umhos/cm	1	10	12/13/14 5:36	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:57	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 15:27	mss2
Fluoride	SM4500F-C	1	0.61		*	mg/L	0.05	0.3	12/16/14 14:37	abd
Hardness as CaCO3	SM2340B - Calculation		161			mg/L	0.8	4	12/22/14 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/20/14 13:58	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:22	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/17/14 14:11	tcd
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.9		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.40			mg/L	0.03	0.2	12/22/14 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.13		*	mg/L	0.01	0.05	12/18/14 12:28	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	12/11/14 21:17	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.01	0.05	12/18/14 13:01	mss2
Residue, Filterable (TDS) @180C	SM2540C	1	346		*	mg/L	10	20	12/15/14 13:24	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	22.0		*	mg/L	5	20	12/15/14 10:41	id
Residue, Total (TS) @ 105C	SM2540B	1	366		*	mg/L	10	20	12/12/14 18:44	eea
Sulfate	D516-02/-07 - Turbidimetric	5	88.8		*	mg/L	5	25	12/19/14 12:07	jlf
Sulfide as S	SM4500S2-D	1	0.03	B	*	mg/L	0.02	0.1	12/11/14 16:15	enb
TDS (calculated)	Calculation		284			mg/L			12/22/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.22						12/22/14 0:00	calc



Report Header Explanations

Table with 2 columns: Term and Definition. Includes terms like Batch, Found, Limit, Lower, MDL, PCN/SCN, PQL, QC, Rec, RPD, Upper, and Sample.

QC Sample Types

Table with 4 columns: Code, Description, Code, Description. Lists various QC sample types such as AS, ASD, CCB, CCV, DUP, ICB, ICV, ICSAB, LCSS, LCSSD, and LCSW.

QC Sample Type Explanations

Table with 2 columns: Term and Definition. Explains Blanks, Control Samples, Duplicates, Spikes/Fortified Matrix, and Standard.

ACZ Qualifiers (Qual)

Table with 2 columns: Qualifier and Definition. Lists qualifiers B, H, L, and U with their respective meanings.

Method References

- List of 5 method references including EPA 600/4-83-020, EPA 600/R-93-100, EPA 600/R-94-111, EPA SW-846, and Standard Methods for the Examination of Water and Wastewater.

Comments

- List of 5 comments regarding QC results, reporting basis (dry weight vs as received), asterisks in XQ column, and MDL/PQL reporting.

For a complete list of ACZ's Extended Qualifiers, please click: <http://www.acz.com/public/extquallist.pdf>

Tahoe Resources, Inc.

ACZ Project ID: **L21966**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21966-01	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376361	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).
	WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	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

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG376013	Total Alkalinity	SM2320B - Titration		
					accurate evaluation (< 10x MDL).
				Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21966-02	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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).
	WG376361	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).
	WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L21966**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21966-03	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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).
	WG376361	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).
	WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ Project ID: **L21966**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21966-04	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG376461	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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).
	WG376361	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).
	WG376085	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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 Project ID: **L21966**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG375962	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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-6ACZ Sample ID: **L21966-01**
Date Sampled: 12/09/14 8:25
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376417Analyst: itk
Extract Date: 12/16/14 15:22
Analysis Date: 12/18/14 15:49

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.1		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-7

ACZ Sample ID: **L21966-02**
Date Sampled: 12/09/14 7:50
Date Received: 12/11/14
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG376417

Analyst: itk
Extract Date: 12/16/14 15:24
Analysis Date: 12/18/14 16:17

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.1	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82.1		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-8ACZ Sample ID: **L21966-03**
Date Sampled: 12/09/14 8:50
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376417Analyst: itk
Extract Date: 12/16/14 15:26
Analysis Date: 12/18/14 16:44

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

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-9ACZ Sample ID: **L21966-04**
Date Sampled: 12/09/14 11:30
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376417Analyst: itk
Extract Date: 12/16/14 15:28
Analysis Date: 12/18/14 17:11

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.2		1	*	%	70	130

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21966**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21966-01	WG376417	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21966-02	WG376417	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21966-03	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			WG376195		M3520
	L21966-04	WG376417	*All Compounds*	M8015D GC/FID	N1
M8015D GC/FID				Q6	Sample was received above recommended temperature.
M8015D GC/FID				Q9	Insufficient sample received to meet method QC requirements.
WG376195			M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21966**

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: L21966
 Date Received: 12/11/2014 10:08
 Received By: ddp
 Date Printed: 12/11/2014

Receipt Verification

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

Samples/Containers

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

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4375	9.4	18	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: L21966
Date Received: 12/11/2014 10:08
Received By: ddp
Date Printed: 12/11/2014

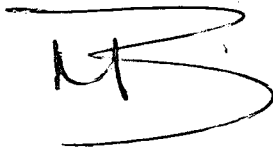
Guatemala December 9th, 2014

To whom it may concern:

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

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

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected together.

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

December 22, 2014

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21965

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 11, 2014. This project has been assigned to ACZ's project number, L21965. 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 L21965. 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.

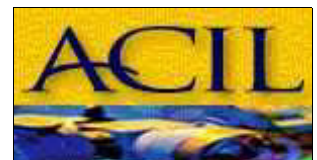
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 22, 2014

Project ID: Escobal

ACZ Project ID: L21965

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 5 ground water samples from Tahoe Resources, Inc. on December 11, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21965. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times except for parameters flagged with an "HE", received too close to the hold time.

Sample Analysis

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

1. For samples with a TDS ratio over 1.2 and a TDS value greater than 150 mg/L, the samples were not retested based on historical re-analysis data and the sample matrix.
2. For the DRO values flagged with an "N1", the value was less than the MDL but the peaks in the chromatogram were not what would be considered normal hydrocarbon peaks.

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-11

ACZ Sample ID: **L21965-01**

Date Sampled: 12/09/14 12:53

Date Received: 12/11/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 9:26	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:00	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 14:07	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 15:28	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:30	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 17:19	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:17	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0032			mg/L	0.0002	0.001	12/16/14 20:17	msh
Barium, dissolved	M200.7 ICP	1	0.032			mg/L	0.003	0.02	12/12/14 17:19	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:19	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:19	jjc
Boron, dissolved	M200.7 ICP	1	0.20			mg/L	0.01	0.05	12/12/14 17:19	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:17	msh
Calcium, dissolved	M200.7 ICP	1	266			mg/L	0.1	0.5	12/12/14 17:19	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:19	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:19	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:19	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:19	jjc
Iron, dissolved	M200.7 ICP	1	2.31			mg/L	0.02	0.05	12/12/14 17:19	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:17	msh
Lithium, dissolved	M200.7 ICP	1	0.081			mg/L	0.008	0.04	12/12/14 17:19	jjc
Magnesium, dissolved	M200.7 ICP	1	41.9			mg/L	0.2	1	12/12/14 17:19	jjc
Manganese, dissolved	M200.7 ICP	1	0.035			mg/L	0.005	0.03	12/12/14 17:19	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:29	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:19	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:19	jjc
Potassium, dissolved	M200.7 ICP	1	4.8			mg/L	0.2	1	12/12/14 17:19	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:19	jjc
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0003	12/16/14 20:17	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:17	msh
Sodium, dissolved	M200.7 ICP	1	78.4			mg/L	0.2	1	12/12/14 17:19	jjc
Strontium, dissolved	M200.7 ICP	1	2.590			mg/L	0.005	0.03	12/12/14 17:19	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:17	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:19	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:19	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	12/16/14 20:17	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:19	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:19	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-11

ACZ Sample ID: **L21965-01**
 Date Sampled: 12/09/14 12:53
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	127		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	127		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.4			%			12/22/14 15:12	calc
Sum of Anions			20			meq/L			12/22/14 15:12	calc
Sum of Cations			21			meq/L			12/22/14 15:12	calc
Chloride	SM4500Cl-E	1	68.7		*	mg/L	0.5	2	12/18/14 10:41	mpb
Conductivity @25C	SM2510B	1	1700		*	umhos/cm	1	10	12/13/14 4:31	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:48	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:24	mss2
Fluoride	SM4500F-C	1	2.51		*	mg/L	0.05	0.3	12/16/14 13:35	abd
Hardness as CaCO3	SM2340B - Calculation		837			mg/L	0.8	4	12/22/14 15:12	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/20/14 13:45	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:10	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 13:55	tcd
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.7		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	12/22/14 15:12	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/18/14 22:51	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/11/14 21:03	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/18/14 0:54	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1360		*	mg/L	10	20	12/12/14 19:44	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	9.0	B	*	mg/L	5	20	12/15/14 10:29	id
Residue, Total (TS) @ 105C	SM2540B	1	1400		*	mg/L	10	20	12/12/14 18:36	eea
Sulfate	D516-02/-07 - Turbidimetric	25	733		*	mg/L	25	125	12/19/14 12:09	jlf
Sulfide as S	SM4500S2-D	1.5	0.08	B	*	mg/L	0.03	0.2	12/11/14 15:12	enb
TDS (calculated)	Calculation		1280			mg/L			12/22/14 15:12	calc
TDS (ratio - measured/calculated)	Calculation		1.06						12/22/14 15:12	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-20

ACZ Sample ID: **L21965-02**
Date Sampled: 12/09/14 12:00
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 9:40	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:07	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 14:31	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 15:48	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:16	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	12/12/14 17:22	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:25	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	12/16/14 20:25	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	12/12/14 17:22	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:22	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:22	jjc
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:22	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:25	msh
Calcium, dissolved	M200.7 ICP	1	0.2	B		mg/L	0.1	0.5	12/12/14 17:22	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:22	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:22	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:22	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:22	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 17:22	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:25	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:22	jjc
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/12/14 17:22	jjc
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:22	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:32	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:22	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:22	jjc
Potassium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	12/12/14 17:22	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:22	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/16/14 20:25	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:25	msh
Sodium, dissolved	M200.7 ICP	1	0.4	B		mg/L	0.2	1	12/12/14 17:22	jjc
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:22	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:25	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:22	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:22	jjc
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:25	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:22	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:22	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: MW-20

ACZ Sample ID: **L21965-02**
 Date Sampled: 12/09/14 12:00
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1		U	*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/22/14 15:12	calc
Sum of Anions			N/A			meq/L			12/22/14 15:12	calc
Sum of Cations				U		meq/L			12/22/14 15:12	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	12/18/14 10:41	mpb
Conductivity @25C	SM2510B	1	2.0	B	*	umhos/cm	1	10	12/13/14 4:38	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:49	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:25	mss2
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	12/16/14 13:42	abd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	0.8	4	12/22/14 15:12	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/20/14 13:48	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:14	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 13:59	tcd
pH (lab)	SM4500H+ B									
pH		1	6.3	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.6		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.03	0.2	12/22/14 15:12	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/18/14 12:18	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	12/11/14 21:04	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/18/14 12:48	mss2
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	12/12/14 19:47	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/14 10:31	id
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	12/12/14 18:37	eea
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	12/19/14 12:08	jlf
Sulfide as S	SM4500S2-D	1.5		U	*	mg/L	0.03	0.2	12/11/14 15:17	enb
TDS (calculated)	Calculation		0.9			mg/L			12/22/14 15:12	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/22/14 15:12	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-21

ACZ Sample ID: **L21965-03**
Date Sampled: 12/09/14 12:00
Date Received: 12/11/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 9:55	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:13	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 14:47	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 15:58	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:27	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	12/12/14 17:25	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:27	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	12/16/14 20:27	msh
Barium, dissolved	M200.7 ICP	1	0.056			mg/L	0.003	0.02	12/12/14 17:25	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:25	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:25	jjc
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/12/14 17:25	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:27	msh
Calcium, dissolved	M200.7 ICP	1	49.8			mg/L	0.1	0.5	12/12/14 17:25	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:25	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:25	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:25	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:25	jjc
Iron, dissolved	M200.7 ICP	1	7.65			mg/L	0.02	0.05	12/12/14 17:25	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:27	msh
Lithium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.008	0.04	12/12/14 17:25	jjc
Magnesium, dissolved	M200.7 ICP	1	8.6			mg/L	0.2	1	12/12/14 17:25	jjc
Manganese, dissolved	M200.7 ICP	1	0.111			mg/L	0.005	0.03	12/12/14 17:25	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:34	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:25	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:25	jjc
Potassium, dissolved	M200.7 ICP	1	4.3			mg/L	0.2	1	12/12/14 17:25	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:25	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/16/14 20:27	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:27	msh
Sodium, dissolved	M200.7 ICP	1	26.2			mg/L	0.2	1	12/12/14 17:25	jjc
Strontium, dissolved	M200.7 ICP	1	0.377			mg/L	0.005	0.03	12/12/14 17:25	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:27	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:25	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:25	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/16/14 20:27	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:25	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:25	jjc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-21

ACZ Sample ID: **L21965-03**
Date Sampled: 12/09/14 12:00
Date Received: 12/11/14
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	129		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	129		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.1			%			12/22/14 15:13	calc
Sum of Anions			4.7			meq/L			12/22/14 15:13	calc
Sum of Cations			4.9			meq/L			12/22/14 15:13	calc
Chloride	SM4500Cl-E	1	9.5		*	mg/L	0.5	2	12/18/14 10:41	mpb
Conductivity @25C	SM2510B	1	450		*	umhos/cm	1	10	12/13/14 4:46	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:50	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:25	mss2
Fluoride	SM4500F-C	1	0.60		*	mg/L	0.05	0.3	12/16/14 13:46	abd
Hardness as CaCO3	SM2340B - Calculation		160			mg/L	0.8	4	12/22/14 15:13	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/20/14 13:50	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:15	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/17/14 14:03	tcd
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.6		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.43			mg/L	0.03	0.2	12/22/14 15:13	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.14		*	mg/L	0.01	0.05	12/18/14 12:19	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/11/14 21:05	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.01	0.05	12/18/14 12:52	mss2
Residue, Filterable (TDS) @180C	SM2540C	1	336		*	mg/L	10	20	12/12/14 19:49	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1	18.0	B	*	mg/L	5	20	12/15/14 10:33	id
Residue, Total (TS) @ 105C	SM2540B	1	362		*	mg/L	10	20	12/12/14 18:38	eea
Sulfate	D516-02/-07 - Turbidimetric	5	86.8		*	mg/L	5	25	12/19/14 12:04	jlf
Sulfide as S	SM4500S2-D	1	0.04	B	*	mg/L	0.02	0.1	12/11/14 15:43	enb
TDS (calculated)	Calculation		273			mg/L			12/22/14 15:13	calc
TDS (ratio - measured/calculated)	Calculation		1.23						12/22/14 15:13	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: PSA-1

ACZ Sample ID: **L21965-04**

Date Sampled: 12/09/14 11:00

Date Received: 12/11/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/19/14 10:09	mss2
Cyanide, WAD	SM4500-CN I- distillation								12/18/14 16:20	bsu
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 15:03	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 16:09	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:37	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	12/12/14 17:28	jjc
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/16/14 20:29	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0065			mg/L	0.0002	0.001	12/16/14 20:29	msh
Barium, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.003	0.02	12/12/14 17:28	jjc
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:28	jjc
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 17:28	jjc
Boron, dissolved	M200.7 ICP	1	0.10			mg/L	0.01	0.05	12/12/14 17:28	jjc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:29	msh
Calcium, dissolved	M200.7 ICP	1	201			mg/L	0.1	0.5	12/12/14 17:28	jjc
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:28	jjc
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:28	jjc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:28	jjc
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:28	jjc
Iron, dissolved	M200.7 ICP	1	1.33			mg/L	0.02	0.05	12/12/14 17:28	jjc
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:29	msh
Lithium, dissolved	M200.7 ICP	1	0.084			mg/L	0.008	0.04	12/12/14 17:28	jjc
Magnesium, dissolved	M200.7 ICP	1	36.1			mg/L	0.2	1	12/12/14 17:28	jjc
Manganese, dissolved	M200.7 ICP	1	0.052			mg/L	0.005	0.03	12/12/14 17:28	jjc
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/14 12:36	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 17:28	jjc
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 17:28	jjc
Potassium, dissolved	M200.7 ICP	1	4.7			mg/L	0.2	1	12/12/14 17:28	jjc
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 17:28	jjc
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/16/14 20:29	msh
Silver, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.00005	0.0003	12/16/14 20:29	msh
Sodium, dissolved	M200.7 ICP	1	47			mg/L	0.2	1	12/12/14 17:28	jjc
Strontium, dissolved	M200.7 ICP	1	1.930			mg/L	0.005	0.03	12/12/14 17:28	jjc
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/16/14 20:29	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 17:28	jjc
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:28	jjc
Uranium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	12/16/14 20:29	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 17:28	jjc
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 17:28	jjc

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-1

ACZ Sample ID: **L21965-04**
 Date Sampled: 12/09/14 11:00
 Date Received: 12/11/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	163		*	mg/L	2	20	12/13/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/13/14 0:00	id
Total Alkalinity		1	163		*	mg/L	2	20	12/13/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.2			%			12/22/14 15:13	calc
Sum of Anions			16			meq/L			12/22/14 15:13	calc
Sum of Cations			15			meq/L			12/22/14 15:13	calc
Chloride	SM4500Cl-E	1	41.9		*	mg/L	0.5	2	12/18/14 10:41	mpb
Conductivity @25C	SM2510B	1	1310		*	umhos/cm	1	10	12/13/14 4:55	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:51	mss2
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/19/14 14:26	mss2
Fluoride	SM4500F-C	1	2.48		*	mg/L	0.05	0.3	12/16/14 13:49	abd
Hardness as CaCO3	SM2340B - Calculation		651			mg/L	0.8	4	12/22/14 15:13	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/20/14 13:51	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 13:16	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/17/14 14:06	tcd
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	12/13/14 0:00	id
pH measured at		1	19.7		*	C	0.1	0.1	12/13/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.03	B		mg/L	0.03	0.2	12/22/14 15:13	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/18/14 12:22	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/11/14 21:09	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/18/14 12:53	mss2
Residue, Filterable (TDS) @180C	SM2540C	1	1000		*	mg/L	10	20	12/12/14 19:51	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/14 10:34	id
Residue, Total (TS) @ 105C	SM2540B	1	1030		*	mg/L	10	20	12/12/14 18:39	eea
Sulfate	D516-02/-07 - Turbidimetric	20	527		*	mg/L	20	100	12/19/14 12:11	jlf
Sulfide as S	SM4500S2-D	1.5	0.17	B	*	mg/L	0.03	0.2	12/11/14 15:48	enb
TDS (calculated)	Calculation		963			mg/L			12/22/14 15:13	calc
TDS (ratio - measured/calculated)	Calculation		1.04						12/22/14 15:13	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21965-01	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376410	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).
	WG375982	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.
	WG376323	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.
			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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375962	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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21965-02	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376361	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.
			SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21965-03	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376361	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	validation because the sample concentration is too low for accurate evaluation (< 10x MDL). Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21965-04	WG376213	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.
	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376338	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376457	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).
	WG376453	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376150	Fluoride	SM4500F-C	Q6	Sample was received above recommended temperature.
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376482	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376237	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375982	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.
	WG376361	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG376072	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).
	WG376050	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376437	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.
	WG375962	Sulfide as S	SM4500S2-D	D1	Sample required dilution due to matrix.
			SM4500S2-D	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-11ACZ Sample ID: **L21965-01**
Date Sampled: 12/09/14 12:53
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376417Analyst: itk
Extract Date: 12/16/14 15:13
Analysis Date: 12/18/14 13:05

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	81.9		1	*	%	70	130

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: MW-20ACZ Sample ID: **L21965-02**
Date Sampled: 12/09/14 12:00
Date Received: 12/11/14
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**
Extract Method: **M3520****Workgroup:** WG376417Analyst: itk
Extract Date: 12/16/14 15:14
Analysis Date: 12/18/14 13:33

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

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: MW-21

ACZ Sample ID: **L21965-03**
Date Sampled: 12/09/14 12:00
Date Received: 12/11/14
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG376417

Analyst: itk
Extract Date: 12/16/14 15:16
Analysis Date: 12/18/14 14:00

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	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: PSA-1

ACZ Sample ID: **L21965-04**

Date Sampled: 12/09/14 11:00

Date Received: 12/11/14

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG376417

Analyst: itk

Extract Date: 12/16/14 15:18

Analysis Date: 12/18/14 14:55

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.3		1.01	*	%	70	130

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21965-01	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21965-02	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21965-03	WG376417	*All Compounds*	M8015D GC/FID	N1	See Case Narrative.
			M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L21965-04	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	
L21965-05	WG376417	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG376195	M3520	Q9	Insufficient sample received to meet method QC requirements.	

Tahoe Resources, Inc.

ACZ Project ID: **L21965**

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: L21965
 Date Received: 12/11/2014 10:09
 Received By: ddp
 Date Printed: 12/11/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
4473	11.3	16	Yes

Was ice present in the shipment container(s)?

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

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



Laboratories, Inc.

21965

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 384-5493

Report to:

Name: Miguel Berganza, Company: Tahoe Resources inc., E-mail: mberganza@sankofuel.com.gt, Address: Boulevard Los Pinos, Torre III oficina 1406, Telephone: (502) 5951 5242

Copy of Report to:

Name: Charlie Muechoff, Company: Tahoe Resources inc., E-mail: Cmuechoff@tahoeresourcesinc.com, Telephone:

Invoice to:

Name: Miguel Berganza, Company: Tahoe Resources inc., E-mail: mberganza@sankofuel.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]

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. Includes rows for MW-11, MW-20, MW-21, PSA-1, GW1A.

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: 01-12-2014 17:21, RECEIVED BY: Dan King, DATE:TIME: 01/12/14 5:21



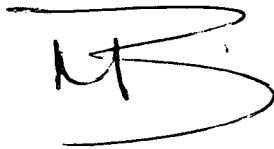
Guatemala December 9th, 2014

To whom it may concern:

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

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

Best regards,

A handwritten signature in black ink, consisting of a stylized 'M' and 'B' connected by a horizontal line.

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

December 22, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21937

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 10, 2014. This project has been assigned to ACZ's project number, L21937. 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 L21937. 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.

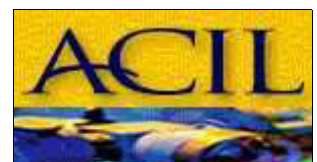
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 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.

December 22, 2014

Project ID: Escobal

ACZ Project ID: L21937

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 3 ground water samples from Tahoe Resources, Inc. on December 10, 2014. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L21937. 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: PSA-SR

ACZ Sample ID: **L21937-02**
Date Sampled: 12/04/14 11:00
Date Received: 12/10/14
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/12/14 15:52	jif
Cyanide, WAD	SM4500-CN I- distillation								12/17/14 16:09	mpb
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 13:18	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:16	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:24	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/14 19:51	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/14 1:21	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0133			mg/L	0.0002	0.001	12/17/14 1:21	pmc
Barium, dissolved	M200.7 ICP	1	0.094			mg/L	0.003	0.02	12/12/14 19:51	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:51	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:51	aeb
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	12/16/14 16:07	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/14 1:21	pmc
Calcium, dissolved	M200.7 ICP	1	109			mg/L	0.1	0.5	12/12/14 19:51	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:51	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:51	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:51	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 18:25	jjc
Iron, dissolved	M200.7 ICP	1	0.10			mg/L	0.02	0.05	12/12/14 19:51	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/14 1:21	pmc
Lithium, dissolved	M200.7 ICP	1	0.149			mg/L	0.008	0.04	12/12/14 19:51	aeb
Magnesium, dissolved	M200.7 ICP	1	6.9			mg/L	0.2	1	12/12/14 19:51	aeb
Manganese, dissolved	M200.7 ICP	1	0.036			mg/L	0.005	0.03	12/12/14 19:51	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:51	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:51	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:51	aeb
Potassium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	12/12/14 19:51	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:51	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/17/14 1:21	pmc
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/14 1:21	pmc
Sodium, dissolved	M200.7 ICP	1	82.9			mg/L	0.2	1	12/12/14 19:51	aeb
Strontium, dissolved	M200.7 ICP	1	4.680			mg/L	0.005	0.03	12/12/14 19:51	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/14 1:21	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:51	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:51	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/17/14 1:21	pmc
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:51	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:51	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: PSA-SR

ACZ Sample ID: **L21937-02**
 Date Sampled: 12/04/14 11:00
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	175		*	mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1	175		*	mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.0			%			12/22/14 10:15	calc
Sum of Anions			10			meq/L			12/22/14 10:15	calc
Sum of Cations			9.8			meq/L			12/22/14 10:15	calc
Chloride	SM4500Cl-E	1	4.2		*	mg/L	0.5	2	12/16/14 14:41	mpb
Conductivity @25C	SM2510B	1	909		*	umhos/cm	1	10	12/12/14 22:23	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/14 22:36	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 16:46	tcd
Fluoride	SM4500F-C	1	0.76		*	mg/L	0.05	0.3	12/15/14 16:12	abd
Hardness as CaCO3	SM2340B - Calculation		301			mg/L	0.8	4	12/22/14 10:15	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/19/14 0:42	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 12:15	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/17/14 13:46	tcd
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	19.1		*	C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	12/22/14 10:15	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/18/14 12:06	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.01	BH	*	mg/L	0.01	0.05	12/10/14 22:44	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/18/14 0:00	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	638		*	mg/L	10	20	12/10/14 17:09	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/11/14 14:49	abd
Residue, Total (TS) @ 105C	SM2540B	1	672		*	mg/L	10	20	12/10/14 15:58	eea
Sulfate	D516-02/-07 - Turbidimetric	20	302		*	mg/L	20	100	12/17/14 17:08	jlf
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/11/14 14:08	enb
TDS (calculated)	Calculation		620			mg/L			12/22/14 10:15	calc
TDS (ratio - measured/calculated)	Calculation		1.03						12/22/14 10:15	calc

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L21937-03**

Date Sampled: 12/08/14 12:02

Date Received: 12/10/14

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/12/14 16:00	jif
Cyanide, WAD	SM4500-CN I- distillation								12/17/14 16:15	mpb
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/14 13:26	bsu
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/17/14 14:27	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/16/14 19:30	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.03	0.2	12/12/14 19:54	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/14 1:25	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0002	0.001	12/17/14 1:25	pmc
Barium, dissolved	M200.7 ICP	1	0.166			mg/L	0.003	0.02	12/12/14 19:54	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:54	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/12/14 19:54	aeb
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/16/14 16:17	aeb
Cadmium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/17/14 1:25	pmc
Calcium, dissolved	M200.7 ICP	1	144			mg/L	0.1	0.5	12/12/14 19:54	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:54	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:54	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/14 19:54	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/14 18:29	jjc
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/12/14 19:54	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/17/14 1:25	pmc
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:54	aeb
Magnesium, dissolved	M200.7 ICP	1	26.7			mg/L	0.2	1	12/12/14 19:54	aeb
Manganese, dissolved	M200.7 ICP	1	0.737			mg/L	0.005	0.03	12/12/14 19:54	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/14 17:54	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/14 19:54	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/12/14 19:54	aeb
Potassium, dissolved	M200.7 ICP	1	13.2			mg/L	0.2	1	12/12/14 19:54	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/12/14 19:54	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/17/14 1:25	pmc
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/14 1:25	pmc
Sodium, dissolved	M200.7 ICP	1	40.8			mg/L	0.2	1	12/12/14 19:54	aeb
Strontium, dissolved	M200.7 ICP	1	0.792			mg/L	0.005	0.03	12/12/14 19:54	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/17/14 1:25	pmc
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/12/14 19:54	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:54	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/17/14 1:25	pmc
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/14 19:54	aeb
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/12/14 19:54	aeb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: RW-1

ACZ Sample ID: **L21937-03**
 Date Sampled: 12/08/14 12:02
 Date Received: 12/10/14
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	95.7		*	mg/L	2	20	12/12/14 0:00	id
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/14 0:00	id
Total Alkalinity		1	95.7		*	mg/L	2	20	12/12/14 0:00	id
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/22/14 10:15	calc
Sum of Anions			12			meq/L			12/22/14 10:15	calc
Sum of Cations			12			meq/L			12/22/14 10:15	calc
Chloride	SM4500Cl-E	1	45.7		*	mg/L	0.5	2	12/16/14 14:41	mpb
Conductivity @25C	SM2510B	1	1080		*	umhos/cm	1	10	12/12/14 22:31	id
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/14 22:37	pjb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/18/14 16:46	tcd
Fluoride	SM4500F-C	1	0.06	B	*	mg/L	0.05	0.3	12/15/14 16:16	abd
Hardness as CaCO3	SM2340B - Calculation		470			mg/L	0.8	4	12/22/14 10:15	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.27		*	mg/L	0.02	0.1	12/19/14 0:43	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1		U	*	mg/L	0.05	0.2	12/17/14 12:05	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/17/14 13:50	tcd
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	12/12/14 0:00	id
pH measured at		1	19.4		*	C	0.1	0.1	12/12/14 0:00	id
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.03	0.2	12/22/14 10:15	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/18/14 12:09	mss2
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	12/10/14 22:56	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.01	0.05	12/18/14 0:01	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	820		*	mg/L	10	20	12/12/14 19:40	eea
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/11/14 14:49	abd
Residue, Total (TS) @ 105C	SM2540B	1	848		*	mg/L	10	20	12/10/14 15:59	eea
Sulfate	D516-02/-07 - Turbidimetric	25	413		*	mg/L	25	125	12/17/14 16:49	jlf
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	12/11/14 14:14	enb
TDS (calculated)	Calculation		743			mg/L			12/22/14 10:15	calc
TDS (ratio - measured/calculated)	Calculation		1.10						12/22/14 10:15	calc



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21937-02	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376179	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376056	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG376398	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376413	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375898	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).
	WG376322	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).
	WG375892	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375961	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).
	WG375890	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376281	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375946	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).
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RP	The duplicate originally assigned to this sample could not be used for precision assessment because the titrant

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
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normality was too weak or too strong for the sample alkalinity. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21937-03	WG376013	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376179	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
			SM4500CI-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376013	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG376056	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
	WG376398	Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376074	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).
	WG376013	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG376413	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG376235	Nitrogen, ammonia	M350.1 - Automated Phenate	Q6	Sample was received above recommended temperature.
			M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376250	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).
	WG376013	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG376353	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).
	WG375898	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).
	WG376322	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).
	WG376052	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG375961	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).
	WG375890	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG376281	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG375946	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).

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG376013	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RP	The duplicate originally assigned to this sample could not be used for precision assessment because the titrant normality was too weak or too strong for the sample alkalinity. Another duplicate in the batch was used to assess precision. Method required duplicate frequency was not met.

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: PSA-SR

ACZ Sample ID: **L21937-02**

Date Sampled: 12/04/14 11:00

Date Received: 12/10/14

Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG376065

Analyst: itk

Extract Date: 12/11/14 16:58

Analysis Date: 12/13/14 18:27

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	77.2		1	*	%	70	130

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: RW-1

ACZ Sample ID: **L21937-03**
Date Sampled: 12/08/14 12:02
Date Received: 12/10/14
Sample Matrix: Ground Water

Diesel Range Organics (C10-C28)

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

Workgroup: WG376065

Analyst: itk
Extract Date: 12/11/14 16:59
Analysis Date: 12/13/14 18:53

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	78.7		1	*	%	70	130

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

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

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

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

Comments

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21937-01	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21937-02	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947		M3520	Q9	Insufficient sample received to meet method QC requirements.
L21937-03	WG376065	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG375947		M3520	Q9	Insufficient sample received to meet method QC requirements.

Tahoe Resources, Inc.

ACZ Project ID: **L21937**

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: L21937
 Date Received: 12/10/2014 10:35
 Received By: ddp
 Date Printed: 12/10/2014

Receipt Verification

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

Samples/Containers

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

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
2634	9.7	16	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.
Escobal

ACZ Project ID: L21937
Date Received: 12/10/2014 10:35
Received By: ddp
Date Printed: 12/10/2014



Laboratories, Inc.

621937

CHAIN of CUSTODY

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

Report to:

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

Address: Bulevar Los Pájaros 12 calle 24-64 zona 10
Empresarial Zona Pradera Torre IV oficina 1406
Telephone: (502) 5951 5242

Copy of Report to:

Name: Charlie Muerhoff
Company: Tahoe Resources Inc

E-mail: cmuerhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

Name: Miguel Berganza
Company: Tahoe Resources Inc
E-mail: mberganza@sonrafael.com.gt

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION:

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, GW + TPH, AUTOM CN. Includes handwritten entries for various samples like GW-11, PSA-SR, HW-1, etc.

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 HW-1 and 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.

REG 016 Resultados de Análisis

Muestras: 13 muestras de agua
 Análisis solicitado por: Ing. Miguel Berganza
 Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
 Procedencia de la muestra: Proyecto Escobal
 Fecha de muestreo: 091214
 Fecha de ingreso de muestras: 091214
 Fecha de análisis: 091214-020115
 Fecha de informe: 020115

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)
3280	MW-2	6665	98	N.D.	< 2
3281	MW-3	< 1	< 1	N.D.	< 2
3282	MW-4	< 1	< 1	N.D.	4.5
3283	MW-5	< 1	< 1	N.D.	< 2
3284	MW-6	< 1	< 1	N.D.	< 2
3285	MW-7	< 1	< 1	N.D.	49
3286	MW-8	< 1	< 1	N.D.	< 2
3287	MW-9	493	117	N.D.	< 2
3288	MW-11	178	< 1	N.D.	< 2
3289	MW-20	< 1	< 1	N.D.	< 2
3290	MW-21	78	42	N.D.	< 2
3291	PSA-1	250	< 1	N.D.	49
3292	GW-1A	166	62	N.D.	4.5

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

Se trabajaron diluciones.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Fernando Fuentes
Gerente Técnico

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

REG 016 Resultados de Análisis

Muestras: 6 muestras de agua
 Análisis solicitado por: Ing. Miguel Berganza
 Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
 Procedencia de la muestra: Proyecto Escobal
 Fecha de muestreo: 081214
 Fecha de ingreso de muestras: 081214
 Fecha de análisis: 081214-191214
 Fecha de informe: 191214

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)
3249	GW-2	153	10	N.D.	240
3250	GW-3	< 1	< 1	N.D.	< 2
3251	GW-4	1263	782	N.D.	< 2
3252	GW-5	882	561	N.D.	< 2
3257	GW-11	< 1	< 1	N.D.	< 2
3258	RW-1	< 1	< 1	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número Mas Probable.

Se trabajaron diluciones.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis referidos.*



Ing. Fernando Fuentes
Gerente Técnico

January 19, 2015

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Account Payable

Tahoe Resources, Inc.

5310 Kietzke Lane

Suite 200

Reno, NV 89511

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L22214

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 31, 2014. This project has been assigned to ACZ's project number, L22214. 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 L22214. 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.

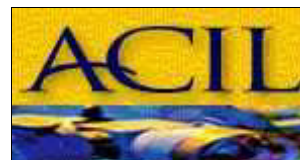
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after February 18, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-1

ACZ Sample ID: **L22214-01**
Date Sampled: 12/01/14 11:40
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 11:20	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 15:05	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	10400		*	mg/Kg	50	300	01/15/15 17:25	msh
Antimony, total (3050)	M6020 ICP-MS	500	0.9	B	*	mg/Kg	0.2	1	01/14/15 13:20	msh
Arsenic, total (3050)	M6020 ICP-MS	500	10.8		*	mg/Kg	0.1	0.5	01/14/15 13:20	msh
Barium, total (3050)	M6020 ICP-MS	500	231		*	mg/Kg	0.3	1	01/14/15 13:20	msh
Boron, total (3050)	M6010B ICP	100	2	B	*	mg/Kg	1	5	01/15/15 11:36	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.20	B		mg/Kg	0.05	0.3	01/14/15 13:20	msh
Calcium, total (3050)	M6010B ICP	100	3330		*	mg/Kg	10	50	01/15/15 11:36	aeb
Chromium, total (3050)	M6020 ICP-MS	500	3.7			mg/Kg	0.3	1	01/14/15 13:20	msh
Copper, total (3050)	M6020 ICP-MS	500	11.1			mg/Kg	0.3	1	01/14/15 13:20	msh
Iron, total (3050)	M6010B ICP	100	12900		*	mg/Kg	2	5	01/15/15 11:36	aeb
Lead, total (3050)	M6020 ICP-MS	500	11.10			mg/Kg	0.05	0.3	01/14/15 13:20	msh
Magnesium, total (3050)	M6010B ICP	100	1250			mg/Kg	20	100	01/15/15 11:36	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	480		*	mg/Kg	30	100	01/15/15 17:25	msh
Mercury, total	M7471A CVAA	249		UH	*	mg/Kg	0.05	0.2	01/02/15 13:34	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/15/15 11:36	aeb
Nickel, total (3050)	M6020 ICP-MS	500	4.6			mg/Kg	0.3	2	01/14/15 13:20	msh
Potassium, total (3050)	M6010B ICP	100	2010			mg/Kg	20	100	01/15/15 11:36	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.11			mg/Kg	0.05	0.1	01/14/15 13:20	msh
Silver, total (3050)	M6020 ICP-MS	500	0.20			mg/Kg	0.03	0.1	01/14/15 13:20	msh
Zinc, total (3050)	M6020 ICP-MS	500	41		*	mg/Kg	1	3	01/14/15 13:20	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	69.1		*	%	0.1	0.5	01/02/15 18:38	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:00	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 12:45	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 12:45	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:00	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-1

ACZ Sample ID: **L22214-01**

Date Sampled: 12/01/14 11:40

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	26.4		UH	*	mg/Kg	0.2	0.5	01/06/15 13:02	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	200	0.027	H	*	%	0.002	0.01	01/03/15 16:14	pjb

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: SED-2

ACZ Sample ID: **L22214-02**
 Date Sampled: 12/01/14 10:30
 Date Received: 12/31/14
 Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 11:41	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 15:45	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	10500		*	mg/Kg	50	300	01/15/15 17:32	msh
Antimony, total (3050)	M6020 ICP-MS	500	5.7		*	mg/Kg	0.2	1	01/14/15 13:27	msh
Arsenic, total (3050)	M6020 ICP-MS	500	39.8		*	mg/Kg	0.1	0.5	01/14/15 13:27	msh
Barium, total (3050)	M6020 ICP-MS	500	74.4		*	mg/Kg	0.3	1	01/14/15 13:27	msh
Boron, total (3050)	M6010B ICP	100	2	B	*	mg/Kg	1	5	01/15/15 11:39	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	4.49		*	mg/Kg	0.05	0.3	01/14/15 13:27	msh
Calcium, total (3050)	M6010B ICP	100	18200		*	mg/Kg	10	50	01/15/15 11:39	aeb
Chromium, total (3050)	M6020 ICP-MS	500	5.7		*	mg/Kg	0.3	1	01/14/15 13:27	msh
Copper, total (3050)	M6020 ICP-MS	500	19.8		*	mg/Kg	0.3	1	01/14/15 13:27	msh
Iron, total (3050)	M6010B ICP	100	14700		*	mg/Kg	2	5	01/15/15 11:39	aeb
Lead, total (3050)	M6020 ICP-MS	500	125		*	mg/Kg	0.05	0.3	01/14/15 13:27	msh
Magnesium, total (3050)	M6010B ICP	100	3880		*	mg/Kg	20	100	01/15/15 11:39	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	1510		*	mg/Kg	30	100	01/15/15 17:32	msh
Mercury, total	M7471A CVAA	294		UH	*	mg/Kg	0.06	0.3	01/02/15 13:41	mfm
Molybdenum, total (3050)	M6010B ICP	100		U	*	mg/Kg	2	10	01/15/15 11:39	aeb
Nickel, total (3050)	M6020 ICP-MS	500	6.8		*	mg/Kg	0.3	2	01/14/15 13:27	msh
Potassium, total (3050)	M6010B ICP	100	1610		*	mg/Kg	20	100	01/15/15 11:39	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.13		*	mg/Kg	0.05	0.1	01/14/15 13:27	msh
Silver, total (3050)	M6020 ICP-MS	500	14.50		*	mg/Kg	0.03	0.1	01/14/15 13:27	msh
Zinc, total (3050)	M6020 ICP-MS	500	407		*	mg/Kg	1	3	01/14/15 13:27	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	01/03/15 5:56	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:06	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 13:56	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 13:56	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:05	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2

ACZ Sample ID: **L22214-02**

Date Sampled: 12/01/14 10:30

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	27.2		UH	*	mg/Kg	0.2	0.5	01/06/15 13:03	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	110	0.025	H	*	%	0.001	0.006	01/03/15 15:31	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2A

ACZ Sample ID: **L22214-03**

Date Sampled: 12/02/14 11:30

Date Received: 12/31/14

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 12:02	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 16:26	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	16200		*	mg/Kg	50	300	01/15/15 17:37	msh
Antimony, total (3050)	M6020 ICP-MS	505	3.3		*	mg/Kg	0.2	1	01/14/15 13:32	msh
Arsenic, total (3050)	M6020 ICP-MS	505	34.2		*	mg/Kg	0.1	0.5	01/14/15 13:32	msh
Barium, total (3050)	M6020 ICP-MS	505	168		*	mg/Kg	0.3	1	01/14/15 13:32	msh
Boron, total (3050)	M6010B ICP	101	3	B	*	mg/Kg	1	5	01/15/15 11:48	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	4.11			mg/Kg	0.05	0.3	01/14/15 13:32	msh
Calcium, total (3050)	M6010B ICP	101	16400		*	mg/Kg	10	50	01/15/15 11:48	aeb
Chromium, total (3050)	M6020 ICP-MS	505	6.6			mg/Kg	0.3	1	01/14/15 13:32	msh
Copper, total (3050)	M6020 ICP-MS	505	20.9			mg/Kg	0.3	1	01/14/15 13:32	msh
Iron, total (3050)	M6010B ICP	101	14600		*	mg/Kg	2	5	01/15/15 11:48	aeb
Lead, total (3050)	M6020 ICP-MS	505	182			mg/Kg	0.05	0.3	01/14/15 13:32	msh
Magnesium, total (3050)	M6010B ICP	101	3430			mg/Kg	20	100	01/15/15 11:48	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	1440		*	mg/Kg	30	100	01/15/15 17:37	msh
Mercury, total	M7471A CVAA	338		UH	*	mg/Kg	0.07	0.3	01/02/15 13:43	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/15/15 11:48	aeb
Nickel, total (3050)	M6020 ICP-MS	505	6.2			mg/Kg	0.3	2	01/14/15 13:32	msh
Potassium, total (3050)	M6010B ICP	101	2040			mg/Kg	20	100	01/15/15 11:48	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.13			mg/Kg	0.05	0.1	01/14/15 13:32	msh
Silver, total (3050)	M6020 ICP-MS	505	13.0			mg/Kg	0.03	0.1	01/14/15 13:32	msh
Zinc, total (3050)	M6020 ICP-MS	505	352		*	mg/Kg	1	3	01/14/15 13:32	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	51.7		*	%	0.1	0.5	01/03/15 11:35	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:13	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 15:07	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 15:07	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:10	mns

Tahoe Resources, Inc.Project ID: Escobal
Sample ID: SED-2AACZ Sample ID: **L22214-03**
Date Sampled: 12/02/14 11:30
Date Received: 12/31/14
Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	45.6		UH	*	mg/Kg	0.3	0.9	01/06/15 13:05	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	310	0.041	H	*	%	0.003	0.02	01/03/15 15:32	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-2B

ACZ Sample ID: **L22214-04**
Date Sampled: 12/01/14 09:30
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 12:13	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 17:06	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	10800		*	mg/Kg	50	300	01/15/15 17:44	msh
Antimony, total (3050)	M6020 ICP-MS	500	2.6		*	mg/Kg	0.2	1	01/14/15 13:39	msh
Arsenic, total (3050)	M6020 ICP-MS	500	22.7		*	mg/Kg	0.1	0.5	01/14/15 13:39	msh
Barium, total (3050)	M6020 ICP-MS	500	101		*	mg/Kg	0.3	1	01/14/15 13:39	msh
Boron, total (3050)	M6010B ICP	100	3	B	*	mg/Kg	1	5	01/15/15 11:51	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	2.02		*	mg/Kg	0.05	0.3	01/14/15 13:39	msh
Calcium, total (3050)	M6010B ICP	100	14600		*	mg/Kg	10	50	01/15/15 11:51	aeb
Chromium, total (3050)	M6020 ICP-MS	500	6.3		*	mg/Kg	0.3	1	01/14/15 13:39	msh
Copper, total (3050)	M6020 ICP-MS	500	14.6		*	mg/Kg	0.3	1	01/14/15 13:39	msh
Iron, total (3050)	M6010B ICP	100	12700		*	mg/Kg	2	5	01/15/15 11:51	aeb
Lead, total (3050)	M6020 ICP-MS	500	129		*	mg/Kg	0.05	0.3	01/14/15 13:39	msh
Magnesium, total (3050)	M6010B ICP	100	4170		*	mg/Kg	20	100	01/15/15 11:51	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	1930		*	mg/Kg	30	100	01/15/15 17:44	msh
Mercury, total	M7471A CVAA	366		UH	*	mg/Kg	0.07	0.4	01/02/15 13:45	mfm
Molybdenum, total (3050)	M6010B ICP	100	3	B	*	mg/Kg	2	10	01/15/15 11:51	aeb
Nickel, total (3050)	M6020 ICP-MS	500	6.3		*	mg/Kg	0.3	2	01/14/15 13:39	msh
Potassium, total (3050)	M6010B ICP	100	1780		*	mg/Kg	20	100	01/15/15 11:51	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.14		*	mg/Kg	0.05	0.1	01/14/15 13:39	msh
Silver, total (3050)	M6020 ICP-MS	500	7.56		*	mg/Kg	0.03	0.1	01/14/15 13:39	msh
Zinc, total (3050)	M6020 ICP-MS	500	204		*	mg/Kg	1	3	01/14/15 13:39	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	46.5		*	%	0.1	0.5	01/03/15 17:14	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:19	mns
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 15:31	spl
Digestion - Hot Plate	M3050B ICP								01/13/15 15:31	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:16	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-2B

ACZ Sample ID: **L22214-04**

Date Sampled: 12/01/14 09:30

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	50		UH	*	mg/Kg	0.3	1	01/06/15 13:06	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	160	0.041	H	*	%	0.002	0.008	01/03/15 15:33	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-3

ACZ Sample ID: **L22214-05**
Date Sampled: 12/02/14 11:00
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 12:23	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 17:46	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	7820		*	mg/Kg	50	300	01/15/15 17:46	msh
Antimony, total (3050)	M6020 ICP-MS	500	1.6		*	mg/Kg	0.2	1	01/14/15 13:42	msh
Arsenic, total (3050)	M6020 ICP-MS	500	11.4		*	mg/Kg	0.1	0.5	01/14/15 13:42	msh
Barium, total (3050)	M6020 ICP-MS	500	114		*	mg/Kg	0.3	1	01/14/15 13:42	msh
Boron, total (3050)	M6010B ICP	100	1	B	*	mg/Kg	1	5	01/15/15 11:55	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.10	B		mg/Kg	0.05	0.3	01/14/15 13:42	msh
Calcium, total (3050)	M6010B ICP	100	2190		*	mg/Kg	10	50	01/15/15 11:55	aeb
Chromium, total (3050)	M6020 ICP-MS	500	3			mg/Kg	0.3	1	01/14/15 13:42	msh
Copper, total (3050)	M6020 ICP-MS	500	4.7			mg/Kg	0.3	1	01/14/15 13:42	msh
Iron, total (3050)	M6010B ICP	100	9960		*	mg/Kg	2	5	01/15/15 11:55	aeb
Lead, total (3050)	M6020 ICP-MS	500	8.60		*	mg/Kg	0.05	0.3	01/14/15 13:42	msh
Magnesium, total (3050)	M6010B ICP	100	730			mg/Kg	20	100	01/15/15 11:55	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	520		*	mg/Kg	30	100	01/15/15 17:46	msh
Mercury, total	M7471A CVAA	322		UH	*	mg/Kg	0.06	0.3	01/02/15 13:47	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/15/15 11:55	aeb
Nickel, total (3050)	M6020 ICP-MS	500	2.3			mg/Kg	0.3	2	01/14/15 13:42	msh
Potassium, total (3050)	M6010B ICP	100	1590			mg/Kg	20	100	01/15/15 11:55	aeb
Selenium, total (3050)	M6020 ICP-MS	500		U		mg/Kg	0.05	0.1	01/14/15 13:42	msh
Silver, total (3050)	M6020 ICP-MS	500		U		mg/Kg	0.03	0.1	01/14/15 13:42	msh
Zinc, total (3050)	M6020 ICP-MS	500	30		*	mg/Kg	1	3	01/14/15 13:42	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	57.1		*	%	0.1	0.5	01/03/15 22:52	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:26	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 15:54	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 15:54	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:21	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-3

ACZ Sample ID: **L22214-05**

Date Sampled: 12/02/14 11:00

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	41.9		UH	*	mg/Kg	0.3	0.8	01/06/15 13:07	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	130	0.023	H	*	%	0.001	0.007	01/03/15 15:34	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4

ACZ Sample ID: **L22214-06**
Date Sampled: 12/01/14 08:45
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 12:33	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 18:26	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	10000		*	mg/Kg	50	300	01/15/15 17:49	msh
Antimony, total (3050)	M6020 ICP-MS	500	3.4		*	mg/Kg	0.2	1	01/14/15 13:44	msh
Arsenic, total (3050)	M6020 ICP-MS	500	16.4		*	mg/Kg	0.1	0.5	01/14/15 13:44	msh
Barium, total (3050)	M6020 ICP-MS	500	141		*	mg/Kg	0.3	1	01/14/15 13:44	msh
Boron, total (3050)	M6010B ICP	100	2	B	*	mg/Kg	1	5	01/15/15 12:04	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.21	B		mg/Kg	0.05	0.3	01/14/15 13:44	msh
Calcium, total (3050)	M6010B ICP	100	2980		*	mg/Kg	10	50	01/15/15 12:04	aeb
Chromium, total (3050)	M6020 ICP-MS	500	5.3			mg/Kg	0.3	1	01/14/15 13:44	msh
Copper, total (3050)	M6020 ICP-MS	500	6.9			mg/Kg	0.3	1	01/14/15 13:44	msh
Iron, total (3050)	M6010B ICP	100	13700		*	mg/Kg	2	5	01/15/15 12:04	aeb
Lead, total (3050)	M6020 ICP-MS	500	13.10		*	mg/Kg	0.05	0.3	01/14/15 13:44	msh
Magnesium, total (3050)	M6010B ICP	100	1060			mg/Kg	20	100	01/15/15 12:04	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	380		*	mg/Kg	30	100	01/15/15 17:49	msh
Mercury, total	M7471A CVAA	252		UH	*	mg/Kg	0.05	0.3	01/02/15 13:54	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/15/15 12:04	aeb
Nickel, total (3050)	M6020 ICP-MS	500	3.3			mg/Kg	0.3	2	01/14/15 13:44	msh
Potassium, total (3050)	M6010B ICP	100	1620			mg/Kg	20	100	01/15/15 12:04	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.05	B		mg/Kg	0.05	0.1	01/14/15 13:44	msh
Silver, total (3050)	M6020 ICP-MS	500	0.18			mg/Kg	0.03	0.1	01/14/15 13:44	msh
Zinc, total (3050)	M6020 ICP-MS	500	45		*	mg/Kg	1	3	01/14/15 13:44	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	66.9		*	%	0.1	0.5	01/04/15 4:31	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:33	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 16:18	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 16:18	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:27	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4

ACZ Sample ID: **L22214-06**

Date Sampled: 12/01/14 08:45

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	34		UH	*	mg/Kg	0.2	0.7	01/06/15 13:08	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	130	0.019	H	*	%	0.001	0.007	01/03/15 15:38	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-5

ACZ Sample ID: **L22214-07**
Date Sampled: 12/02/14 07:40
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 12:44	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 19:06	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	7520		*	mg/Kg	50	300	01/15/15 17:51	msh
Antimony, total (3050)	M6020 ICP-MS	500	5.3		*	mg/Kg	0.2	1	01/14/15 13:47	msh
Arsenic, total (3050)	M6020 ICP-MS	500	46.8		*	mg/Kg	0.1	0.5	01/14/15 13:47	msh
Barium, total (3050)	M6020 ICP-MS	500	201		*	mg/Kg	0.3	1	01/14/15 13:47	msh
Boron, total (3050)	M6010B ICP	100		U	*	mg/Kg	1	5	01/15/15 12:07	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.12	B		mg/Kg	0.05	0.3	01/14/15 13:47	msh
Calcium, total (3050)	M6010B ICP	100	1280		*	mg/Kg	10	50	01/15/15 12:07	aeb
Chromium, total (3050)	M6020 ICP-MS	500	5.6			mg/Kg	0.3	1	01/14/15 13:47	msh
Copper, total (3050)	M6020 ICP-MS	500	5.1			mg/Kg	0.3	1	01/14/15 13:47	msh
Iron, total (3050)	M6010B ICP	100	31100		*	mg/Kg	2	5	01/15/15 12:07	aeb
Lead, total (3050)	M6020 ICP-MS	500	12.90		*	mg/Kg	0.05	0.3	01/14/15 13:47	msh
Magnesium, total (3050)	M6010B ICP	100	740			mg/Kg	20	100	01/15/15 12:07	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	690		*	mg/Kg	30	100	01/15/15 17:51	msh
Mercury, total	M7471A CVAA	281	0.07	BH	*	mg/Kg	0.06	0.3	01/02/15 13:56	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/15/15 12:07	aeb
Nickel, total (3050)	M6020 ICP-MS	500	2.2			mg/Kg	0.3	2	01/14/15 13:47	msh
Potassium, total (3050)	M6010B ICP	100	1530			mg/Kg	20	100	01/15/15 12:07	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.07	B		mg/Kg	0.05	0.1	01/14/15 13:47	msh
Silver, total (3050)	M6020 ICP-MS	500	0.25			mg/Kg	0.03	0.1	01/14/15 13:47	msh
Zinc, total (3050)	M6020 ICP-MS	500	53		*	mg/Kg	1	3	01/14/15 13:47	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	66.4		*	%	0.1	0.5	01/04/15 10:10	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:39	mns
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 16:42	spl
Digestion - Hot Plate	M3050B ICP								01/13/15 16:42	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:32	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-5

ACZ Sample ID: **L22214-07**

Date Sampled: 12/02/14 07:40

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	34.4		UH	*	mg/Kg	0.2	0.7	01/06/15 13:10	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	70	0.0165	H	*	%	0.0007	0.004	01/03/15 15:39	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-6

ACZ Sample ID: **L22214-08**
Date Sampled: 12/02/14 08:00
Date Received: 12/31/14
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 12:54	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 19:46	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	6150		*	mg/Kg	50	300	01/15/15 17:53	msh
Antimony, total (3050)	M6020 ICP-MS	500	0.4	B	*	mg/Kg	0.2	1	01/14/15 13:49	msh
Arsenic, total (3050)	M6020 ICP-MS	500	6.3		*	mg/Kg	0.1	0.5	01/14/15 13:49	msh
Barium, total (3050)	M6020 ICP-MS	500	93.6		*	mg/Kg	0.3	1	01/14/15 13:49	msh
Boron, total (3050)	M6010B ICP	100	2	B	*	mg/Kg	1	5	01/15/15 12:10	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.09	B		mg/Kg	0.05	0.3	01/14/15 13:49	msh
Calcium, total (3050)	M6010B ICP	100	1000		*	mg/Kg	10	50	01/15/15 12:10	aeb
Chromium, total (3050)	M6020 ICP-MS	500	3.5			mg/Kg	0.3	1	01/14/15 13:49	msh
Copper, total (3050)	M6020 ICP-MS	500	5			mg/Kg	0.3	1	01/14/15 13:49	msh
Iron, total (3050)	M6010B ICP	100	8330		*	mg/Kg	2	5	01/15/15 12:10	aeb
Lead, total (3050)	M6020 ICP-MS	500	4.43		*	mg/Kg	0.05	0.3	01/14/15 13:49	msh
Magnesium, total (3050)	M6010B ICP	100	770			mg/Kg	20	100	01/15/15 12:10	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	280		*	mg/Kg	30	100	01/15/15 17:53	msh
Mercury, total	M7471A CVAA	275		UH	*	mg/Kg	0.06	0.3	01/02/15 13:59	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/15/15 12:10	aeb
Nickel, total (3050)	M6020 ICP-MS	500	1.8	B		mg/Kg	0.3	2	01/14/15 13:49	msh
Potassium, total (3050)	M6010B ICP	100	1140			mg/Kg	20	100	01/15/15 12:10	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.11			mg/Kg	0.05	0.1	01/14/15 13:49	msh
Silver, total (3050)	M6020 ICP-MS	500	0.03	B		mg/Kg	0.03	0.1	01/14/15 13:49	msh
Zinc, total (3050)	M6020 ICP-MS	500	22		*	mg/Kg	1	3	01/14/15 13:49	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	61.7		*	%	0.1	0.5	01/04/15 15:49	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:46	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 17:05	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 17:05	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:37	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-6

ACZ Sample ID: **L22214-08**

Date Sampled: 12/02/14 08:00

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	39.5		UH	*	mg/Kg	0.2	0.8	01/06/15 13:11	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	140	0.014	H	*	%	0.001	0.007	01/03/15 15:40	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-7

ACZ Sample ID: **L22214-09**
Date Sampled: 12/01/14 08:00
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 13:05	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 20:26	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	17900		*	mg/Kg	50	300	01/15/15 17:56	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.1		*	mg/Kg	0.2	1	01/14/15 13:52	msh
Arsenic, total (3050)	M6020 ICP-MS	505	10.7		*	mg/Kg	0.1	0.5	01/14/15 13:52	msh
Barium, total (3050)	M6020 ICP-MS	505	207		*	mg/Kg	0.3	1	01/14/15 13:52	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	01/15/15 12:14	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.32			mg/Kg	0.05	0.3	01/14/15 13:52	msh
Calcium, total (3050)	M6010B ICP	101	3160		*	mg/Kg	10	50	01/15/15 12:14	aeb
Chromium, total (3050)	M6020 ICP-MS	505	4.3			mg/Kg	0.3	1	01/14/15 13:52	msh
Copper, total (3050)	M6020 ICP-MS	505	13.2			mg/Kg	0.3	1	01/14/15 13:52	msh
Iron, total (3050)	M6010B ICP	101	14000		*	mg/Kg	2	5	01/15/15 12:14	aeb
Lead, total (3050)	M6020 ICP-MS	505	12.20		*	mg/Kg	0.05	0.3	01/14/15 13:52	msh
Magnesium, total (3050)	M6010B ICP	101	1360			mg/Kg	20	100	01/15/15 12:14	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	780		*	mg/Kg	30	100	01/15/15 17:56	msh
Mercury, total	M7471A CVAA	513		UH	*	mg/Kg	0.1	0.5	01/02/15 14:01	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/15/15 12:14	aeb
Nickel, total (3050)	M6020 ICP-MS	505	3.9			mg/Kg	0.3	2	01/14/15 13:52	msh
Potassium, total (3050)	M6010B ICP	101	1980			mg/Kg	20	100	01/15/15 12:14	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.16			mg/Kg	0.05	0.1	01/14/15 13:52	msh
Silver, total (3050)	M6020 ICP-MS	505	0.13			mg/Kg	0.03	0.1	01/14/15 13:52	msh
Zinc, total (3050)	M6020 ICP-MS	505	51		*	mg/Kg	1	3	01/14/15 13:52	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	36.7		*	%	0.1	0.5	01/04/15 21:28	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:52	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 17:29	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 17:29	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:43	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-7

ACZ Sample ID: **L22214-09**

Date Sampled: 12/01/14 08:00

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	55.1		UH	*	mg/Kg	0.3	1	01/06/15 13:12	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	290	0.041	H	*	%	0.003	0.01	01/03/15 15:41	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-8

ACZ Sample ID: **L22214-10**

Date Sampled: 12/02/14 09:20

Date Received: 12/31/14

Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 13:15	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 21:07	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	12300		*	mg/Kg	50	300	01/15/15 17:58	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.4		*	mg/Kg	0.2	1	01/14/15 13:54	msh
Arsenic, total (3050)	M6020 ICP-MS	505	12.5		*	mg/Kg	0.1	0.5	01/14/15 13:54	msh
Barium, total (3050)	M6020 ICP-MS	505	192		*	mg/Kg	0.3	1	01/14/15 13:54	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	01/15/15 12:20	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.54			mg/Kg	0.05	0.3	01/14/15 13:54	msh
Calcium, total (3050)	M6010B ICP	101	2690		*	mg/Kg	10	50	01/15/15 12:20	aeb
Chromium, total (3050)	M6020 ICP-MS	505	5.4			mg/Kg	0.3	1	01/14/15 13:54	msh
Copper, total (3050)	M6020 ICP-MS	505	15.4			mg/Kg	0.3	1	01/14/15 13:54	msh
Iron, total (3050)	M6010B ICP	101	13900		*	mg/Kg	2	5	01/15/15 12:20	aeb
Lead, total (3050)	M6020 ICP-MS	505	22.90		*	mg/Kg	0.05	0.3	01/14/15 13:54	msh
Magnesium, total (3050)	M6010B ICP	101	950			mg/Kg	20	100	01/15/15 12:20	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	670		*	mg/Kg	30	100	01/15/15 17:58	msh
Mercury, total	M7471A CVAA	262	0.07	BH	*	mg/Kg	0.05	0.3	01/02/15 14:03	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/15/15 12:20	aeb
Nickel, total (3050)	M6020 ICP-MS	505	2.9			mg/Kg	0.3	2	01/14/15 13:54	msh
Potassium, total (3050)	M6010B ICP	101	1850			mg/Kg	20	100	01/15/15 12:20	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.10			mg/Kg	0.05	0.1	01/14/15 13:54	msh
Silver, total (3050)	M6020 ICP-MS	505	0.74			mg/Kg	0.03	0.1	01/14/15 13:54	msh
Zinc, total (3050)	M6020 ICP-MS	505	92		*	mg/Kg	1	3	01/14/15 13:54	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	63.7		*	%	0.1	0.5	01/05/15 3:06	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 14:59	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 17:53	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 17:53	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:48	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-8

ACZ Sample ID: **L22214-10**

Date Sampled: 12/02/14 09:20

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.4		UH	*	mg/Kg	0.2	0.6	01/06/15 13:13	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	190	0.072	H	*	%	0.002	0.01	01/03/15 15:42	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-4A

ACZ Sample ID: **L22214-11**
Date Sampled: 12/02/14 10:35
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 13:26	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 21:47	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	13300		*	mg/Kg	50	300	01/15/15 18:01	msh
Antimony, total (3050)	M6020 ICP-MS	505	3.2		*	mg/Kg	0.2	1	01/14/15 13:57	msh
Arsenic, total (3050)	M6020 ICP-MS	505	18.8		*	mg/Kg	0.1	0.5	01/14/15 13:57	msh
Barium, total (3050)	M6020 ICP-MS	505	165		*	mg/Kg	0.3	1	01/14/15 13:57	msh
Boron, total (3050)	M6010B ICP	101	2	B	*	mg/Kg	1	5	01/15/15 12:23	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.48			mg/Kg	0.05	0.3	01/14/15 13:57	msh
Calcium, total (3050)	M6010B ICP	101	3980		*	mg/Kg	10	50	01/15/15 12:23	aeb
Chromium, total (3050)	M6020 ICP-MS	505	6.7			mg/Kg	0.3	1	01/14/15 13:57	msh
Copper, total (3050)	M6020 ICP-MS	505	11.3			mg/Kg	0.3	1	01/14/15 13:57	msh
Iron, total (3050)	M6010B ICP	101	15500		*	mg/Kg	2	5	01/15/15 12:23	aeb
Lead, total (3050)	M6020 ICP-MS	505	27.80		*	mg/Kg	0.05	0.3	01/14/15 13:57	msh
Magnesium, total (3050)	M6010B ICP	101	1370			mg/Kg	20	100	01/15/15 12:23	aeb
Manganese, total (3050)	M6020 ICP-MS	50500	970		*	mg/Kg	30	100	01/15/15 18:01	msh
Mercury, total	M7471A CVAA	323		UH	*	mg/Kg	0.06	0.3	01/02/15 14:05	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/15/15 12:23	aeb
Nickel, total (3050)	M6020 ICP-MS	505	4.6			mg/Kg	0.3	2	01/14/15 13:57	msh
Potassium, total (3050)	M6010B ICP	101	1820			mg/Kg	20	100	01/15/15 12:23	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.13			mg/Kg	0.05	0.1	01/14/15 13:57	msh
Silver, total (3050)	M6020 ICP-MS	505	1.61			mg/Kg	0.03	0.1	01/14/15 13:57	msh
Zinc, total (3050)	M6020 ICP-MS	505	76		*	mg/Kg	1	3	01/14/15 13:57	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	51.6		*	%	0.1	0.5	01/05/15 8:45	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 15:06	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 18:16	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 18:16	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:54	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-4A

ACZ Sample ID: **L22214-11**

Date Sampled: 12/02/14 10:35

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	32.3		UH	*	mg/Kg	0.2	0.6	01/06/15 13:13	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	150	0.031	H	*	%	0.002	0.008	01/03/15 15:43	pjb

Tahoe Resources, Inc.

Project ID: Escobal
Sample ID: SED-9

ACZ Sample ID: **L22214-12**
Date Sampled: 12/02/14 08:40
Date Received: 12/31/14
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/05/15 13:36	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/02/15 22:27	mss2/b s

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	11200		*	mg/Kg	50	300	01/15/15 18:03	msh
Antimony, total (3050)	M6020 ICP-MS	500	0.8	B	*	mg/Kg	0.2	1	01/14/15 13:59	msh
Arsenic, total (3050)	M6020 ICP-MS	500	9.5		*	mg/Kg	0.1	0.5	01/14/15 13:59	msh
Barium, total (3050)	M6020 ICP-MS	500	144		*	mg/Kg	0.3	1	01/14/15 13:59	msh
Boron, total (3050)	M6010B ICP	100	1	B	*	mg/Kg	1	5	01/15/15 12:26	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.24	B		mg/Kg	0.05	0.3	01/14/15 13:59	msh
Calcium, total (3050)	M6010B ICP	100	1880		*	mg/Kg	10	50	01/15/15 12:26	aeb
Chromium, total (3050)	M6020 ICP-MS	500	3.8			mg/Kg	0.3	1	01/14/15 13:59	msh
Copper, total (3050)	M6020 ICP-MS	500	10.2			mg/Kg	0.3	1	01/14/15 13:59	msh
Iron, total (3050)	M6010B ICP	100	13300		*	mg/Kg	2	5	01/15/15 12:26	aeb
Lead, total (3050)	M6020 ICP-MS	500	13.50		*	mg/Kg	0.05	0.3	01/14/15 13:59	msh
Magnesium, total (3050)	M6010B ICP	100	1000			mg/Kg	20	100	01/15/15 12:26	aeb
Manganese, total (3050)	M6020 ICP-MS	50000	450		*	mg/Kg	30	100	01/15/15 18:03	msh
Mercury, total	M7471A CVAA	334		UH	*	mg/Kg	0.07	0.3	01/02/15 14:07	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/15/15 12:26	aeb
Nickel, total (3050)	M6020 ICP-MS	500	2.2			mg/Kg	0.3	2	01/14/15 13:59	msh
Potassium, total (3050)	M6010B ICP	100	1580			mg/Kg	20	100	01/15/15 12:26	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.06	B		mg/Kg	0.05	0.1	01/14/15 13:59	msh
Silver, total (3050)	M6020 ICP-MS	500	0.17			mg/Kg	0.03	0.1	01/14/15 13:59	msh
Zinc, total (3050)	M6020 ICP-MS	500	52		*	mg/Kg	1	3	01/14/15 13:59	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	53.4		*	%	0.1	0.5	01/05/15 14:24	rjv

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/09/15 15:12	mns
Digestion - Hot Plate	M3050B ICP								01/13/15 18:40	spl
Digestion - Hot Plate	M3050B ICP-MS								01/13/15 18:40	spl
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/12/15 10:59	mns

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: SED-9

ACZ Sample ID: **L22214-12**

Date Sampled: 12/02/14 08:40

Date Received: 12/31/14

Sample Matrix: *Sediment*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	41.2		UH	*	mg/Kg	0.2	0.8	01/06/15 13:14	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	130	0.033	H	*	%	0.001	0.007	01/03/15 15:45	pjb



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L22214**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-01	WG377408	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.
WG377314		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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
WG377378		Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
WG377408		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG376860		Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
WG377314		Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
WG376996		Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376906		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Tahoe Resources, Inc.

ACZ Project ID: **L22214**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-02	WG377408	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.
WG377314		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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG377378		Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
			M6010B ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
WG377408		Manganese, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
WG376860		Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
WG377314		Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
WG376996		Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376906		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Tahoe Resources, Inc.

ACZ Project ID: **L22214**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-03	WG377408	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.
	WG377314	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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG377378	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
	WG377408	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.
	WG376860	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG377314	Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG376996	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
M9012B - Automated Colorimetric			Q6	Sample was received above recommended temperature.	
M9012B - Automated Colorimetric			RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG376906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-04	WG377408	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.
WG377314		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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
WG377378		Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
WG377314		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.
			M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
WG377408		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.
WG376860		Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
WG377314		Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
WG376996		Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376906		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-05	WG377408	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.
WG377314		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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
WG377378		Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
WG377314		Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
WG377408		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.
WG376860		Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
WG377314		Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
WG376996		Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376906		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-06	WG377408	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.
	WG377314	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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG377378	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
	WG377314	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG377408	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.
	WG376860	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG377314	Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG376996	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-07	WG377408	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.
WG377314		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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
WG377378		Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
WG377314		Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
WG377408		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.
WG376860		Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
WG377314		Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
WG376996		Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376906		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-08	WG377408	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.
WG377314		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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
WG377378		Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
			M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
WG377408	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.	
WG376860		Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
WG377314		Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
WG376996		Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376906		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-09	WG377408	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.
WG377314		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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			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.
WG377378		Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
			M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
WG377408	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.	
WG376860		Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
WG377314		Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
WG376996		Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG376906		Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-10	WG377408	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.
	WG377314	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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG377378	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
	WG377314	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG377408	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.
	WG376860	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG377314	Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG376996	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-11	WG377408	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.
	WG377314	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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG377378	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
	WG377314	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG377408	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.
	WG376860	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG377314	Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG376996	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

Tahoe Resources, Inc.

ACZ Project ID: **L22214**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22214-12	WG377408	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.
	WG377314	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	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
		Barium, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG377378	Boron, total (3050)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium, total (3050)	M6010B ICP	M2	Matrix spike recovery was low, 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.
	WG377314	Lead, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG377408	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.
	WG376860	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG377314	Zinc, total (3050)	M6020 ICP-MS	RL	Recovery for either the LCS or LCS duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG376996	Cyanide, total	M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
			M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG376906	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
			M365.1 - Auto Ascorbic Acid (digest)	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.

Tahoe Resources, Inc.

ACZ Project ID: **L22214**

Soil Analysis

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

Solids, Percent	D2216-80
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Wet Chemistry

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

Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)
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Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L22214
 Date Received: 12/31/2014 10:11
 Received By: ddp
 Date Printed: 12/31/2014

Receipt Verification

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

Samples/Containers

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

Some parameters were received past hold time.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA20998	10.6	17	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.



Laboratories, Inc.

1500214

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
 Company: Tahoe Resources inc.
 E-mail: MBERGANZA@SANTAFAEL.CO.GF

Address: Buival los paises 18calle 24-69 zona la
 Empresa 11, Zona pedregal, Torre IV oficina 1406
 Telephone: (502) 59515248

Copy of Report to:

Name: Charlie Muerohoff
 Company: Tahoe Resources inc.

E-mail: cmuerohoff@tahoeresourcesinc.com
 Telephone:

Invoice to:

Name: Miguel Berganza
 Company: Tahoe Resources inc.
 E-mail: MBERGANZA@SANTAFAEL.CO.GF

Address:
 Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #:	PO#:	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers								
water quality	Escobar			SFD-1	01/12/14 11:40	SO	1	/							
				SFD-2	01/12/14 10:30	SO	1	/							
				SFD-2A	02/12/14 11:30	SO	1	/							
				SFD-2B	01/12/14 09:30	SO	1	/							
				SFD-3	02/12/14 11:00	SO	1	/							
				SFD-4	01/12/14 08:45	SO	1	/							
				SFD-5	02-12-14 07:40	SO	1	/							
				SFD-6	02-12-14 08:00	SO	1	/							
				SFD-7	01-12-14 08:00	SO	1	/							
				SFD-8	02-12-14 09:20	SO	1	/							

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

REMARKS

COC # 1

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	29-12-2014 15:17	[Signature]	29/12/14 15:17 23-1410:10



Laboratories, Inc.

L22214

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza
Company: Tahoe Resources Inc
E-mail: M.Berganza@Sanrafael-Com.gt

Address: Boulevard las procesas 16 calle 24-69 zona 10
Empresarial zona pradera torre IV oficina 1406
Telephone: (502) 5951 5948

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: Boulevard las procesas 16 calle 24-69 zona 10
Empresarial zona pradera torre IV oficina 1406
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and 10 analysis columns. Includes handwritten entries for SED-4A and SED-9.

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

REMARKS

COC # 2
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.

Table with columns: RELINQUISHED BY, DATE:TIME, RECEIVED BY, DATE:TIME. Includes signatures and dates for 29.12.2014.

Guatemala December 29th, 2014

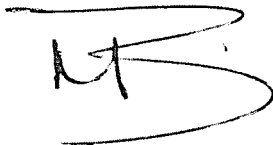
QUARANTINE STATEMENT

To whom it might concern:

Minera San Rafael, S.A is sending a case of sediment samples, which require quarantine and documentation due to organic content. These samples will be analyzed by ACZ Laboratories Inc. in Steamboat Springs, Colorado, USA.

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

Best regards,

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

Miguel Berganza
Environment Department
Proyecto Escobal, S. A.

United States Department of Agriculture
 Animal and Plant Health Inspection Service
 4700 River Road
 Riverdale, MD 20737

**Permit to Receive Soil
 Regulated by 7 CFR 330**

This permit was generated electronically via the ePermits system.

PERMITTEE NAME:	Ms. Audrey J Stover	PERMIT NUMBER:	P330-13-00153
COMPANY:	ACZ Laboratories, Inc.	APPLICATION NUMBER:	P525-130418-001
RECEIVING ADDRESS:	2773 Downhill Drive Steamboat Springs, CO 80487	DATE ISSUED:	05/22/2013
MAILING ADDRESS:	2773 Downhill Drive Steamboat Springs, CO 80487		
PHONE:	(970) 879-6590 Ext. 515	EXPIRES:	05/22/2016
FAX:	(815) 301-3857		


PORTS OF ARRIVAL/PLANT INSPECTION STATIONS: AK, Anchorage; AL, Huntsville; AL, Mobile; AZ, Douglas; AZ, Lukeville; AZ, Naco; AZ, Nogales; AZ, Phoenix; AZ, San Luis; AZ, Tucson; CA, Calexico; CA, Fresno; CA, Hawthorne; CA, Hawthorne; CA, Long Beach; CA, Oakland; CA, Ontario; CA, Otay Mesa; CA, Port Hueneme; CA, Sacramento; CA, San Diego; CA, San Francisco; CA, San Jose; CA, San Ysidro; CA, Tecate; CO, Denver; CT, Hartford; CT, New Haven; DE, Dover; DE, Wilmington; FL, Ft. Lauderdale; FL, Ft. Myers; FL, Ft. Pierce; FL, Jacksonville; FL, Key West; FL, Miami; FL, Orlando; FL, Pensacola; FL, Port Canaveral; FL, Port Everglades; FL, Sanford; FL, Tampa; FL, West Palm Beach; GA, Atlanta; GA, Savannah; GU, Agana; HI, Hilo; HI, Honolulu; HI, Kahului; HI, Kailua-Kona; HI, Lihue; ID, Eastport; IL, Chicago; IN, Indianapolis; KY, Louisville; MA, South Boston; MD, Baltimore; MD, Beltsville; ME, Bangor; ME, Calais; ME, Houlton; ME, Portland; MI, Detroit; MI, Port Huron; MI, Romulus; MI, Sault Saint Marie; MN, Duluth; MN, Grand Portage; MN, International Falls; MN, Minneapolis; MO, Kansas City; MO, St. Louis; MP, Commonwealth of the Northern Mariana Islands; MS, Gulfport; MS, Port Bienville; MT, Raymond; MT, Roosville; MT, Sweetgrass; NC, Raleigh; NC, Wilmington; ND, Dunseith; ND, Pembina; ND, Portal; NJ, Linden; NJ, Newark; NM, Albuquerque; NM, Columbus; NM, SantaTeresa; NV, Las Vegas; NY, Albany; NY, Alexandria Bay; NY, Brooklyn; NY, Buffalo; NY, Champlain, Rouses Point; NY, Jamaica; NY, Jamaica; NY, Newburgh; OH, Ashtabula; OH, Cincinnati; OH, Cleveland; OH, Columbus; OH, Toledo; OH, Wilmington; OK, Oklahoma City; OR, Portland; PA, Allentown; PA, Harrisburg; PA, Philadelphia; PA, Pittsburgh; PA, Scranton; PR, Aguadilla; PR, Carolina; PR, Fajardo; PR, Mayaguez; PR, Ponce; RI, Warwick/Providence; SC, Charleston; TN, Memphis; TN, Nashville; TX, Austin; TX, Brownsville; TX, Corpus Christi; TX, Dallas; TX, Del Rio; TX, Eagle Pass; TX, El Paso; TX, Fabens; TX, Falcon; TX, Fort Hancock; TX, Galveston; TX, Hidalgo; TX, Humble; TX, Laredo; TX, Los Indios; TX, Pharr; TX, Port Arthur; TX, Presidio; TX, Progreso; TX, Rio Grande City; TX, Roma; TX, San Antonio; TX, Victoria; UT, Salt Lake City; VA, Dulles; VA, Norfolk; VI, St. Croix; VI, St. Thomas; VT, Berlin; WA, Blaine; WA, Oroville; WA, Port Angeles; WA, SeaTac; WA, Sumas; WI, Green Bay; WI, Milwaukee

HAND CARRY: No

Under the conditions specified, this permit authorizes the following:
Quantity of Soil per Shipment and Treatment
 Over 3 lbs - Your facility **MUST** be inspected and approved to receive this soil

SPECIAL INSTRUCTIONS TO INSPECTORS
 See permit conditions below

Permit Number P330-13-00153

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.  Osmond Baron	DATE 05/22/2013
--	------------------------

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

AUTOCLAVE soil and other material using the following conditions:

- a. Soil must be autoclaved at 121 degrees Centigrade (250 degrees Fahrenheit) for a minimum of 30 minutes at 15 psi.
- b. Autoclave tape or other indicators must be placed on each bag or sharps container prior to treatment. The autoclave tape or other indicator on each container must be checked to verify color change before disposal.
- c. The autoclave log must be completed by each user for each autoclave cycle. All parameters must be noted as listed on the log for each autoclave load.
- d. If the autoclave does not attain the minimum time and/or temperature or the autoclave tape does not change color, a notation must be made in the comment section of the autoclave log. The load must then be re-autoclaved after placing new tape on the material. If minimum time and temperature is not attained on the second cycle, users must contact the person responsible for maintaining the unit to initiate repairs. Waste must then be treated at an alternate autoclave facility that is approved by USDA.
- e. Thermometers on the autoclave must be calibrated annually, and a written record must be maintained. This must be done by an authorized autoclave service company during routine servicing.
- f. Every 6 months, you should use a commercially available test indicator kit that uses bacterial spores *Bacillus stearothermophilus* that are rendered unviable at 250 degrees F or 121 degrees C. For the test, ampules of *B. stearothermophilus* are autoclaved along with a load of waste. Upon completion of the cycle, the ampules are incubated for 48 hours and then observed for any sign of growth, which indicates insufficient sterilization.


HYDROCLAVE: Soil must be hydroclaved at 121oC/250oF for a minimum of 30 minutes or 132oC for 15 minutes.

PERMIT CONDITIONS

This permit authorizes the importation of soil from all foreign sources (except countries with sanctions or embargoes by U.S. State Department), and interstate/ domestic movement of soil from Hawaii, the contiguous U.S., the continental U.S., and all U.S. territories only for chemical/ physical analysis in a controlled laboratory environment at the named facility on the permit.

1. This permit is issued only for the named permit holder at the address(s) identified on this permit. This permit cannot be transferred or assigned.
2. The permit holder verifies United States residency by initialing and accepting these permit conditions. If you are not a United States resident, it is unlawful for you to initial or accept these permit conditions because a USDA 525 soil Permit can only be issued to United States residents.
3. The permit holder is solely responsible for ensuring compliance with all statutory requirements and specifically listed permit conditions. Failure to comply with the terms and conditions of this permit is cause for the following: (a) cancellation of this permit, (b) cancellation of other permits issued to the permit holder, (c) seizure and/or destruction of regulated organisms, (d) denial of future permit applications by this permit holder, (e) liability for civil penalties, and (f) criminal prosecution under provisions in the Plant Protection Act.
4. Any alteration, forgery, unauthorized use of this permit and/or associated Federal Forms are subject to civil and criminal penalties including fines and imprisonment.
5. This permit must not be used for the movement or use of plant pathogens listed in the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. If any organism listed as a Select Agent is identified from materials associated with this research, the permit holder is required to notify APHIS, Agricultural Select Agent Program (ASAP) within one business day by phone at 301-851-3300, and within seven (7) days submit APHIS/CDC Form 4 (Report of Identification of a Select Agent or Toxin in a Clinical or Diagnostic Laboratory) to APHIS, ASAP; 4700 River Rd, Unit 2, Riverdale, MD 20737 (see instructions at: http://www.aphis.usda.gov/programs/ag_selectagent/index.shtml). Failure to comply with this requirement is a violation of the Agricultural Bioterrorism Protection Act of 2002.

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITTS.</p>	<p>DATE</p>
<p> Osmond Baron</p>	<p>05/22/2013</p>

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

19. The soil must not be used in field research or release into the environment before sterilization.

The soil must not be used for isolation or culture of organisms, or for extracting and concentrating organisms from the soil.

The soil must not be used as a growing medium.

20. Further distribution of soil is not allowed without prior approval from Federal officials [State Plant Health Director or designee] (or from Federal officials with State concurrence): Access the website at <http://www.aphis.usda.gov/ppq/sphd/> for a list of State Plant Health Offices. Access the website at <http://nationalplantboard.org/member/index.html> for a list of State Plant Regulatory Officials.

21. While in storage, all soil must be kept locked (e.g. in freezer, cabinet) in the approved lab with access limited to authorized personnel or they will be in a restricted access building that requires a key card entry and access is restricted to authorized personnel only; or it must be in locked room restricted to authorized personnel only.

22. The soil must be handled as quarantined material until sterilized. This will include keeping the soil enclosed in containers when not in use and labeling all containers and/or storage areas: "Quarantine Soil- Sterilize Before Disposal"

23. All packing material, media, substrate, and shipping containers must be sterilized or destroyed as approved and prescribed by the permit conditions after removing the soil.

24. All unconsumed soil, containers and effluent must be autoclaved, incinerated or properly sterilized by the permittee at the conclusion of the project as approved and prescribed by the permit conditions.

25. Any water residues (effluent) from the processing of soil samples must be treated by an approved sterilization procedure such as hydroclave or autoclave.

26. All soil residues must be dry-heated, incinerated, hydroclaved or autoclaved.

Dry Heat Treatment: use one of the following schedules:

- 110- 120.5 degrees C (230-249 F) for 16 hours
- 121-154 degrees C (250-309 F) for 2 hours
- 154.4 - 192.5 degrees C (310-379 F) for 30 minutes
- 193-220 degrees C (380-429 F) for 4 minutes
- 221-232 degrees C (430-450) for 2 minutes

Time starts when the entire sample reaches the required temperature, and a suitable temperature probe must be used for verification.


27. Incineration: With the exception of metal and glass containers, all regulated and associated material must be reduced completely to ash at the end of the incineration cycle.

28. Equipment and supplies used to conduct operations or that have contacted the soil must be decontaminated using one of the following methods:

- (a) Material can be soaked in a fresh bleach solution of 10 percent (1:10) for at least 30 minutes. (1:10 is a convention that means 1 in 10 or 1 part 9 parts = 10 parts total, which is a 10 percent solution)
- (b) Material can be soaked in 70 percent ethanol
- (c) Flamed with ethanol
- (d) Treated with quaternary ammonium compounds.

Note also that autoclaving, hydroclave, incineration, and dry heat sterilization are also acceptable sterilization/decontamination methods.

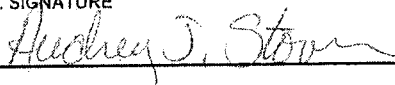
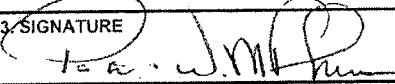

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.</p>  <p>Osmond Baron</p>	<p>DATE</p> <p>05/22/2013</p>
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WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control numbers for this information collection are 0579-0054, 0088, 0129, 0198, 0236, 0257, 0306, 0310. The time required to complete this information collection is estimated to average 1.25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

FORM APPROVED
OMB NUMBER 0579-0054/0088/0129/0198/0236/0257/0306/0310

UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION AND QUARANTINE		COMPLIANCE AGREEMENT	
1. NAME AND MAILING ADDRESS OF PERSON OR FIRM Audrey J. Stover ACZ Laboratories 2773 Downhill Drive Steamboat Springs, CO 80487 Ph: 970-879-6590 Ext. 515 Fax: 815-301-3857 Email: audreys@acz.com		2. LOCATION Same	
3. REGULATED ARTICLE(S) Non-sterilized Foreign soil; or Foreign & Regulated Domestic soil; or Domestic soil (HI and/or U.S. territories) - ANALYSIS			
4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS 7 CFR Part 330 and 7 CFR 301			
5. I/WE AGREE TO THE FOLLOWING: I. Transfer and Noncompliance A. This agreement may be immediately cancelled or revoked for noncompliance. B. This compliance agreement is non-transferable. C. Any person who knowingly violates the Plant Protection Act (PPA) (7 U.S.C. 7701 et seq.) and/or the Animal Health Protection Act (AHPA) (7 U.S.C. 8301 et. seq.) may be criminally prosecuted and found guilty of a misdemeanor which can result in penalties, a one-year prison term or both. Additionally, any person violating the PPA and/or the AHPA may be assessed civil penalties of up to \$250,000 per violation or twice the gross gain or gross loss for any violation that results in the person deriving pecuniary gain or causing pecuniary loss to another, whichever is greater. II. Procedures, protocols and limitations established in 'General Stipulations' (attached).			
6. SIGNATURE 		7. TITLE President/CEO	8. DATE SIGNED 4-30-13
The affixing of the signatures below will validate this agreement which shall remain in effect until cancelled, but may be revised as necessary or revoked for noncompliance.		9. AGREEMENT NO. SP-13 169	
		10. DATE OF AGREEMENT	
11. PPQ/CBP OFFICIAL (NAME AND TITLE) Patrick McPherran State Plant Health Director		12. ADDRESS USDA APHIS PPQ 3950 N. Lewiston St. Suite 104 Aurora, CO 80011	
13. SIGNATURE 		15. ADDRESS Colorado Department of Agriculture 700 Kipling Suite 4000 Lakewood, CO 80215	
14. U.S. GOVERNMENT/STATE AGENCY OFFICIAL (NAME AND TITLE) Mitch Yergert Director, Division of Plant Industry			
16. SIGNATURE 			

PPQ FORM 519 (MAY 2007)

Previous editions are obsolete

11.6 Informes Originales de los Resultados Analíticos Obtenidos del Efluente en los meses de Febrero a Abril de 2015.

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 12:00 horas

Alicuota 2: 15:00 horas

Alicuota 3: 18:00 horas

Alicuota 4: 21:00 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: 101114

Fecha de ingreso de muestras: 111114

Fecha de análisis: 111114-211114

Fecha de informe: 211114

Identificación de la muestra: WW9

Correlativo Ecosistemas: 2990

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	7.62	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	1.5	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.009	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Límites Máximos Permisibles Entes
					Generadores Nuevos Acuerdo 236-2006 descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	7	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	540	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
 Análisis solicitado por: Ing. Miguel Berganza
 Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
 Procedencia de la muestra: Proyecto Escobal
 Fecha de muestreo: 101114
 Fecha de ingreso de muestras: 101114
 Fecha de análisis: 101114-201114
 Fecha de informe: 201114

Identificación de la muestra: WW10

Correlativo Ecosistemas: 2979

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	7.64	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	---	---	---
Relación DQO/DBO ₅	---	---	---	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	N.D.	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del limite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).


Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

*** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**** Análisis referido.**

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

November 24, 2014

Report to:

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

Bill to:

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

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21537

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 13, 2014. This project has been assigned to ACZ's project number, L21537. 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 L21537. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

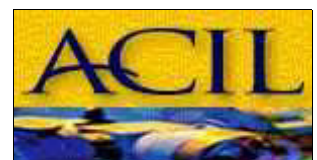
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 24, 2014. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L21537-03**

Date Sampled: 11/10/14 21:00

Date Received: 11/13/14

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								11/20/14 16:19	mpb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	11/21/14 13:21	mpb

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW10

ACZ Sample ID: **L21537-04**

Date Sampled: 11/10/14 12:00

Date Received: 11/13/14

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								11/20/14 16:26	mpb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	11/21/14 13:22	mpb



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21537**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21537-01	WG375122	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).
L21537-02	WG375122	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).
L21537-03	WG375122	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).
L21537-04	WG375122	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).
L21537-05	WG375122	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: **L21537**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21537
 Date Received: 11/13/2014 09:42
 Received By: ear
 Date Printed: 11/13/2014

Receipt Verification

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

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	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?
4075	8.1	17	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: L21537
Date Received: 11/13/2014 09:42
Received By: ear
Date Printed: 11/13/2014



Laboratories, Inc.

L21537

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza, Address: Bulevar Los Pinos 18 calle 24-69 zona 10, Company: Tahoe Resources inc., E-mail: mberganza@samralex.com.gt, Telephone: (502) 5951 4248

Copy of Report to:

Name: Charlie Mearoff, E-mail: Cmearoff@tahoeresourcesinc.com, Company: Tahoe Resources inc., Telephone:

Invoice to:

Name: Miguel Berganza, Address:, Company: Tahoe Resources inc., E-mail: mberganza@samralex.com.gt, Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, SW, total CN. Includes handwritten entries for WW9, WW10, WW11 and a large 'COF' stamp.

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 signatures and dates like 11.11.2014 13:50 and 11.13.14 9:42.

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: 011214

Fecha de ingreso de muestras: 011214

Fecha de análisis: 011214-111214

Fecha de informe: 111214

Identificación de la muestra: WW9

Correlativo Ecosistemas: 3170

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	7.12	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	8.1	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.006	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

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	5	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	49	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).


Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

Comparación de descarga según información del cliente.


Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
 Análisis solicitado por: Ing. Miguel Berganza
 Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
 Procedencia de la muestra: Proyecto Escobal
 Fecha de muestreo: 011214
 Fecha de ingreso de muestras: 011214
 Fecha de análisis: 011214-111214
 Fecha de informe: 111214

Identificación de la muestra: WW10

Correlativo Ecosistemas: 3171

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	6.80	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	---	---	---
Relación DQO/DBO ₅	---	---	---	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	1	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	N.D.	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	<1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).


Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

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*** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**** Análisis referido.**

Comparación de descarga según información del cliente.


Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

December 09, 2014

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L21798

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 03, 2014. This project has been assigned to ACZ's project number, L21798. 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 L21798. 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.

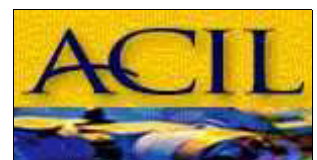
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 08, 2015. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L21798-01**

Date Sampled: 12/01/14 12:00

Date Received: 12/03/14

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/05/14 9:36	mss2

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/08/14 14:56	bsu

Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW10

ACZ Sample ID: **L21798-02**

Date Sampled: 12/01/14 12:00

Date Received: 12/03/14

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation		-						12/08/14 11:42	bsu

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/08/14 15:17	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. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L21798**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L21798-01	WG375752	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).
L21798-02	WG375755	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
L21798-03	WG375752	Cyanide, total	M335.4 - Colorimetric w/ distillation	H3	Sample was received and analyzed past holding time.
			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).
L21798-04	WG375752	Cyanide, total	M335.4 - Colorimetric w/ distillation	H3	Sample was received and analyzed past holding time.
			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: **L21798**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L21798
 Date Received: 12/03/2014 09:58
 Received By: ear
 Date Printed: 12/3/2014

Receipt Verification

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

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	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?
3979	7.1	17	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: L21798
Date Received: 12/03/2014 09:58
Received By: ear
Date Printed: 12/3/2014



Laboratories, Inc.

LD798

CHAIN of CUSTODY

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

Report to:

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

Address: Bulvar Los Proceres 18 Calle 2469 Zona 10
Empresarial Zona Piedra, Torre IV Oficina 1506
Telephone: (502) 5951-5248

Copy of Report to:

Name: Charlie Muechhoff
Company: Tahoe Resources Inc.

E-mail: Cmuechhoff@tahoeresourcesinc.com
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis columns (SW, TOTAL CN, etc.). Includes handwritten entries for WW6, WW9, WW10, WW9, WW10, WW11.

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.

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

Handwritten signatures and dates for relinquished and received parties.

Handwritten list: 1. 2. 3. 4. 4.5. LCC 12-3-14

Handwritten 'COPY' stamp

Handwritten 'LCC 12-3-14'



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: 260115

Fecha de ingreso de muestras: 260115

Fecha de análisis: 260115-060215

Fecha de informe: 060215

Identificación de la muestra: WW9

Correlativo Ecosistemas: 199

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	7.88	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/L	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente	Visual	ausente
Demanda Bioquímica de Oxígeno DBO ₅	mg/L	10	< 10	Oxitop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/L	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO ₅ /DQO	---	---	----	---	---
Relación DQO/DBO ₅	---	---	----	---	---
* Sólidos Suspendidos	mg/L	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/L	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/L	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/L	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.010	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

teléfonos: (502) 2437 7224 - 2437 4455

17 avenida 2-39 zona 4 de Mixco

Ofibodegas Zaragoza 2, Bodega No. 2, Guatemala.

laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	20	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.

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** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*** Análisis referido.*

Comparación de descarga según información del cliente.


Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 260115
Fecha de ingreso de muestras: 260115
Fecha de análisis: 260115-060215
Fecha de informe: 060215

Identificación de la muestra: WW10
Correlativo Ecosistemas: 200

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	6.52	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

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Limites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	< 2	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento

un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal


de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

*** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**** Análisis referido.**

Comparación de descarga según información del cliente.


Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua simple
Análisis solicitado por: Ing. Miguel Berganza
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa
Procedencia de la muestra: Proyecto Escobal
Fecha de muestreo: 260115
Fecha de ingreso de muestras: 260115
Fecha de análisis: 260115-060215
Fecha de informe: 060215

Identificación de la muestra: WW11
Correlativo Ecosistemas: 201

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	7.24	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	Oxítóp-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	0.1	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/L	0.002	0.010	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/L	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/L	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/L	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/L	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/L	0.05	N.D.	SMWW 3111B	2

teléfonos: (502) 2437 7224 - 2437 4455

17 avenida 2-39 zona 4 de Mixco

Ofibodegas Zaragoza 2, Bodega No. 2, Guatemala.

laboratorio@ecosistemas.com.gt • info@ecosistemas.com.gt

www.ecosistemas.com.gt

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/L	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/L	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	17	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100mL	2	49	NMP	< 1 x 10 ⁴

Notas:

Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.

Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas

Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664

N.D. No detectable. Debajo del límite de detección.

NMP: Número mas probable

El valor DQO/DBO₅ y DBO₅/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.

Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/L (ver Acuerdo Artículo 21).

Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

*** Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**** Análisis referido.**

Comparación de descarga según información del cliente.



Ing. Fernando Fuentes
Gerente Técnico

LUIS FERNANDO FUENTES MÉNDEZ
INGENIERO QUIMICO
COLEGIADO No. 876

February 09, 2015

Report to:

Miguel Berganza

Tahoe Resources, Inc.

Boulevard Los Proceres 18 c. 24-69 zona 10

Centro

Corporativo Zona Pradera, Torre 4 Of. 1408 Guatemala

Bill to:

Account Payable

Tahoe Resources, Inc.

5310 Kietzke Lane

Suite 200

Reno, NV 89511

cc: Charlie Muerhoff

Project ID: Escobal

ACZ Project ID: L22562

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on January 28, 2015. This project has been assigned to ACZ's project number, L22562. 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 L22562. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

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

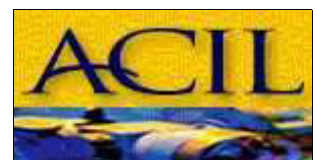
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

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

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L22562-01**

Date Sampled: 01/26/15 12:00

Date Received: 01/28/15

Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								02/04/15 9:31	tcd

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	02/05/15 23:31	tcd

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW10

ACZ Sample ID: **L22562-02**
 Date Sampled: 01/26/15 12:00
 Date Received: 01/28/15
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								02/04/15 9:31	tcd

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	02/05/15 23:32	tcd

Tahoe Resources, Inc.

Project ID: Escobal
 Sample ID: WW11

ACZ Sample ID: **L22562-03**
 Date Sampled: 01/26/15 12:10
 Date Received: 01/28/15
 Sample Matrix: Waste Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								02/04/15 9:31	tcd

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	02/05/15 23:33	tcd



Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

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

ACZ Qualifiers (Qual)

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

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L22562**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L22562-01	WG378483	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L22562-02	WG378483	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L22562-03	WG378483	Cyanide, total	M335.4 - Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L22562**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.
 Escobal

ACZ Project ID: L22562
 Date Received: 01/28/2015 09:49
 Received By: ddp
 Date Printed: 1/28/2015

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 6 section prior to ACZ custody.	X		

Samples/Containers

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

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
3099	13.8	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: L22562
Date Received: 01/28/2015 09:49
Received By: ddp
Date Printed: 1/28/2015



Laboratories, Inc. C22562

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: Pulevar los proceres 18 calle 24-64 zona 10
Empresarial Zona Pradera Torre IV oficina 1406
Telephone: (502) 3951 5242

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns: # of Containers, Total CN, MS, and multiple empty columns for analysis results.

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix. Rows include WW9, WW10, WW9, WW10, SW2A, SW2B, SW4A, WW6, WW11, SW3A.

1. *
2. *
3. *

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

REMARKS

* WW9, WW10, WW11 of cyanide analysis, please present results in a different report

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

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

