

**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 2016



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## 1 Introducción

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

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

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

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

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

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

- Calidad de Aire: Se monitorearon nueve estaciones ubicadas dentro del área de Influencia (AI) del proyecto para medir la concentración de material particulado igual o menor a 10 micrómetros ( $PM_{10}$ ), en microgramos por metro cúbico ( $\mu g/m^3$ ). También se monitorearon siete estaciones para medir la concentración de metales en  $PM_{10}$ , sólidos sedimentables totales (PST), y gases de combustión: dióxido de azufre ( $SO_2$ ) y óxidos nitrosos ( $NO_x$ ).
- Calidad de Presión Sonora: Se monitorearon nueve estaciones ubicadas dentro del ID del proyecto, para determinar los niveles de presión sonora, en decibeles escala A (dBa) y respuesta lenta.
- Calidad de Agua: Se tomaron muestras en once estaciones de agua superficial, 5 estaciones de agua subterránea (manantiales), 2 estaciones de pozos de producción y once estaciones de agua en pozos de monitoreo ubicadas en el AID del proyecto.
- Sedimentos: Se tomaron muestras de sedimentos en las mismas estaciones de agua superficial ubicadas en el AI del proyecto.
- Calidad de Efluente: Se tomaron muestras mensuales en el efluente de la planta de tratamiento de aguas proveniente de túneles y del agua contenida en la pileta de cumplimiento ambiental. En el anexo 11.2 se presenta una copia de los registros diarios.



- Vibraciones: Se instalaron tres medidores de vibraciones, los cuales registraron la velocidad de partícula durante cada una de las voladuras. En total se registraron 848 voladuras durante los meses de Febrero a Abril 2016.
- Geoquímica de roca estéril: Se analizó el pH en pasta de 22 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 (H<sub>2</sub>S).
- 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 2016.
- Copia de registro documentado del análisis In Situ y kit de Cianuro de efluentes. En el anexo 11.2 se presenta copia de las lecturas diarias de parámetros *In Situ* (pH, temperatura, conductividad y turbidez), así como los resultados obtenidos con el Kit de Cianuro (método colorimétrico) y resultados de muestras enviadas al laboratorio ACZ para la verificación del método colorimétrico, durante los meses de Febrero a Abril 2016.



## 2 Condiciones Ambientales

En el Cuadro 2-1 se describen algunos parámetros meteorológicos en el área del Proyecto y de la Figura 2-1 a la Figura 2-3 se representa la dirección del viento durante Febrero a Abril de 2016.

Cuadro 2-1: Condiciones meteorológicas, Proyecto Minero Escobal

Temperatura (°C)			Velocidad del viento (km/h)			Ráfagas (km/h)	Humedad relativa (%)			Precipitación (mm)
Max	Min	Media	Max	Min	Media	Max	Max	Min	Media	Total
<b>Febrero 2016</b>										
30.09	10.73	18.41	49.23	0.16	14.86	60.56	100	28.64	67.55	0.00
<b>Marzo 2016</b>										
32.63	10.93	20.98	40.9	0.31	4.74	52.54	100	25.22	73.97	11.64
<b>Abril 2016</b>										
33.8	12.79	21.95	36.34	0.16	5.63	42	100	14.17	71.32	58.70

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

Durante el trimestre se registró una temperatura promedio de entre los 18.41° a los 21.95°C y en el mes de Febrero no se registró precipitación. El mes que en promedio presentó la mayor humedad relativa fue Marzo con 73.97% y el mes que en promedio presentó la mayor velocidad de vientos fue Febrero con 14.86 km/h. En la Fotografía 2-1 se muestra la ubicación de la estación meteorológica, donde se registran las condiciones ambientales que se reportan.

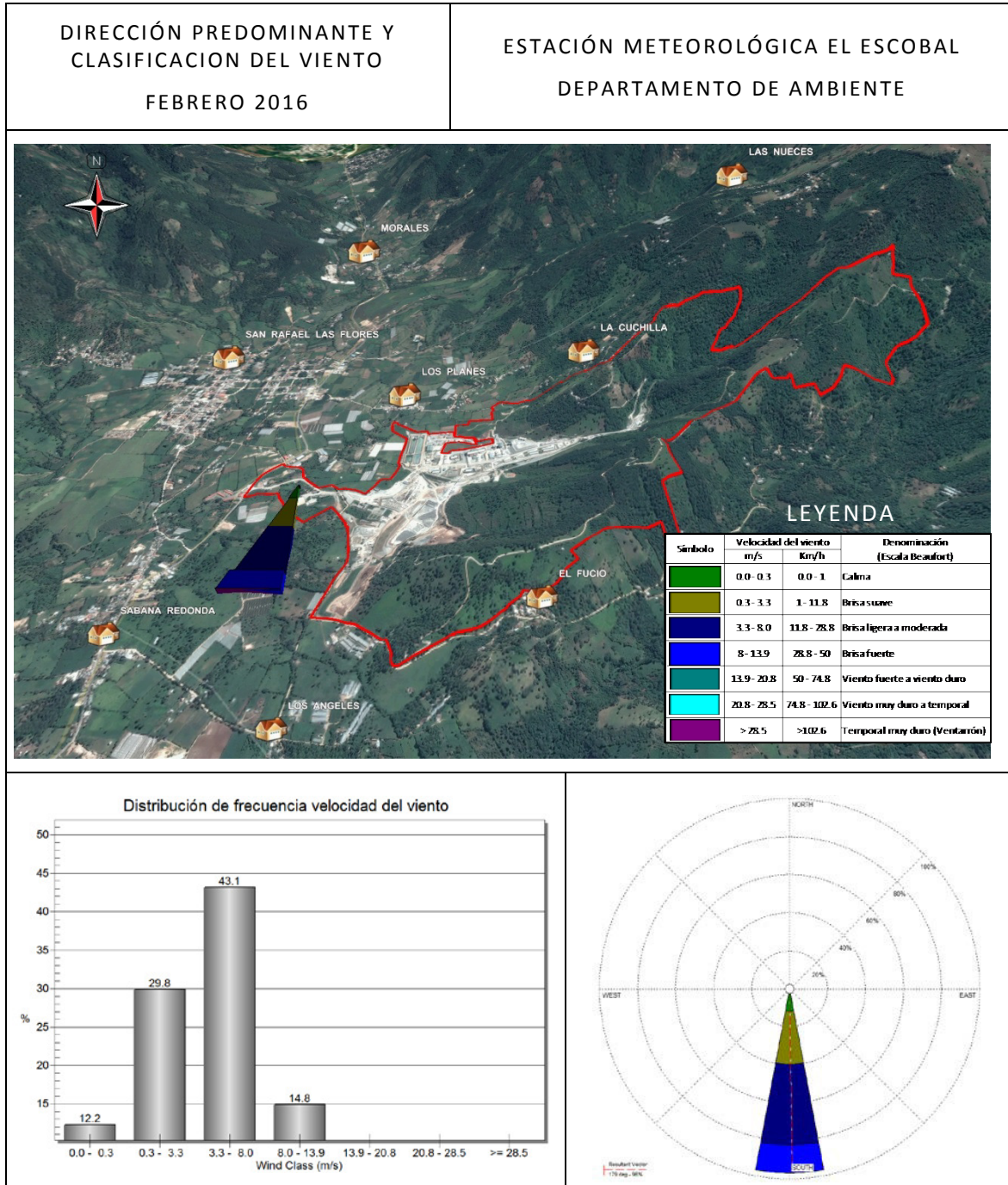


Fotografía 2-1: Estación meteorológica Escobal, San Rafael Las Flores, Santa Rosa

Fuente: MSR, 2016.

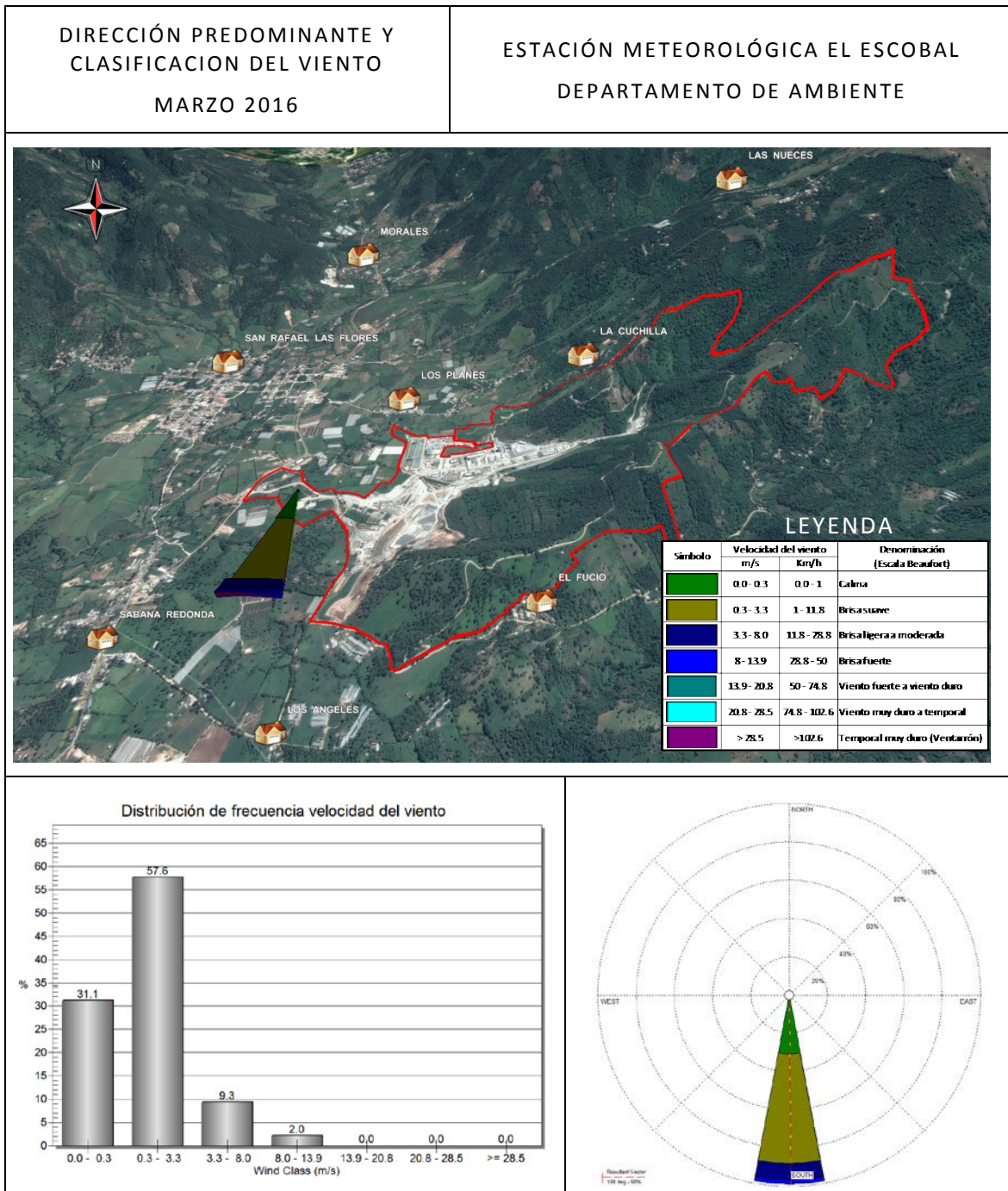
Como se puede observar en la Figura 2-1, Figura 2-2 y Figura 2-3 la predominancia de los vientos de Febrero a Abril de 2016 fue de norte a sur oeste.

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



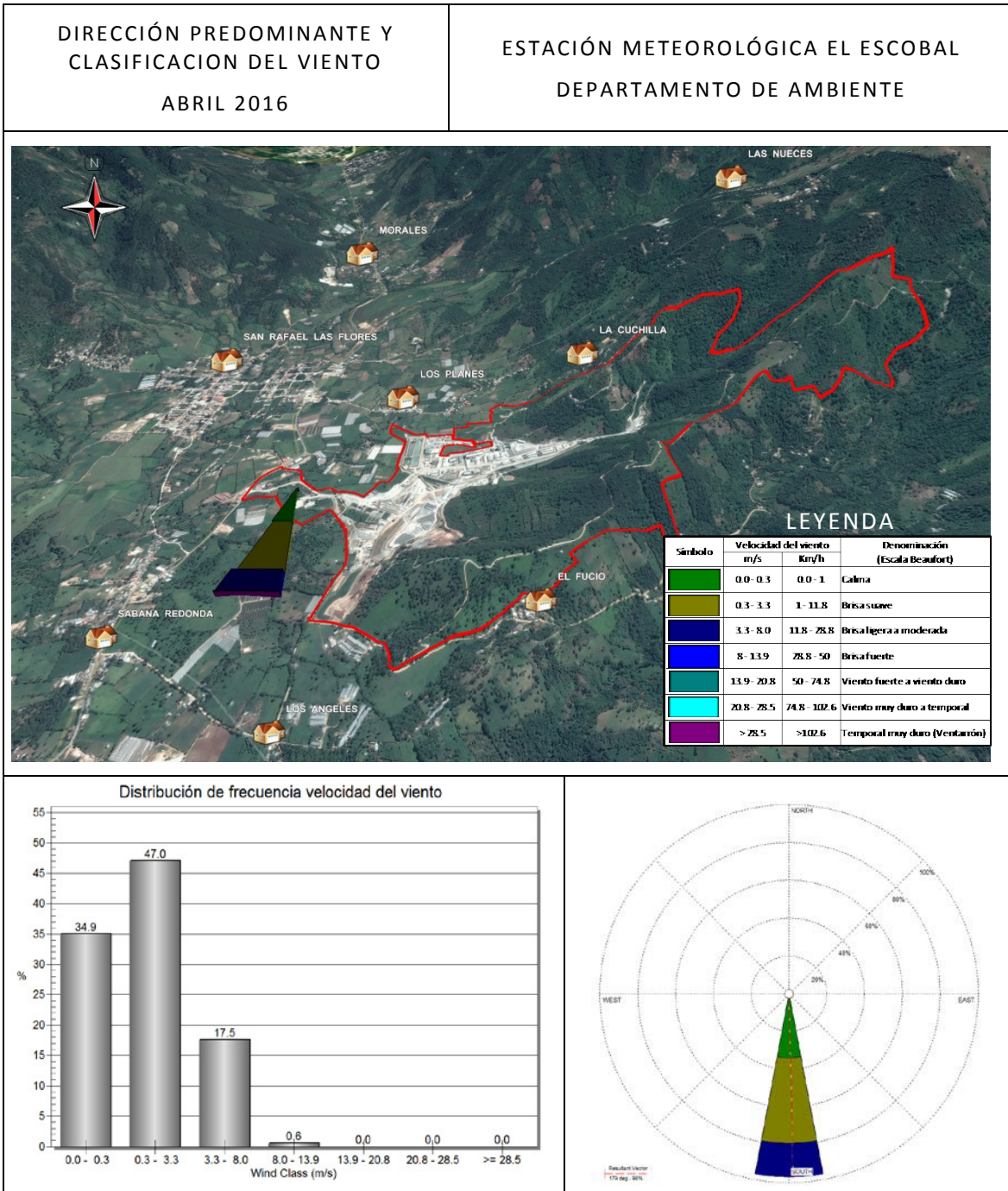
Fuente: MSR, 2016.

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



Fuente: MSR, 2016.

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



Fuente: MSR, 2016.

### 3 Calidad de Aire

#### 3.1 Material Particulado

##### 3.1.1 Sitios de Monitoreo

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

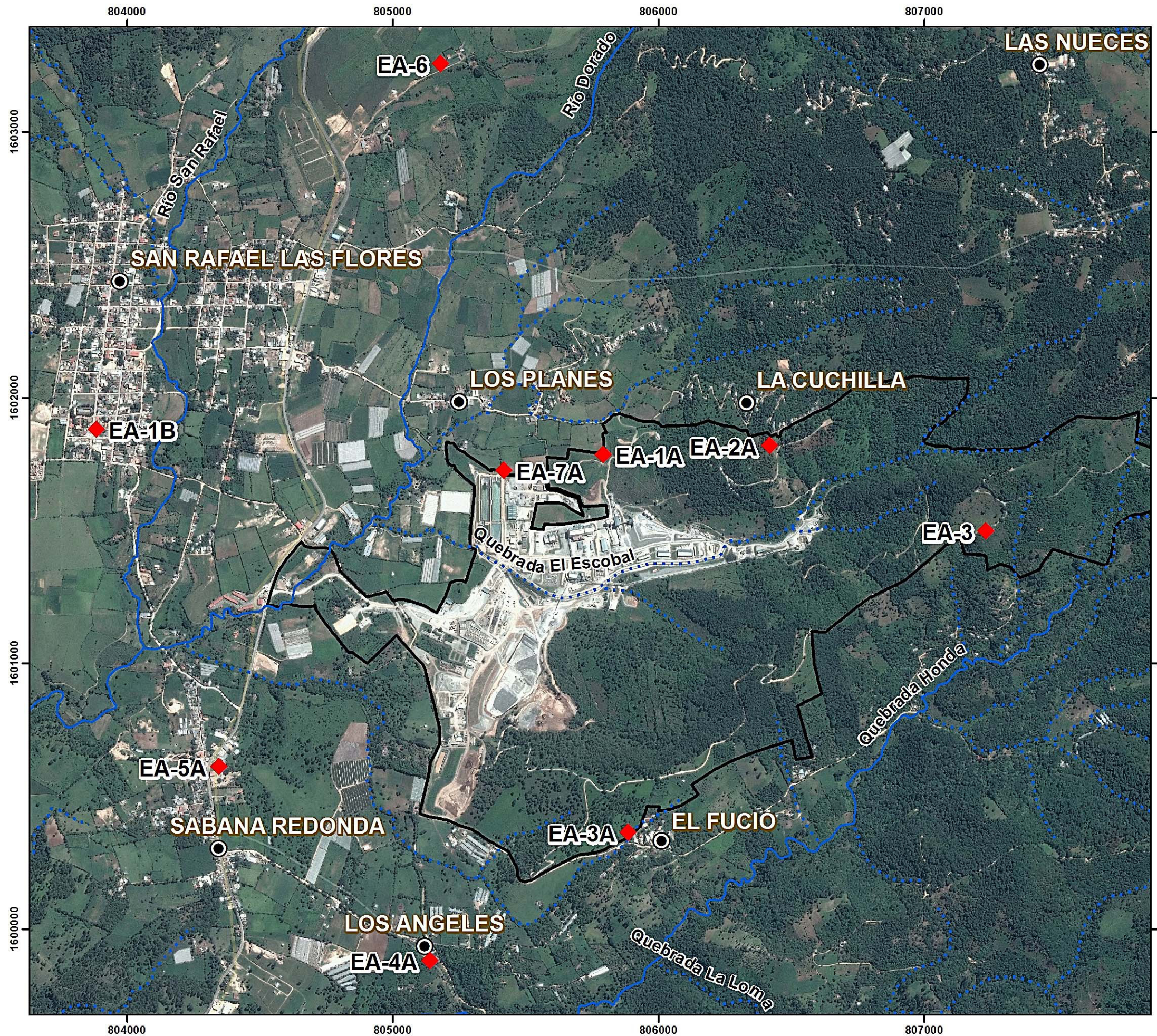
Cuadro 3-1: Sitios de monitoreo de material particulado, Proyecto Minero Escobal

Estación	Coordenadas		Altitud (msnm)	Sitio	Período línea base
<b>Periodicidad de monitoreo mensual</b>					
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
<b>Periodicidad de monitoreo trimestral</b>					
EA-1B	803,894	1,601,727	1,328	Poblado San Rafael Las Flores, cercano a Escuela	No cuenta con línea base
EA-3A	806,000	1,600,108	1,416	Aldea El Fucío	
EA-4A	805,142	1,599,903	1,360	Caserío El Portón de los Ángeles	Enero 2011 a Abril 2011
EA-5A*	804,352	1,600,408	1,339	Aldea Sabana Redonda, al sur-oeste del proyecto	No cuenta con línea base
EA-6	805,168	1,603,247	1,434	Al norte del Proyecto, ruta a Mataquescuintla	Julio 2010 a Abril 2011

\*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.







MAPA DE LOCALIZACIÓN  
ESTACIONES DE MONITOREO  
MATERIAL PARTICULADO (PM10)

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO (PM10)

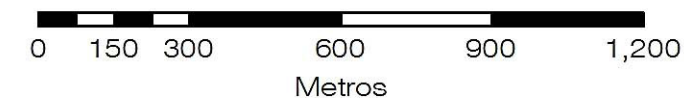
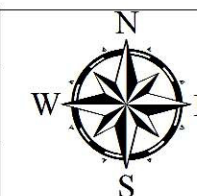
Símbolo	Estación	X	Y
	EA-1A	805791	1601785
	EA-1B	803885	1601881
	EA-2A	806419	1601819
	EA-3	807232	1601498
	EA-3A	805886	1600364
	EA-4A	805140	1599883
	EA-5A	804346	1600611
	EA-6	805181	1603257
	EA-7A	805419	1601726

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

Fecha de Elaboración: Abril de 2016

Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:15,000





### 3.1.2 Metodología

En el Cuadro 3-2 se describe el procedimiento, parámetros y equipo utilizados en la medición de PM<sub>10</sub>.

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

<b>Parámetros utilizados</b>	
PM <sub>10</sub>	Material particulado igual o menor a 10 micrómetros ( $\leq 10 \mu\text{m}$ ).
<b>Procedimiento</b>	
La medición se realiza haciendo pasar un flujo continuo de aire durante $24 \pm 1$ 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 <sub>10</sub> . El equipo de medición utilizado cumple con las especificaciones de la Agencia de Protección Ambiental de los Estados Unidos (EPA).	
<b>Equipo utilizado</b>	
Nombre	PM <sub>10</sub> Air Sampler
Modelo	PQ 200
Fabricante	BGI INSTRUMENTS
<b>Laboratorio contratado</b>	
Nombre	Laboratorio Ambiental, S.A. Laboratorio respaldado por un Sistema de Calidad ISO 17025, otorgado por la Oficina Guatemalteca de Acreditación (OGA); y con ello los análisis acreditados (análisis gravimétrico de filtros) cuentan con validez internacional según OGA-LE 050-12.

Fuente: MSR, 2016.

### 3.1.3 Resultados

En el Cuadro 3-3 se presentan los resultados de PM<sub>10</sub> durante los meses de Febrero a Abril de 2016 y los resultados de laboratorio del análisis gravimétrico de filtros y los cálculos realizados para determinar el PM<sub>10</sub> se presentan en el anexo 11.3.1

Los valores de PM<sub>10</sub> 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 2016 en la estación EA-4A. Probablemente el aumento del valor de PM<sub>10</sub> estuvo afectado debido a que ese día no se registró precipitación.

Cuadro 3-3: Resultados de PM<sub>10</sub>, Proyecto Minero Escobal

Estación	Norma*	Guías*		Línea Base			Resultados		
	USEPA <sup>1</sup>	Banco Mundial <sup>2</sup>	OMS <sup>3</sup>	Promedio	Máximo	Mínimo	Feb-16	Mar-16	Abr-16
				(µg/m <sup>3</sup> )					
EA-1A	150	150**	50	24.36	89.95	3.67	27.68	41.18	36.19
EA-1B				NR	NR	NR	20.4	NA	NA
EA-2A				21.40	76.20	2.74	27.08	53.21	72.79
EA-3				25.68	78.85	1.25	30.77	9.88	63.98
EA-3A				NR	NR	NR	73.84	NA	NA
EA-4A				103.55	120.40	86.70	152.34	NA	NA
EA-5A				50.73 <sup>¥</sup>	104.80 <sup>¥</sup>	11.80 <sup>¥</sup>	81.74	NA	NA
EA-6				23.05	57.90	1.70	27.71	NA	NA
EA-7A				46.48 <sup>¥</sup>	115.90 <sup>¥</sup>	13.40 <sup>¥</sup>	2.81	98.17	47.84

µg/m<sup>3</sup> = microgramos por metro cúbico. NR = cálculo No Realizado por falta de datos de línea base. NA = No Analizado. <sup>1</sup>USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). <sup>2</sup>Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. <sup>3</sup>Guía de Calidad del Aire, OMS 2005.\* Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. \*\* este valor corresponde al límite provisional 1 dado por esta guía. ¥: Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente. Fuente: MSR, 2016.

Los resultados obtenidos durante los meses de Febrero a Abril de 2016 se encontraron entre los 2.81 a 152.34 µg/m<sup>3</sup>. En Febrero se registró el menor valor de PM<sub>10</sub> en la estación EA-7A (2.81 µg/m<sup>3</sup>), y el mayor valor se registró en la estación EA-4A 152.34 µg/m<sup>3</sup> respectivamente. Los valores más altos de PM<sub>10</sub> se registraron en la estaciones EA-4A durante Febrero (152.34 µg/m<sup>3</sup>), mientras que los valores más altos en Marzo y Abril se registraron en las estaciones EA-7A y EA-2A (98.17 y 72.79 µg/m<sup>3</sup>) respectivamente.

Todos los valores de PM<sub>10</sub> 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 PM<sub>10</sub> de la estación EA-4A registrado durante Febrero de 2016.

### 3.2 Metales en Material Particulado

#### 3.2.1 Sitios de Monitoreo

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

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

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

\*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Nota: 1er y 3er trimestre del año se analiza metales totales, 2do y 4to trimestre únicamente mercurio total. El análisis del laboratorio es destructivo, por tanto es imposible analizar metales y mercurio en un mismo filtro. Fuente: MSR, 2016.

#### 3.2.2 Metodología

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

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

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

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

**Laboratorio**

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

**3.2.3 Resultados**

En el Cuadro 3-6 se presentan los resultados de concentración de metales en PM<sub>10</sub> durante el mes de Febrero de 2016, los resultados de laboratorio del análisis de metales en filtros y los cálculos realizados para determinar el PM<sub>10</sub> se presentan en el anexo 11.3.2. La concentración de metales registradas durante Febrero de 2016 se encontraron cercanos a los valores registrados durante Febrero de 2015 en todas las estaciones de monitoreo.

Cuadro 3-6: Resultados de concentración de metales en PM<sub>10</sub>, Proyecto Minero Escobal (1/2)

Parámetros	Unidades	EA-1B	EA-2A			EA-3A	EA-4A				
		feb-16	Línea Base			feb-16	Línea Base			feb-16	
		2909-0505	Promedio	Máximo	Mínimo	2912-0808	2914-1010	Promedio	Máximo	Mínimo	2915-1111
Aluminio	µg/m <sup>3</sup>	0.814	0.23	0.28	<0.34	0.803	0.731	1.27	1.27	1.27	1.159
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	0.8	0.99	0.343	1.23	1.23	1.23	1.202
Bario		0.018	0.01	0.01	<0.02	0.017	N.D.	<0.02	<0.02	<0.02	N.D.
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	0.5	0.03	N.D.	N.D.	<0.1	<0.1	<0.1	0.005
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	1.1	0.2	1.138	0.492	0.78	0.78	0.78	0.682
Cromo		N.D.	NR	NR	NR	0.001	0.002	NR	NR	NR	0.003
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.				N.D.	N.D.				N.D.
Fósforo		N.D.				N.D.	N.D.				N.D.
Hierro		0.846				0.26	0.32				0.2
Magnesio		0.323	0.11	0.14	<0.17	0.251	0.303	<0.33	<0.33	<0.33	0.293
Manganeso		0.031	0.01	0.01	<0.02	0.054	0.054	0.09	0.09	0.09	0.052
Molibdeno		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Níquel		N.D.	<0.03	<0.05	<0.01	N.D.	N.D.	<0.05	<0.05	<0.05	N.D.
Plata		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Plomo		N.D.	<0.03	<0.05	<0.01	0.029	0.011	<0.05	<0.05	<0.05	0.013
Potasio		N.D.	0.55	0.6	0.5	N.D.	N.D.	0.73	0.73	0.73	0.531
Selenio		N.D.	NR	NR	NR	N.D.	N.D.	NR	NR	NR	N.D.
Silicio		0.668	0.42	0.53	0.3	0.369	N.D.	0.55	0.55	0.55	N.D.
Sodio		0.226	0.53	0.6	0.46	0.03	0.147	1.4	1.4	1.4	0.212
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	0.043	0.09	0.09	0.09	0.065
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				0.051	0.029				
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/m<sup>3</sup> = microgramos por metro cúbico. Fuente: MSR, 2016.

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

Parámetros	Unidades	EA-5A				EA-6				EA-7A			
		Línea Base			feb-16	Línea Base			feb-16	Línea Base			feb-16
		Promedio	Máximo	Mínimo	2916-1222	Promedio	Máximo	Mínimo	2907-0303	Promedio	Máximo	Mínimo	2906-0202
Aluminio	µg/m <sup>3</sup>	<0.33	<0.33	<0.33	0.943	0.31	0.45	<0.33	N.D.	0.45	0.73	<0.33	N.D.
Antimonio		<0.17	<0.17	<0.17	N.D.	<0.17	<0.17	<0.17	N.D.	<0.17	<0.17	<0.17	N.D.
Arsénico		<0.1	<0.1	<0.1	N.D.	<0.10	<0.10	<0.10	N.D.	<0.10	<0.10	<0.10	N.D.
Azufre		<0.42	<0.42	<0.42	2.295	3.02	4.73	1.3	0.249	2.28	4.35	<0.42	1.871
Bario		<0.02	<0.02	<0.02	N.D.	0.01	0.01	<0.02	N.D.	0.01	0.01	<0.02	N.D.
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	0.005	<0.10	<0.10	<0.10	0.001	<0.10	<0.10	<0.10	N.D.
Cadmio		<0.03	<0.03	<0.03	N.D.	<0.03	<0.03	<0.03	N.D.	<0.03	<0.03	<0.03	N.D.
Calcio		1.03	1.03	1.03	0.770	0.79	1.5	<0.17	0.069	0.28	0.48	<0.17	0.457
Cromo		NR	NR	NR	0.000	NR	NR	NR	0.001	NR	NR	NR	0.009
Cobalto					N.D.				N.D.				
Cobre					N.D.				N.D.				
Estaño					N.D.				N.D.				
Estroncio					0.006				N.D.				
Fósforo					0.041				0.003				0.029
Hierro					0.18				0.18				0.18
Magnesio		<0.33	<0.33	<0.33	0.369	3.05	6.02	<0.17	N.D.	0.23	0.38	<0.17	N.D.
Manganeso		<0.02	<0.02	<0.02	0.047	0.02	0.02	<0.02	0.002	0.02	0.03	<0.02	0.019
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	0.738	0.83	1.05	0.6	N.D.	0.8	1.43	<0.33	N.D.
Selenio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Silicio		<0.17	<0.17	<0.17	N.D.	0.49	0.58	0.4	0.309	0.43	0.78	<0.17	N.D.
Sodio		<0.08	<0.08	<0.08	0.262	0.07	0.1	<0.08	0.043	1.27	2.5	<0.08	0.664
Talio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Titanio		<0.02	<0.02	<0.02	0.057	0.02	0.03	<0.02	0.002	0.02	0.03	<0.02	0.021
Uranio		NR	NR	NR	N.D.	NR	NR	NR	N.D.	NR	NR	NR	N.D.
Vanadio	N.D.				N.D.								
Zinc	0.032				N.D.								
Zirconio	<0.01				<0.01				<0.01				N.D.

NR = cálculo No Realizado por falta de datos de línea base. µg/m<sup>3</sup> = microgramos por metro cúbico. Fuente: MSR, 2016.



### 3.3 Partículas Sedimentables Totales (PST)

#### 3.3.1 Sitios de Monitoreo

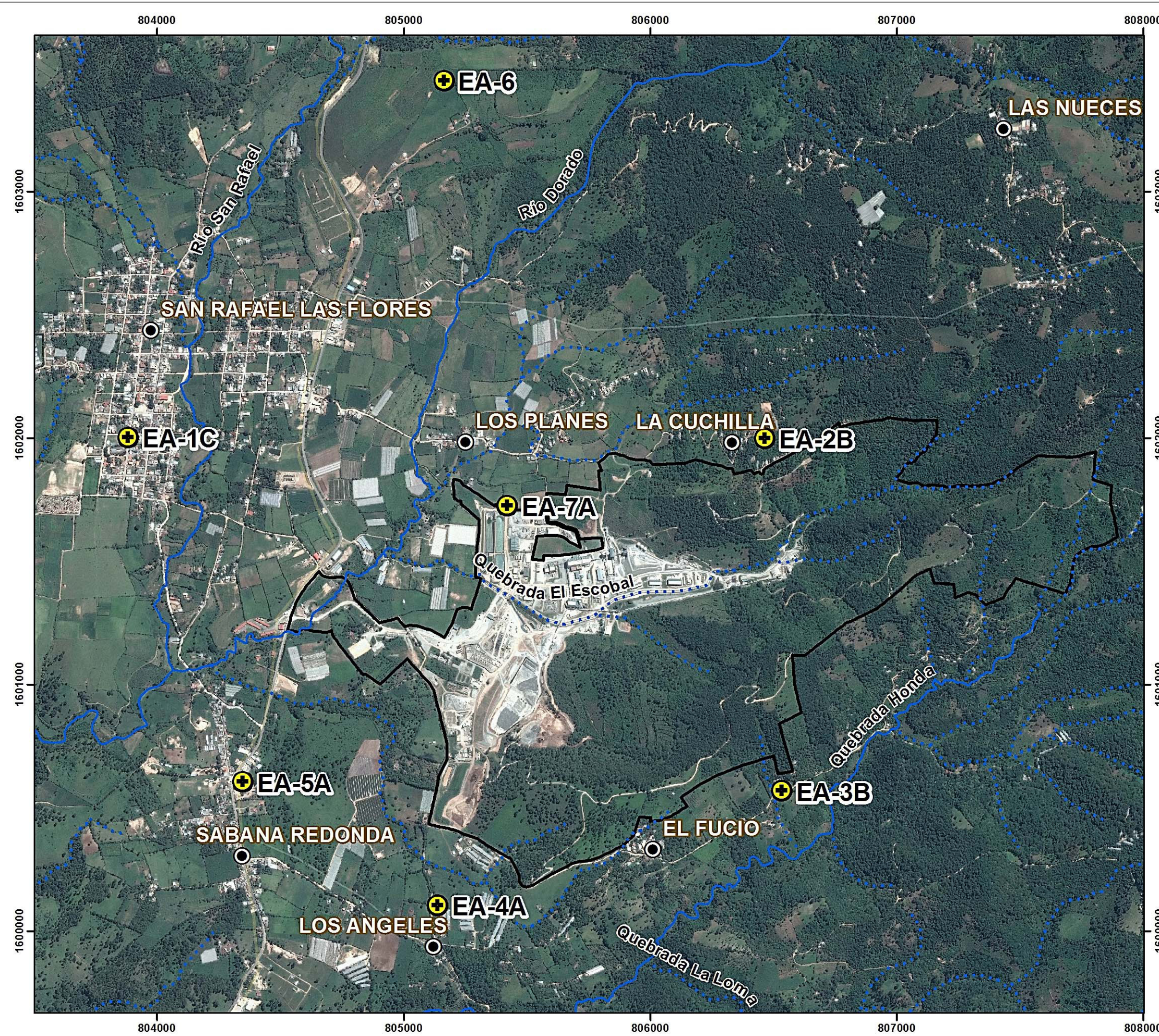
En el Cuadro 3-7 se enlistan las estaciones de monitoreo de PST ubicada en el área de influencia (AI) del Proyecto y su ubicación se presenta en la Figura 3-2.

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

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

\*Se incluye como período de línea base de Agosto 2010 a Mayo 2011 la información registrada en la estación EA-5. Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.





MAPA DE LOCALIZACIÓN  
ESTACIONES DE MONITOREO  
DE PARTICULAS SEDIMENTABLES  
TOTALES

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

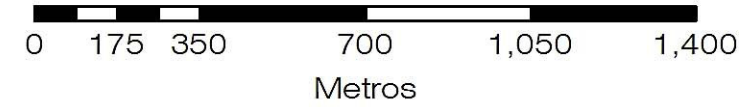
Símbolo	Estación	X	Y
	EA-1C	803881	1602004
	EA-2B	806464	1601999
	EA-3B	806532	1600570
	EA-4A	805136	1600106
	EA-5A	804346	1600607
	EA-6	805162	1603450
	EA-7A	805419	1601726

FUENTE: Capas digitales del proyecto ESPREDE/MAGA/IGN del año 2000  
Hojas 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 2016

Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:16,000





### 3.3.2 Metodología

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

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

<b>Parámetros utilizados</b>	
PST	Partículas Sedimentables Totales
<b>Procedimiento</b>	
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.	
<b>Equipo utilizado</b>	
Nombre	High Altitude Ambient Particulate Sampler
Modelo	Diseño establecido en norma ASTM D 1739-98
Fabricante	CTA

Fuente: MSR, 2016.

### 3.3.3 Resultados

En el Cuadro 3-9 se presentan los resultados de Partículas Sedimentables Totales (PST) realizado durante Marzo de 2016. El resumen del informe de resultados presentado por el contratista se presenta en el anexo 11.3.3.



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

Parámetro	Norma	Guías	EA-1C	EA-2B	EA-3B	EA-4A			EA-5A				EA-6	EA-7A	
	USEPA <sup>1</sup>	Banco Mundial <sup>2</sup> OMS <sup>3</sup>	Mar-16	Mar-16	Mar-16	Línea Base		Muestreo	Línea Base			Muestreo	Mar-16	Mar-16	Mar-16
						Promedio	Mínimo	Máximo	Promedio	Mínimo	Máximo				
<b>g/(m<sup>2</sup> x 30 días)</b>															
Sólidos insolubles	ND	ND	14.38	12.89	13.94	6.27	2.60	10.80	32.59	6.50	0.80	16.00	19.32	2.51	8.08
Sólidos solubles			0.96	1.54	0.66	2.12	0.90	2.90	1.95	11.26	2.00	37.00	0.64	0.50	0.60
Sólidos totales			15.35	14.43	14.59	8.37	4.60	13.00	34.54	17.58	3.20	50.00	19.96	3.01	8.68

<sup>1</sup>USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). <sup>2</sup>Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. <sup>3</sup>Guía de Calidad del Aire, OMS 2005. ND: estas normas y guías no establecen un límite para estos parámetros. g/(m<sup>2</sup> x 30 días)= gramos por metro cuadrado durante 30 días. ND: no determinado. Fuente: MSR, 2016.





Los valores de PST se encuentran entre 3.01 a 34.54 g/(m<sup>2</sup> x 30 días), los cuales corresponden a las estaciones EA-6 y EA-4A respectivamente. Únicamente el valor para la estación EA-4A 34.54 g/(m<sup>2</sup> x 30 días) y valor de la estación EA-5A 19.32 g/(m<sup>2</sup> x 30 días) se encuentran por arriba de los valores mínimos y máximos registrados durante el establecimiento de la línea base. Sin embargo, los valores de PST en las mismas estaciones 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 (SO<sub>2</sub> y NO<sub>2</sub>)

#### 3.4.1 Sitios de Monitoreo

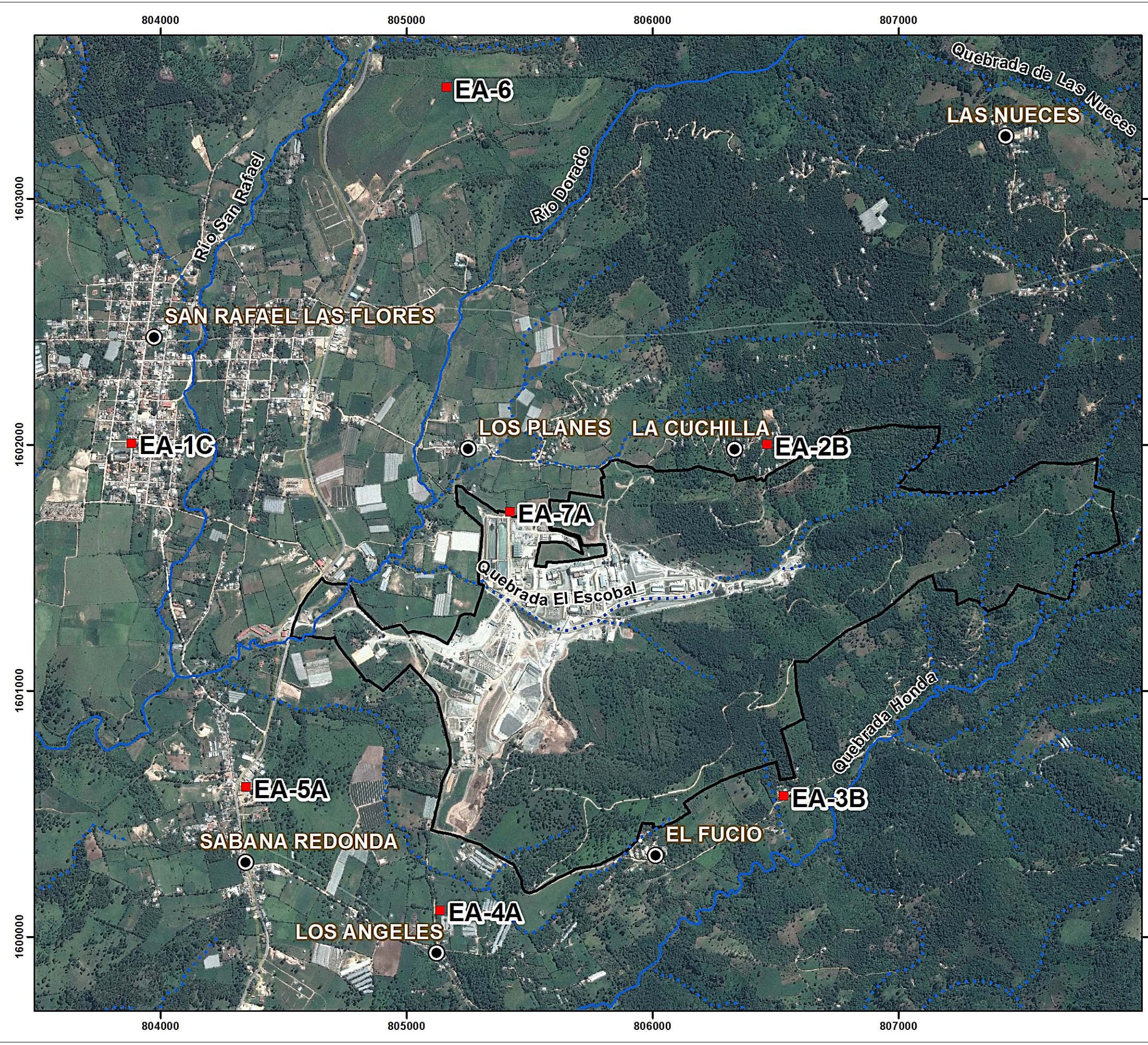
En el Cuadro 3-10 se enlistan las estaciones de monitoreo de dióxido de azufre (SO<sub>2</sub>) y de dióxido de nitrógeno (NO<sub>2</sub>) ubicada en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de SO<sub>2</sub> y NO<sub>2</sub> se presenta en la Figura 3-3.

Cuadro 3-10: Sitios de Monitoreo de SO<sub>2</sub> y NO<sub>2</sub>, 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 Mataquesuintla	
EA-7A*	805,425	1,601,523	1,320	Noreste de pileta de agua de proceso y pileta de cumplimiento ambiental, Jurisdicción Aldea Los Planes	

\*Se incluye como período de línea base de Julio 2010 a Abril 2011 la información registrada en las estaciones EA-5 y EA-7. Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.





MAPA DE LOCALIZACIÓN  
ESTACIONES DE MONITOREO  
DE GASES DE COMBUSTIÓN

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

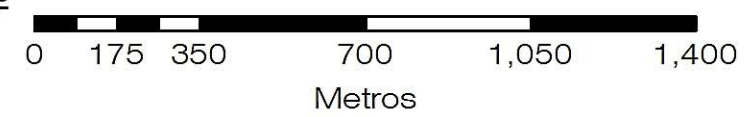
Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

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

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

Fecha de Elaboración: Abril de 2016  
Distancia Horizontal y Vertical  
de Grilla: 1,000 metros  
**Escala 1:16,000**





### 3.4.2 Metodología

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

Cuadro 3-11: Procedimiento y equipo utilizado para la medición de SO<sub>2</sub> y NO<sub>2</sub>, Proyecto Minero Escobal

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

Fuente: MSR, 2016.

### 3.4.3 Resultados

En el Cuadro 3-12 se presentan los resultados de las mediciones de SO<sub>2</sub> y NO<sub>2</sub> 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 NO<sub>2</sub> (<9µg/m<sup>3</sup>). Los valores de SO<sub>2</sub> se encontraron entre 13 µg/m<sup>3</sup> (EA-6) y 15 µg/m<sup>3</sup> EA-2B y EA-3B respectivamente. Todos los valores registrados de SO<sub>2</sub> y de NO<sub>2</sub> 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 <sup>1</sup>	Banco Mundial <sup>2</sup>	OMS <sup>3</sup>	British Columbia <sup>4</sup>	Mar-16	Mar-16	Mar-16	Mar-16	Promedio	Mínimo	Máximo	Mar-16	Mar-16	Promedio	Mínimo	Máximo	Mar-16
	(µg/m <sup>3</sup> )																
SO <sub>2</sub>	370	20	20	160	14	15	15	<13	<13	<13	<13	14	13	<13	<13	<13	<13
NO <sub>2</sub>	100 <sup>¥</sup>	40 <sup>¥</sup>	40 <sup>¥</sup>	200	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9

Nota: µg/m<sup>3</sup> = microgramos por metro cúbico; SO<sub>2</sub>= dióxido de azufre, NO<sub>2</sub>= dióxido de nitrógeno. <sup>1</sup> USEPA, 2006. Normas nacionales de calidad de aire ambiental (NAAQS), 40 CFR parte 50 (US). <sup>2</sup>Guías Generales sobre Medio Ambiente, Salud y Seguridad, Corporación Financiera Internacional, Grupo del Banco Mundial 2007. <sup>3</sup>Guía de Calidad del Aire, OMS 2005. <sup>4</sup>Guías 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 de aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. \*\*Corresponde a los valores de línea base de la estación EA-5 y de la estación EA-7 respectivamente. ¥ Este valor corresponde a la concentración promedio anual. Fuente: MSR, 2016.





### 3.5 Niveles de Presión Sonora

#### 3.5.1 Sitios de Monitoreo

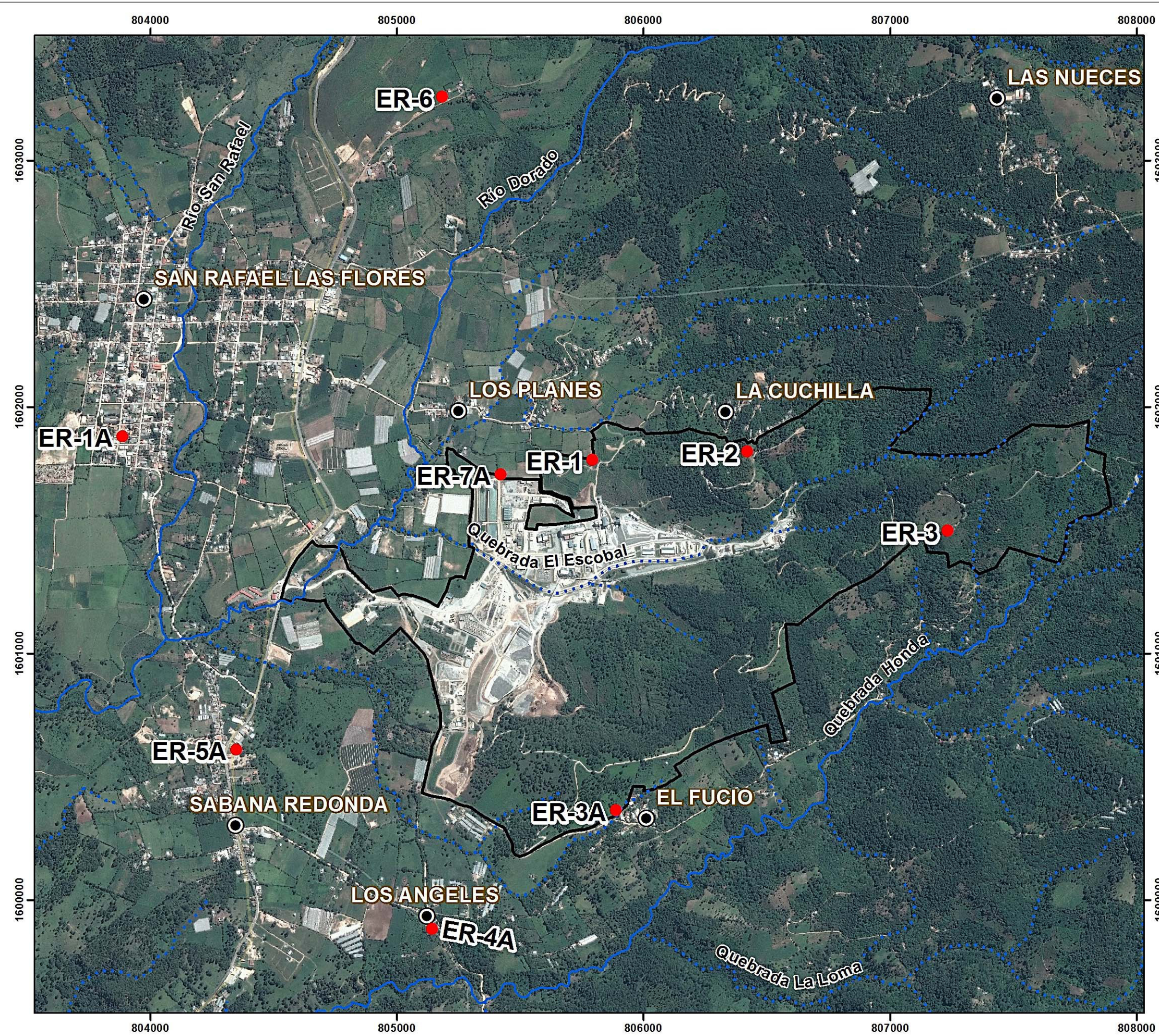
En el Cuadro 3-13 se enlistan las estaciones de monitoreo de presión sonora ubicados en el área de influencia (AI) del Proyecto, localizadas en la jurisdicción de los centros poblados: Los Planes, La Cuchilla, El Fucío, Sabana Redonda, Portón de los Ángeles y San Rafael Las Flores. La ubicación de las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

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

Estación	Coordenadas		Altitud (msnm)	Sitio
<b>Periodicidad de monitoreo mensual</b>				
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
<b>Periodicidad de monitoreo trimestral</b>				
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, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.





MAPA DE LOCALIZACIÓN  
ESTACIONES DE MONITOREO  
NIVELES DE PRESIÓN SONORA

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

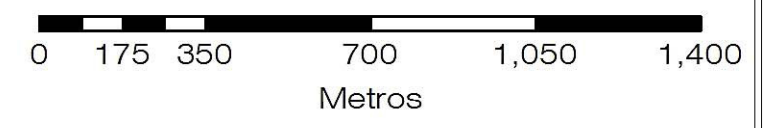
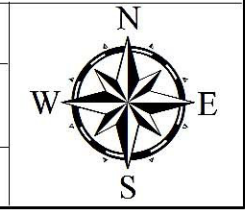
Símbolo	Estación	X	Y
	ER-1	805791	1601785
	ER-1A	803885	1601881
	ER-2	806419	1601819
	ER-3	807232	1601498
	ER-3A	805886	1600364
	ER-4A	805140	1599883
	ER-5A	804346	1600611
	ER-6	805181	1603257
	ER-7A	805419	1601726

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

Fecha de Elaboración: Abril de 2016

Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:16,000





### 3.5.2 Metodología

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

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

<b>Parámetros analizados</b>	
$L_{MAX}$	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.
<b>Procedimiento</b>	
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.	
<b>Equipo utilizado</b>	
Nombre	Sound Pro
Modelo	SE/DL
Fabricante	Quest Technologies, Inc.

Fuente: MSR, 2016.

### 3.5.3 Resultados

En el Cuadro 3-15 y en el Cuadro 3-16 se presentan los valores registrados de los niveles de presión sonora (**NPS**) durante los meses de Febrero a Abril de 2016. Los informes generados por los equipos de medición se presentan en el anexo 11.3.4.

Los resultados obtenidos de NPS en las estaciones muestreadas respecto al parámetro  $L_{eq}$ , están dentro del rango de 44.6 dBa y 61.9 dBa, los cuales corresponden a las estaciones ER-3 y ER-1 respectivamente.

La estación ER-1 presentó el menor promedio diurno (44.4 dBa) y el menor promedio nocturno (44.5 dBa) se registró en la estación ER-3; mientras que la estación ER-1 presentó el mayor promedio diurno (61.9 dBa) y el mayor promedio nocturno (62 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 Abril en promedio diurno y nocturno en la estación ER-1, la medición de Febrero en promedio nocturno en la estación ER-7A y en las mediciones de Febrero en promedio diurno en la estación ER-4A. Las estaciones ER-1A, ER-3A y ER-6 no cuentan con datos de línea base.

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Los promedios diurnos registrados durante los meses de Febrero a Abril de 2016 estuvieron por debajo de la guía establecida por la OMS y Banco Mundial para zonas residenciales; asimismo por debajo de la norma establecida por la USEPA. A excepción de ER-1, ER-1A y ER-5A. 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-6.

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 <sup>1</sup>	OMS <sup>2</sup>	Banco Mundial <sup>3</sup>		Línea Base			Feb-16	Mar-16	Abr-16	Línea Base			Feb-16	Mar-16	Abr-16
					Residencial	Industrial	Promedio				Máximo	Mínimo	Promedio			
dBA																
Lmax					89.3	99.5	64.6	87.2	78.2	91.5	86.7	97.8	64.9	84.9	89.2	80.4
Lmin	NL	NL	NL	NL	32.5	37.7	27.0	37.4	32.7	53	35.2	42.8	26.5	45.7	44.9	39.9
Leq					49.9	57.1	41.2	48.4	45	61.9	49.4	58.7	39.7	50.8	49.5	48.9
PD	55	55	55	70	50.5	59.1	39.7	49.3	44.4	61.9	48.8	57.1	39.8	50.7	49.3	48.8
PN	55	50	45	70	47.6	55.7	39.3	46.5	46	62	46.6	54.5	37.9	51.1	50.4	49.3

Parámetro	Norma*		Guías*		ER-3						ER-7A					
	USEPA <sup>1</sup>	OMS <sup>2</sup>	Banco Mundial		Línea Base			Feb-16	Mar-16	Abr-16	Línea Base**			Feb-16	Mar-16	Abr-16
					Residencial	Industrial	Promedio				Máximo	Mínimo	Promedio			
dBA																
Lmax					87.4	100.7	67.2	76	78.6	77.3	87.5	89.0	82.1	77.5	79.7	85.3
Lmin	NL	NL	NL	NL	49.4	56.2	26.9	35.2	43.8	30.3	NR	NR	NR	41.2	40.2	38.8
Leq					56.8	63.2	39.7	44.6	47.4	46.9	52.8	54.5	50.9	52.5	51.6	50.7
PD	55	55	55	70	56.5	63.1	41.0	44.8	48.1	46.9	52.1	53.5	50.4	52.5	52.3	51.7
PN	55	50	45	70	57.2	64.0	34.1	44.5	46.2	46.9	49.7	50.9	48.8	52.8	50.4	48.3

\*Las normas de calidad de aire ambiental son los niveles de calidad del aire fijados y publicados a partir de procesos legislativos nacionales y procesos regulatorios, mientras que las guías sobre calidad del aire ambiental hacen referencia a niveles de calidad del aire obtenidos principalmente a través de datos clínicos, toxicológicos y epidemiológicos. <sup>1</sup> USEPA, 2006. Normas nacionales de niveles de presión sonora. <sup>2</sup>Guías sobre ruido comunitario, OMS 1999. <sup>3</sup>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, 2016.

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

Parámetro	Norma*		Guías*		ER-1A				ER-3A				ER-4A			
	USEPA <sup>1</sup>	OMS <sup>2</sup>	Banco Mundial <sup>3</sup>		Línea Base			Feb-16	Línea Base			Feb-16	Línea Base			Feb-16
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
			dBA													
Lmax	NL	NL	NL	NL	NR	NR	NR	89.6	NR	NR	NR	85.3	80.6	78.2	82.1	81.6
Lmin								41.3				43.8	NR	NR	NR	26.4
Leq								57.5				48.8	50.2	49.3	50.9	52
PD								57.7				48.9	49.5	48.4	50.4	53.7
PN								57.2				48.7	48.6	48.2	48.9	45.9

Parámetro	Norma*		Guías*		ER-5A				ER-6			
	USEPA <sup>1</sup>	OMS <sup>2</sup>	Banco Mundial <sup>3</sup>		Línea Base			Feb-16	Línea Base			Feb-16
			Residencial	Industrial	Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
			dBA									
Lmax	NL	NL	NL	NL	91.6	85.1	92.2	80.9	NR	NR	NR	83.2
Lmin					NR	NR	NR	34				39.3
Leq					65.8	51.6	67.6	55.8				61
PD					61.2	50.2	63.8	57.7				61.2
PN					62.8	45.9	65.0	46.4				60.7

\*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. <sup>1</sup> USEPA, 2006. Normas nacionales de niveles de presión sonora. <sup>2</sup> Guías sobre ruido comunitario, OMS 1999. <sup>3</sup> 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. Fuente: MSR, 2016.



## 4 Calidad del Agua

### 4.1 Sitios de Monitoreo

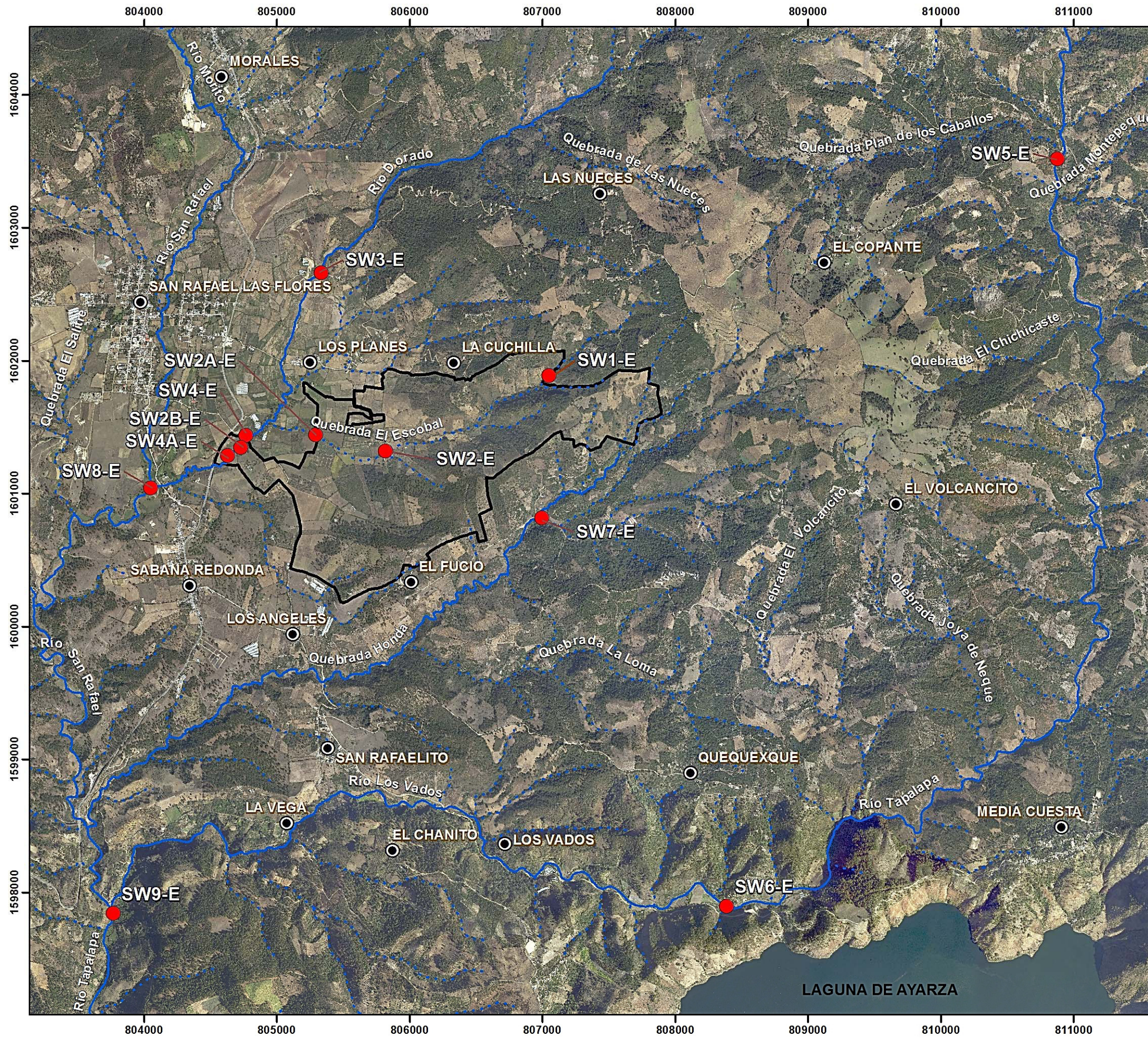
En el Cuadro 4-1 se enlistan las estaciones de monitoreo de calidad de agua superficial y subterránea localizadas en las quebradas, ríos, manantiales, pozos de monitoreo y pozos mecánicos ubicados en el área de influencia (AI) del Proyecto. La ubicación de las estaciones de monitoreo de calidad de agua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

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

Estación	Coordenadas		Sitio	Período Línea Base
<b>Agua Superficial</b>				
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
<b>Agua Subterránea, Nacimientos</b>				
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
<b>Agua Subterránea, Pozos de monitoreo</b>				
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
<b>Agua Subterránea, pozo de producción</b>				
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
<b>Agua de grifo</b>				
HW-1	803,888	1,601,977	Agua de grifo, casa poblado San Rafael las Flores, cercano a Escuelita	No cuenta con línea base

Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.



# MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO AGUA SUPERFICIAL

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

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

## LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

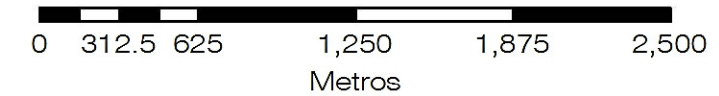
Símbolo	Estación	X	Y
	SW1-E	807047	1601885
	SW2-E	805805	1601367
	SW2A-E	805289	1601433
	SW2B-E	804728	1601341
	SW3-E	805331	1602656
	SW4-E	804775	1601431
	SW4A-E	804623	1601255
	SW5-E	810876	1603516
	SW6-E	808385	1597892
	SW7-E	806995	1600815
	SW8-E	804048	1601037
	SW9-E	803766	1597838

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

Fecha de Elaboración: Abril de 2016

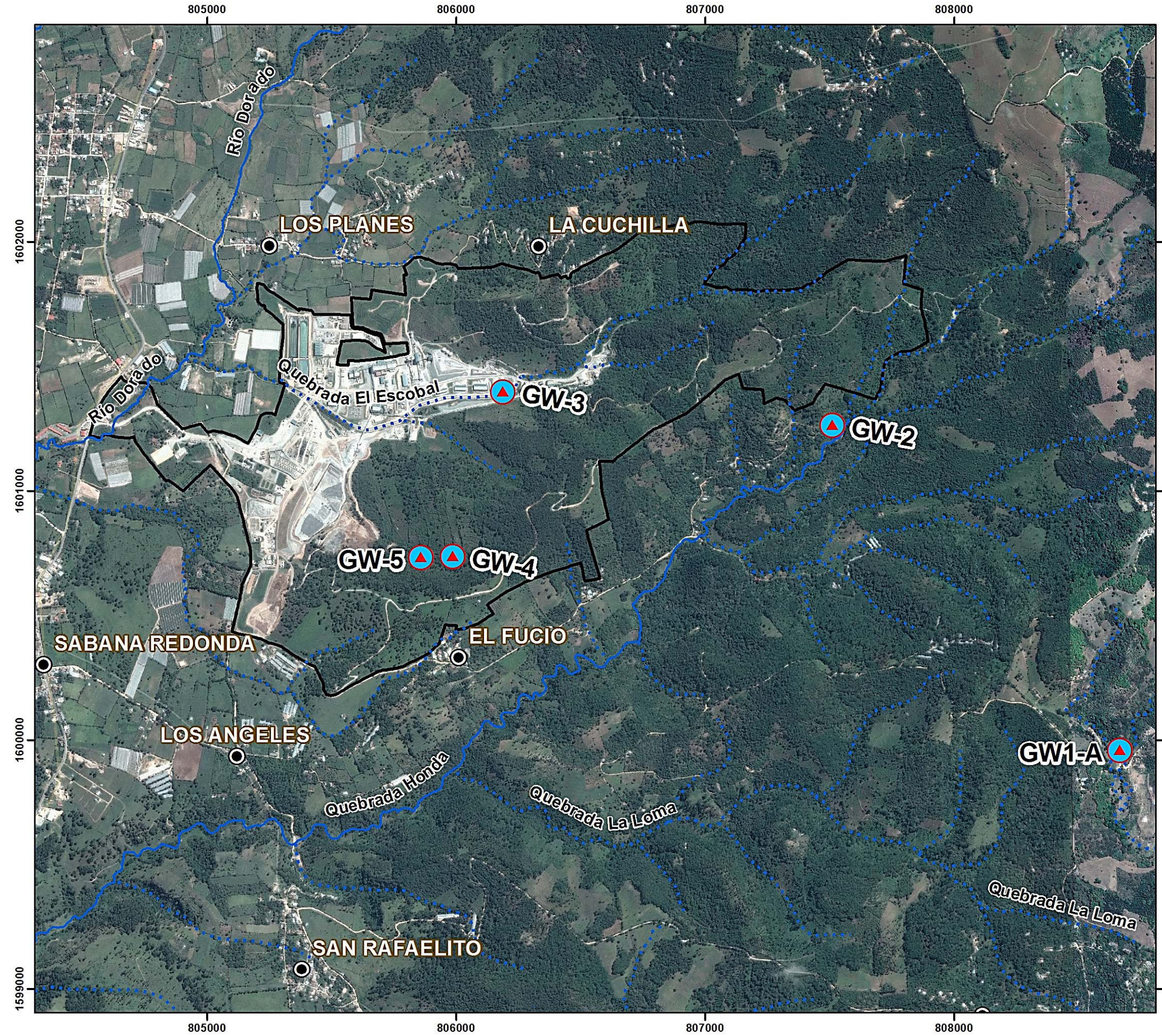
Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:30,000



LAGUNA DE AYARZA





MAPA DE LOCALIZACIÓN  
ESTACIONES DE MONITOREO  
CALIDAD DE AGUA SUBTERRÁNEA

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermittente

ESTACIONES DE MONITOREO (POZOS)

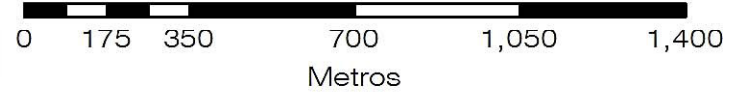
Símbolo	Estación	X	Y
	GW-1A	808664	1599957
	GW-2	807509	1601262
	GW-3	806187	1601397
	GW-4	805986	1600736
	GW-5	805858	1600731

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

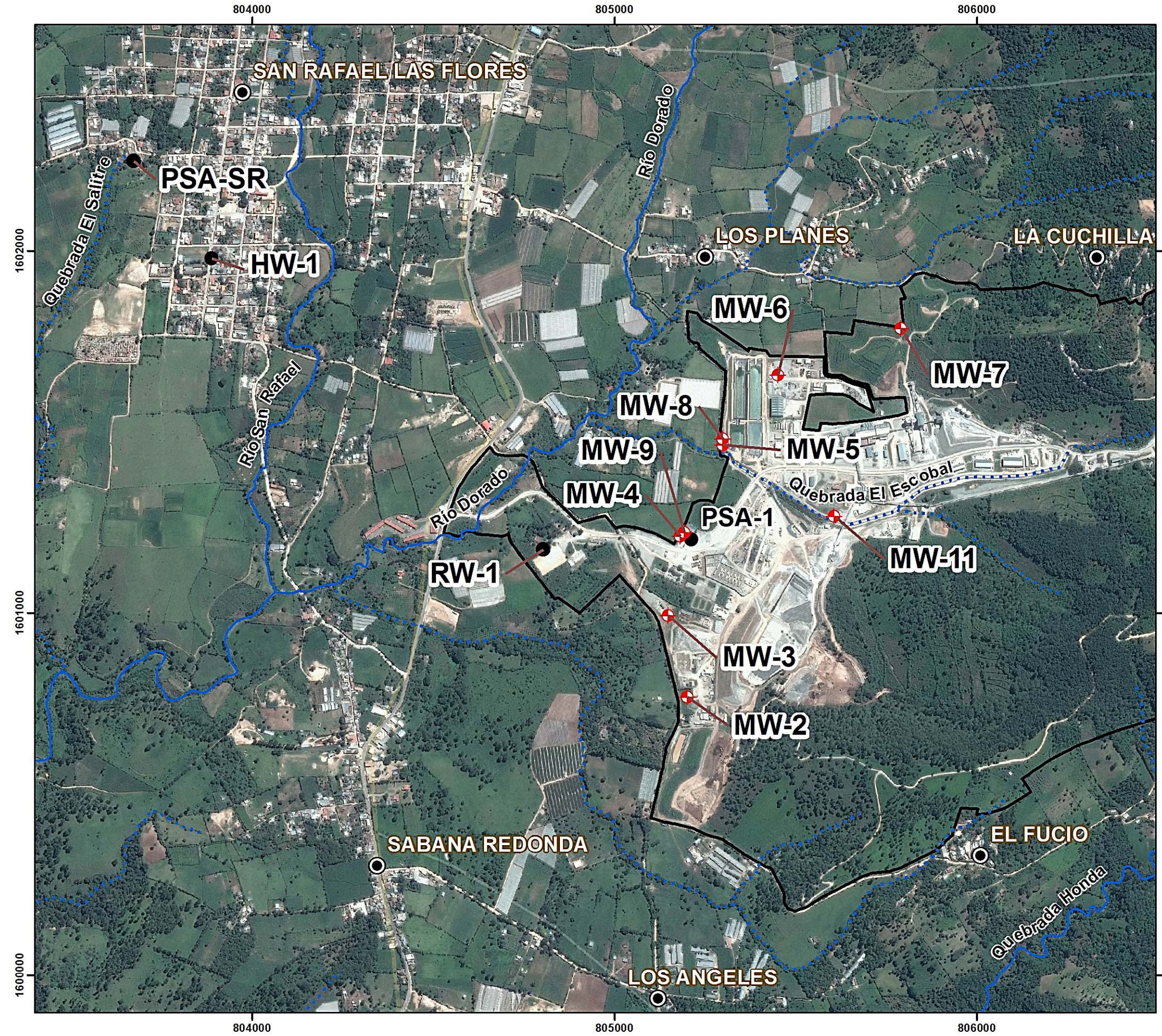
Fecha de Elaboración: Abril de 2016

Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:16,000







# MAPA DE LOCALIZACIÓN ESTACIONES (POZOS) DE MONITOREO Y REFERENCIA

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

## LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

## ESTACIONES DE MONITOREO (POZOS)

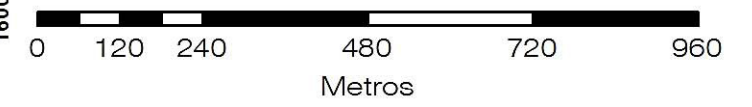
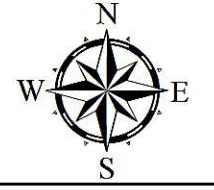
Símbolo	Estación	X	Y	
	MW-2	805201	1600768	
	MW-3	805148	1600993	
	MW-4	805181	1601212	
	MW-5	805299	1601463	
	MW-6	805452	1601657	
	MW-7	805791	1601785	
	MW-8	805298	1601480	
	MW-9	805192	1601222	
	MW-11	805607	1601267	
		RW-1	804803	1601175
		PSA-SR	803672	1602247
HW-1		803888	1601977	
PSA-1		805212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

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

Fecha de Elaboración: Abril de 2016

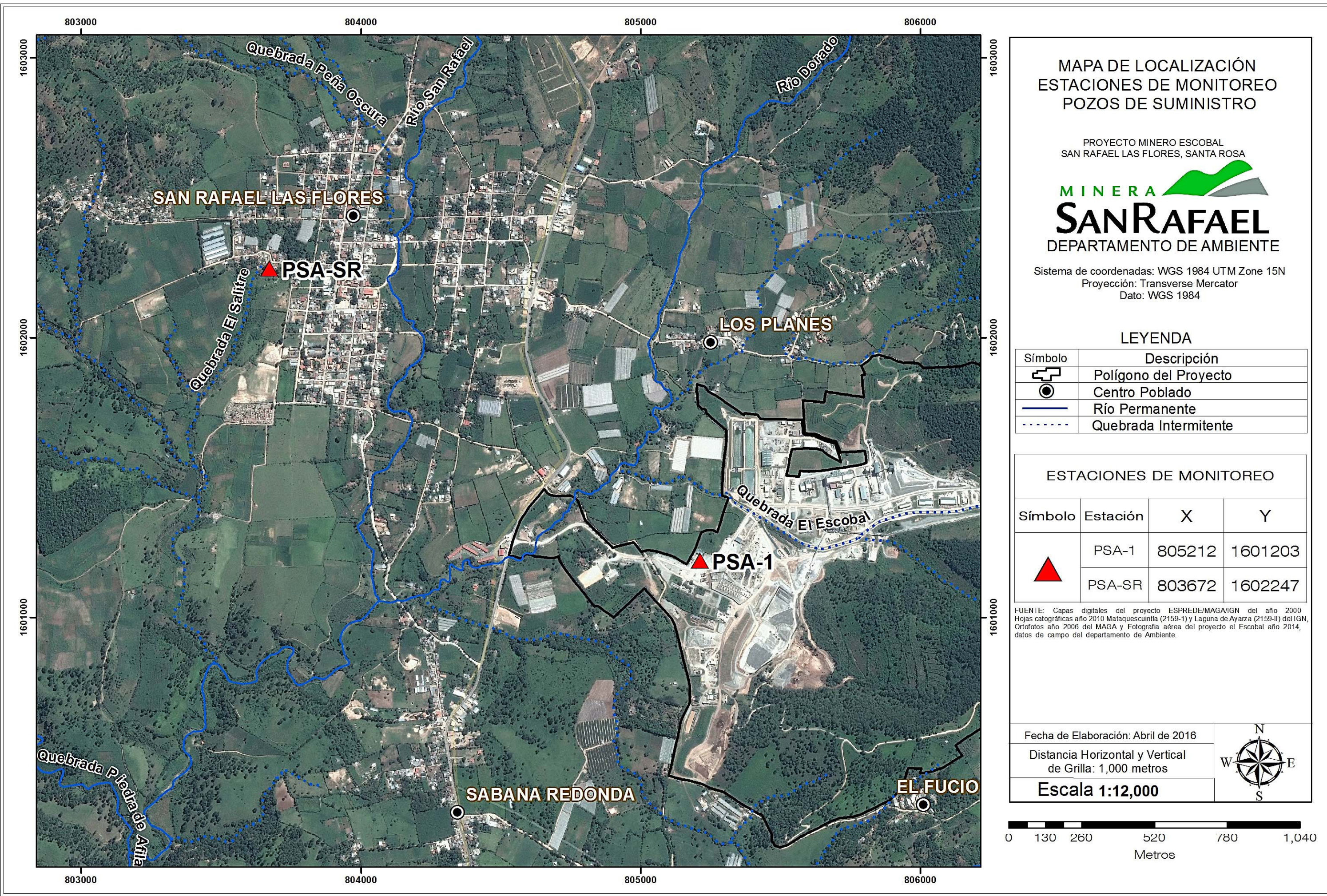
Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:11,000









MAPA DE LOCALIZACIÓN  
ESTACIONES DE MONITOREO  
POZOS DE SUMINISTRO

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIONES DE MONITOREO

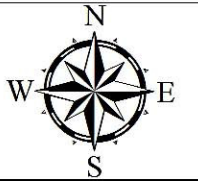
Símbolo	Estación	X	Y
	PSA-1	805212	1601203
	PSA-SR	803672	1602247

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

Fecha de Elaboración: Abril de 2016

Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:12,000





## 4.2 Metodología

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

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

<b>Parámetros analizados</b>	
<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.
<b>Procedimiento</b>	
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 ( <b>SW</b> ) y agua subterránea ( <b>GW</b> ). 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.	
<b>Equipo utilizado</b>	
Nombre	Multiparámetros
Modelo	PCD650
Fabricante	OAKTON

Fuente: MSR, 2016.

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

## 4.3 Resultados

### 4.3.1 Control de Calidad

En el monitoreo correspondiente al mes de Marzo de 2016 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 (GW10) calcio total (SW10), cobalto disuelto y total (SW10), magnesio total (SW10), sodio disuelto (MW20), amonio (GW10), sulfatos (GW10) y fósforo disuelto orto (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	700	220	<2	4.5	<2	4.5
Color Real	U Pt/Co	<1	<1	<1	<1	<1	<1	<1	<1	<1
Materia flotante	U Pt/Co					Ausente		Ausente		Ausente
Aluminio Disuelto	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Aluminio Total		<0.03	NA	NA	<0.03	0.04	NA	NA	NA	NA
Antimonio Disuelto		<0.0004	<0.0004	<0.0004	0.0114	0.0114	0.0005	0.0007	0.0007	<0.0004
Antimonio Total		<0.0004	NA	NA	0.0125	0.0126	NA			
Arsénico Disuelto		<0.0002	<0.0002	<0.0002	0.008	0.008	0.0021	0.0018	0.0014	0.0016
Arsénico Total		<0.0002	NA	NA	0.0083	0.0086	NA			
Bario Disuelto		<0.003	<0.003	<0.003	0.062	0.062	0.091	0.089	0.069	0.057
Bario Total		<0.003	NA	NA	0.066	0.067	NA			
Berilio Disuelto		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Berilio Total		<0.01	NA	NA	<0.01	<0.01	NA			
Bismuto Disuelto		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Bismuto Total		<0.04	NA	NA	<0.04	<0.04	NA			
Boro Disuelto		<0.01	<0.01	<0.01	0.14	0.15	0.02	0.02	0.03	0.02
Boro Total		<0.01	NA	NA	0.16	0.16	NA			
Cadmio Disuelto		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		<0.0001	NA	NA	<0.0001	<0.0001	NA			
Calcio Disuelto		<0.1	0.1	<0.1	393	390	57.5	55.9	110	44.7
Calcio Total		0.1	NA	NA	397	408	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	4.07
Hierro Total		<0.02	NA	NA	<0.02	<0.02	NA			
Plomo Disuelto		<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	0.0001	<0.0001	<0.0001
Plomo Total		<0.0001	NA	NA	0.0006	0.0006	NA			
Litio Disuelto	<0.008	<0.008	<0.008	0.092	0.092	<0.008	<0.008	0.009	0.012	
Litio Total	<0.008	NA	NA	0.093	0.096	NA				

Parámetros	Unidad	Blancos de campo			Muestras duplicado					
		Agua EMSURE (metales) y agua desmineralizada (Fisicoquímicos)			Duplicado	Original	Duplicado	Original	Duplicado	Original
		SW10	GW10	MW20	SW11	SW2A	GW11	GW3	MW21	MW9
Magnesio Disuelto	mg/L	<0.2	<0.2	<0.2	20.3	20.1	12.8	12.5	17.1	7.7
Magnesio Total		0.2	NA	NA	20.8	21.4	NA			
Manganeso Disuelto		<0.005	<0.005	<0.005	0.028	0.028	<0.005	<0.005	<0.005	0.050
Manganeso Total		<0.005	NA	NA	0.031	0.033	NA			
Mercurio Disuelto		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercurio Total		<0.0002	NA	NA	<0.0002	<0.0002	NA			
Molibdeno Disuelto		<0.02	<0.02	<0.02	0.03	0.03	<0.02	<0.02	<0.02	<0.02
Molibdeno Total		<0.02	NA	NA	0.03	0.03	NA			
Níquel Disuelto		<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Níquel Total		<0.008	NA	NA	<0.008	<0.008	NA			
Potasio Disuelto		<0.2	<0.2	<0.2	14.3	14.3	7.6	7.5	6.7	4.4
Potasio Total		<0.2	NA	NA	14.8	15.1	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	0.001	0.001	0.0004	0.0004	0.0004	<0.0001
Selenio Total		<0.0001	NA	NA	0.0011	0.001	NA			
Plata Disuelta		<0.00005	<5x10 <sup>-5</sup>	<5x10 <sup>-5</sup>	<0.00005	<0.00005	<5x10 <sup>-5</sup>	<5x10 <sup>-5</sup>	<5x10 <sup>-5</sup>	<5x10 <sup>-5</sup>
Plata Total		<0.00005	NA	NA	<0.00005	<0.00005	NA			
Sodio Disuelto		<0.2	<0.2	0.2	81.5	81.4	19.5	19.2	25.2	24.7
Sodio Total		<0.2	NA	NA	84	85.7	NA			
Estroncio Disuelto		<0.005	<0.005	<0.005	3.98	3.94	0.300	0.295	0.380	0.328
Estroncio Total		<0.005	NA	NA	4.13	4.31	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	0.0003	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	0.007	0.006	0.005	0.005	0.007	<0.005
Titanio Total		<0.005	NA	NA	0.008	0.008	NA			
Uranio Disuelto		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001
Uranio Total		<0.0001	NA	NA	<0.0001	<0.0001	NA			
Vanadio Disuelto		<0.005	<0.005	<0.005	0.007	0.006	<0.005	<0.005	0.006	<0.005
Vanadio Total		<0.005	NA	NA	0.007	0.007	NA			
Zinc Disuelto		<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.02
Zinc Total		<0.01	NA		<0.01	<0.01	NA			
Grasas y Aceites		<2	NA		2.7	2.8	NA			
DQO		<10	NA		<10	<10	NA			
Cloruros		<0.5	<0.5	0.5	87.5	88	11.6	11.9	22.8	7.8
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	1.32	1.35	0.19	0.19	0.17	0.60
Nitratos/Nitritos como N		<0.02	<0.02	<0.02	1.38	1.4	2.89	2.87	4.39	0.05
Amonio	<0.05	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Nitrógeno Kjeldahl (TKN)	<0.1	<0.1	<0.1	0.2	0.3	0.1	<0.1	<0.1	<0.1	
Fosfatos	<0.06	<0.06	<0.06	<0.06	<0.06	0.09	0.09	0.16	0.53	
Fósforo Disuelto (Orto)	0.04	<0.02	<0.02	<0.02	<0.02	0.04	0.04	0.09	0.03	
Fósforo Total	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.05	0.06	0.15	
STD (TDS)	<10	<10	<10	1770	1790	410	414	648	336	
SST (TSS)	<5	<5	<5	<5	<5	<5	<5	<5	<5	
ST (TS)	<10	<10	<10	1800	1790	422	422	656	352	
Sulfatos	<1	1.1	<1	1030	1040	155	155	281	76.4	
Alcalinidad Total	<2	<2	<2	35.1	35	76.3	69.5	77.0	116	

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
Hidrocarburos totales (TPH)	mg/L	<0.1	NA		<0.1	<0.1	NA			

u.e.: unidades exponenciales. mg/L: miligramos por litro. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. Fuente: MSR, 2016.

### 4.3.2 Agua Superficial

En el Cuadro 4-4 se presentan los resultados de la calidad del agua superficial para el mes de Marzo de 2016 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 (7.13 a 8.40 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, a excepción de las estaciones SW-4, SW-4A y SW-8 cumpliendo con lo establecido por el Banco Mundial (125 mg/L). Únicamente en la estación SW-4A se detectó concentración 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 por debajo de los valores establecidos por el Acuerdo y el Banco Mundial (2 mg/L) para Fósforo total (10 mg/L)

En dos 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 SW1, SW4 y SW6.

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 ocho 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 0.0006 – 0.0141 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 en todas las estaciones, excepto en las estaciones SW7, SW6, SW5, SW3 y SW1 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-16	Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.509	7.14	8.06	7.61	7.42	6.56	7.87	8.18				7.93
Temperatura (campo)	°C				17.4	13	19.8	18.5	22.4	20.3	25.6	25.6				27.3
Conductividad (campo)	µS/cm				277.9	66.3	566.6	346.1	807.3	177.3	1965	2130				2021
Oxígeno disuelto (campo)					3.6	0.1	6.4	5.69	4.76	3.5	5.8	6.97				7.35
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				<10
Coliformes Fecales	NMP/100ml							49				540				220
Color Real	U Pt/Co				NR	NR	NR	<1	NR	NR	NR	<1				<1
Materia Flotante								Ausente				Ausente				Ausente
Turbidez	NTU							3.16				1.71				0.51
Aluminio Disuelto					0.035	<0.03	0.09	<0.03	0.043	<0.03	0.12	0.06				<0.03
Aluminio Total		0.2			5.02	<0.03	35.1	0.03	2.35	0.06	8.77	0.1				0.04
Antimonio Disuelto					<0.0004	<0.0004	0.0006	<0.0004	<0.0004	<0.0004	<0.0004	0.014				0.0114
Antimonio Total		0.006			<0.0004	<0.0004	0.0007	<0.0008	<0.0004	<0.0004	0.0005	0.0141				0.0126
Arsénico Disuelto					0.00216	0.0005	0.0034	0.0024	0.00184	0.0013	0.0024	0.0109				0.008
Arsénico Total		0.01		0.1	0.00339	0.0015	0.0094	0.0027	0.00266	0.0012	0.0054	0.0118				0.0086
Bario Disuelto					0.1361	0.086	0.207	0.171	0.109	0.088	0.133	0.049				0.062
Bario Total		1			0.186	0.1	0.434	0.169	0.131	0.096	0.186	0.051				0.067
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	0.17				0.15
Boro Total					<0.01	<0.01	0.02	<0.01	0.11	<0.01	0.28	0.18				0.16
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	<0.0002	<0.0001	<0.0001	0.0001	0.0001				<0.0001
Calcio Disuelto					45.2	18.9	74.5	52.1	144.9	20.7	333	415				390
Calcio Total					45.5	20.9	70.5	49.2	144.6	20.5	331	419				408
Cromo Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cromo Total		0.1		0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobalto Disuelto					<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01				<0.01
Cobalto Total					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Disuelto					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Cobre Total		1.3		3	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01				<0.01
Galio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Galio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Hierro Disuelto					<0.02	<0.02	0.04	<0.02	0.04	<0.02	0.12	<0.02				<0.02
Hierro Total		0.3			2.7	<0.02	19.5	<0.02	1.3	0.06	5.19	0.02				<0.02
Plomo Disuelto					<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001	0.0005				0.0002
Plomo Total		0.015		0.4	0.0025	<0.0001	0.0191	<0.0002	0.00088	<0.0001	0.0038	0.0029				0.0006
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.096				0.092
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.105				0.096
Magnesio Disuelto					3.9	2.6	5.3	5.4	15.9	3.2	37.3	23.4				20.1
Magnesio Total					4.2	2.8	5.2	5.4	15.1	3.6	32.2	24.7				21.4
Manganeso Disuelto					0.0051	<0.005	0.02	<0.005	0.0195	<0.005	0.07	0.021				0.028
Manganeso Total		0.4			0.1041	<0.005	0.721	<0.005	0.0602	0.007	0.174	0.037				0.033
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	0.03				0.03

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW1-E				SW2-E				SW2A-E			
					Quebrada Escobal-aguas arriba				Quebrada Escobal-en medio del Proyecto				Quebrada Escobal- salida del Proyecto			
					Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	0.05				0.03
Níquel Disuelto					<0.01	<0.01	0.03	<0.008	0.013	<0.01	0.04	<0.008				<0.008
Níquel Total		0.61		2	<0.01	<0.01	0.04	<0.008	0.022	<0.01	0.04	<0.008				<0.008
Potasio Disuelto					4.4	3.5	5.1	5.1	6.1	4.9	7.6	11				14.3
Potasio Total					5.3	3.5	13	5.1	6.3	5.2	7.4	11.9				15.1
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	0.0009				0.001
Selenio Total		0.17			0.0001	<0.0001	0.0003	<0.0002	0.00011	<0.0001	0.0002	0.001				0.001
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	<0.0001	<0.00005	<0.00005	0.00006	0.00016				<0.00005
Sodio Disuelto					9.81	8.3	11.6	10.4	40.1	9.4	87.8	86.3				81.4
Sodio Total					9.46	7.8	11.8	10.3	39.8	9.4	85.2	93.7				85.7
Estroncio Disuelto					0.17	0.09	0.26	0.219	1.23	0.1	2.99	4.12				3.94
Estroncio Total					0.18	0.1	0.25	0.214	1.23	0.11	2.91	4.39				4.31
Talio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	0.0001	0.0003				0.0002
Talio Total		0.002			<0.0001	<0.0001	0.0004	<0.0002	0.0001	<0.0001	0.0002	0.0003				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	0.007	<0.005	<0.005	0.007	0.015				0.006
Titanio Total					0.092	<0.005	0.591	0.006	0.2715	<0.005	0.171	0.014				0.008
Uranio Disuelto					0.00013	<0.0001	0.0003	0.0002	0.00028	<0.0001	0.0006	0.0004		NR	NR	<0.0001
Uranio Total					0.00038	<0.0001	0.0011	<0.0002	0.00024	<0.0001	0.0005	0.0004		NR	NR	<0.0001
Vanadio Disuelto					<0.005	<0.005	0.007	<0.005	0.0065	<0.005	0.015	0.011				0.006
Vanadio Total					0.0059	<0.005	0.024	<0.005	<0.005	<0.005	0.006	0.011				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	2.6	<2.04	<2.04	<2.04	2.2				2.8
DQO			125		15.7	<10	40	<10	<2.04	<2.04	<2.04	<10				<10
Cloruros		250			5	4	7	5.2	<2.04	<2.04	<2.04	92.2				88
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	0.14	0.6	0.1	1.2	1.54				1.35
Nitratos/Nitritos como N					1.61	0.08	4.87	0.08	2.46	0.03	4.9	2.88				1.4
Amonio					<0.005	<0.005	0.07	<0.05	<0.05	<0.05	0.07	0.07				<0.05
Nitrógeno Kjeldahl (TKN)					3.53	<0.1	25.9	0.1	0.32	<0.1	0.8	0.6				0.3
Fosfatos					0.185	0.1	0.3	0.19	0.19	0.1	0.4	<0.06				<0.06
Fósforo Disuelto (Orto)					0.06	0.03	0.1	0.06	0.06	0.02	0.13	<0.02				<0.02
Fósforo Total			2	10	0.37	0.04	2.51	0.05	0.08	0.03	0.19	<0.02				<0.02
STD (TDS)		500			225	170	280	270	754	170	1620	1920				1790
SST (TSS)			50	100	163.6	<5	780	<5	67	<5	320	<5				<5
ST (TS)					346.3	200	1080	266	850	230	1660	1960				1790
Sulfatos		250			26.3	10	42	45.2	472.6	14	1600	1180				1040
Alcalinidad Total					104	38	161	123	80	44	119	35.0				35
Hidrocarburos totales (TPH)					<0.1	<0.09	<0.1	<0.1	<0.1	<0.09	<0.1	<0.1				<0.1

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

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW3-E				SW4-E				SW4A-E			
					Río El Dorado – Aguas arriba				Río El Dorado – sobre camino vecinal				Río El Dorado – Aguas abajo			
					Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.58	7.17	8.17	8.40	7.4	6.56	7.94	7.62				7.63
Temperatura (campo)	°C				19.8	17	24	23.2	21	17.2	24	20.7				24.3
Conductividad (campo)	µS/cm				219.7	80	374.5	248.2	308.9	120	612	986.2				1660
Oxígeno disuelto (campo)					3.8	0.1	6.8	9.39	4.2	0.1	7.5	6.54				5.78
Cr VI	mg/L							<0.05				<0.05				<0.05
DBO								<10				<10				17
Coliformes Fecales	NMP/100ml							49				4.9 x 10 <sup>4</sup>				2.4 x 10 <sup>4</sup>
Color Real	U Pt/Co				NR	NR	NR	<1	NR	NR	NR	<1				<1
Materia Flotante								Ausente				Ausente				Ausente
Turbidez	NTU							1.91				4.17				24.2
Aluminio Disuelto					0.061	<0.03	0.15	<0.03	0.03	<0.03	0.1	0.04				<0.03
Aluminio Total		0.2			3.25	<0.03	17.4	<0.03	5.72	0.1	36	0.18				0.54
Antimonio Disuelto					<0.0004	<0.0004	<0.0004	<0.0004	0.0007	0	0.0011	0.0027				0.0057
Antimonio Total		0.006			<0.0004	<0.0004	<0.0004	<0.0004	0.0012	0.0005	0.0037	0.003				0.0068
Arsénico Disuelto					0.00797	0.0041	0.0139	0.009	0.00541	0.0039	0.0072	0.0054				0.0061
Arsénico Total		0.01		0.1	0.00888	0.006	0.0137	0.0096	0.00873	0.0043	0.0326	0.006				0.0068
Bario Disuelto					0.0915	0.051	0.118	0.104	0.1645	0.08	0.234	0.116				0.118
Bario Total		1			0.12445455	0.098	0.253	0.11	0.2356	0.144	0.567	0.118				0.134
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	0.07				0.1
Boro Total					<0.01	<0.01	0.02	0.01	0.012	<0.01	0.02	0.06				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	0.0002	<0.0001	0.00012	<0.0001	0.0005	<0.0002				<0.0002
Calcio Disuelto					27.8	11.7	39.9	33.8	37.4	18.5	61.7	180				298
Calcio Total					27.9272727	12.3	38.7	34.8	38.3	17.2	58.9	178				314
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	0.13				0.02
Hierro Total		0.3			1.9	0.06	10.2	0.04	3.8	0.09	26.5	0.41				0.45
Plomo Disuelto					<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	0.0002	0.0002				0.0001
Plomo Total		0.015		0.4	0.0013	<0.0001	0.0072	<0.0001	0.003	<0.0001	0.0198	0.0006				0.0015
Litio Disuelto					<0.02	<0.02	<0.02	<0.008	<0.02	<0.02	<0.02	0.026				0.058
Litio Total					<0.02	<0.02	<0.02	<0.008	0.02	<0.02	0.02	0.029				0.059
Magnesio Disuelto					2.6	1.3	3.5	2.8	4.2	2.4	7.3	13.5				19.2
Magnesio Total					2.7	1.6	3.5	3	4.6	2.5	7.3	13.6				20.1
Manganeso Disuelto					0.07418182	0.01	0.381	0.026	0.116	0.011	0.26	0.238				0.291
Manganeso Total		0.4			0.14745455	0.025	0.403	0.032	0.2844	0.101	1.23	0.27				0.374
Mercurio Disuelto					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Mercurio Total		0.002		0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002				<0.0002
Molibdeno Disuelto					0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	0.02				<0.02

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-16	Línea Base			Mar-16	Línea Base			Mar-16			
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo				
Molibdeno Total	mg/L	0.61		2	0.01	<0.01	0.01	<0.02	<0.01	<0.01	<0.01	<0.02	NR	NR	NR	<0.02			
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	0.02	<0.008				<0.008			
Níquel Total					<0.01	<0.01	0.05	<0.008	0.01	<0.01	0.06	<0.008				<0.008			
Potasio Disuelto					4.2	3.5	5.5	4.3	5.8	4.2	8.7	13.1				16			
Potasio Total					4.5	3.6	7	4.4	6.5	4.4	11.7	11.2				15.5			
Escandio Disuelto					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1			
Escandio Total					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1			
Selenio Disuelto					<0.0001	<0.0001	0.0001	<0.0001	0.00014	<0.0001	0.0005	0.0003				0.0007			
Selenio Total					<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0004				0.0007			
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005				<0.00005			
Plata Total					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00011	<0.0001				<0.0001			
Sodio Disuelto					12.65	7.7	16.6	13.7	12.44	9	15.6	41.8				64.3			
Sodio Total					12.17	7.5	15.4	14.1	12.13	8.6	15.2	42.2				67.3			
Estroncio Disuelto					0.19	0.06	0.3	0.182	0.22	0.09	0.36	1.48				2.8			
Estroncio Total					0.18818182	0.08	0.3	0.19	0.228	0.11	0.33	1.53				2.98			
Talio Disuelto					<0.0001	<0.0001	0.0005	<0.0001	0.0001	<0.0001	0.0001	<0.0001				<0.0001			
Talio Total					0.002	<0.0001	<0.0001	0.0002	<0.0001	0.00017	<0.0001	0.0007				<0.0002			
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	0.016				0.01			
Titanio Total					0.071	<0.005	0.307	0.005	0.127	0.005	0.534	0.018				0.027			
Uranio Disuelto					<0.0001	<0.0001	0.0002	<0.0001	0.00012	<0.0001	0.0004	0.0002				0.0001			
Uranio Total					0.00019	<0.0001	0.0005	<0.0001	0.00027	<0.0001	0.0009	0.0002				<0.0002			
Vanadio Disuelto					<0.005	<0.005	0.008	<0.005	<0.005	<0.005	0.011	<0.005				<0.005			
Vanadio Total					0.0051	<0.005	0.019	<0.005	0.0085	<0.005	0.04	<0.005				<0.005			
Zinc Disuelto					0.068	<0.01	0.14	<0.01	0.061	0.05	0.14	<0.01				<0.01			
Zinc Total					7.4	<0.01	1.01	<0.01	0.065	0.01	0.17	<0.01				0.04			
Grasas y Aceites						10	10	<2.062	<2.04	<2.326	<2.1	<2.062				<2.02	<2.084	3.3	4.2
DQO						125		10.9	<10	40	<10	16.8				<10	60	14	63
Cloruros					250			2.7	2	3	3	8.5				4	16	39.8	69.5
Cianuro Total	0.14		1	<0.003	<0.003	0.015	<0.003	<0.003	<0.003	0.014	<0.003	<0.003							
Fluoruros	4			<0.003	<0.003	0.015	0.18	0.15	0.1	0.2	0.44	0.87							
Nitratos/Nitritos como N				0.59	<0.02	1.51	<0.02	4.49	1.96	10.1	4.93	3.36							
Amonio				0.05	<0.05	0.21	<0.05	0.059	<0.05	0.15	0.15	2.07							
Nitrógeno Kjeldahl (TKN)				0.35	<0.1	0.6	<0.1	0.58	0.1	1.3	0.8	6.1							
Fosfatos				0.12	0.1	0.4	<0.06	0.36	0.1	1.2	0.68	1.4							
Fósforo Disuelto (Orto)				0.04	0.02	0.12	0.03	0.12	0.03	0.39	0.18	0.38							
Fósforo Total		2	10	0.05	0.02	0.14	0.04	0.17	0.04	0.39	0.25	1.18							
STD (TDS)	500			183.636364	140	220	212	233.6	150	350	922	1410							
SST (TSS)		50	100	48	5	340	<5	115	<5	880	7	26.0							
ST (TS)				231.8	140	500	208	378.2	260	1180	930	1460							
Sulfatos	250			16.9	4	25	18.8	27.5	10	57	406.0	783							
Alcalinidad Total				83	38	118	114	80	45	102	85.5	68.8							
Hidrocarburos totales (TPH)				<0.1	<0.09	<0.2	<0.1	<0.1	<0.09	<0.1	<0.1	0.2							

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

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW5-E				SW6-E				SW7-E			
					Río Tapalapa – Aguas arriba				Río Los Vados				Quebrada La Honda			
					Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.5	7.1	8	7.70	7.4	7.1	7.8	7.56	7.5	6.9	8	
Temperatura (campo)	°C				17.4	14.5	21.5	17.0	19.4	12.2	27.3	19.3	18.7	15	21.3	
Conductividad (campo)	μS/cm				72.1	0.1	160.2	501.3	259	60	948	238.9	216	120	416.2	
Oxígeno disuelto (campo)					4	0	8	7.47	4	0	8.3	8.54	3.9	0.1	7.5	
Cr VI	mg/L							<0.05				<0.05				
DBO								<10				<10				
Coliformes Fecales	NMP/100ml							1.6 x 10 <sup>4</sup>				1.7 x 10 <sup>3</sup>				
Color Real	U Pt/Co							<1				<1				
Materia Flotante								Ausente				Ausente				
Turbidez	NTU							4.41				0.67				
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	0.08	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	0.0013	0.0032	0.0007	0.0076	0.0034	0.00382	0.0022	0.0054	
Arsénico Total		0.01	0.1		0.00177	0.0013	0.0028	0.0015	0.00387	0.0025	0.0074	0.0039	0.00446	0.003	0.0061	
Bario Disuelto					0.0447	0.023	0.072	0.054	0.0618	0.027	0.136	0.067	0.0946	0.052	0.143	
Bario Total		1			0.0556	0.039	0.069	0.056	0.0806	0.055	0.136	0.074	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	0.26	<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	9.1	15.1	5.4	38.9	16.3	23.1	11.2	38.1	
Calcio Total					7.73	3.4	13.1	8.7	14.81	5.9	37.5	17.4	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	0.03	0.097	<0.02	0.28	0.05	0.022	<0.02	0.07	
Hierro Total		0.3			0.7	0.16	1.8	0.12	1.3	0.33	4.8	0.1	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	<0.0001	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	0.085	<0.02	<0.02	<0.02	
Litio Total					<0.02	<0.02	<0.02	<0.008	0.133	<0.02	0.68	0.092	<0.02	<0.02	<0.02	
Magnesio Disuelto					1.5	0.8	2.5	1.7	3	1.4	7.4	3	4.1	2.2	6.4	
Magnesio Total					1.5	0.9	2.5	1.8	3.1	1.8	7.5	3.3	4.3	2.6	6.5	
Manganeso Disuelto					0.025	0.006	0.047	0.014	0.114	<0.005	0.551	0.023	0.032	0.014	0.074	
Manganeso Total		0.4			0.0406	0.014	0.062	0.017	0.1482	0.04	0.543	0.025	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-16	Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	
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	2.9	4.1	3.2	7.1	4	4.1	3.6	5.4	
Potasio Total					3	2.2	4.1	3	4.2	3.1	7.5	4.3	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	5.9	32.16	6	135	24.2	11.69	8.7	15.4	
Sodio Total					5.99	3.4	9.4	6.1	31.11	5.3	124	25.8	11.45	8.3	15.5	
Estroncio Disuelto					0.06	0.02	0.09	0.072	0.12	0.03	0.33	0.118	0.17	0.07	0.29	
Estroncio Total					0.057	0.02	0.08	0.072	0.122	0.04	0.35	0.129	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	<0.005	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	<2.1	<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	2.3	43.9	3	230	31.2	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	0.09	0.11	<0.1	0.3	0.15	<0.1	0.2	0.1	
Nitratos/Nitritos como N					0.13	0.03	0.42	<0.02	0.3	<0.02	1.22	<0.02	<0.1	3.53	0.19	
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	0.1	<0.1	0.7	0.4	
Fosfatos					0.04	<0.03	0.2	<0.06	0.08	<0.03	0.3	<0.06	0.1	0.2	0.09	
Fósforo Disuelto (Orto)					0.15	<0.01	0.06	<0.02	0.03	<0.01	0.09	0.03	0.03	0.08	0.03	
Fósforo Total			2	10	0.02	<0.01	0.05	<0.02	0.04	0.02	0.08	0.02	0.03	0.19	0.19	
STD (TDS)		500			84	60	110	104	187	90	540	176	140	240	100	
SST (TSS)			50	100	9	<5	32	<5	21	<5	105	<5	<5	330	6	
ST (TS)					97	70	130	100	221	120	550	172	150	610	140	
Sulfatos		250			16.5	<10	47	21.1	14	<10	23	27.8	9	38	19.4	
Alcalinidad Total					25	13	43	26.2	48	22	108	51.5	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 por no contener agua la estación de monitoreo; **NR =** Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.

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

Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	SW8-E				SW9-E			
					Aguas debajo de la confluencia del Río San Rafael Y el Río El Dorado				Río Tapalapa, aguas debajo de la confluencia del Río San Rafael Río Los Vados y Quebrada La Honda			
					Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
pH de campo	u.e.	5.0-9.0	6.0-9.0	6.0-9.0	7.49	7	9.8	7.13	7.86	7.5	10.7	8.26
Temperatura (campo)	°C				22.1	18.9	25.1	24.0	21.8	19.1	24.2	21.2
Conductividad (campo)	µS/cm				363.7	186.8	807.6	685.5	267.4	121.8	518	542.8
Oxígeno disuelto (campo)	mg/L				5.14	0.28	7.48	5.92	6.2	0.8	8.5	7.79
Cr VI					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DBO					15	15	25	<10	<10	<10	<10	<10
Coliformes Fecales	NMP/100ml				2x10 <sup>6</sup>	2x10 <sup>4</sup>	5x10 <sup>6</sup>	2.4 x 10 <sup>4</sup>	9x10 <sup>4</sup>	1x10 <sup>2</sup>	2x10 <sup>5</sup>	2.4x10 <sup>3</sup>
Color Real	U Pt/Co				172	19	351	<1	342	29	824	<1
Materia Flotante					NR	NR	NR	Ausente	NR	NR	NR	Ausente
Turbidez	NTU				14.15	6.09	22.2	4.37	25.72	4.93	46.5	4.42
Aluminio Disuelto	mg/L				0.033	<0.03	0.06	<0.03	0.087	<0.03	0.22	<0.03
Aluminio Total		0.2			2.39	0.04	7.35	0.22	2.96	0.4	8.6	0.19
Antimonio Disuelto					0.001	<0.0004	0.0033	0.0017	0.0006	<0.0004	0.0013	0.0004
Antimonio Total		0.006			0.001	<0.0004	0.0027	0.0019	0.0007	<0.0004	0.0012	0.0006
Arsénico Disuelto					0.0043	0.0025	0.0064	0.0037	0.004	0.0023	0.0057	0.0044
Arsénico Total		0.01	0.1		0.006	0.0041	0.0096	0.0046	0.0042	0.002	0.006	0.005
Bario Disuelto					0.107	0.074	0.143	0.12	0.094	0.056	0.135	0.111
Bario Total		1			0.136	0.102	0.185	0.133	0.121	0.09	0.154	0.117
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	0.03	0.043	<0.01	0.09	0.13
Boro Total					0.023	<0.01	0.06	0.04	0.041	<0.01	0.1	0.15
Cadmio Disuelto					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmio Total		0.003	0.1		<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	0.0002	<0.0001
Calcio Disuelto					50.4	17.5	156	102	35.7	18.2	78.3	61.9
Calcio Total					52.1	18.6	156	102	36.2	18.5	79.7	60.8
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	0.07	0.09	<0.02	0.17	0.03
Hierro Total	0.3			1.53	0.05	4.36	0.41	1	0.25	2.2	0.2	
Plomo Disuelto				0.0001	<0.0001	0.0003	<0.0001	0.0002	<0.0001	0.0005	<0.0001	
Plomo Total	0.015	0.4		0.003	<0.0001	0.0089	0.0006	0.0022	0.0002	0.008	0.0003	
Litio Disuelto				<0.02	<0.02	0.04	0.023	<0.02	<0.02	0.04	0.041	
Litio Total				<0.02	<0.02	0.04	0.021	<0.02	<0.02	0.04	0.04	
Magnesio Disuelto				6.3	3.2	14.7	8.5	6	3.3	9.7	8.9	
Magnesio Total				6.6	3.3	14.8	8.9	6.2	3.4	10.1	9	
Manganeso Disuelto				0.095	0.009	0.118	0.156	0.057	0.023	0.148	0.111	
Manganeso Total	0.4			0.1808	0.047	0.349	0.179	0.115	0.043	0.187	0.154	
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-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Molibdeno Disuelto					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Molibdeno Total					<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02
Níquel Disuelto					<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Níquel Total		0.61		2	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.008
Potasio Disuelto					6.5	5.8	7.4	9.7	6	4.5	8.1	6.7
Potasio Total					6.8	6.4	7.8	10.1	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	0.0002	<0.0001	<0.0001	0.0001	<0.0001
Selenio Total		0.17			0.00011	<0.0001	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0002
Plata Disuelta					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Plata Total					<0.00005	<0.00005	0.00007	<0.0001	<0.00005	<0.00005	0.00007	<0.00005
Sodio Disuelto					18.8	12.3	33.7	32.2	17.6	10.7	26.9	31.2
Sodio Total					18.4	12.9	34.3	33.2	17.4	11	28.5	31.4
Estroncio Disuelto					0.44	0.16	1.5	0.963	0.29	0.14	0.71	0.533
Estroncio Total					0.44	0.16	1.48	0.985	0.295	0.14	0.73	0.535
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	<0.0002	<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	0.007	<0.005	<0.005	0.009	0.007
Titanio Total					0.069	<0.005	0.195	0.018	0.084	0.015	0.237	0.013
Uranio Disuelto					0.00014	<0.0001	0.0003	<0.0001	0.00014	<0.0001	0.0002	0.0001
Uranio Total					0.00022	0.0001	0.0003	<0.0002	0.00022	0.0002	0.0003	0.0001
Vanadio Disuelto					<0.005	<0.005	0.006	<0.005	<0.005	<0.005	0.006	<0.005
Vanadio Total					<0.005	<0.005	0.01	<0.005	0.0054	<0.005	0.012	<0.005
Zinc Disuelto					<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.03	<0.01
Zinc Total		7.4		10	0.015	<0.01	0.04	<0.01	<0.01	<0.01	0.03	<0.01
Grasas y Aceites			10	10	<2.04	<2.02	<2.062	3.3	<2.02	<2.02	<5	<2.2
DQO			125		20	<10	40	13	17.8	<10	35	<10
Cloruros		250			10	7	19	28.8	12	6	20	31.5
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	0.34	0.006	<0.003	0.013	0.29
Nitratos/Nitritos como N					3.07	2.01	5.23	2.95	1.97	1.14	3.85	0.97
Amonio					0.24	<0.05	0.58	0.76	0.129	<0.05	0.22	<0.05
Nitrógeno Kjeldahl (TKN)					0.74	<0.1	1.6	1.3	0.57	0.3	0.9	0.2
Fosfatos					0.55	0.3	1	0.74	0.49	0.22	1.3	0.47
Fósforo Disuelto (Orto)					0.18	0.08	0.33	0.22	0.18	0.09	0.49	0.15
Fósforo Total			2	10	0.27	0.12	0.51	0.26	0.25	0.09	0.58	0.17
STD (TDS)		500			312	160	750	542	255	160	440	406
SST (TSS)			50	100	34	<5	102	<5	73	<5	340	<5
ST (TS)					362	180	750	572	310	200	450	420
Sulfatos		250			91	22	360	214	60	25	169	140
Alcalinidad Total					79	50	110	85.4	70	45	90	87.2
Hidrocarburos totales (TPH)					<0.01	<0.01	<0.01	<0.1	70	45	90	<0.1

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



### 4.3.3 Agua Subterránea

En el Cuadro 4-5 se presentan los resultados de la calidad del agua subterránea (manantiales) y los resultados de laboratorio se presentan en el Anexo 11.5.2. En términos generales los parámetros analizados en las estaciones GW-1A, GW-2 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 17.5 y 24.0 °C. La lectura menor de pH se obtuvo en la estación GW-3 (6.38 u.e.) y la mayor en la estación GW-2 (6.53 u.e.). Los Sólidos Suspendidos Totales (**SST**) no se registraron en ninguna de las estaciones monitoreadas. 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. 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-16	Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
STD (TDS)	mg/L	500			190	190	190		223	130	350	138	213	190	260	414	170	170	170	NA	NR	NR	NR	NA
SST (TSS)			50	100	6.5	6	7		7.7	6	9	<5	39	5	105	<5	206	206	206					
ST (TS)					200	180	220		237.5	140	380	136	217.5	170	270	422	360	360	360					
Sulfatos		250			12.5	11	14		43	7	90	12.7	30	16	71	155	7	7	7					
Alcalinidad Total					31	31	31		0.18	0.09	0.27	47	83	71	97	69.5	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 analizado. NR= Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.



Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-2				MW-3				MW-4				MW-5				
					Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16	
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		
Fosfatos	mg/L				0.233	0.21	0.27	NA	0.315	0.27	0.37	0.25	0.248	0.24	0.27	0.25	0.203	0.15	0.24	0.12	
Fósforo Total			2	10	0.24	0.06	0.44		0.09	0.08	0.1	0.08	0.07	0.06	0.08	0.07	0.06	0.05	0.07	0.05	
STD (TDS)		500			253	190	360		470	460	480	496	553	540	560	454	305	290	320	796	
SST (TSS)			50	100	345.8	137	584		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	16
ST (TS)					597.5	350	810		487.5	450	510	500	555	520	580	464	325	280	350	806	
Sulfatos		250			28.5	4	97		166	162	169	176	212.5	210	220	156	72.3	64	76	344	
Alcalinidad Total					64	56	80		84	82	86	83.8	85	83	88	86.5	66	61	68	99.5	

u.e.: unidades exponenciales. mg/L: miligramos por litro.  $\mu$ S/cm: micro siemens por centímetro. °C: grados centígrados. NMP/100ml: número más probable en 100ml. u Pt/Co: unidades platino cobalto. NA: No Analizado por haber agua al momento del monitoreo. NA: no analizado. NR = Cálculo No Realizado por falta de datos de línea base. Fuente: MSR, 2016.



Parámetros	Unidades	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW-6				MW-7				MW-8				MW-9			
					Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo	
Fosfatos	mg/L				0.173	0.15	0.21	0.16	0.113	0.09	0.18	<0.06	0.23	0.21	0.24	0.16	<0.03	<0.03	<0.03	0.53
Fósforo Total			2	10	0.05	0.04	0.06	0.05	0.04	0.01	0.07	0.03	0.07	0.06	0.08	0.07	<0.01	<0.01	0.02	0.03
STD (TDS)		500			340	260	440	880	233	220	250	656	277	270	290	662	905	890	920	0.15
SST (TSS)			50	100	<5	<5	<5	<5	19.75	7	45	<5	9	6	14	<5	27	25	29	336.0
ST (TS)					345	240	450	890	260	230	280	664	300	290	310	672	940	910	970	<5
Sulfatos		250			85.3	33	153	400	19.3	17	23	256	54.7	54	55	288	440	440	440	352
Alcalinidad Total					65	62	68	71.0	48	41	60	90.2	68	66	70	77.3	147	136	157	88.5

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





Parámetros	Unidad	USEPA Salud Humana	IFC Agua Residual Tratada	Acuerdo 236-2006	MW11			PSA-SR			HW-1			RW-1			PSA-1							
					Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16	Línea Base			Mar-16				
					Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo		Promedio	Mínimo	Máximo					
Fosfatos	mg/L				0.03	0.03	0.03	<0.06	0.06	0.06	0.06	0.06				0.12				0.12				<0.06
Fósforo Total			2	10	0.06	0.06	0.06	<0.02	0.02	0.02	0.02	<0.02				0.03				0.05				<0.02
STD (TDS)		500			1370	1370	1370	1360	320	320	320	650				542				1090				1020
SST (TSS)			50	100	145	145	145	<5	<5	<5	<5	<5	NR	NR	NR	<10	NR	NR	NR	8.0	NR	NR	NR	<5
ST (TS)					1000	1000	1000	1400	300	300	300	638				534				1130				1050
Sulfatos		250			700	700	700	685	45	45	45	299				232				588				525
Alcalinidad Total					133	133	133	134	186	186	186	175				145				129				160

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

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 2016. 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 6.23 a 7.56 u.e. y la temperatura en el rango de 22.8 a 31.0 °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-9, MW-11, PSA-SR, RW-1 y PSA-1 los valores registrados de sulfatos se encuentran por encima de los valores establecidos durante el levantamiento de línea base y/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 MW5, MW9 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, Escandio, Plomo y Cianuro total no fueron detectados en ninguno de los pozos monitoreados.

El Antimonio se detectó en los pozos MW-4, MW-5, MW-6, MW-7, MW-8 y PSA-SR 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 Arsénico fue detectado en todas las estaciones de pozos de monitoreo y las concentraciones se encuentran dentro los mínimos y máximos establecidos en la línea base y por debajo de lo estipulado por la USEPA (0.01 mg/L).

## 5 Sedimentos

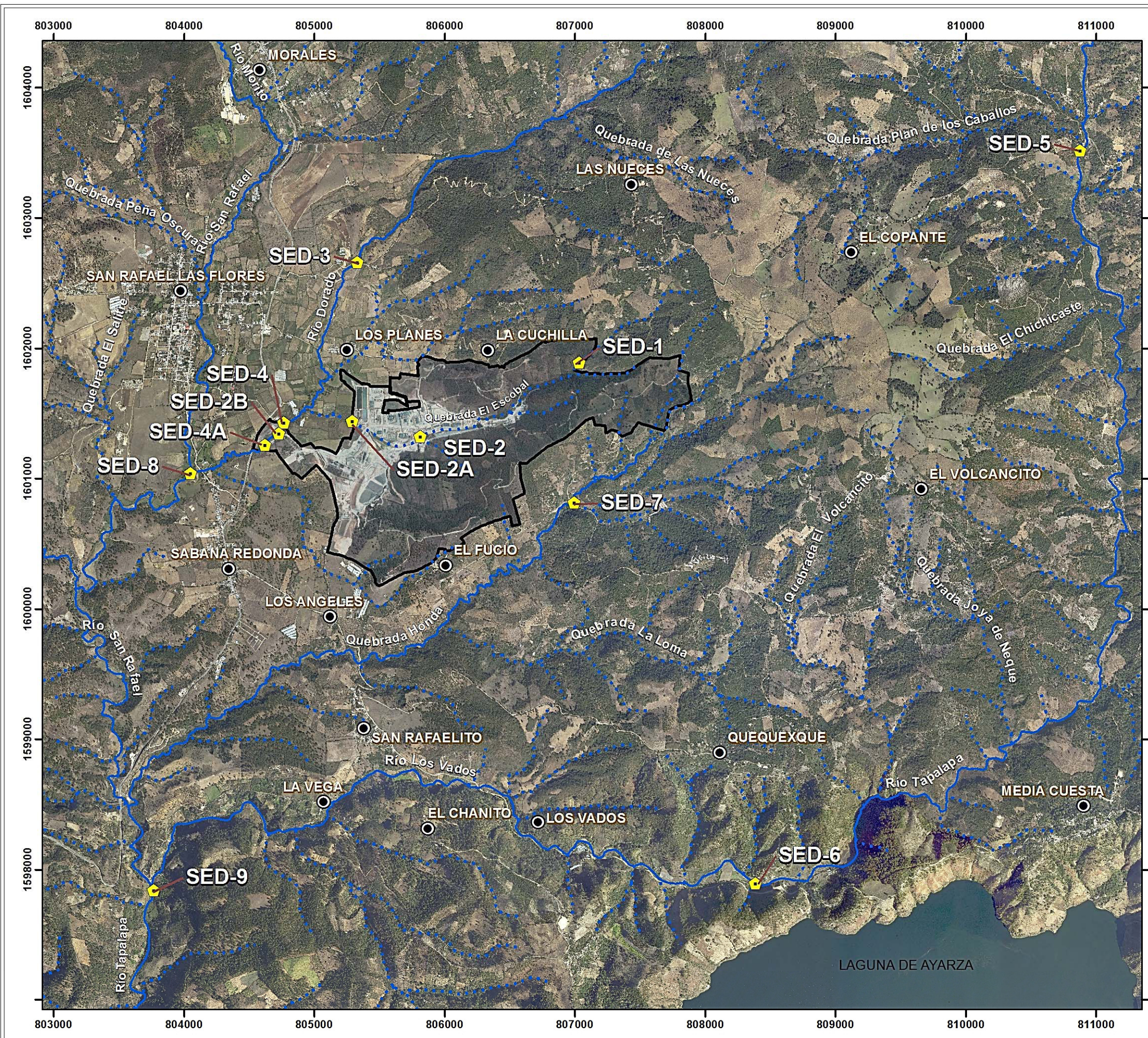
### 5.1 Sitios de Monitoreo

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

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


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

Nota: en ninguna de las estaciones monitoreadas se cuenta con línea base de metales en sedimentos. Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.



## MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO DE SEDIMENTOS





PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



**MINERA**  
**SAN RAFAEL**  
DEPARTAMENTO DE AMBIENTE


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

### LEYENDA


Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

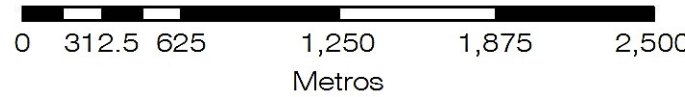
  

### ESTACIONES DE MONITOREO

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

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

Fecha de Elaboración: Abril de 2016	
Distancia Horizontal y Vertical de Grilla: 1,000 metros	
<b>Escala 1:30,000</b>	



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

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

Fuente: MSR, 2016.

## 5.3 Resultados

En el Cuadro 5-3 se presenta los resultados de metales registrados para el mes de Marzo de 2016. Los resultados del laboratorio se presentan en el Anexo 11.6.

El porcentaje de fósforo total se encuentra en el rango de 0.009234% (SED-6) a 0.0994% (SED-8). No se detectó cianuro en ninguna de las estaciones muestreadas, a excepción de las estaciones SED-2 y SED-4.

El mercurio se detectó únicamente en SED-2, SED-2A, SED-3 y SED-5 en concentraciones por debajo de lo establecido (25 mg/kg) para la disposición de lodos en el suelo establecidos por el Acuerdo 236-2006. Las concentraciones de Cadmio, Cromo y Plomo registradas están muy por debajo de los valores guía, a excepción 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-16	Mar-16	Mar-16	Mar-16	Mar-16	Mar-16
Arsénico Total	mg/Kg**	50	8.2	45.7	35.1	7.7	19.4	21.6
Cadmio Total	mg/Kg**	50	0.56	15.7	5.91	0.23	1.35	1.62
Cromo Total	mg/Kg**	1500	3.6	11.7	7.9	2.7	11.4	8.5
Plomo Total	mg/Kg**	500	13.0	806	256	6.34	49.1	72.3
Mercurio Total	mg/Kg**	25	<0.05	0.2	0.13	0.12	<0.1	<0.08
Cianuro Total	mg/Kg**		<0.2	1.1	<0.3	<0.2	0.3	<0.2
Fósforo Total	%		0.0248	0.0589	0.0424	0.0126	0.123	0.0436

Parámetro	Unidades	Acuerdo 236-2006	SED-5	SED-6	SED-7	SED-8	SED-9
		Aplicación al suelo	Mar-16	Mar-16	Mar-16	Mar-16	Mar-16
Arsénico Total	mg/Kg**	50	10.3	11	NA	8.6	9.1
Cadmio Total	mg/Kg**	50	0.36	0.19		0.37	0.61
Cromo Total	mg/Kg**	1500	6.2	2.9		2.5	5.3
Plomo Total	mg/Kg**	500	7.7	4.38		10.4	17.9
Mercurio Total	mg/Kg**	25	0.1	<0.05		<0.06	<0.04
Cianuro Total	mg/Kg**		<0.2	<0.2		<0.2	<0.2
Fósforo Total	%		0.0167	0.00923		0.0994	0.027

\*Al momento de tomar la muestra el cuerpo de agua se encontraba sin agua. NA: No analizado. mg/Kg: miligramo por kilogramo. \*\* mg/kg de materia seca a 104°C. %: porcentaje. \*LMP para suelos con pH < 7 unidades, en los suelos que posean pH>7 se podrán disponer lodos hasta un 50% mayor de los valores presentados como LMP. Fuente: MSR, 2016.



## 6 Calidad de Efluentes

### 6.1 Sitios de Monitoreo

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

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

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

Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar. Fuente: MSR, 2016.





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

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



DEPARTAMENTO DE AMBIENTE

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

LEYENDA

Símbolo	Descripción
	Polígono del Proyecto
	Centro Poblado
	Río Permanente
	Quebrada Intermitente

ESTACIÓN DE MONITOREO

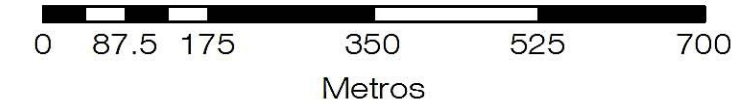
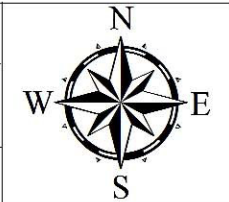
Símbolo	Estación	X	Y
	WW9	805461	1601314

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

Fecha de Elaboración: Abril de 2016

Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

Escala 1:8,000





## 6.2 Metodología

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

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

<b>Parámetros analizados</b>	
<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.
<b>Procedimiento</b>	
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.	
<b>Equipo utilizado</b>	
Nombre	Automuestreador
Modelo	6712 Full-size con módulo integrado 701 para medición continua de pH y temperatura.
Fabricante	ISCO

Fuente: MSR, 2016.

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

## 6.3 Resultados

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

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

Mes	Unidades	LMP Acuerdo 236-2006	Febrero	Marzo	Abril	Febrero	
Control de Calidad			Blanco	Blanco	Blanco	Duplicado	Original
ID Muestra			WW10	WW10	WW10	WW11	WW9
No. Reporte Lab.			328-16	470-16	594-16	329-16	237-16
Grasas y Aceites	mg/L	10	<5	<5	<5	<5	<5
Materia Flotante	NL	Ausente	ausente	ausente	ausente	ausente	ausente
DBO	mg/L	200	< 10	< 10	< 10	<10	< 10
DQO			< 25	< 25	< 25	<25	< 25
SST (TSS)		100	< 10	< 10	< 10	<10	< 10
Sólidos Sedimentables			< 0.1	< 0.1	< 0.1	<0.1	< 0.1
Nitrógeno Total		20	<10	<10	<10	<10	<10
Fósforo Total		10	<0.05	<0.05	<0.05	<0.05	<0.05
Arsénico		0.1	<0.002	<0.002	<0.002	0.006	0.007
Cadmio		0.1	<0.02	<0.02	<0.02	<0.02	<0.02
Cobre		3	<0.03	<0.03	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Cianuro Total*		1	<0.003	<0.003	<0.003	<0.003	<0.003
Mercurio		0.01	<0.004	<0.004	<0.004	<0.004	<0.004
Níquel		2	<0.05	<0.05	<0.05	<0.05	<0.05
Plomo		0.4	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc		10	<0.01	<0.01	<0.01	<0.01	<0.01
Color Aparente	u Pt/Co	500	< 1	< 1	< 1	< 1	< 1
Color Real			< 1	< 1	< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 <sup>4</sup>	< 2	< 2	< 2	4.5	23

\*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, 2016.

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

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

Los valores de pH se encontraron en el rango de 6.63 a 7.74 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					15/02/2016	16/03/2016	11/04/2016
ID Muestra					WW9	WW9	WW9
No. Reporte Lab.					237-16	422-16	593-16
pH de campo	u.e.	6.0-9.0	6.0-9.0	6.0-9.0	7.16	6.63	7.74
Temperatura de campo	°C		+/- 3		24.4	26.6	26.5
Temperatura. Quebrada El Escobal					30.3	30.9	33.5
Grasas y Aceites	mg/L	10	10		<5	<5	<5
Materia Flotante		Ausente			ausente	ausente	ausente
DBO	mg/L	200	50		< 10	< 10	< 10
DQO			150		< 25	< 25	< 25
SST (TSS)		100	50	30	< 10	< 10	< 10
Sólidos Sedimentables					< 0.1	< 0.1	< 0.1
Nitrógeno Total		20	10		<10	<10	<10
Fósforo Total		10	2		<0.05	<0.05	<0.05
Arsénico		0.1	0.1		0.007	0.008	0.007
Cadmio		0.1	0.05		<0.02	<0.02	<0.02
Cobre		3	0.3	0.3	<0.03	<0.03	<0.03
Cromo Hexavalente		0.1	0.1		<0.05	<0.05	<0.05
Cianuro Total*		1	1		<0.003	<0.003	<0.003
Mercurio		0.01	0.002	0.002	<0.004	<0.004	<0.004
Níquel		2	0.5		<0.05	<0.05	<0.05
Plomo		0.4	0.2	0.6	<0.05	<0.05	<0.05
Zinc		10	0.5	1.5	<0.01	0.06	<0.01
Color Aparente		u Pt/Co	500			< 1	6
Color Real					< 1	< 1	< 1
Coliformes Fecales	NMP/100ml	<1x10 <sup>4</sup>	400		23	4.5	540

u.e. unidades electroquímicas. °C: grados centígrados. mg/L: miligramos por litro. U Pt/Co: unidades de Platino-Cobalto. NMP/100ml: número más probable en 100 mililitros. \*: análisis efectuados en laboratorio ACZ. Fuente: MSR, 2016.



## 7 Vibraciones

### 7.1 Sitios de Monitoreo

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

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

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

Sistema de coordenadas proyectadas UTM, DATUM WGS-84. Msnm: metros sobre el nivel del mar.  
Fuente: MSR, 2016.





# MAPA DE LOCALIZACIÓN ESTACIONES DE MONITOREO DE VIBRACIONES PERMANENTE

PROYECTO MINERO ESCOBAL  
SAN RAFAEL LAS FLORES, SANTA ROSA



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

## LEYENDA

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

## ESTACIONES DE MONITOREO

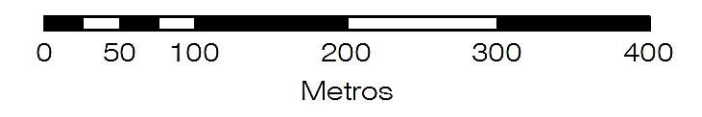
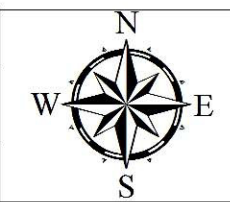
Símbolo	Estación	X	Y
	BS-1	806419	1601819
	BS-2	806361	1601492
	BS-3	805791	1601785

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 2016

Distancia Horizontal y Vertical  
de Grilla: 1,000 metros

**Escala 1:5,000**







## 7.2 Metodología

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

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

<b>PARAMETROS ANALIZADOS</b>	
Velocidad	Velocidad de partícula
<b>PROCEDIMIENTO</b>	
Se registraron todas las voladuras realizadas en ambos portales durante los meses de febrero a abril de 2016. Y se enlistan las velocidades de partículas registrados por los equipos de vibraciones.	
<b>EQUIPO UTILIZADO</b>	
Equipo	eXPeak Seismograph modelo eXAD-8
Fabricante	Physical Measurement Technologies, Inc.

Fuente: MSR, 2016.

## 7.3 Resultados

En el Cuadro 7-3 se presentan todas las mediciones de las voladuras registradas en los 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

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1315-6890	1	06:00	<1.3
	1265-6790	1	06:05	<1.3
	1480-7420	1	06:10	<1.3
	1480-RAMPA	1	06:15	<1.3
	1365-6760	1	06:20	<1.3
	1215-6360	1	18:00	<1.3
	1240-6560	1	18:05	<1.3
	1480-7380	1	18:10	<1.3
	1480-C/F.E.	1	18:15	<1.3
	1480-7440	2	06:00	<1.3
	1480-7420	2	06:05	<1.3
	1240-cfto	2	06:10	<1.3
	1265-7460	2	06:15	<1.3
	1390-6850	2	06:20	<1.3
	1480-SERV	2	06:25	<1.3
	1480-RAMPA	2	18:00	<1.3
	1315-6890	2	18:05	<1.3
	1265-6790	2	18:10	<1.3
	1340-6730	2	18:15	<1.3
	1365-PORT	2	18:20	<1.3
	1430-7340	3	06:00	<1.3
	1240-6560	3	06:05	<1.3
	1390-CFTO	3	06:10	<1.3
	1315-6630	3	06:15	<1.3
	1340-6440	3	06:20	<1.3
	1455-7420	3	06:25	<1.3
	1340-6730	3	18:00	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1365-6540	3	18:05	<1.3
	1190-6790	3	18:10	<1.3
	1240-CFTO	3	18:15	<1.3
	1480-7380	3	18:20	<1.3
	1480-6720	4	06:00	<1.3
	1315-6890	4	06:05	<1.3
	1390-6860	4	06:10	<1.3
	1340-6960	4	06:15	<1.3
	1480-7440	4	06:20	<1.3
	1480-7480	4	06:25	<1.3
	1340-6490	4	18:00	<1.3
	1480-RAMPA	4	18:05	<1.3
	1240-CFTO	4	18:10	<1.3
	1190-6740	5	06:00	<1.3
	1265-6470	5	06:05	<1.3
	1480-7440	5	06:10	<1.3
	1480-7480	5	06:15	<1.3
	1455-7420	5	06:20	<1.3
	1430-7340	5	18:00	<1.3
	1390-CFTO	5	18:05	<1.3
	1340-6730	5	18:10	<1.3
	1480-7400	6	06:00	<1.3
	1315-6890	6	06:05	<1.3
	1340-6890	6	06:10	<1.3
	1240-CFTO	6	06:15	<1.3
	1265-6790	6	06:20	<1.3
	1240-6560	6	18:00	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1190-6900	6	18:05	<1.3
	1290-7100	6	18:10	<1.3
	1480-RAMPA	6	18:15	<1.3
	1455-VENT	6	18:20	<1.3
	1265-6470	6	18:25	<1.3
	1480-7420	6	18:30	<1.3
	1480-7480	7	06:00	<1.3
	1340-6490	7	06:05	<1.3
	1190-6790	7	06:10	<1.3
	1480-CFTE	7	06:15	<1.3
	1455-7420	7	06:20	<1.3
	1480-7420	7	18:00	<1.3
	1480-7440	7	18:05	<1.3
	1265-6476	7	18:10	<1.3
	1265-6790	7	18:15	<1.3
	1480-SERVI	7	18:20	<1.3
	1240-6780	8	06:00	<1.3
	1390-6860	8	06:05	<1.3
	1240-CFTO	8	06:10	<1.3
	1390-CFTO	8	06:15	<1.3
	1240-6560	8	06:20	<1.3
	1315-6890	8	06:25	<1.3
	1430-7340	8	06:30	<1.3
	1455-SERV	8	18:00	<1.3
	1290-7100	8	18:05	<1.3
	1190-6790	8	18:10	<1.3
	1480-7480	8	18:15	<1.3
	1480-RAMPA	9	06:00	<1.3
	1340-6490	9	06:05	<1.3
	1265-6470	9	06:10	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1265-6790	9	06:15	<1.3
	1390-6860 PROD	9	06:20	<1.3
	1455-SERV	9	18:00	<1.3
	1240-6560	9	18:05	<1.3
	1480-CFTE	9	18:10	<1.3
	1480-7440	9	18:15	<1.3
	1190-6900	9	18:20	<1.3
	1240-CFTO	10	06:00	<1.3
	1190-6790	10	06:05	<1.3
	1340-6490	10	06:10	<1.3
	1240-6780	10	18:00	<1.3
	1480-7480	10	18:05	<1.3
	1390-CFTO	10	18:10	<1.3
	1265-6470	10	18:15	<1.3
	1480-RAMPA	11	06:00	<1.3
	1480-7420	11	06:05	<1.3
	1190-6900	11	06:10	<1.3
	1290-7100	11	06:15	<1.3
	1390-6860	11	06:20	<1.3
	1240-6560	11	18:00	<1.3
	1240-CFTO	11	18:05	<1.3
	1480-CFTO	11	18:10	<1.3
	1265-6790	12	06:00	<1.3
	1315-6960	12	06:05	<1.3
	1240-6780	12	18:00	<1.3
	1490-6770	12	18:05	<1.3
	1480-7420	12	18:10	<1.3
	1480-7440	12	18:15	<1.3
	1190-6790	13	06:00	<1.3
	1215-6900	13	06:05	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1265-7470	13	06:10	<1.3
	1315-6770	13	06:15	<1.3
	1390-6880	13	18:00	<1.3
	1340-6770	13	18:05	<1.3
	1240-6560	13	18:10	<1.3
	1290-7100	13	18:15	<1.3
	1340-6490	13	18:20	<1.3
	1190-6790	14	06:00	<1.3
	1190-6900	14	06:05	<1.3
	1265-6770	14	06:10	<1.3
	1215-6900	14	18:00	<1.3
	1240-CFTO	14	18:05	<1.3
	1390-6840	14	18:10	<1.3
	1480-7440	14	18:15	<1.3
	1265-6470	14	18:20	<1.3
	1190-6900	15	06:00	<1.3
	1290-7100	15	06:05	<1.3
	1340-6490	15	06:10	<1.3
	1390 C/F.O.	15	06:15	<1.3
	1480-7420	15	18:00	<1.3
	1505-Rampa	15	18:05	<1.3
	1265-6790	15	18:10	<1.3
	1265-6470	15	18:15	<1.3
	1190-6900	16	06:00	<1.3
	1290-7100	16	06:05	<1.3
	1340-6490	16	06:10	<1.3
	1390 C/F.O.	16	06:15	<1.3
	1480-7360	16	18:00	<1.3
	1190-6900	16	18:05	<1.3
	1190-6790	16	18:10	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1430-7440	16	18:15	<1.3
	1505-RAMPA	17	06:00	<1.3
	1340-6770	17	06:05	<1.3
	1265-6790	17	06:10	<1.3
	1265-6470	17	06:15	<1.3
	1240-6440	17	06:20	<1.3
	1480-7420	17	18:00	<1.3
	1215-6900	17	18:05	<1.3
	1190-6540	17	18:10	<1.3
	1390-6840	17	18:15	<1.3
	1190-6900	18	06:00	<1.3
	1480-7360	18	06:05	<1.3
	1265-6790	18	06:10	<1.3
	1340-6490	18	06:15	<1.3
	1240-6560	18	18:00	<1.3
	1265-6470	18	18:05	<1.3
	1190-6420	18	18:10	<1.3
	1390-6880	18	18:15	<1.3
	1505-RAMPA	19	06:00	<1.3
	1480-7420	19	06:05	<1.3
	1340-6770	19	06:10	<1.3
	1480-7440	19	06:15	<1.3
	1480-VENT	19	18:00	<1.3
	1240-6460	19	18:05	<1.3
	1240-CFTO	19	18:10	<1.3
	1480-7360	19	18:15	<1.3
	1215-6900	20	06:00	<1.3
	1455-7340	20	06:05	<1.3
	1455-7340	20	06:10	<1.3
	1430-7360	20	06:15	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1240-6440	20	06:20	<1.3
	1390-6880	20	18:00	<1.3
	1390-6840	20	18:05	<1.3
	1340-6770	20	18:10	<1.3
	1265-6790	20	18:15	<1.3
	1340-6490	20	18:20	<1.3
	1480-7360	21	06:00	<1.3
	1390-CFTO	21	06:05	<1.3
	1480-7420	21	06:10	<1.3
	1505-RAMPA	21	06:15	<1.3
	1455-6340	21	06:20	<1.3
	1240-C/FO	21	18:00	<1.3
	1430-7340	21	18:05	<1.3
	1240-6560	21	18:10	<1.3
	1480-7440	21	18:15	<1.3
	1215-6540	21	18:20	<1.3
	1480-7360	22	06:00	<1.3
	1390-CFTO	22	06:05	<1.3
	1480-7420	22	06:10	<1.3
	1505-RAMPA	22	06:15	<1.3
	1455-6340	22	06:20	<1.3
	1240-C/FO	22	18:00	<1.3
	1430-7340	22	18:05	<1.3
	1240-6560	22	18:10	<1.3
	1480-7440	22	18:15	<1.3
	1215-6540	22	18:20	<1.3
	1430-7340	23	06:00	<1.3
	1455-7340	23	06:05	<1.3
	1215-6540PROD	23	06:10	<1.3
	1505-RAMPA	23	06:15	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1340-6490	23	18:00	<1.3
	1480-7440	23	18:05	<1.3
	1430-7370	23	18:10	<1.3
	1480-7420	24	06:00	<1.3
	1215-6900	24	06:05	<1.3
	1480-VENT	24	06:10	<1.3
	1505-AUX	24	18:00	<1.3
	1390-6840	24	18:05	<1.3
	1390-C/F.O	24	18:10	<1.3
	1480-7420	25	06:00	<1.3
	1215-6900	25	06:05	<1.3
	1480-VENT	25	06:10	<1.3
	1505-AUX	25	18:00	<1.3
	1390-6840	25	18:05	<1.3
	1390-C/F.O	25	18:10	<1.3
	1390-CFTO	26	06:00	<1.3
	1505-ACCS	26	06:05	<1.3
	1430-7370	26	06:10	<1.3
	1480-7400	26	06:15	<1.3
	1480-7380	26	18:00	<1.3
	1480-VENT	26	18:05	<1.3
	1390-6840	27	06:00	<1.3
	1190-6360	27	06:05	<1.3
	1340-6770	27	06:10	<1.3
	1480-7360	27	06:15	<1.3
	1430-7340	27	18:00	<1.3
	1455-7340	27	18:05	<1.3
	1315-6730	27	18:10	<1.3
	1505-RAMPA	27	18:15	<1.3
	1505-ACC.	27	18:20	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1215-6900	28	06:00	<1.3
	1480-7400	28	06:05	<1.3
	1480-7380	28	06:10	<1.3
	1430-7380	28	06:15	<1.3
	1240-CF-O	28	06:20	<1.3
	1265-6790	28	18:00	<1.3
	1340-6770	28	18:05	<1.3
	1390-CFTO	28	18:10	<1.3
	1415-ACCE	28	18:15	<1.3
	1480-7360	28	18:20	<1.3
	1290-CFTE	29	06:00	<1.3
	1480-VENT	29	06:05	<1.3
	1430-7340	29	06:10	<1.3
	1390-6840	29	06:15	<1.3
	1315-6730 PROD	29	06:20	<1.3
	1480-7380	29	18:00	<1.3
	1430-7370	29	18:05	<1.3
	1340-6980 DESG	29	18:10	<1.3
	1265-6970	29	18:15	<1.3
	1390-6800	30	06:00	<1.3
	1215-6900	30	06:05	<1.3
	1480-SERV	30	18:00	<1.3
	1315-6730	30	18:05	<1.3
	1480-7360	30	18:10	<1.3
	1240-CFTO	30	18:15	<1.3
	1390-6840	30	18:20	<1.3
	1290-CFTE	30	18:25	<1.3
	1455-7340	31	06:00	<1.3
1340-6770	31	06:05	<1.3	
1415-ACSS	31	06:10	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Febrero	1315-6730	31	06:15	<1.3
	1340-6960	31	06:20	<1.3
	1430-7370	31	18:00	<1.3
	1505-RAMPA	31	18:05	<1.3
	1480-7380	31	18:10	<1.3
	1240-6480	1	06:00	<1.3
Marzo	1455-7440	1	06:05	<1.3
	1290-6730	1	18:00	<1.3
	1365-6540	2	06:00	<1.3
	1190-6360	2	06:05	<1.3
	1315-6560	2	06:10	<1.3
	1215-6360	2	06:15	<1.3
	1365-6560	2	06:20	<1.3
	1190-6780	2	18:00	<1.3
	1430-c.f.e.	2	18:05	<1.3
	1455-vent.	2	18:10	<1.3
	1240-6400	3	06:00	<1.3
	1240-6860	3	06:05	<1.3
	1355-DDST	3	06:10	<1.3
	1430-7360	3	06:15	<1.3
	1315-6670	3	06:20	<1.3
	1340-VENT.	3	06:25	<1.3
	1480-C,F,E,	3	18:00	<1.3
	1480-C,F,O,	3	18:05	<1.3
	1215-6780	3	18:10	<1.3
	1455-7440	3	18:15	<1.3
1190-6360	4	06:00	<1.3	
1240-6480	4	06:05	<1.3	
1365-6540	4	06:10	<1.3	
1430-C,F,E,	4	06:15	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1315-6670	4	18:00	<1.3
	1290-6730	4	18:05	<1.3
	1315-6530	4	18:10	<1.3
	1340-VNET.	4	18:15	<1.3
	1215-6360	4	18:20	<1.3
	1290-6810	5	06:00	<1.3
	1190-6780	5	06:05	<1.3
	1455-VENT.	5	06:10	<1.3
	1365-6560	5	06:15	<1.3
	1340-6670	5	18:00	<1.3
	1355-DDST	5	18:05	<1.3
	1455-7440	6	06:00	<1.3
	1240-6880	6	06:05	<1.3
	1240-6400	6	06:10	<1.3
	1240-6860	6	18:00	<1.3
	1215-6360	6	18:05	<1.3
	1315-6530	6	18:10	<1.3
	1480-C.F.O.	7	06:00	<1.3
	1240-6480	7	06:05	<1.3
	1290-6770	7	18:00	<1.3
	1365-6740	7	18:05	<1.3
	1190-6780	7	18:10	<1.3
	1365-6540	7	18:15	<1.3
	1340-6670	7	18:20	<1.3
	1455-VENT.	7	18:25	<1.3
	1340-6630	8	06:00	<1.3
	1355-DDST	8	06:05	<1.3
	1240-6400	8	06:10	<1.3
	1240-6860	8	06:15	<1.3
	1315-6400	8	06:20	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1215-6360	8	18:00	<1.3
	1365-6560	8	18:05	<1.3
	1365-6540	8	18:10	<1.3
	1365-6740	8	18:15	<1.3
	1190-6360	9	06:00	<1.3
	1215-6780	9	06:05	<1.3
	1315-6530	9	06:10	<1.3
	1190-6780	9	18:00	<1.3
	1240-6480	9	18:05	<1.3
	1340-6630	9	18:10	<1.3
	1455-7400	9	18:15	<1.3
	1340-6670	9	18:20	<1.3
	1290-6770	10	06:00	<1.3
	1240-6860	10	06:05	<1.3
	1355-DDST	10	06:10	<1.3
	1215-6360	10	06:15	<1.3
	1455-7440	10	06:20	<1.3
	1315-6630	10	06:25	<1.3
	1315-6770	10	18:00	<1.3
	1365-6900	10	18:05	<1.3
	1365-6540	10	18:10	<1.3
	1215-6480	10	18:15	<1.3
	1455-C.F.E.	10	18:20	<1.3
	14360-7440	11	06:00	<1.3
	1190-6360	11	06:05	<1.3
	1365-6860	11	06:10	<1.3
	1215-6480	11	06:15	<1.3
	1455-7400	11	06:20	<1.3
	1215-6780	11	18:00	<1.3
	1240-C.F.E.	11	18:05	<1.3



Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1365-6560	11	18:10	<1.3
	1340-6670	11	18:15	<1.3
	1190-6780	11	18:20	<1.3
	1315-6630	11	18:25	<1.3
	1315-6810	12	06:00	<1.3
	1340-6630	12	06:05	<1.3
	1215-6360	12	06:10	<1.3
	1480-RAMPA	12	06:15	<1.3
	1365-6540	12	06:20	<1.3
	1190-6360	12	18:00	<1.3
	1240-6480	12	18:05	<1.3
	1355-DDST	12	18:10	<1.3
	1480-C,F,E,	12	18:15	<1.3
	1480-C,F,O.	12	18:20	<1.3
	1365-6900	13	06:00	<1.3
	1365-6860	13	06:05	<1.3
	12156-6780	13	06:10	<1.3
	1365-6740	13	06:15	<1.3
	1340-6670	13	06:20	<1.3
	1215-6360	13	18:00	<1.3
	1190-6780	13	18:05	<1.3
	1430-7400	13	18:10	<1.3
	1365-6540	13	18:15	<1.3
	1240-6860	14	06:00	<1.3
	1455-vent.	14	06:05	<1.3
	1430-7400	14	06:10	<1.3
	1340-6630	14	18:00	<1.3
	1315-6770	14	18:05	<1.3
	1365-6560	14	18:10	<1.3
	1365-6540	15	06:00	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1480-RAMPA	15	06:05	<1.3
	1290-6810	15	06:10	<1.3
	1265-6730	15	18:00	<1.3
	1365-6860	15	18:05	<1.3
	1215-6780	16	06:00	<1.3
	1240-C/F,E	16	06:05	<1.3
	1340-6670	16	06:10	<1.3
	1190-6360	16	06:15	<1.3
	1365-6900	16	06:20	<1.3
	1340-6440	16	06:25	<1.3
	1340-6630	16	18:00	<1.3
	1290-6770	16	18:05	<1.3
	1190-6780	16	18:10	<1.3
	1455-VENT.	16	18:15	<1.3
	1355-DDST	17	06:00	<1.3
	1455-C.F.E.	17	06:05	<1.3
	1365-6860	17	06:10	<1.3
	1215-6360	17	06:15	<1.3
	1480-C.F.E.	17	06:20	<1.3
	1365-6560	17	06:25	<1.3
	1480-RAMPA	17	06:30	<1.3
	1480-C.F.O.	17	18:00	<1.3
	1365-6540	17	18:05	<1.3
	1340-6670	17	18:10	<1.3
	1240-6860	17	18:15	<1.3
	1315-6810	17	18:20	<1.3
	1340-6630	18	06:00	<1.3
	1430-7440	18	06:05	<1.3
	1215-6780	18	06:10	<1.3
	1365-6400	18	06:15	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1365-6480	18	06:20	<1.3
	1190-6360	18	06:25	<1.3
	1240-C.F.E.	18	18:00	<1.3
	1340-6670	18	18:05	<1.3
	1480-RAMPA	18	18:10	<1.3
	1365-6860	18	18:15	<1.3
	1215-6360	18	18:20	<1.3
	1315-6440	18	18:25	<1.3
	1480-C.F.E.	19	06:00	<1.3
	1480-C.F.O.	19	06:05	<1.3
	1365-6640	19	06:10	<1.3
	1315-6640	19	06:15	<1.3
	1315-6810	19	06:20	<1.3
	1365-6480	19	06:25	<1.3
	1365-6560	19	06:30	<1.3
	1340-6630	19	18:00	<1.3
	1355-DDST	19	18:05	<1.3
	1365-6900	19	18:10	<1.3
	1365-6860	20	06:00	<1.3
	1315-6730	20	06:05	<1.3
	1480-RAMPA	20	06:10	<1.3
	1190-6360	20	06:15	<1.3
	1290-6770	20	06:20	<1.3
	1365-6560	20	18:00	<1.3
	1215-6360	20	18:05	<1.3
	1315-6810	20	18:10	<1.3
	1340-6580	21	06:00	<1.3
	1390-c.f.o.	21	06:05	<1.3
	1265-6930	21	06:10	<1.3
	1365-6540	21	06:15	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1365-6860	21	06:20	<1.3
	1215-6780	21	18:00	<1.3
	1480-C.F.E.	21	18:05	<1.3
	1480-C,F,O,	21	18:10	<1.3
	1290-6730	21	18:15	<1.3
	1290-6340	21	18:20	<1.3
	1365-6900	22	06:00	<1.3
	1390-6900	22	06:05	<1.3
	1355-ddst	22	06:10	<1.3
	1315-6730	22	06:15	<1.3
	1365-6860	22	06:20	<1.3
	1480-rampa	22	06:25	<1.3
	1290-6730	22	06:30	<1.3
	1240-6480	22	06:35	<1.3
	1365-6560	22	18:00	<1.3
	1340-6630	23	06:00	<1.3
	1340-6670	23	06:05	<1.3
	1265-6930	23	06:10	<1.3
	1315-6810	23	06:15	<1.3
	1265-6850	23	06:20	<1.3
	1290-6730	23	06:25	<1.3
	1190-6360	23	18:00	<1.3
	1365-6520	23	18:05	<1.3
	1365-6860	23	18:10	<1.3
1365-6540	23	18:15	<1.3	
1480-rampa	23	18:20	<1.3	
1455-VENT.	24	06:00	<1.3	
1215-6780	24	06:05	<1.3	
1480-C.F.O.	24	06:10	<1.3	
1340-6580	24	06:15	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1430-7440	24	06:20	<1.3
	1340-6670	24	18:00	<1.3
	1340-6580	24	18:05	<1.3
	1355-DDST	24	18:10	<1.3
	1390-C,F,O,	24	18:15	<1.3
	1315-6480	24	18:20	<1.3
	1215-6360	24	18:25	<1.3
	1290-6420	24	18:30	<1.3
	1315-6730	25	06:00	<1.3
	1190-6540	25	06:05	<1.3
	1340-6630	25	06:10	<1.3
	1480-RAMPA	25	06:15	<1.3
	1365-VENT.	25	06:20	<1.3
	1240-6480	25	06:25	<1.3
	1480-C.F.O.	25	06:30	<1.3
	1265-6970	25	18:00	<1.3
	1265-6430	25	18:05	<1.3
	1315-6810	25	18:10	<1.3
	1480-C,F,O	25	18:15	<1.3
	1290-6530	25	18:20	<1.3
	1365-6520	25	18:25	<1.3
	1365-6540	26	06:00	<1.3
	1340-6670	26	06:05	<1.3
	1190-6360	26	06:10	<1.3
	1355-DDST	26	06:15	<1.3
	1365-6860	26	18:00	<1.3
	1390-C,F,O	26	18:05	<1.3
	1455-VENT.	26	18:10	<1.3
	1315-6770	26	18:15	<1.3
	1215-6780	27	06:00	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Marzo	1315-6730	27	06:05	<1.3
	1365-6520	27	06:10	<1.3
	1480-RAMPA	27	06:15	<1.3
	1240-6480	27	06:20	<1.3
	1455-7400	27	06:25	<1.3
	1340-6630	27	18:00	<1.3
	1315-6810	27	18:05	<1.3
	1480-RAMPA	27	18:10	<1.3
	1455-VENT.	27	18:15	<1.3
	1365-6900	27	18:20	<1.3
	1190-6360	27	18:25	<1.3
	13565-DDST	28	06:00	<1.3
	1480-C.F.O.	28	06:05	<1.3
	1365-6540	28	06:10	<1.3
	1365-6860	28	18:00	<1.3
	1390-6900	28	18:05	<1.3
	1390-C.F.O.	28	18:10	<1.3
	1315-6730	28	18:15	<1.3
	1480-rampa	29	06:00	<1.3
	1480-C.F.O.	29	06:05	<1.3
	1240-6480	29	06:10	<1.3
	1215-6780	29	06:15	<1.3
	1390-C.F.O	29	06:20	<1.3
	1355-DDST	29	18:00	<1.3
	1315-6850	29	18:05	<1.3
	1390-6920	29	18:10	<1.3
	1365-6900	29	18:15	<1.3
	1455-7400	29	18:20	<1.3
	1455-VENT.	30	06:00	<1.3
	1265-6930	30	06:05	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
<b>Marzo</b>	1265-6970	30	06:10	<1.3
	1340-6670	30	06:15	<1.3
	1315-6810	30	06:20	<1.3
	1430-7400	30	06:25	<1.3
	1190-6360	30	18:00	<1.3
	1480-RAMPA	30	18:05	<1.3
	1240-C,F,E,	30	18:10	<1.3
	1365-6520	30	18:15	<1.3
	1455-7400	30	18:20	<1.3
	1340-6680	30	18:25	<1.3
	1340-6630	31	06:00	<1.3
	1215-6540	31	06:05	<1.3
	1315-6810	31	06:10	<1.3
	1190-6540	31	06:15	<1.3
	1190-6360	31	06:20	<1.3
	1215-6780	31	18:00	<1.3
	1365-6860	31	18:05	<1.3
	1265-6930	31	18:10	<1.3
	1265-6890	31	18:15	<1.3
	<b>Abril</b>	1355-DDST	1	06:00
1315-6850		1	06:05	<1.3
1340-6670		1	06:10	<1.3
1390-C.F.O.		1	06:15	<1.3
1315-6730		1	18:00	<1.3
1365-6540		1	18:05	<1.3
1480-RAMPA		1	18:10	<1.3
1365-6520		1	18:15	<1.3
1190-6540		2	06:00	<1.3
1265-6970		2	06:05	<1.3
1365-6900	2	06:10	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
<b>Abril</b>	1190-6360	2	06:15	<1.3
	1265-6930	2	06:20	<1.3
	1315-6810	2	18:00	<1.3
	1340-6670	2	18:05	<1.3
	1240-C.F.E.	2	18:10	<1.3
	1480-RAMPA	2	18:15	<1.3
	1340-6670	2	18:20	<1.3
	1355-DDST	3	06:00	<1.3
	1340-6630	3	06:05	<1.3
	1365-6860	3	06:10	<1.3
	1315-6850	3	06:15	<1.3
	1190-6360	3	18:00	<1.3
	1290-6890	3	18:05	<1.3
	1390-C.F.O	3	18:10	<1.3
	1365-6520	3	18:15	<1.3
	1190-6540	4	06:00	<1.3
	1265-6970	4	06:05	<1.3
	1365-6900	4	06:10	<1.3
	1340-6670	4	06:15	<1.3
	1315-6730	4	18:00	<1.3
	1480-rampa	4	18:05	<1.3
	1215-6540	4	18:10	<1.3
	1365-6540	4	18:15	<1.3
	1240-C.F.E.	5	06:00	<1.3
	1355-DDST	5	06:05	<1.3
	1190-6540	5	06:10	<1.3
	1315-6710	5	06:15	<1.3
	1365-6540	5	06:20	<1.3
1265-6770	5	18:00	<1.3	
1365-6860	5	18:05	<1.3	

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1365-6520	5	18:10	<1.3
	1315-6810	6	06:00	<1.3
	1190-6360	6	06:05	<1.3
	1480-rampa	6	06:10	<1.3
	1365-6900	6	06:15	<1.3
	1340-6630	6	18:00	<1.3
	1315-6850	6	18:05	<1.3
	1265-6930	6	18:10	<1.3
	1265-6970	6	18:15	<1.3
	1315-6630	6	18:20	<1.3
	1190-6540	7	06:00	<1.3
	1340-6670	7	06:05	<1.3
	1480-RAMPA	7	06:10	<1.3
	1365-6900	7	06:15	<1.3
	1340-6960	7	06:20	<1.3
	1315-6530	7	18:00	<1.3
	1365-6540	7	18:05	<1.3
	1215-6510	7	18:10	<1.3
	1365-6860	7	18:15	<1.3
	1365-6520	7	18:20	<1.3
	1315-6770	7	18:25	<1.3
	1265-6890	8	06:00	<1.3
	1240-C.F.O.	8	06:05	<1.3
	1290-6430	8	06:10	<1.3
	1315-6850	8	06:15	<1.3
	1365-6520	8	06:20	<1.3
	1315-6810	8	06:25	<1.3
	1215-6360	8	18:00	<1.3
	1480-RAMPA	8	18:05	<1.3
	1290-6890	8	18:10	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1265-6930	8	18:15	<1.3
	1340-6630	8	18:20	<1.3
	1340-6670	8	18:25	<1.3
	1190-6540	8	18:30	<1.3
	1340-6580	8	18:35	<1.3
	1315-6730	9	06:00	<1.3
	1215-6540	9	06:05	<1.3
	1190-6540	9	06:10	<1.3
	1390-6670	9	06:15	<1.3
	1315-6810	9	18:00	<1.3
	1365-6540	9	18:05	<1.3
	1265-6970	9	18:10	<1.3
	1265-6890	9	18:15	<1.3
	1240-6840	9	18:20	<1.3
	1480-RAMPA	10	06:00	<1.3
	1315-6730	10	06:05	<1.3
	1315-6850	10	06:10	<1.3
	1365-6900	10	06:15	<1.3
	1290-6770	10	06:20	<1.3
	1365-6520	10	18:00	<1.3
	1430-PORTON	10	18:05	<1.3
	1215-6540	10	18:10	<1.3
	1190-6540	10	18:15	<1.3
	1340-6670	11	06:00	<1.3
	1340-6630	11	06:05	<1.3
	1315-6810	11	06:10	<1.3
	1290-6970	11	06:15	<1.3
	1240-c.f.e.	11	06:20	<1.3
	1480-ramapa	11	18:00	<1.3
	1265-6970	11	18:05	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1290-6730	11	18:10	<1.3
	1240-6840	11	18:15	<1.3
	1215-6540	12	06:00	<1.3
	1190-6540	12	06:05	<1.3
	1315-6730	12	06:10	<1.3
	1365-6520	12	06:15	<1.3
	1340-6670	12	06:20	<1.3
	1240-C.F.E.	12	06:25	<1.3
	1290-6770	12	06:30	<1.3
	1365-6540	12	18:00	<1.3
	1290-6970	12	18:05	<1.3
	1240-6840	12	18:10	<1.3
	1265-6890	13	06:00	<1.3
	1265-6930	13	06:05	<1.3
	1290-6930	13	06:10	<1.3
	1480-RAMPA	13	06:15	<1.3
	1430-C.F.E.	13	06:20	<1.3
	1455-7480	13	06:25	<1.3
	1240-6840	13	18:00	<1.3
	1340-6670	13	18:05	<1.3
	1365-6520	13	18:10	<1.3
	1315-6810	13	18:15	<1.3
	1290-6890	13	18:20	<1.3
	1390-C.F.O.	13	18:25	<1.3
	1430-PORTOM	13	18:30	<1.3
	1265-6970	13	18:35	<1.3
	1190-6540	14	06:00	<1.3
	1390-6900	14	06:05	<1.3
	1340-6630	14	06:10	<1.3
	1480-RAMPA	14	06:15	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1390-6580	14	06:20	<1.3
	1215-6540	14	06:25	<1.3
	1455-7360	14	18:00	<1.3
	1240-C.F.O.	14	18:05	<1.3
	1265-6890	14	18:10	<1.3
	1315-6730	14	18:15	<1.3
	1430-C.F.E.	14	18:20	<1.3
	1290-6930	15	06:00	<1.3
	1215-6540	15	06:05	<1.3
	1390-6920	15	06:10	<1.3
	1480-rampa	15	06:15	<1.3
	1190-6540	15	18:00	<1.3
	1315-6810	15	18:05	<1.3
	1340-6630	15	18:10	<1.3
	1215-6880	15	18:15	<1.3
	1365-6580	15	18:20	<1.3
	1265-6770	15	18:25	<1.3
	1290-6970	16	06:00	<1.3
	1365-6520	16	06:05	<1.3
	1340-6670	16	06:10	<1.3
	1480-RAMPA	16	06:15	<1.3
	1340-6360	16	06:20	<1.3
	1215-6540	16	18:00	<1.3
	1290-6890	16	18:05	<1.3
	1430-C.F.E.	16	18:10	<1.3
	1315-6730	16	18:15	<1.3
	1265-6770	16	18:20	<1.3
	1315-6890	16	18:25	<1.3
	1315-6810	17	06:00	<1.3
	1340-6630	17	06:05	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1190-6540	17	06:10	<1.3
	1240-C,F.E.	17	06:15	<1.3
	1455-7360	17	06:20	<1.3
	1480-RAMPA	17	06:25	<1.3
	1365-6580	17	06:30	<1.3
	1290-6930	17	18:00	<1.3
	1340-6670	17	18:05	<1.3
	1390-C.F.O.	17	18:10	<1.3
	1390-6920	17	18:15	<1.3
	1430-C.F.E.	17	18:20	<1.3
	1290-6770	17	18:25	<1.3
	1430-7460	18	06:00	<1.3
	1290-6970	18	06:05	<1.3
	1215-6540	18	06:10	<1.3
	1365-6520	18	06:15	<1.3
	1455-vent.	18	06:20	<1.3
	1315-6730	18	18:00	<1.3
	1240-c.f.o.	18	18:05	<1.3
	1455-7360	18	18:10	<1.3
	1315-6770	18	18:15	<1.3
	1190-6540	19	06:00	<1.3
	1480-RAMPA	19	06:05	<1.3
	1390-6900	19	18:00	<1.3
	1390-C.F.O.	19	18:05	<1.3
	1355-SUM.	19	18:10	<1.3
	1340-6630	20	06:00	<1.3
	1340-6670	20	06:05	<1.3
	1315-6810	20	06:10	<1.3
	1430-C.F.E.	20	06:15	<1.3
	1480-RAMPA	20	06:20	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1265-6930	20	18:00	<1.3
	1290-6930	20	18:05	<1.3
	1480-C.F.E.	20	18:10	<1.3
	1480-C.F.O.	20	18:15	<1.3
	1265-6890	21	06:00	<1.3
	1290-6550	21	06:05	<1.3
	1215-6540	21	06:10	<1.3
	1315-6730	21	06:15	<1.3
	1290-6450	21	06:20	<1.3
	1240-C.F.E.	21	06:25	<1.3
	1290-6970	21	18:00	<1.3
	1290-6630	21	18:05	<1.3
	1190-6540	21	18:10	<1.3
	1430-7460	21	18:15	<1.3
	1340-6500	21	18:20	<1.3
	1340-6760	21	18:25	<1.3
	1340-6630	22	06:00	<1.3
	1290-6930	22	06:05	<1.3
	1390-C.F.O.	22	06:10	<1.3
	1480-RAMPA	22	06:15	<1.3
	1365-6520	22	06:20	<1.3
	1315-6630	22	06:25	<1.3
	1340-6670	22	18:00	<1.3
	1390-6920	22	18:05	<1.3
	1480-C.F.O.	22	18:10	<1.3
	1315-6850	22	18:15	<1.3
	1190-6540	23	06:00	<1.3
	1315-6730	23	06:05	<1.3
	1480-C.F.O.	23	06:10	<1.3
	1240-C.F.E.	23	06:15	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1290-6890	23	06:20	<1.3
	1290-6450	23	06:25	<1.3
	1430-C.F.E.	23	18:00	<1.3
	1480-RAMPA	23	18:05	<1.3
	1430-RAMPA	23	18:10	<1.3
	1340-6500	23	18:15	<1.3
	1290-6970	23	18:20	<1.3
	1340-6710	24	06:00	<1.3
	1390-C.F.O.	24	06:05	<1.3
	1215-6540	24	06:10	<1.3
	1240-CHIM	24	06:15	<1.3
	1315-6630	24	06:20	<1.3
	1340-6630	24	18:00	<1.3
	1480-C.F.O.	24	18:05	<1.3
	1440-6760	24	18:10	<1.3
	1480-RAMPA	25	06:00	<1.3
	1355-SUM.	25	06:05	<1.3
	1365-6520	25	06:10	<1.3
	1240-C.F.E.	25	06:15	<1.3
	1430-C.F.E.	25	06:20	<1.3
	1290-6930	25	06:00	<1.3
	1340-6670	25	06:05	<1.3
	1390-C.F.O.	25	06:10	<1.3
	1390-6960	25	06:15	<1.3
	1290-6770	25	06:20	<1.3
	1290-6450	25	18:25	<1.3
	1190-6540	26	06:00	<1.3
	1290-6890	26	06:05	<1.3
	1480-C.F.O.	26	06:10	<1.3
	1365-6580	26	06:15	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1480-7420	26	18:00	<1.3
	1480-C.F.E.	26	18:05	<1.3
	1365-6520	26	18:10	<1.3
	1290-6450	26	18:15	<1.3
	1290-6770	26	18:20	<1.3
	1355-SUMID	26	18:25	<1.3
	1290-6970	27	06:00	<1.3
	1480-RAMPA	27	06:05	<1.3
	1480-C.F.E.	27	06:10	<1.3
	1290-6550	27	06:15	<1.3
	1215-6540	27	06:20	<1.3
	1365-6500	27	06:25	<1.3
	1390-6630	27	18:00	<1.3
	1340-6670	27	18:05	<1.3
	1340-6810	27	18:10	<1.3
	1455-7480	27	18:15	<1.3
	1290-6930	28	06:00	<1.3
	1240-6890	28	06:05	<1.3
	1190-6540	28	06:10	<1.3
	1430-7460	28	06:15	<1.3
	1430-C.F.E.	28	06:20	<1.3
	1365-6500	28	06:25	<1.3
	1480-C.F.E.	28	18:00	<1.3
	1265-6930	28	18:05	<1.3
	1480-C.F.O.	28	18:10	<1.3
	1240-6880	28	18:15	<1.3
	1480-7420	28	18:20	<1.3
	1390-6630	29	06:00	<1.3
	1290-6970	29	06:05	<1.3
	1290-C.F.E.	29	06:10	<1.3



Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1480-RAMPA	29	06:15	<1.3
	1055-7480	29	18:00	<1.3
	1290-6550	29	18:05	<1.3
	1340-6690	29	18:10	<1.3
	1290-6930	29	18:15	<1.3
	1190-6540	30	06:00	<1.3
	1315-6850	30	06:05	<1.3
	1340-6650	30	06:10	<1.3

Mes	Sitio	Día	HORA	Velocidad de Partícula (mm/s)
Abril	1430-C.F.E.	30	06:15	<1.3
	1265-6930	30	18:00	<1.3
	1430-7460	30	18:05	<1.3
	1480-C.F.E.	30	18:10	<1.3
	1480-7400	30	18:15	<1.3
	1240-6880	30	18:20	<1.3

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



## 8 Geoquímica de Roca Estéril

### 8.1 Sitios de Monitoreo

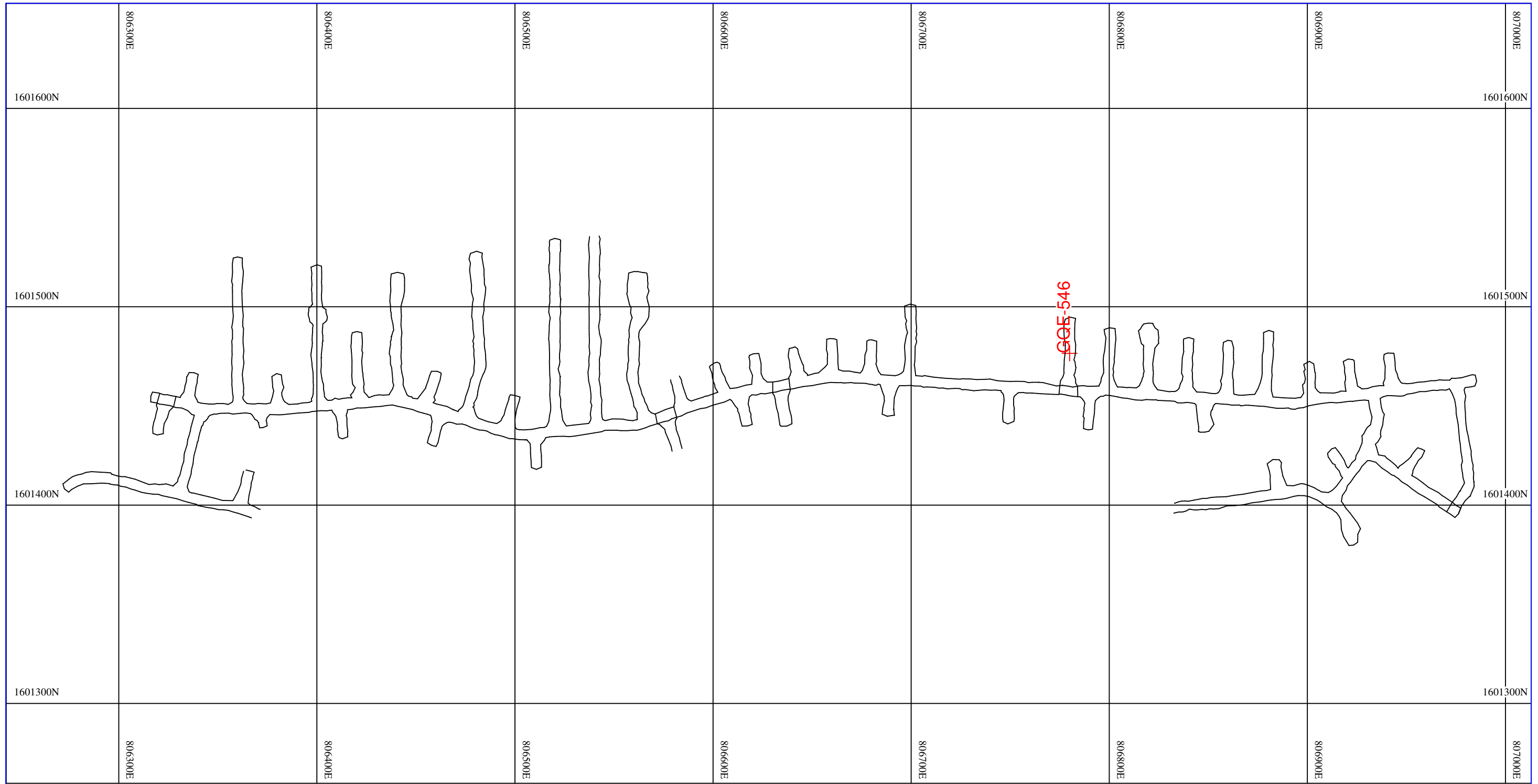
En el Cuadro 8-1 se enlistan las muestras analizadas de material extraído de los túneles del proyecto, rampa oeste y rampa este, durante los meses de Febrero a Abril de 2016. La ubicación de la extracción de las muestras se presenta en la Figura 8-1, Figura 8-2, Figura 8-3, Figura 8-4, Figura 8-5, Figura 8-6, Figura 8-7, Figura 8-8 y Figura 8-9.

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

Código de Muestra	Área	Coordenadas		
		X	Y	Z
GQE-537	1240-6400-OC	806400	1601448.5	1244
GQE-538	1390-CFTO-EC	806926	1601382	1392
GQE-539	1480-ACC-ZE	806432.5	1601601	1478
GQE-540	1430-CFTE-ZE	807459	1601604	1433
GQE-541	1455-CFTO-ZE	8077298	1601573	1454
GQE-542	1430-7440-Ze	807442.5	1601615	1433
GQE-543	1355-DDST-ZE	807111	1601386	1351
GQE-544	1365-6540-EC	806540	1601391	1367
GQE-545	1365-6560-OC	806560	1601390	1368
GQE-546	1190-6780-EC	806780	1601476.5	1193
GQE-547	1240-CFTE-EC	806925.5	1601425.5	1240
GQE-548	1365-6520	806520	1601397	1369
GQE-549	1480-RAMP-ZE	807415.5	1601528	1484
GQE-550	1355-DDST-ZE	807145.5	1601328	1351
GQE-551	1390-CFTO-EC	806878	1601382	1392
GQE-552	1455-VENT-ZE	807305	1601543	1454
GQE-553	1390-CFTO-EC	806864	1601377.5	1391
GQE-554	1390-6900-EC	806900	1601391	1391
GQE-555	1390-6920-EC	806920	1601391.5	1391
GQE-556	1480-CFTO-EC	807390	1601597	1480
GQE-557	1480-RAMP-ZE	807460	1601513.5	1491
GQE-558	1370-RAMP-ZE	807394.66	1601495.85	1377

Fuente: MSR, 2016.





### Drenaje Ácido de Roca (ARD)

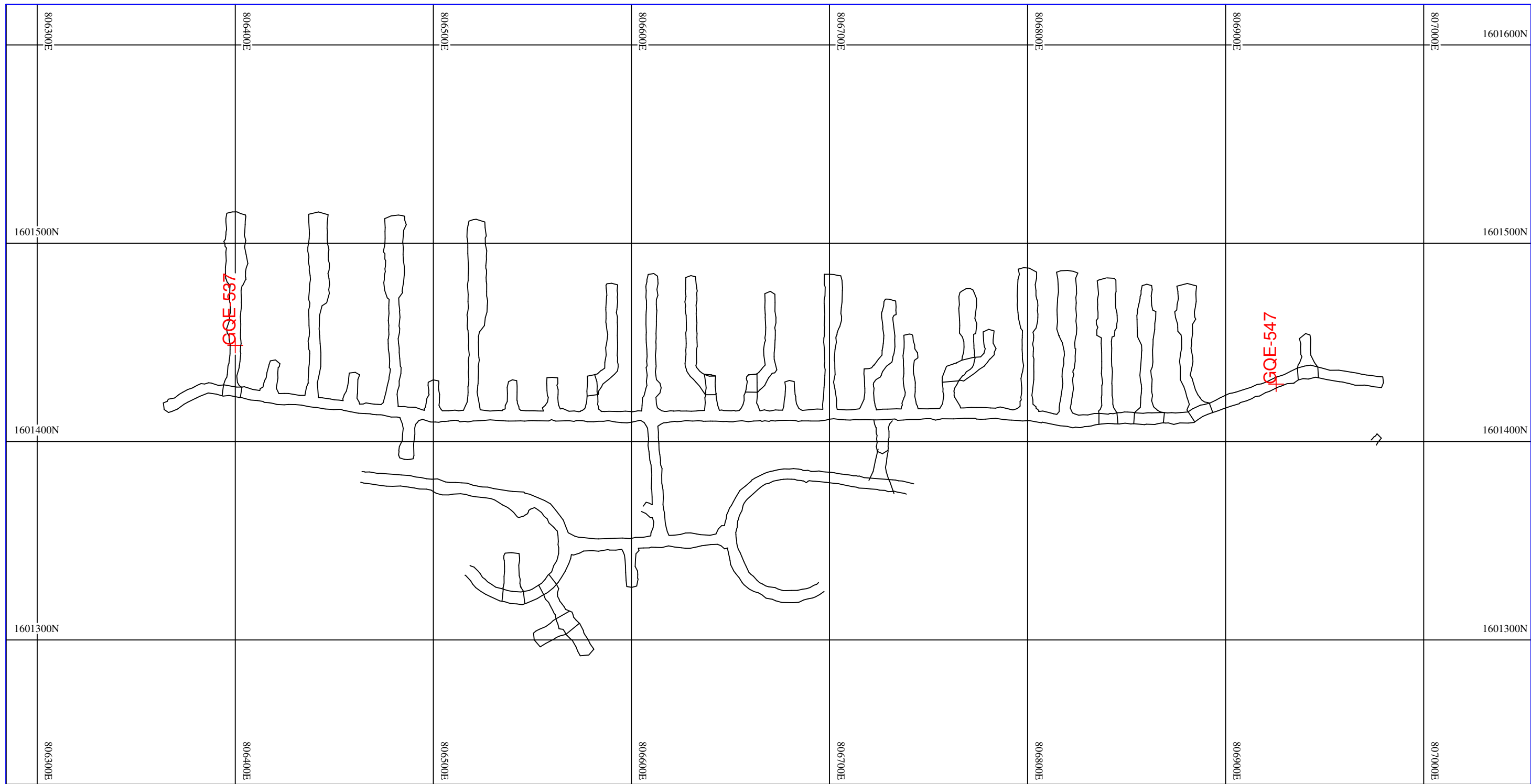
Febrero 2016-Abril 2016

### Nivel 1190

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16

febrero-abril\_2016\_nivel\_1190\_01





**Drenaje Ácido de Roca (ARD)**

Febrero 2016-Abril 2016

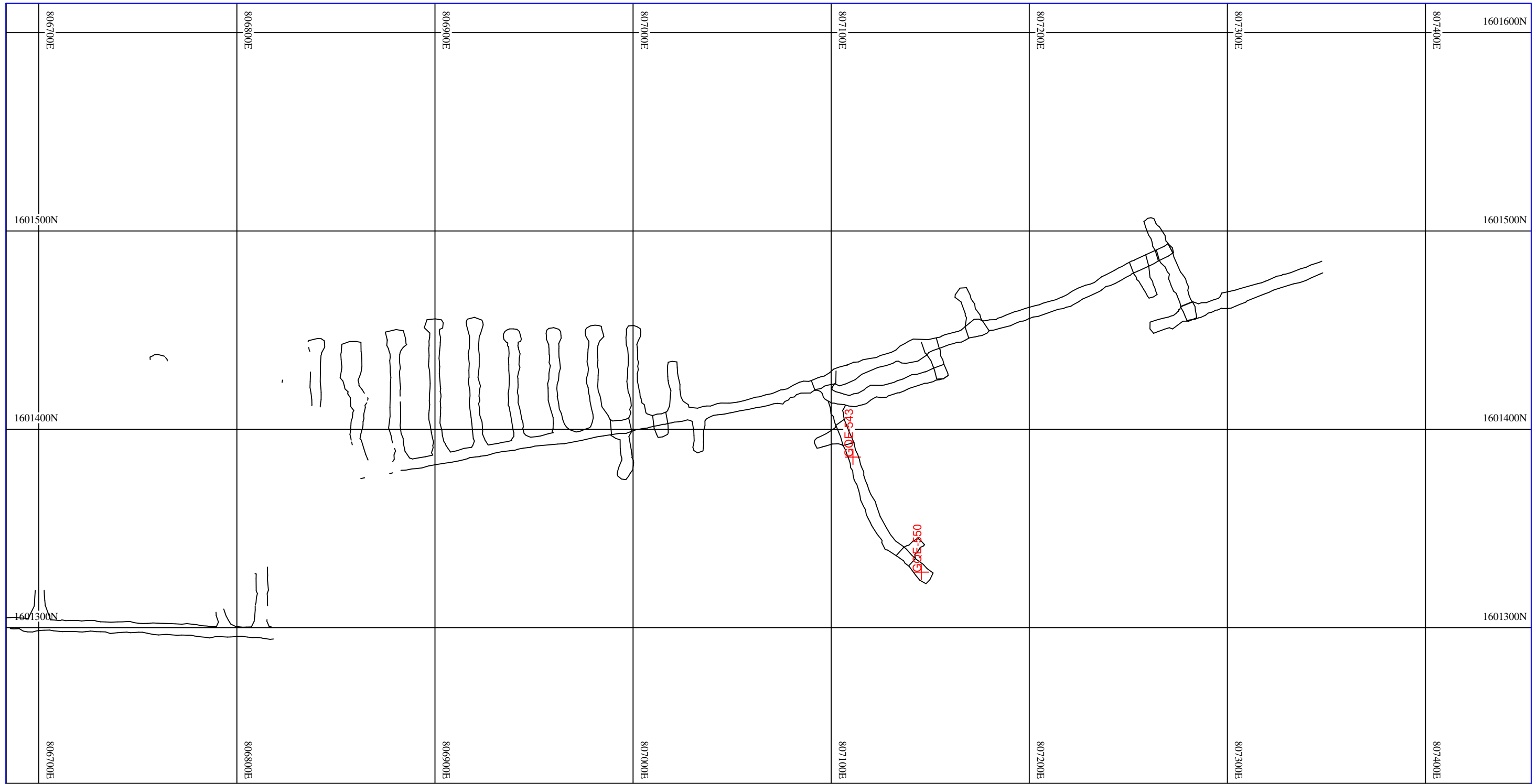
**Nivel 1240**

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16

febrero-abril\_2016\_nivel\_1240\_01







febrero-abril\_2016\_nivel\_1355

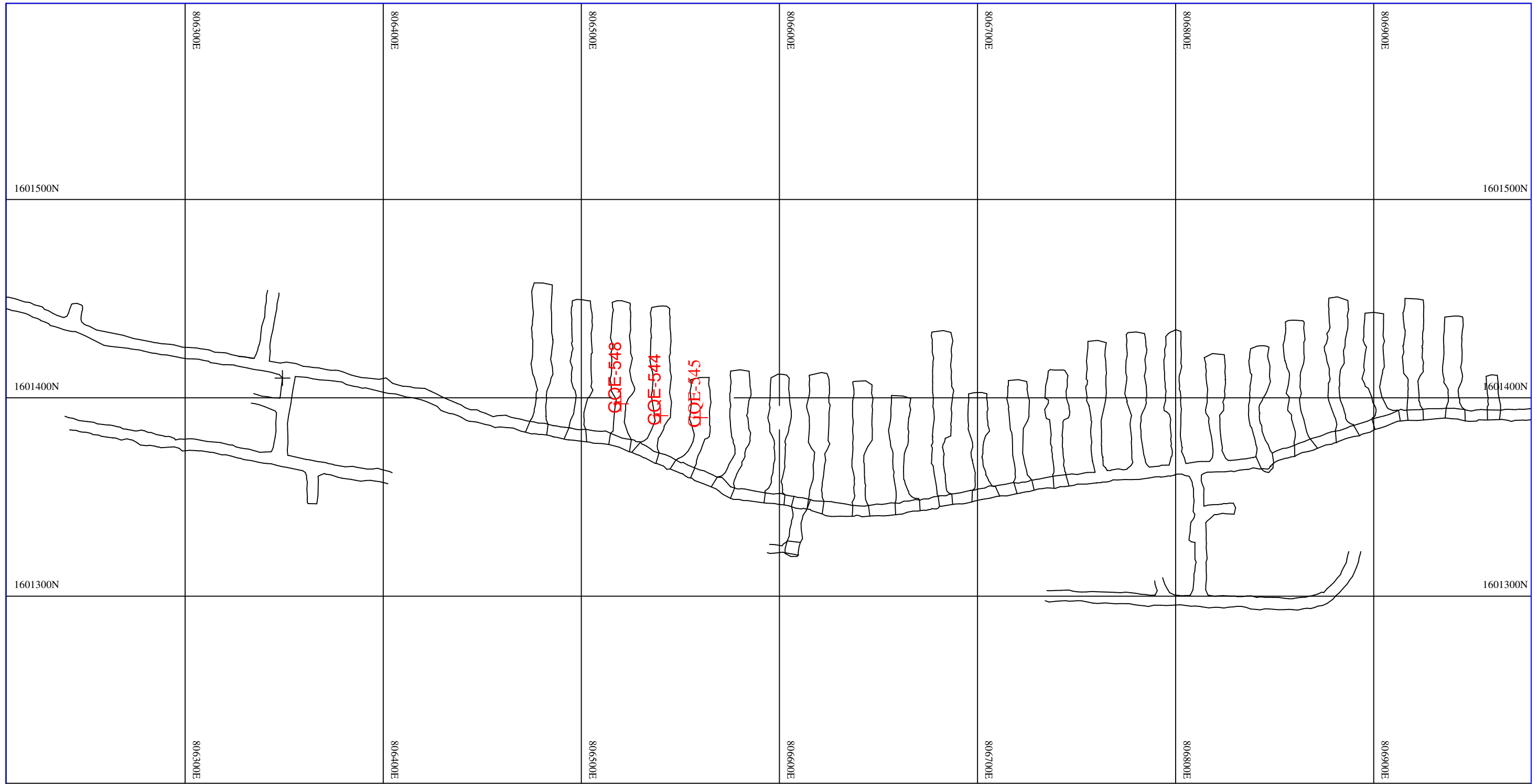


Drenaje Ácido de Roca (ARD)  
 Febrero 2016-Abril 2016

Nivel 1355

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16





Drenaje Ácido de Roca (ARD)

Febrero 2016-Abril 2016

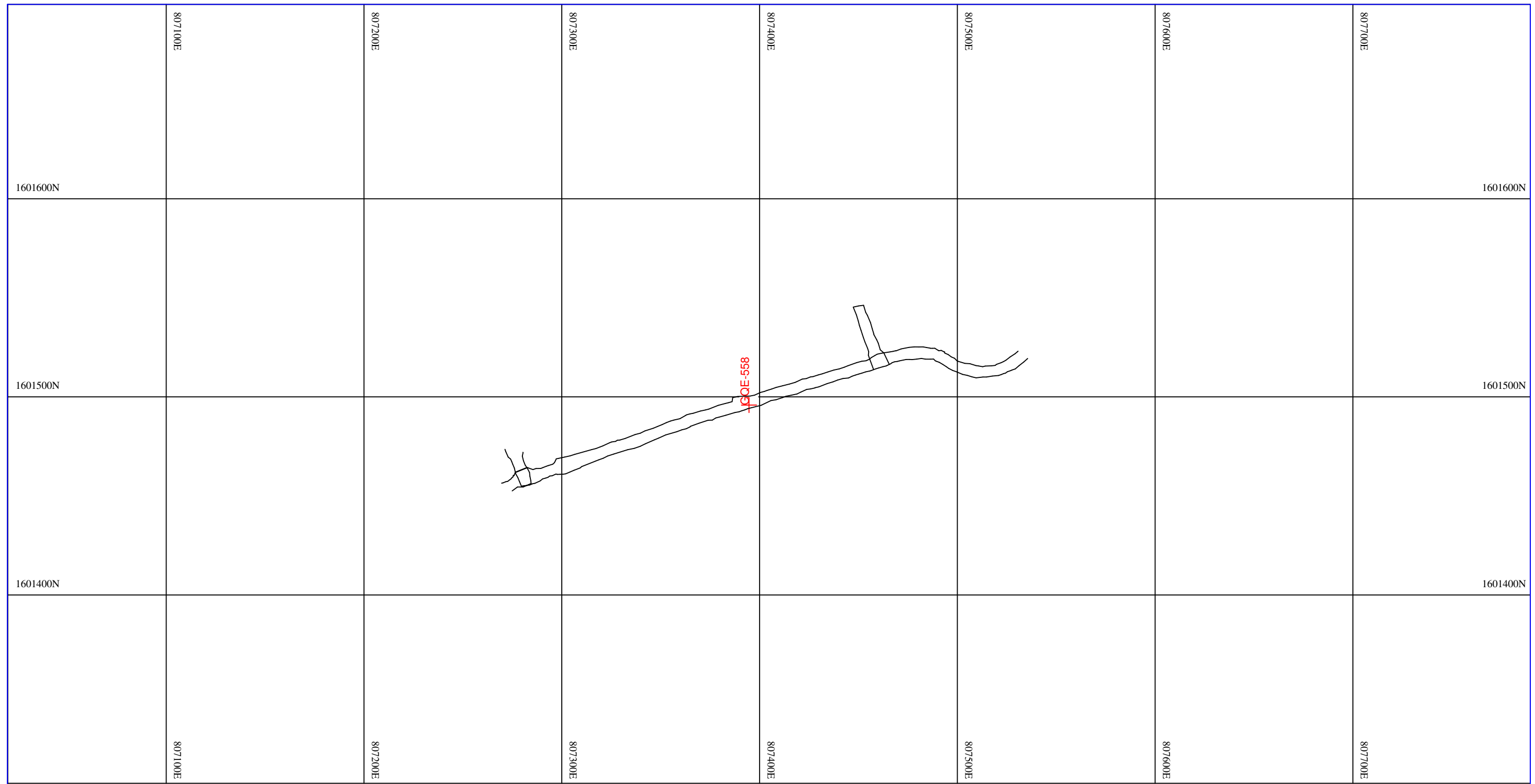
Nivel 1365

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16

febrero-abril\_2016\_nivel\_1365



febrero-abril\_2016\_nivel\_1370



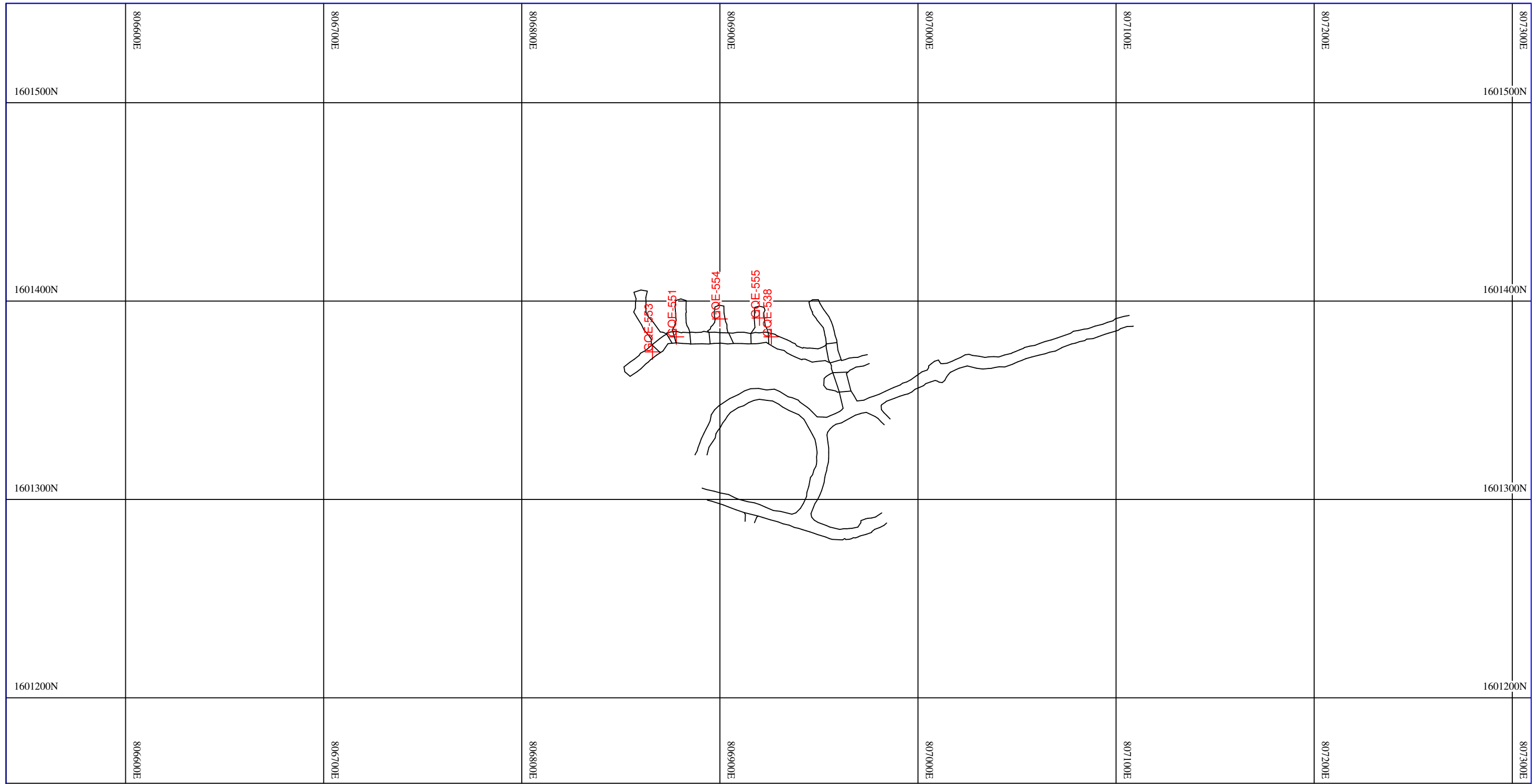
Drenaje Ácido de Roca (ARD)

Febrero 2016-Abril 2016

Nivel 1370-Rampa-ZE

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16





**Drenaje Ácido de Roca (ARD)**

Febrero 2016-Abril 2016

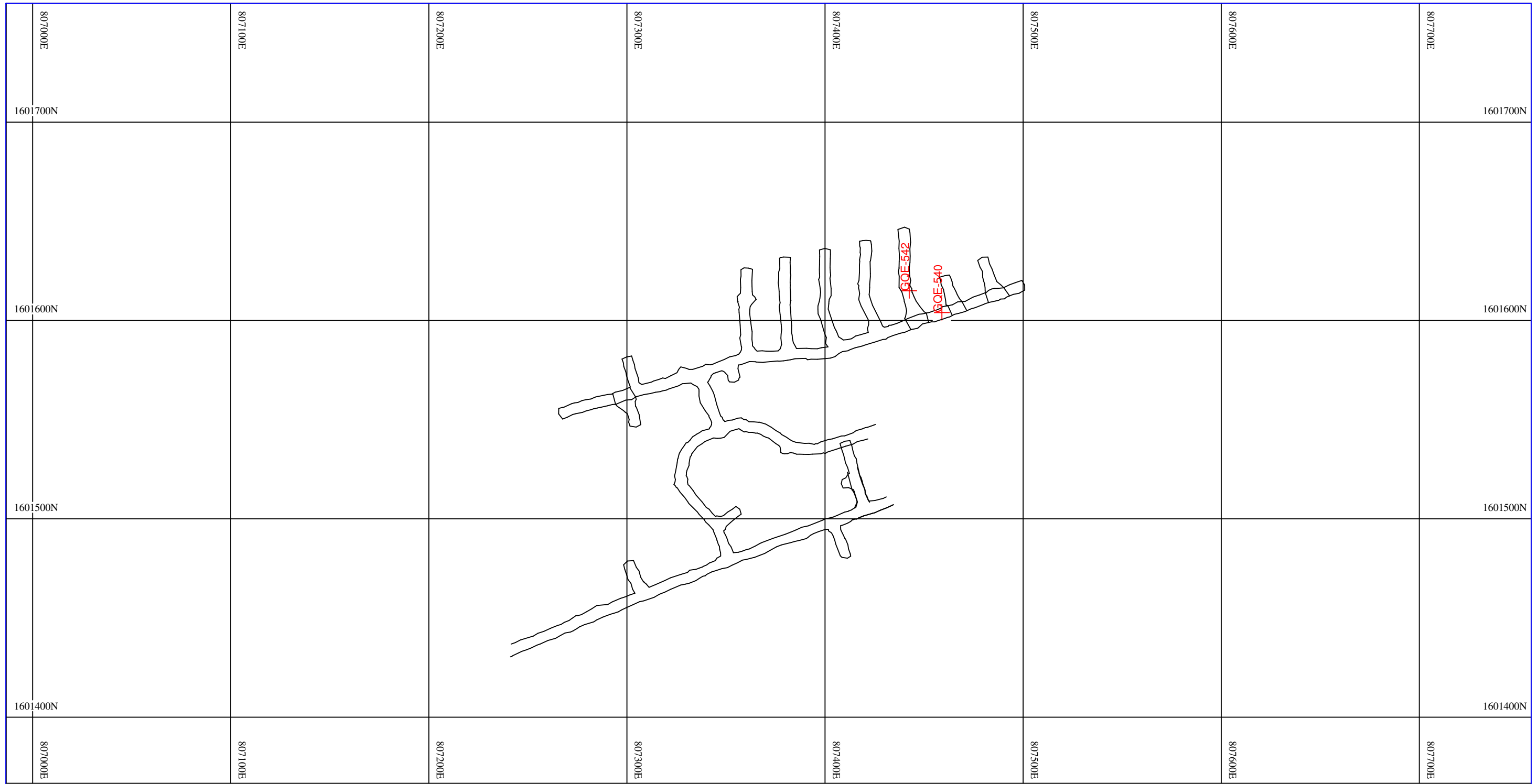
**Nivel 1390**

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16

febrero-abril\_2016\_nivel\_1390\_01







Drenaje Ácido de Roca (ARD)

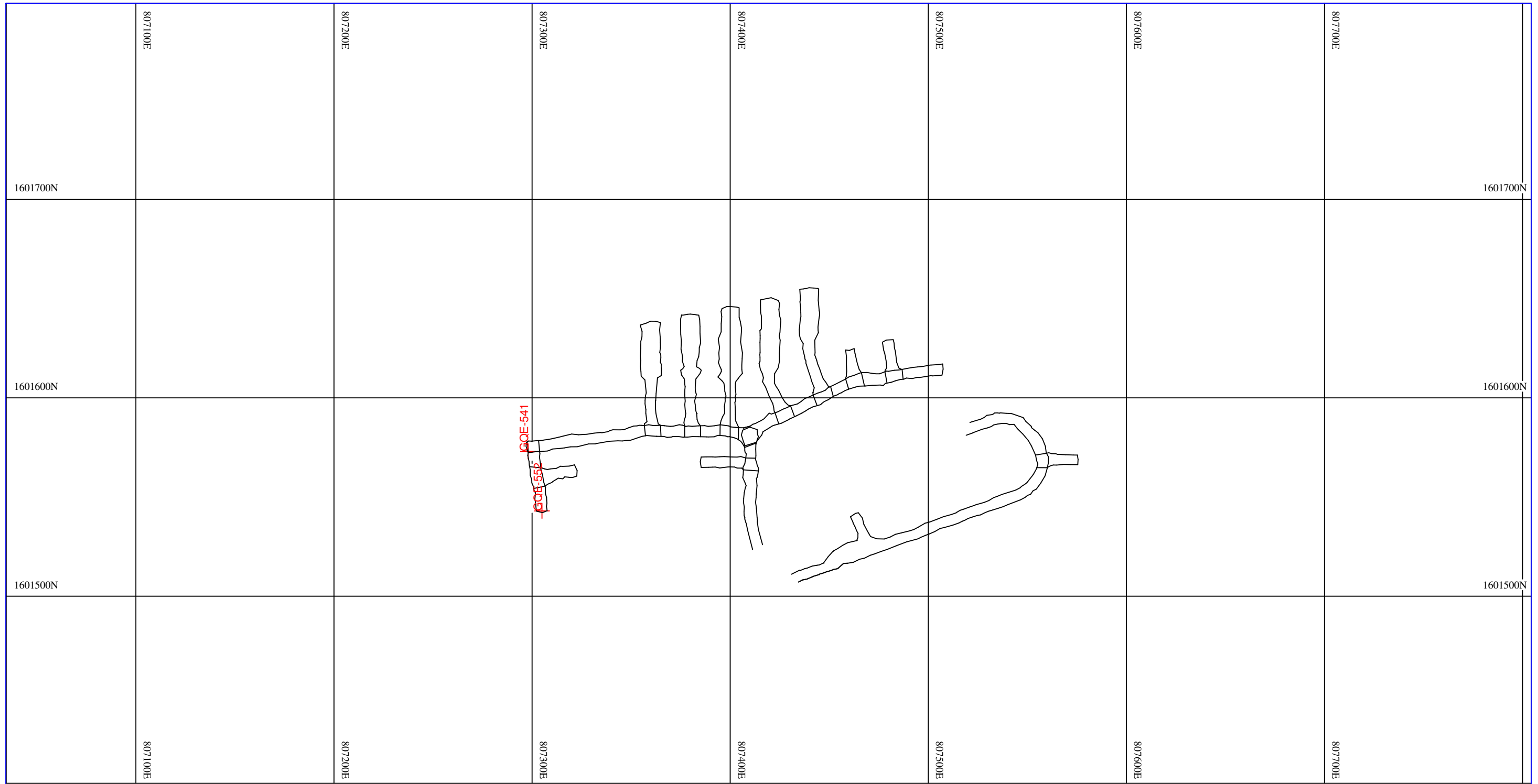
Febrero 2016-Abril 2016

Nivel 1430

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16

febrero-abril\_2016\_nivel\_1430





Drenaje Ácido de Roca (ARD)

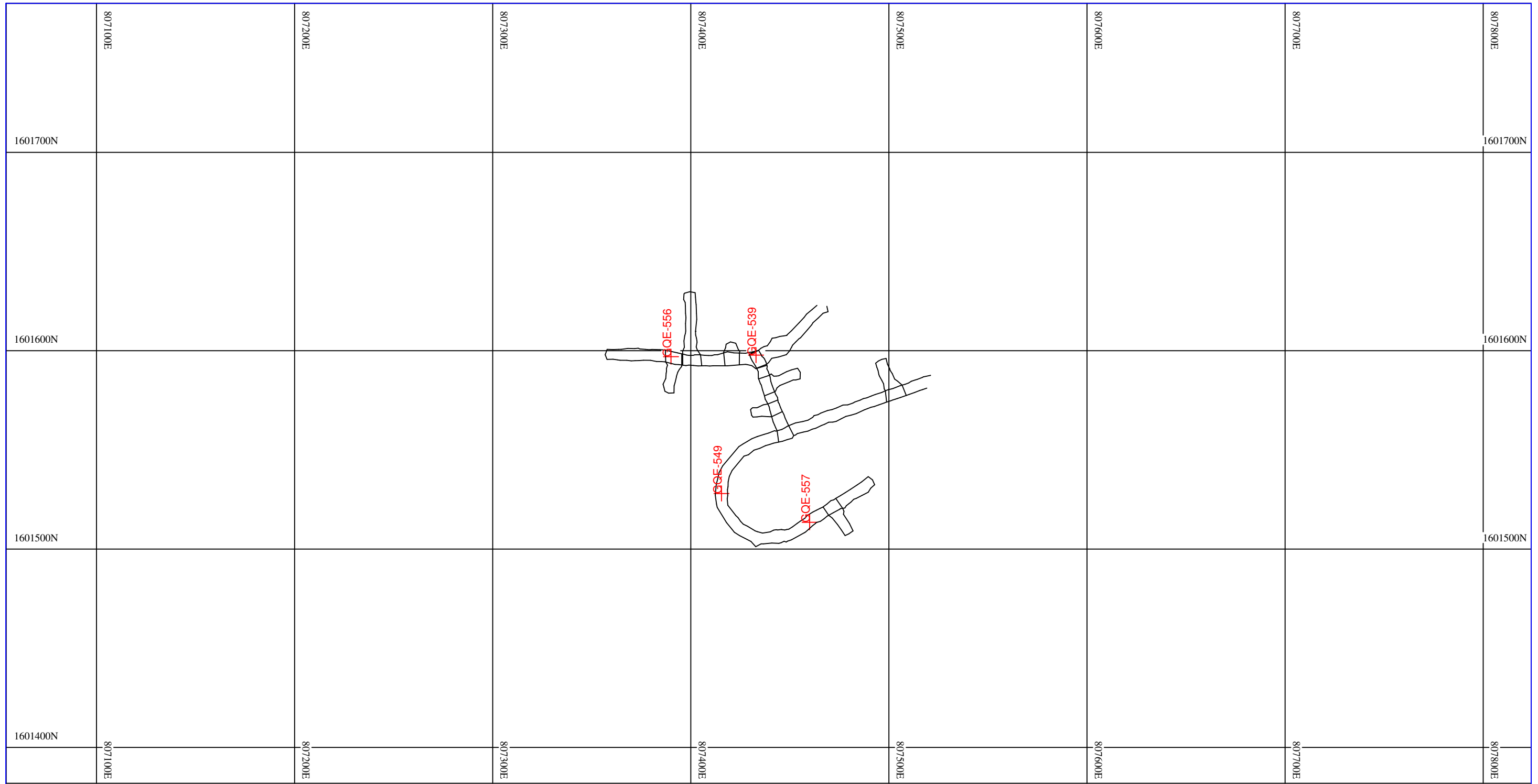
Febrero 2016-Abril 2016

Nivel 1455

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16

febrero-abril\_2016\_nivel\_1455





**Drenaje Ácido de Roca (ARD)**

Febrero 2016-Abril 2016

**Nivel 1480**

DIBUJO:	Herberth Cacao	
REVISO:	Richard Yancey	
Depto.	Geología de Mina	
Scale: 1: 2000	Plan No.	Date: 25-May-16

febrero-abril\_2016\_nivel\_1480



## 8.2 Metodología

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

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

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

Fuente: MSR, 2016.

## 8.3 Resultados

Los resultados de pH en pasta se presentan en el Cuadro 8-3. Los valores de pH se encontraron en el rango de 8.14 a 9.40 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-537	01/02/2016	03/02/2016	8.49	20.0
GQE-538	01/02/2016	03/02/2016	8.20	20.1
GQE-539	13/02/2016	18/02/2016	9.30	ND
GQE-540	15/02/2016	18/02/2016	9.40	
GQE-541	17/02/2016	18/02/2016	8.94	
GQE-542	17/02/2016	18/02/2016	9.27	
GQE-543	25/02/2016	28/02/2016	9.34	18.3
GQE-544	26/02/2016	28/02/2016	9.05	18.1

Código de Muestra	Fecha Toma de Muestra	Fecha Lectura pH	pH pasta	Temperatura (°C)
GQE-545	02/02/2016	14/03/2016	8.19	ND
GQE-546	03/03/2016	14/03/2016	8.44	
GQE-547	12/03/2016	14/03/2016	8.83	
GQE-548	26/03/2016	27/03/2016	8.14	
GQE-549	01/04/2016	05/04/2016	9.27	
GQE-550	02/04/2016	05/04/2016	9.08	
GQE-551	02/04/2016	05/04/2016	8.93	
GQE-552	02/04/2016	05/04/2016	8.61	
GQE-553	23/04/2016	25/04/2016	8.58	
GQE-554	23/04/2016	25/04/2016	9.01	
GQE-555	23/04/2016	25/04/2016	8.51	
GQE-556	23/04/2016	25/04/2016	8.28	
GQE-557	25/04/2016	27/04/2016	8.26	
GQE-558	25/04/2016	27/04/2016	8.73	

ND: no determinado. Fuente: MSR, 2016.



## 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 2016 se muestra en el Cuadro 9-1. Se hicieron monitoreos mediante el uso de dosímetros portables y posteriormente se realizan comparaciones con la norma OSHA. Los resultados muestran que se está dentro de parámetros aceptables 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				2016			
Mes	Febrero	Marzo	Abril	Mes	Febrero	Marzo	Abril
Fecha	05/02/16	18/03/16	27/04/16	Fecha	18/02/16	23/03/16	05/04/16
Hora Inicio	6:55	7:54	7:12	Hora Inicio	6:31	7:04	7:18
Duración	10:05h	11:19h	10:00h	Duración	11:21h	10:43h	10:03h
Lmax dBA	142.5	109.7	126.7	Lmax dBA	133.3	132.1	125.1
Lmin dBA	60.7	60.5	60.6	Lmin dBA	60.5	60.6	60.6
Prom. Diurno dBA	101.8	84.3	97.7	Prom. Diurno dBA	98.2	94.5	86.9
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	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	Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	101.8	84.3	97.7	Leq (Normal sin uso de EPP)	98.2	94.5	86.9
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	87.3	69.8	83.2	Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	83.7	80	72.4
Resultado (Leq ≤ Límite, entonces es Aceptable)	No Aceptable	Aceptable	Aceptable	Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Superficie Planta de Proceso - FILTROS				2016			
Mes	Febrero	Marzo	Abril	Mes	Febrero	Marzo	Abril
Fecha	05/02/16	23/03/16	05/04/16	Fecha	17/02/16		06/04/16
Hora Inicio	6:59	7:01	7:18	Hora Inicio	6:36		7:10
Duración	10:01h	10:50h	10:18h	Duración	10:42h		06:28h
Lmax dBA	137.8	133.6	123	Lmax dBA	114.5		115.9
Lmin dBA	60.8	61.2	60.6	Lmin dBA	60.7		60.6
Prom. Diurno dBA	99.3	89.1	87.3	Prom. Diurno dBA	97.1		93.8
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86		86
Duración de Referencia OSHA	12h	12h	12h	Duración de Referencia OSHA	12h		12h
Leq (Normal sin uso de EPP)	99.3	89.1	87.3	Leq (Normal sin uso de EPP)	97.1		93.8
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	84.8	74.6	72.8	Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	82.6		79.3
Resultado (Leq ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable		Aceptable

Puesto de Operador de Jumbo				2016			
Mes	Febrero	Marzo	Abril	Mes	Febrero	Marzo	Abril
Fecha	15/02/16	21/03/16	06/04/16	Fecha	15/02/16	21/03/16	04/04/16
Hora Inicio	6:50	7:41	7:03	Hora Inicio	6:46	7:39	6:55
Duración	11:02h	10:09h	06:34h	Duración	11:07h	10:12h	10:39h
Lmax dBA	115.8	115.6	117.2	Lmax dBA	126.3	124.2	119
Lmin dBA	60.6	60.6	60.9	Lmin dBA	60.5	60.7	60.6
Prom. Diurno dBA	94.8	99	94.1	Prom. Diurno dBA	91	91.5	98.2
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	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	Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	94.8	99	94.1	Leq (Normal sin uso de EPP)	91	91.5	98.2
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	80.3	84.5	79.6	Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	76.5	77	83.7
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Puesto de Operador de Scoop				2016			
Mes	Febrero	Marzo	Abril	Mes	Febrero	Marzo	Abril
Fecha	17/02/16		06/04/16	Fecha	15/02/16	21/03/16	04/04/16
Hora Inicio	6:36		7:10	Hora Inicio	6:46	7:39	6:55
Duración	10:42h		06:28h	Duración	11:07h	10:12h	10:39h
Lmax dBA	114.5		115.9	Lmax dBA	126.3	124.2	119
Lmin dBA	60.7		60.6	Lmin dBA	60.5	60.7	60.6
Prom. Diurno dBA	97.1		93.8	Prom. Diurno dBA	91	91.5	98.2
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86		86	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	Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	97.1		93.8	Leq (Normal sin uso de EPP)	91	91.5	98.2
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	82.6		79.3	Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	76.5	77	83.7
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable		Aceptable	Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Puesto de Operador de Boltec				2016			
Mes	Febrero	Marzo	Abril	Mes	Febrero	Marzo	Abril
Fecha	15/02/16	21/03/16	04/04/16	Fecha	15/02/16	21/03/16	04/04/16
Hora Inicio	6:50	7:41	7:03	Hora Inicio	6:46	7:39	6:55
Duración	11:02h	10:09h	06:34h	Duración	11:07h	10:12h	10:39h
Lmax dBA	115.8	115.6	117.2	Lmax dBA	126.3	124.2	119
Lmin dBA	60.6	60.6	60.9	Lmin dBA	60.5	60.7	60.6
Prom. Diurno dBA	94.8	99	94.1	Prom. Diurno dBA	91	91.5	98.2
Límite Nivel de Sonido Ponderado-A dBA acorde a OSHA para 12 horas (12.1 horas y 10.6 horas)*	86	86	86	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	Duración de Referencia OSHA	12h	12h	12h
Leq (Normal sin uso de EPP)	94.8	99	94.1	Leq (Normal sin uso de EPP)	91	91.5	98.2
Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	80.3	84.5	79.6	Leq ajustado (Con EPP, homologación 29 dBA a 50% = NRR 14.5 dBA)	76.5	77	83.7
Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable	Resultado (Leq ajustado ≤ Límite, entonces es Aceptable)	Aceptable	Aceptable	Aceptable

Fuente: MSR, 2016.



## 9.2 Mediciones de Partículas Respirables

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

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

Superficie Planta de Proceso - TRITURACION							2016		
Trimestre							XVII		
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							11/02/2016	25/03/2016	22/04/2016
Hora Inicio					7:00	7:00	7:00		
Duración					11 h	11 h	11 h		
OSHA Fraccion Respirable PM <sub>4</sub>	mg/m <sup>3</sup>	5	16667	150	150	50	0.56	0.464	0.503
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	50000	150	150	50	1.25	0.69	0.749

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

Superficie Planta de Proceso - MOLINO							2016		
Trimestre							XVII		
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							11/02/2016	25/03/2016	22/04/2016
Hora Inicio					7:00	7:00	7:00		
Duración					11 h	11 h	11 h		
OSHA Fraccion Respirable PM <sub>4</sub>	mg/m <sup>3</sup>	5	16667	150	150	50	0.005	0.072	0.16
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	50000	150	150	50	0.022	0.079	0.221

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

Superficie Planta de Proceso - FILTROS							2016		
Trimestre							XVII		
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							11/02/2016	25/03/2016	22/04/2016
Hora Inicio					7:00	7:00	7:00		
Duración					11 h	11 h	11 h		
OSHA Fraccion Respirable PM <sub>4</sub>	mg/m <sup>3</sup>	5	16667	150	150	50	0.011	0.128	0.143
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	50000	150	150	50	0.047	0.143	0.183

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

Interior Mina General - REZAGA							2016		
Trimestre							XVII		
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							18/02/2016	24/03/2016	21/04/2016
Hora Inicio					7:00	7:00	7:00		
Duración					11 h	11 h	11 h		
OSHA Fraccion Respirable PM <sub>4</sub>	mg/m <sup>3</sup>	5	16667	150	150	50	0.31	3.24	3.55
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	50000	150	150	50	0.622	4.08	3.63

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

Interior Mina General - LANZADO							2016		
Trimestre							XVII		
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							18/02/2016	24/03/2016	
Hora Inicio					7:00	7:00			
Duración					11 h	11 h			
OSHA Fraccion Respirable PM <sub>4</sub>	mg/m <sup>3</sup>	5	16667	150	150	50	0.142	10.2	
OSHA Polvo Total @ PM <sub>10</sub>	mg/m <sup>3</sup>	15	50000	150	150	50	0.243	14.7	

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

Fuente: MSR, 2016.

### 9.3 Mediciones de Gas

Las mediciones de Gas, se hacen en forma rutinaria (turno a turno) y debido a que no se ha rebasado los límites permisibles cuando se encuentra maquinaria presente trabajando en las áreas según norma OSHA (Tabla Z1 1910.100 Límites para aires contaminados), 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 Sulhídrico - 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 XVII trimestre, acorde a procedimiento de tomar la primera etapa del ciclo que aparezca.

FECHA	Lugar	Maquinaria	Etapa de Ciclo	CO (PPM)	H2S (PPM)	Hora	Turno	Reportado por
				Límite Máximo Turno 25ppm, Exposición Breve 50 ppm	Límite 10ppm, Valores mayores a 1ppm alertar.			
01-feb-16	1340-VENT.EC	Ninguna	Medición posterior a voladura	0	0	07:00	Diurno	José Camillo
	1290-6850.EC	Ninguna	Medición posterior a voladura	12	0	07:18		
	1240-6860.EC	Ninguna	Medición posterior a voladura	0	0	07:30		
	1240-6400.OC	Ninguna	Medición posterior a voladura	13	0	07:20		
	1365-6570.OC	Ninguna	Carguillo	0	0	10:30		
	1340-6960.EC	Ninguna	Reparación del refugios	5	0	12:10		
01-mar-16	1190-6780.EC	Ninguna	Medición posterior a voladura	0	0	07:16	Diurno	Ludyn Lima Y Jose Leiva
	1340-vent.EC	Ninguna	Medición posterior a voladura	0	0	07:25		
	1290-6810.EC	Ninguna	Medición posterior a voladura	48	0	07:36		
	1265-6810.EC	Ninguna	Medición posterior a voladura	5	0	07:11		
01-abr-16	1215-6780.EC	Ninguna	Medición posterior a voladura	15	0	07:14	Diurno	Marvin López
	1265-6930.EC	Ninguna	Medición posterior a voladura	10	0	07:22		
	1265-6890.EC	Ninguna	Medición posterior a voladura	0	0	07:20		
	1365-6860.EC	Ninguna	Medición posterior a voladura	13	0	07:09		
	1215-Taller O.C	RB-03	Reparación bolter	8	0	15:30		

Fuente: MSR, 2016.



## 10 Conclusiones

### 10.1 Mediciones del aire en el ambiente

- 1) Los gases de combustión (**SO<sub>2</sub>** y **NO<sub>2</sub>**) y los niveles de presión sonora (**NPS**) presentaron valores por debajo de las guías establecidos por la USEPA (**SO<sub>2</sub>** y **NO<sub>2</sub>**), Banco Mundial (**SO<sub>2</sub>**, **NO<sub>2</sub>** y **NPS**) y British Columbia y OMS (**SO<sub>2</sub>** y **NO<sub>2</sub>**). Los niveles de PM<sub>10</sub> 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 2015.

### 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 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 únicamente en SW y en concentraciones por debajo de lo sugerido por la USEPA y por debajo del rango de lo establecido durante la línea base.
- 4) El efluente (**WW9**) de la planta de tratamiento de aguas residuales de tipo especial del proceso de minado cumple con el Acuerdo Gubernativo 236-2006 para entes generadores nuevos para todas las muestras tomadas durante Febrero a Abril de 2016.

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

- 5) Las vibraciones generadas por las voladuras registradas se encuentran por debajo de los límites de detección del equipo (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.



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Febrero 2016																													
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
<b>LECTURA FLUJÓMETRO (m<sup>3</sup>)</b>																													
Portal Este (tubería 6")	136286	139268	142182	145266	148429	149853	151144	152550	154169	155181	155760	155965	157236	158303	159123	159171	159224	159261	159291	159331	159337	159352	159357	159367	159378	159383	159409	159414	159416
Total Este (tubería 8")	123278	123825	124080	121472	124704	125052	125179	125210	125211	125267	125294	125327	125366	125395	125730	126769	127821	128956	130135	131299	132154	133038	134102	134762	135596	136337	136637	137455	138425
Portal Oeste (tubería 6")	344978	344978	344978	344978	344978	344978	344979	344980	344981	344983	344986	344988	344991	344991	344992	344995	344991	344995	344998	345002	305006	344991	344996	315000	345004	345008	345012	345253	346286
Portal Oeste (tubería 8")	325833	325833	325833	325833	325833	325833	327305	328416	329035	329544	329720	329903	331277	332710	334888	336553	337830	338859	340452	341578	343393	346597	348660	350285	359836	359933	359933	362185	363375
Clarificador	3867900	3869448	3871159	3872843	3874552	3875976	3876885	3878293	3879708	3881229	3882882	3884633	3886360	3887901	3889256	3890862	3892683	3896253	3900299	3904814	3908109	3911846	3915506	3918671	3922132	3924896	3928707	3932273	3935637
<b>VOLUMEN BOMBEO (m<sup>3</sup>)</b>																													
Portal Este (tubería 6")	2651	2982	2914	3084	3163	1424	1291	1406	1619	1012	579	205	1271	1067	820	48	53	37	30	40	6	15	5	10	11	5	26	5	2
Total Este (tubería 8")	296	547	255	312	312	348	127	31	1	56	27	33	39	29	335	1039	1052	1135	1179	1164	855	884	1064	660	834	741	300	818	970
Portal Oeste (tubería 6")	0	0	0	0	0	0	1	1	1	2	3	2	3	0	1	3	-4	4	3	4	-39996	39985	5	-29996	30004	4	4	241	1033
Portal Oeste (tubería 8")	0	0	0	0	0	0	1472	1111	619	509	176	183	1374	1433	2178	1665	1277	1029	1593	1126	1815	3204	2063	1625	9551	97	0	2252	1190
Clarificador	1495	1548	1711	1684	1709	1424	909	1408	1415	1521	1653	1751	1727	1541	1355	1606	1821	3570	4046	4515	3295	3737	3660	3165	3461	2764	3811	3566	3364
<b>CAUDAL PROYECTADO (gpm)</b>																													
Portal Este (tubería 6")	486	547	534	565	580	261	237	258	297	186	106	38	233	196	150	9	10	7	6	7	1	3	1	2	2	1	5	1	0
Total Este (tubería 8")	54	100	47	57	57	64	23	6	0	10	5	6	7	5	61	190	193	208	216	213	157	162	195	121	153	136	55	150	178
Portal Oeste (tubería 6")	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	-1	1	1	1	-7333	7331	1	-5499	5501	1	1	44	189
Portal Oeste (tubería 8")	0	0	0	0	0	0	270	204	113	93	32	34	252	263	399	305	234	189	292	206	333	587	378	298	1751	18	0	413	218
Clarificador	274	284	314	309	313	261	167	258	259	279	303	321	317	283	248	294	334	655	742	828	604	685	671	580	635	507	699	654	617

m<sup>3</sup>: metro cúbico. Gpm: galones por minuto. Azul: Por fallo en flujómetro, se utilizó la lectura del día siguiente para los cálculos. Fuente: MSR, 2016.

Marzo 2016																																
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<b>LECTURA FLUJÓMETRO (m<sup>3</sup>)</b>																																
Portal Este (tubería 6")	159851	159893	160131	160391	160522	161295	162427	163805	165255	166561	167473	168051.5	168151	168466	168672	168810	168856	168856	168856	168856	168859	168892	168947	169365	169457	169745	170063	170068	170104	170517	170793	
Total Este (tubería 8")	138234	138804	139395	140209	141180	141416	141445	141466	141474	141491	141509	141941	142788	143560	144304	144635	145441	146763	147739	148413	149112	149675	149854	149854	149870	149886	150125	151116	151853	152156	152762	
Portal Oeste (tubería 6")	312018	312095	312095	312095	312095	313867	317207	319801	319926	319926	319926	319926	319926	319926	319926	319926	319926	319926	319926	319926	321045	324524	326661	329136	331405	333813	336100	338578	340836	343340	345629	348044
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	3939350	3940675	3943237	3946187	3948708	3952063	3955558	3958810	3961996	3964825	3968373	3972180	3975690	3977870	3980680	3984473	3988045	3992530	3995391	3998821	4001708	4004553	4008438	4011812	4015177	4018723	4022406	4026392	4028849	4030470	4032189	
<b>VOLUMEN BOMBEO (m<sup>3</sup>)</b>																																
Portal Este (tubería 6")	435	42	238	259	131	773	1132	1378	1450	1306	912	579	99	316	205	138	46	0	0	0	3	33	56	418	92	288	318	5	37	413	276	
Total Este (tubería 8")	-191	571	591	814	971	236	29	21	8	17	19	431	848	772	744	331	806	1322	975	674	699	563	180	0	16	16	239	991	737	303	606	
Portal Oeste (tubería 6")	-34268	77	0	0	0	1772	3340	2594	125	0	0	0	0	0	0	0	0	0	0	0	1118	3479	2137	2475	2269	2408	2288	2478	2258	2504	2289	2415
Portal Oeste (tubería 8")	-363375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	3713	1325	2562	2950	2521	3355	3495	3252	3186	2829	3548	3807	3510	2180	2810	3793	3572	4485	2861	3430	2887	2845	3885	3374	3365	3546	3683	3986	2457	1621	1719	
<b>CAUDAL PROYECTADO (gpm)</b>																																
Portal Este (tubería 6")	80	8	44	48	24	142	208	253	266	239	167	106	18	58	38	25	8	0	0	0	1	6	10	77	17	53	58	1	7	76	51	
Total Este (tubería 8")	-35	105	108	149	178	43	5	4	1	3	3	79	155	141	136	61	148	242	179	124	128	103	33	0	3	3	44	182	135	56	111	
Portal Oeste (tubería 6")	-6283	14	0	0	0	325	612	476	23	0	0	0	0	0	0	0	0	0	0	0	205	638	392	454	416	441	419	454	414	459	420	443
Portal Oeste (tubería 8")	-66619	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	681	243	470	541	462	615	641	596	584	519	650	698	644	400	515	695	655	822	525	629	529	522	712	619	617	650	675	731	450	297	315	

m<sup>3</sup>: metro cúbico. Gpm: galones por minuto. A partir de Marzo de 2016 se comenzaron a utilizar los valores registrados automáticamente a las 00:00hrs. en sala de control para los portales y los valores manuales del clarificador al inicio del turno por Planta de Proceso. Verde: Cálculo afectado por cambio entre lecturas manuales y automáticas. Fuente: MSR, 2016.

Abril 2016																														
Descarga/fecha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>LECTURA FLUJÓMETRO (m<sup>3</sup>)</b>																														
Portal Este (tubería 6")	170958	171603.2	171827.2	172102.1	172427.6	173652.8	174732.5	175794.2	176834.2	176969.1	177059.9	177217.3	177452.1	177545.6	177878.2	178147.3	178417.5	178744.6	179370.4	179474.6	179477.2	179503.3	179830.2	180478.7	181195.7	181995	182617.5	183218.5	183400.6	183578.9
Total Este (tubería 8")	153158.1	153336.6	153831.7	154365	154484.9	154484.9	154485	154485	154485	155395	156392	157109	157780.7	158386.9	158939.6	159324	159691.3	160410.4	161013.9	162131.3	163214.1	163988.1	164658.7	165056.6	165564.7	166148.7	166568.1	166851.9	167885.4	169029.5
Portal Oeste (tubería 6")	350399	352722	355045	357001	359204	361511	363624	365773	367966	370237	372268	374456	376602	378784	380910	383054	385170	387242	389334	391445	393574	395542	396779	396779	396779	396779	396779	396779	396779	
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	4037037	4040580	4043998	4051255	4057598	4062200	4066413	4069287	4074223	4077421	4080104	4083492	4087089	4090677	4095071	4099349	4103602	4107515	4111760	4115090	4118611	4126963	4130745	4134905	4151187	4153112	4157165	4161325	4164558	4167963
<b>VOLUMEN BOMBEADO (m<sup>3</sup>)</b>																														
Portal Este (tubería 6")	164	645	224	275	325	1225	1080	1062	1040	135	91	157	235	94	333	269	270	327	626	104	3	26	327	649	717	799	623	601	182	178
Total Este (tubería 8")	396	179	495	533	120	0	0	0	0	910	997	717	672	606	553	384	367	719	603	1117	1083	774	671	398	508	584	419	284	1034	1144
Portal Oeste (tubería 6")	2355	2324	2323	1956	2202	2308	2112	2150	2193	2271	2031	2189	2145	2182	2125	2144	2116	2073	2092	2111	2129	1968	1236	0	0	0	0	0	0	
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	4848	3543	3418	7257	6343	4602	4213	2874	4936	3198	2683	3388	3597	3588	4394	4278	4253	3913	4245	3330	3521	8352	3782	4160	16282	1925	4053	4160	3233	3405
<b>CAUDAL PROYECTADO (gpm)</b>																														
Portal Este (tubería 6")	30	118	41	50	60	225	198	195	191	25	17	29	43	17	61	49	50	60	115	19	0	5	60	119	131	147	114	110	33	33
Total Este (tubería 8")	73	33	91	98	22	0	0	0	0	167	183	131	123	111	101	70	67	132	111	205	199	142	123	73	93	107	77	52	189	210
Portal Oeste (tubería 6")	432	426	426	359	404	423	387	394	402	416	372	401	393	400	390	393	388	380	383	387	390	361	227	0	0	0	0	0	0	
Portal Oeste (tubería 8")	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clarificador	889	650	627	1330	1163	844	772	527	905	586	492	621	659	658	806	784	780	717	778	611	646	1531	693	763	2985	353	743	763	593	624

m<sup>3</sup>: metro cúbico. Gpm: galones por minuto. A partir de Marzo de 2016 se comenzaron a utilizar los valores registrados automáticamente a las 00:00hrs. en sala de control para los portales y los valores manuales del clarificador al inicio del turno por Planta de Proceso. Fuente: MSR, 2016.

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

Febrero 2016																														
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
<b>Efluente Planta de Tratamiento Agua de Túneles (WW9)</b>																														
pH	u.e.	7.6	7.63	7.8	7.59	7.39	7.44	Sin Descarga	7.81	7.5	7.49	6.92	7.78	7.56	7.57	7.69	7.57	7.51	7.37	7.3	7.06	7.14	6.82	7.57	6.96	Sin Descarga	7.42	6.19	6.94	7.16
Temperatura	°C	24.1	26.1	24.3	26.6	23.3	23.5		26.5	21.5	25.3	25.2	27.2	24.5	26.4	24.4	24.4	23.9	22.8	24.5	27.9	28.2	24.8	24.8	24.8		26.2	22.1	23.8	25.3
Conductividad	µS/cm	1969	2052	1856	2181	2201	1981		1929	2001	1962	2095	2073	2342	1297	1880	2008	1904	2112	1964	2018	1973	2259	2073	1966		1894	1905	1977	1766
Turbidez	NTU	4.32	4.97	5.4	10.2	5.49	3.25		3.2	2.16	13.8	3.6	6.81	8.08	28.9	6.34	4.86	3.24	1.69	3.42	12	3.91	6.45	3.46	3.74		12.8	4.65	4.2	4.42
kit CN	mg/L	0.006	0.001	0.004	0.003	0.003	0.000		0.000	0.000	0.004	0.001	0.002	0.003	0.006	0.005	0.004	0.005	0.005	0.000	0.000	0.001	0.004	0.005	0.000		0.003	0.001	0.002	0.002
CN Total		NA	NA	NA	NA	<0.003	NA		0.004	NA	NA	NA	<0.003	NA	NA	0.004	NA	NA	NA	NA	<0.003	NA	<0.003	NA	NA		NA	<0.003	NA	NA
<b>Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)</b>																														
pH	u.e.	8.85	8.92	8.94	8.91	8.5	8.67	8.52	8.38	8.03	8.14	8.24	8.38	8.2	8.42	8.5	8.66	8.76	8.74	8.81	8.84	8.87	8.88	9.03	8.97	8.88	8.84	8.76	8.79	8.74
Temperatura	°C	21.3	21.1	22	21.7	18.3	17.1	20.1	15.5	14.7	13.1	13.9	15.5	17.5	16.5	19.9	20.7	20	20	19.9	21.7	20	19.9	21.7	22.6	17.6	16.7	16.3	16.9	23.3
Conductividad	µS/cm	1282	1326	1403	1458	1385	1567	1391	1760	1575	1508	1453	2213	1444	1718	1494	1770	1474	1439	1485	1458	1793	1564	1508	1524	1626	1581	1560	1561	1517
Turbidez	NTU	7.41	6.4	6.07	6.2	9.2	7.97	11.7	13.9	10.5	12.1	11.8	10.4	8.14	10.3	16.4	10.3	9.85	10.4	9.49	8.47	8.35	7.84	7.36	5.64	8.59	10.6	10.2	9.67	10.1
Kit CN	mg/L	0.003	0.002	0.002	0.000	0.003	0.000	0.005	0.000	0.000	0.002	0.002	0.004	0.000	0.003	0.004	0.001	0.000	0.001	0.000	0.002	0.003	0.003	0.003	0.001	0.000	0.005	0.004	0.000	0.001
CN Total		NA	NA	NA	NA	0.005	NA	NA	NA	NA	NA	0.005	NA	0.004	NA	NA	0.004	NA	NA	NA	0.006	NA	NA	0.004	NA	NA	0.005	NA	NA	0.005

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



Marzo 2016																																	
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<b>Efluente Planta de Tratamiento Agua de Túneles (WW9)</b>																																	
pH	u.e.	7.69	Sin Descarga	7.77	7.5	Sin Descarga	7.66	6.58	7.13	Sin Descarga	7.74	6.57	7.3	Sin Descarga	5.26	6.63	7.53	7.01	Sin Descarga	7.37	7.5	7.15	6.93	7.29	8	7.12	7.28	7.26	8.72	7.06	7.45		
Temperatura	°C	23.2		25.3	26.7		24.3	25.6	25.4		28.1	25.8	26.4		25.7	26.6	27.4	28.4		27	25.9	25.3	24.9	29	27.8	25.1	25.5	27.7	27.1	25.4	26.8		
Conductividad	µS/cm	2148		1701	2088		1747	1772	2179		2080	2065	1944		2183	1941	1957	2005		2250	2020	2086	1894	2143	1986	2074	2078	1615	2151	1952	2133		
Turbidez	NTU	19.5		26.3	5.2		7.94	2.25	2.71		7.32	4.04	7.7		2.77	5.59	17.1	6.09		3.29	8.08	3.84	1.87	5.27	3.59	3.47	4.57	4.66	4.28	2.5	2.31		
kit CN	mg/L	0.004		0.000	0.002		0.001	0.003	0.000		0.003	0.003	0.001		0.010	0.008	0.000	0.001		0.001	0.004	0.000	0.003	0.000	0.005	0.003	0.003	0.000	0.001	0.004	0.004		
CN Total	mg/L	NA	NA	<0.003	NA	NA	<0.003	NA	<0.003	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	0.003	NA	NA	0.004	0.004			
<b>Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)</b>																																	
pH	u.e.	8.81	8.85	8.89	8.78	8.87	8.72	8.65	8.63	8.59	8.65	8.64	8.55	8.6	7.14	8.52	8.46	8.45	8.39	8.41	8.38	8.13	8.09	8.16	8.2	8.26	8.22	8.2	8.18	7.36	8.2	8.19	
Temperatura	°C	22.1	21	20.4	20.2	20.7	20.7	22.1	21.3	22.8	24.9	22.7	23.1	24.2	24	23.1	24.2	25.7	24	25	24.4	21.2	20.9	20.4	24.3	23.6	23.2	24.3	25.4	23.8	23.9	24.5	
Conductividad	µS/cm	1538	1528	1599	1614	1628	1757	1530	1554	1915	1517	1553	1533	1653	1684	1770	1928	1787	1715	1650	1691	1557	1618	1579	1667	1677	1705	1691	1903	2292	1716	1728	
Turbidez	NTU	7.54	7.56	8.42	8.57	9.05	6.47	9.06	9.05	9.68	10.4	13	10.4	9.78	9.1	8.85	8.95	7.78	8.08	6.93	7.58	9.64	7.63	7.11	7.61	7.74	7.17	6.02	7.53	6.08	5.81	5.46	
Kit CN	mg/L	0.004	0.004	0.002	0.000	0.003	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.001	0.000	0.000	0.007	0.001	0.001	0.000	0.005	0.000	0.001	0.003	0.002	
CN Total	mg/L	NA	NA	NA	0.003	NA	NA	NA	0.004	NA	0.004	NA	NA	0.004	NA	NA	NA	NA	0.003	NA	NA	<0.003	NA	NA	NA	<0.003	NA	<0.003	NA	NA	NA	0.003	0.003

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

Abril 2016																															
Parámetro	Unidades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>Efluente Planta de Tratamiento Agua de Túneles (WW9)</b>																															
pH	u.e.	7.52	7.51	7.32	7.52	9.28	6.83	7.18	7.3	6.67	Sin Descarga	7.74	7.66	7.4	7.36	7.37	7.33	7.31	7.35	Sin Descarga	7.71	7.45	7.27	7.54	7.54	7.26	7.47	7.39	7.59	7.68	7.55
Temperatura	°C	26.1	26.6	28.8	25.3	25.3	25.8	26.4	25.3	25.7		26.5	24.3	25.8	25.6	25.6	25.9	25.9	26		24.6	25.9	25.9	30.4	25.9	26.6	25.6	25.7	26.7	26.4	26.1
Conductividad	µS/cm	2250	2089	2027	2540	2010	1994	2309	2251	2285		2847	2120	2013	1959	2176	2048	2030	2185		2179	2270	1883	1994	2022	1995	1865	1957	1781	1885	1786
Turbidez	NTU	13.4	24.5	10.1	6.09	1.38	2.94	2.08	1.98	5.65		2.67	3.09	5.55	2.51	3.23	3.02	4.69	2.35		6.54	2.92	2.61	6.98	3.48	5.54	4.52	2.86	6.13	4.25	26.5
kit CN	mg/L	0.000	0.009	0.006	0.004	0.002	0.002	0.004	0.001	0.002		0.007	0.006	0.005	0.006	0.006	0.003	0.000	0.018		0.007	0.005	0.003	0.005	0.005	0.003	0.006	0.003	0.021	0.004	0.005
CN Total	mg/L	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	NA	NA	NA	0.003	NA	<0.003	NA	NA	NA	NA	NA	<0.003	NA	NA	0.006	NA	NA	NA	0.008	NA	
<b>Pileta de Cumplimiento Ambiental (EP-3 o pileta 3)</b>																															
pH	u.e.	8.2	8.19	8.12	8.09	8.13	8.08	8.05	8.03	8.05	8.03	8.08	8.13	8.17	8.37	8.44	8.37	8.42	8.39	8.42	7.53	7.74	8.05	7.81	7.53	7.73	Sin agua	7.42	7.86	8.14	
Temperatura	°C	25.7	26.2	23.9	22.1	21.7	21.3	21.9	21	21.6	22.4	20.7	22.9	23.7	24.4	24	24.6	25.2	23.4	23.1	22.3	23.7	25.3	22.6	23.7	22		22.5	24.7	25.9	
Conductividad	µS/cm	1722	1766	1758	1789	1864	1819	2038	2054	2136	2126	2012	1955	1993	1998	2183	2005	2010	2100	2080	1704	1844	1803	2055	560	1145		184.3	248.6	215.7	
Turbidez	NTU	6.41	6.22	7.76	8.2	7.45	6.6	6.29	9.87	10.3	18.9	7.87	8.07	9.04	9.52	9.03	11.5	13.3	15.8	16.9	41.4	18.5	15.7	14.7	50.8	12.9		53.1	32.2	28.7	
kit CN	mg/L	0.000	0.002	0.000	0.003	0.002	0.002	0.000	0.000	0.003	0.005	0.004	0.004	0.002	0.000	0.003	0.001	0.000	0.001	0.003	0.000	0.001	0.002	0.003	0.000	0.003		0.000	0.000	0.003	
CN Total	mg/L	NA	NA	NA	NA	<0.003	NA	NA	<0.003	NA	<0.003	NA	NA	NA	NA	0.015	NA	NA	0.01	NA	NA	NA	0.011	NA	0.005	NA	NA	NA	NA		

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

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

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



## **11.3 Resultados crudos de calidad de aire**

### **11.3.1 Material Particulado (PM<sub>10</sub>)**

# BGI PQ200 Air Sampling System

Downloaded February 2016

**Job Details:**

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

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

	Max	Min	Avg	Units
BP	655	650	652	mmHg
TA	23.0	11.5	15.6	°C
Q	---	---	16.71	Lpm

**Timer Information:**

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Feb-16	14:55:00
Stop:	11-Feb-16	14:55:00

**Mass Concentration Data:**

Filter ID:	2905-0101
Final Wt:	151.090 mg
Initial Wt:	150.500 mg
Delta Wt:	0.590 mg
Total Vol:	21.32 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C

occured NA

ET: 23:59:00

Mass Conc: 27.68 µg/m<sup>3</sup>

Notes 1: Depósito de Suelos, Proyecto El Escobal

Notes 2: Minera San Rafael, S.A.

# BGI PQ200 Air Sampling System

Downloaded February 2016

**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	655	651	652	mmHg
TA	25.7	15.0	18.8	°C
Q	---	---	16.71	Lpm

**Timer Information:**

	Date	Time
	dd-mmm	hh:mm:ss
Start:	27-Feb-16	12:08:00
Stop:	28-Feb-16	12:08:00

**Mass Concentration Data:**

Filter ID:	2909-0505
Final Wt:	151.110 mg
Initial Wt:	150.680 mg
Delta Wt:	0.430 mg
Total Vol:	21.08 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C

occured NA

ET: 23:59:00

Mass Conc: 20.40 µg/m<sup>3</sup>

Notes 1: San Rafael Las Flores, Santa Rosa.

Notes 2: Minera San Rafael, S.A.

# BGI PQ200 Air Sampling System

Downloaded February 2016

**Job Details:**

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

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

	Max	Min	Avg	Units
BP	634	627	631	mmHg
TA	32.7	14.1	19.9	°C
Q	---	---	16.70	Lpm

**Timer Information:**

	Date	Time
	dd-mmm	hh:mm:ss
Start:	16-Feb-16	14:12:00
Stop:	17-Feb-16	14:12:00

**Mass Concentration Data:**

Filter ID:	2912-0808
Final Wt:	151.660 mg
Initial Wt:	151.110 mg
Delta Wt:	0.550 mg
Total Vol:	20.31 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C

occured NA

ET: 20:05:00

Mass Conc: 27.08 µg/m<sup>3</sup>

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 2016

<b>Job Details:</b>			Job Code: EA-3																									
Job Name: EA-3			Site Name: El Fucío, zona este.																									
Version: PQ200			Station Code:																									
Serial No: 2.00			Operators: EvQ																									
Pump Time:			User1: NA																									
Flags: NA			User2: NA																									
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>628</td><td>623</td><td>625</td><td>mmHg</td></tr><tr><td>TA</td><td>31.3</td><td>12.9</td><td>19.5</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.70</td><td>Lpm</td></tr></tbody></table>				Max	Min	Avg	Units	BP	628	623	625	mmHg	TA	31.3	12.9	19.5	°C	Q	---	---	16.70	Lpm	<b>Timer Information:</b>			<b>Mass Concentration Data:</b>		
	Max	Min	Avg	Units																								
BP	628	623	625	mmHg																								
TA	31.3	12.9	19.5	°C																								
Q	---	---	16.70	Lpm																								
QCV			Date			Filter ID: <b>2911-0707</b>																						
Max overheat			Time			Final Wt: 151.440 mg																						
occured NA			dd-mmm			Initial Wt: 150.820 mg																						
			hh:mm:ss			Delta Wt: 0.620 mg																						
			Start: 16-Feb-16			Total Vol: 20.15 m <sup>3</sup>																						
			Stop: 17-Feb-16			<b>Mass Conc: 30.77 µg/m<sup>3</sup></b>																						
			ET: 23:59:00																									
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 2016

<b>Job Details:</b>			Job Code: EA-3A																									
Job Name: EA-3A			Site Name: Aldea El Fucío																									
Version: PQ200			Station Code:																									
Serial No: 3.00			Operators: EvQ																									
Pump Time:			User1: NA																									
Flags: NA			User2: NA																									
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>647</td><td>644</td><td>645</td><td>mmHg</td></tr><tr><td>TA</td><td>28.2</td><td>17.0</td><td>20.7</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.71</td><td>Lpm</td></tr></tbody></table>				Max	Min	Avg	Units	BP	647	644	645	mmHg	TA	28.2	17.0	20.7	°C	Q	---	---	16.71	Lpm	<b>Timer Information:</b>			<b>Mass Concentration Data:</b>		
	Max	Min	Avg	Units																								
BP	647	644	645	mmHg																								
TA	28.2	17.0	20.7	°C																								
Q	---	---	16.71	Lpm																								
QCV			Date			Filter ID: <b>2914-1010</b>																						
Max overheat			Time			Final Wt: 152.370 mg																						
occured NA			dd-mmm			Initial Wt: 150.840 mg																						
			hh:mm:ss			Delta Wt: 1.530 mg																						
			Start: 18-Feb-16			Total Vol: 20.72 m <sup>3</sup>																						
			Stop: 19-Feb-16			<b>Mass Conc: 73.84 µg/m<sup>3</sup></b>																						
			ET: 23:59:00																									
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 2016

<b>Job Details:</b>			Job Code: EA-4A																									
Job Name: EA-4A			Site Name: Aldea Los Ángeles																									
Version: PQ200			Station Code:																									
Serial No: 2.00			Operators: EvQ																									
Pump Time:			User1: NA																									
Flags: NA			User2: NA																									
<table border="1"><thead><tr><th></th><th>Max</th><th>Min</th><th>Avg</th><th>Units</th></tr></thead><tbody><tr><td>BP</td><td>653</td><td>646</td><td>650</td><td>mmHg</td></tr><tr><td>TA</td><td>28.9</td><td>14.5</td><td>20.8</td><td>°C</td></tr><tr><td>Q</td><td>---</td><td>---</td><td>16.71</td><td>Lpm</td></tr></tbody></table>				Max	Min	Avg	Units	BP	653	646	650	mmHg	TA	28.9	14.5	20.8	°C	Q	---	---	16.71	Lpm	<b>Timer Information:</b>			<b>Mass Concentration Data:</b>		
	Max	Min	Avg	Units																								
BP	653	646	650	mmHg																								
TA	28.9	14.5	20.8	°C																								
Q	---	---	16.71	Lpm																								
QCV			Date			Filter ID: <b>2915-1111</b>																						
Max overheat			Time			Final Wt: 154.350 mg																						
occured NA			dd-mmm			Initial Wt: 151.170 mg																						
			hh:mm:ss			Delta Wt: 3.180 mg																						
			Start: 23-Feb-16			Total Vol: 20.87 m <sup>3</sup>																						
			Stop: 24-Feb-16			<b>Mass Conc: 152.34 µg/m<sup>3</sup></b>																						
			ET: 23:59:00																									
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 2016

**Job Details:**

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

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

	Max	Min	Avg	Units
BP	654	647	651	mmHg
TA	31.8	13.1	20.6	°C
Q	---	---	16.71	Lpm

**Timer Information:**

	Date	Time
	dd-mmm	hh:mm:ss
Start:	23-Feb-16	16:17:00
Stop:	23-Feb-16	16:17:00

**Mass Concentration Data:**

Filter ID:	2916-1222
Final Wt:	152.390 mg
Initial Wt:	150.680 mg
Delta Wt:	1.710 mg
Total Vol:	20.92 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 81.74 µg/m<sup>3</sup>

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 2016

**Job Details:**

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

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

	Max	Min	Avg	Units
BP	647	642	645	mmHg
TA	25.3	14.3	17.7	°C
Q	---	---	16.71	Lpm

**Timer Information:**

	Date	Time
	dd-mmm	hh:mm:ss
Start:	25-Feb-16	15:23:00
Stop:	26-Feb-16	15:23:00

**Mass Concentration Data:**

Filter ID:	2907-0303
Final Wt:	152.710 mg
Initial Wt:	152.130 mg
Delta Wt:	0.580 mg
Total Vol:	20.93 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 27.71 µg/m<sup>3</sup>

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 2016

**Job Details:**

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

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

	Max	Min	Avg	Units
BP	656	652	654	mmHg
TA	23.1	11.7	15.7	°C
Q	---	---	16.71	Lpm

**Timer Information:**

	Date	Time
	dd-mmm	hh:mm:ss
Start:	10-Feb-16	15:17:00
Stop:	11-Feb-16	15:17:00

**Mass Concentration Data:**

Filter ID:	2906-0202
Final Wt:	151.370 mg
Initial Wt:	151.310 mg
Delta Wt:	0.060 mg
Total Vol:	21.37 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

ET: 23:59:00

Mass Conc: 2.81 µg/m<sup>3</sup>

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

Notes 2: Minera San Rafael, S.A.

**Cliente:** Minera San Rafael, S.A.  
**Dirección:** Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV  
**Proyecto:** 178-079 (El Escobal)  
**Análisis de muestras:** Marzo, 03 al 07 de 2016  
**Emisión de reporte:** Marzo, 07 de 2016

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

**Análisis:** Gravimetría en filtros.

**Método analítico:** 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM<sub>10</sub> in the Atmosphere. **Acreditado ISO 17025**

Cuadro 1: resultados de filtros peso final

No.	Identificación de la muestra	Código de filtro <sup>1</sup>	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2905-0101	0.15050	0.15109
2	EA-7A	2906-0202	0.15131	0.15137
3	EA-6	2907-0303	0.15213	0.15271
4	EA-1B	2909-0505	0.15068	0.15111
5	EA-10	2910-0606	0.15136	0.15137
6	EA-3	2911-0707	0.15082	0.15144
7	EA-2A	2912-0808	0.15111	0.15166
8	EA-3A	2914-1010	0.15084	0.15237
9	EA-4A	2915-1111	0.15117	0.15435
10	EA-5A	2916-1222	0.15068	0.15239

<sup>1</sup>: Código de filtro asignado por Laboratorio Ambiental, S.A. \*: Corresponde a los pesos iniciales indicado en reportes analíticos RA-16-11509

**Anexos:**

Anexo 1. Cadena de Custodia R-02-000729

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.

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

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Lic. Eddy Mendoza  
Director de Laboratorio  
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Marzo, 07/16	D.S.	Marzo, 07/16	E.M.	Marzo, 07/16	<b>01</b>





# BGI PQ200 Air Sampling System

Downloaded March 2016

## 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	653	648	651	mmHg
TA	32.2	13.6	20.8	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 10-Mar-16	14:20:00
Stop: 11-Mar-16	14:20:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2937-1616
Final Wt:	152.200 mg
Initial Wt:	151.210 mg
Delta Wt:	0.990 mg
Total Vol:	24.04 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **41.18** µg/m<sup>3</sup>

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

# BGI PQ200 Air Sampling System

Downloaded March 2016

## Job Details:

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

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

	Max	Min	Avg	Units
BP	633	630	632	mmHg
TA	34.5	17.5	23.0	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 24-Mar-16	11:33:00
Stop: 25-Mar-16	11:33:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2942-0404
Final Wt:	151.780 mg
Initial Wt:	150.720 mg
Delta Wt:	1.060 mg
Total Vol:	19.92 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **53.21** µg/m<sup>3</sup>

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

# BGI PQ200 Air Sampling System

Downloaded March 2016

## Job Details:

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

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

	Max	Min	Avg	Units
BP	630	626	628	mmHg
TA	30.7	14.4	19.4	°C
Q	---	---	16.70	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 22-Mar-16	11:27:00
Stop: 23-Mar-16	11:27:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2939-0101
Final Wt:	150.750 mg
Initial Wt:	150.550 mg
Delta Wt:	0.200 mg
Total Vol:	20.25 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **9.88** µg/m<sup>3</sup>

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

# BGI PQ200 Air Sampling System

Downloaded March 2016

## Job Details:

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

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

	Max	Min	Avg	Units
BP	653	649	651	mmHg
TA	31.7	15.5	22.5	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 29-Mar-16	11:05:00
Stop: 30-Mar-16	11:05:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2938-1797
Final Wt:	152.960 mg
Initial Wt:	150.600 mg
Delta Wt:	2.360 mg
Total Vol:	24.04 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **98.17** µg/m<sup>3</sup>

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

**Cliente:** Minera San Rafael, S.A.  
**Dirección:** Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV  
**Proyecto:** 178-079 (El Escobal)  
**Análisis de muestras:** Abril, 18 al 19 de 2016  
**Emisión de reporte:** Abril, 20 de 2016

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

**Análisis:** Gravimetría en filtros.

**Método analítico:** 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM<sub>10</sub> in the Atmosphere. **Acreditado ISO 17025**

Cuadro 1: resultados de filtros peso final

No.	Identificación de la muestra	Código de filtro <sup>1</sup>	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2937-1616	0.15121	0.15220
2	EA-2A	2942-0404	0.15072	0.15178
3	EA-3	2939-0101	0.15055	0.15075
4	EA-7A	2938-1797	0.15060	0.15296
5	EA-8	2941-0303	0.15001	0.15252
6	EA-10	2943-0525	0.15061	0.15062

<sup>1</sup>: Código de filtro asignado por Laboratorio Ambiental, S.A. \*: Corresponde a los pesos iniciales indicado en reportes analíticos RA-16-11526 y RA-16-11532.

**Anexos:**

Anexo 1. Cadena de Custodia R-02-000728

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.	Abril, 20/16	J.J.	Abril, 20/16	A.G.J.	Abril, 20/16	<b>02</b>



# BGI PQ200 Air Sampling System

Downloaded April 2016

## Job Details:

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

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

	Max	Min	Avg	Units
BP	651	646	649	mmHg
TA	31.6	14.5	21.5	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 19-Apr-16	14:38:00
Stop: 20-Apr-16	14:38:00
ET: 21:34:00	

Mass Concentration Data:	
Filter ID:	2944-0606
Final Wt:	151.360 mg
Initial Wt:	150.490 mg
Delta Wt:	0.870 mg
Total Vol:	24.04 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **36.19** µg/m<sup>3</sup>

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

# BGI PQ200 Air Sampling System

Downloaded April 2016

## Job Details:

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

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

	Max	Min	Avg	Units
BP	634	630	631	mmHg
TA	31.5	17.4	21.9	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 14-Apr-16	11:19:00
Stop: 15-Apr-16	11:19:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2945-0707
Final Wt:	151.740 mg
Initial Wt:	150.290 mg
Delta Wt:	1.450 mg
Total Vol:	19.92 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **72.79** µg/m<sup>3</sup>

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 2016

## Job Details:

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

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

	Max	Min	Avg	Units
BP	626	623	624	mmHg
TA	28.3	17.1	21.1	°C
Q	---	---	16.70	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 14-Apr-16	12:12:00
Stop: 15-Apr-16	12:12:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2946-0808
Final Wt:	151.290 mg
Initial Wt:	150.010 mg
Delta Wt:	1.280 mg
Total Vol:	20.01 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **63.98** µg/m<sup>3</sup>

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 2016

## Job Details:

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

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

	Max	Min	Avg	Units
BP	653	648	651	mmHg
TA	32.9	15.9	22.6	°C
Q	---	---	16.71	Lpm

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 19-Apr-16	14:15:00
Stop: 20-Apr-16	14:15:00
ET: 23:59:00	

Mass Concentration Data:	
Filter ID:	2947-1010
Final Wt:	151.150 mg
Initial Wt:	150.000 mg
Delta Wt:	1.150 mg
Total Vol:	24.04 m <sup>3</sup>

QCV	NA	%
Max overheat	NA	°C
occured NA		

Mass Conc: **47.84** µg/m<sup>3</sup>

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

**Cliente:** Minera San Rafael, S.A.  
**Dirección:** Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV  
**Proyecto:** 178-079 (CTA)  
**Análisis de muestras:** Mayo 02 de 2016  
**Emisión de reporte:** Mayo, 03 de 2016

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

**Análisis:** Gravimetría en filtros.

**Método analítico:** 40 CFR, Apéndice J, Parte 50, Capítulo 1, Edición 07-1-97, EPA. Reference Method for the Determination of Particulate Matter as PM<sub>10</sub> in the Atmosphere. **Acreditado ISO 17025**

Cuadro 1: resultados de filtros peso final

No.	Identificación de la muestra	Código de filtro <sup>1</sup>	Peso inicial* (gramos)	Peso final (gramos)
Límite de detección del método			0.00005	
1	EA-1A	2944-0606	0.15049	0.15136
2	EA-2A	2945-0707	0.15029	0.15174
3	EA-3	2946-0808	0.15001	0.15129
4	EA-7A	2947-1010	0.15000	0.15115

<sup>1</sup>: Código de filtro asignado por Laboratorio Ambiental, S.A. \*: Corresponde a los pesos iniciales indicado en reportes analíticos RA-16-11542.

## Anexos:

Anexo 1. Cadena de Custodia R-02-000780

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.

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

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

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
L.D.	Mayo, 03/16	J.J.	Mayo, 03/16	A.G.J.	Mayo, 03/16	<b>01</b>





### **11.3.2 Informe de Metales en PM<sub>10</sub>**

## Reporte Analítico RA-16-11528

**Cliente:** Minera San Rafael  
**Dirección:** Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV  
**Proyecto:** 178-080 (El Escobal)  
**Análisis de muestras:** Marzo, 22 de 2016  
**Emisión del reporte:** Marzo, 29 de 2016

**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
<b>Código de filtro</b>		2909-0505	2912-0808	2914-1010	2915-1111	2916-1222	2907-0303	2906-0202	2910-0606
Aluminio (Al)	5.0	< 5.0	< 5.0	23.9	54.6	23.0	< 5.0	< 5.0	< 5.0
Antimonio (Sb)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsénico (As)	0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
Azufre (S)	2.5	6.7	30.6	11.2	56.6	56.0	30.4	26.2	< 2.5
Bario (Ba)	0.10	0.20	0.14	0.50	1.22	0.57	0.15	0.14	< 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	0.63	0.66	0.62	0.90	0.79	0.79	< 0.60	0.67
Cadmio (Cd)	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Calcio (Ca)	5.0	28.7	16.0	26.5	42.5	29.2	18.8	16.8	10.4
Cromo (Cr)	0.50	1.03	1.00	1.01	1.08	0.96	1.04	1.08	0.96
Cobalto (Co)	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cobre (Cu)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Estaño (Sn)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Estroncio (Sr)	0.10	< 0.10	< 0.10	< 0.10	0.23	0.14	< 0.10	< 0.10	< 0.10
Fósforo (P)	2.5	10.1	9.3	9.1	12.8	10.5	9.9	9.9	9.5
Hierro (Fe)	5.0	6.7	6.9	29.6	50.3	24.9	6.1	5.3	< 5.0

## Reporte Analítico RA-16-11528

*Parámetros	LDM (µg)	Estación							
		EA-1B	EA-2A	EA-3A	EA-4A	EA-5A	EA-6	EA-7A	EA-10
<b>Código de filtro</b>		2909-0505	2912-0808	2914-1010	2915-1111	2916-1222	2907-0303	2906-0202	2910-0606
Magnesio (Mg)	5.0	5.2	< 5.0	9.9	13.8	9.0	< 5.0	< 5.0	< 5.0
Manganeso (Mn)	0.10	0.28	0.29	1.78	2.44	1.14	0.28	0.26	< 0.10
Molibdeno (Mo)	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Níquel (Ni)	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Plata (Ag)	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Plomo (Pb)	0.30	< 0.30	< 0.30	0.36	0.59	< 0.30	< 0.30	< 0.30	< 0.30
Potasio (K)	10.0	< 10.0	< 10.0	< 10.0	25.0	18.0	< 10.0	< 10.0	< 10.0
Selenio (Se)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Silicio (Si)	1.0	15.8	17.9	32.7	47.1	24.4	122	14	84.3
Sodio (Na)	5.0	30.7	29.1	34.0	39.2	35.6	34.4	38.5	29.2
Talio (Tl)	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanio (Ti)	0.10	0.27	0.26	1.42	3.04	1.39	0.26	0.29	< 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	< 0.50	1.66	1.37	0.77	< 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-02-000729

Anexo 2. Reporte de laboratorio subcontratado

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

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

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Lic. Eddy Mendoza  
Director de Laboratorio  
Colegiado: 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Marzo, 29/16	J.J.	Marzo, 29/16	E.M	Marzo, 29/16	<b>01</b>

Información General				Información para el Reporte			
Empresa	Minera San Rafael			Word <input type="checkbox"/>	Reportar a: <i>Ing. Miguel Berganza</i>		
Contacto	Ing. Miguel Berganza						
Dirección	Blvd. Los Próceres No. 24-69 Z. 10 Empresarial Zona Pradera, Torre N Of. 1406			PDF <input checked="" type="checkbox"/>	Proyecto: <i>Mina El Escobal</i>		
	Ciudad	Guatemala	País				
Teléfono	59515248	Fax	-	Impresión <input type="checkbox"/>	Dirección: <i>Ver info. gen.</i>		
e-mail	M.Berganza@sanrafael.com.gt			Otro <input type="checkbox"/>			

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

Cadena de Custodía No.
R-02-000729
Pág. ___ de ___

### Instrucciones:

Completar la información solicitada con letra legible.

1. Para uso exclusivo de Laboratorio Ambiental dejar en blanco

2. Marque con una "x" sobre las opciones que desee sean tomadas en consideración.

3. Colocar el número de recipientes que correspondan a la descripción del encabezado.

No.	Identificación de las Muestra	Identificación laboratorio <sup>1</sup>	Fecha del muestreo	No. Total recipiente	Descripción recipiente <sup>3</sup>			Tipo de Matriz <sup>3</sup>							Preservante <sup>3</sup>							Parámetros a analizar <sup>2</sup>																Observaciones						
					Vidrio	Porta filtros	Plástico	Otros	Agua	Aire	Filtros	Macroinvertebrados	Peces	Fauna y Flora	Otros	Frio	HNO3	H2SO4	HCl	NaOH	Etanol	Otro	Físico-químico de Agua						Filtros		Aire		Biología											
																							Alcalinidad	Dureza Total	Nitrogeno Kjeldahl	Nitrogeno total	Fósforo Total	Carbono hexavalente	Color	Aniones: F <sup>-</sup> , Cl <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , NO <sub>2</sub> <sup>-</sup> , NO <sub>3</sub> <sup>-</sup>	Cationes: Mg, K, Ca, Na	Grumo total	Amonio	TOC	Sólidos totales	Sólidos Suspensidos Totales	Sólidos Disueltos Totales		Peso seco inicial	Peso seco final	Metales	PH <sub>10</sub>	NO <sub>2</sub> y SO <sub>2</sub>	Id.Tax. Macroinvertebrados
1	EA-1A	2905-0101	10/02/16	1																																							Favor devolver filtro.	
2	EA-1B	2909-0505	23/02/16	1																																								
3	EA-2A	2912-0808	16/02/16	1																																								
4	EA-3	2911-0707	16/02/16	1																																								
5	EA-3A	2914-1010	18/02/16	1																																								
6	EA-4A	2915-1111	23/02/16	1																																								
7	EA-5A	2916-1222	23/02/16	1																																								
8	EA-6	2907-0303	25/02/16	1																																								
9	EA-7A	2906-0202	10/02/16	1																																								
10	EA-10	2910-0606	15/02/16	1																																								
11																																												
12																																												
13																																												
14																																												
15																																												
16																																												
17																																												
18																																												
19																																												
20																																												
Ingreso	Material Entregado por/Firma		<i>Erik van Aardnaw</i>		Fecha	01/03/2016	Hora																	Para Uso Exclusivo del laboratorio <sup>1</sup>																				
	Material Recibido por/Firma		<i>Diego Silva</i>		Fecha	02/03/2016	Hora	16:45	Estado de las muestras						Bueno	<input checked="" type="checkbox"/>	Malo	<input type="checkbox"/>	(especificar en observaciones)																									
Egreso	Material Entregado por/Firma				Fecha		Hora																	Temperatura de muestras:		<i>NA</i>	pH:	<i>NA</i>																
	Material Recibido por/Firma				Fecha		Hora																	Observaciones:																				

Nota: F=fluoruros; Cl=cloruros; SO<sub>4</sub><sup>2-</sup>=sulfatos; NO<sub>2</sub>=nitritos; NO<sub>3</sub>=nitratos; Mg=magnesio; K=potasio; Ca=calcio; Na=sodio; Si=silicio; Hg=mercurio; C=carbono. TOC=carbono orgánico total; Id.Tax.=identificación taxonómica. HNO3=ácido nítrico; H2SO4=ácido sulfúrico; HCl=ácido clorhídrico. Agregar % de la solución de etanol empleada para preservar o "+" "G" si se utiliza en solución con glicerina.

Your P.O. #: 5752  
 Your Project #: 178-080  
 Site Location: MSR  
 Your C.O.C. #: na

**Attention: Ana Gabriela Juarez**

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

**Report Date: 2016/03/22**  
 Report #: R3938991  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B649245**  
**Received: 2016/03/10, 15:04**

Sample Matrix: Filter  
 # Samples Received: 8

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Total Metals (6010Cmod)	8	2016/03/15	2016/03/15	CAM SOP-00408 / BRL SOP-00102	EPA 6010C m
Total Metals on Small Filter (6020Amod)	8	2016/03/15	2016/03/22	BRL SOP-00103 / BRL SOP- EPA 6020A m 00102	

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

**Encryption Key**

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

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

**ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)**

<b>Maxxam ID</b>		BZR023	BZR023	BZR024	BZR025	BZR026	BZR027	BZR028		
<b>Sampling Date</b>		2016/02/27	2016/02/27	2016/02/16	2016/02/18	2016/02/23	2016/02/23	2016/02/25		
<b>COC Number</b>		na	na	na	na	na	na	na		
	<b>UNITS</b>	<b>2909-0505</b>	<b>2909-0505 Lab-Dup</b>	<b>2912-0808</b>	<b>2914-1010</b>	<b>2915-1111</b>	<b>2916-1222</b>	<b>2907-0303</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Metals</b>										
Total Uranium (U)	ug	ND	ND	ND	ND	ND	ND	ND	0.10	4417973

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
ND = Not detected

<b>Maxxam ID</b>		BZR029	BZR030		
<b>Sampling Date</b>		2016/02/10	2016/02/15		
<b>COC Number</b>		na	na		
	<b>UNITS</b>	<b>2906-0202</b>	<b>2910-0606</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Metals</b>					
Total Uranium (U)	ug	ND	ND	0.10	4417973

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



**MISCELLANEOUS (FILTER)**

Maxxam ID		BZR023	BZR024	BZR025	BZR026	BZR027	BZR028	BZR029		
Sampling Date		2016/02/27	2016/02/16	2016/02/18	2016/02/23	2016/02/23	2016/02/25	2016/02/10		
COC Number		na	na	na	na	na	na	na		
	<b>UNITS</b>	<b>2909-0505</b>	<b>2912-0808</b>	<b>2914-1010</b>	<b>2915-1111</b>	<b>2916-1222</b>	<b>2907-0303</b>	<b>2906-0202</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Metals</b>										
Aluminum (Al)	ug	ND	ND	23.9	54.6	23.0	ND	ND	5.0	4417938
Antimony (Sb)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4417938
Arsenic (As)	ug	ND	ND	ND	ND	ND	ND	ND	0.60	4417938
Barium (Ba)	ug	0.20	0.14	0.50	1.22	0.57	0.15	0.14	0.10	4417938
Beryllium (Be)	ug	ND	ND	ND	ND	ND	ND	ND	0.10	4417938
Bismuth (Bi)	ug	ND	ND	ND	ND	ND	ND	ND	0.60	4417938
Boron (B)	ug	0.63	0.66	0.62	0.90	0.79	0.79	ND	0.60	4417938
Cadmium (Cd)	ug	ND	ND	ND	ND	ND	ND	ND	0.20	4417938
Calcium (Ca)	ug	28.7	16.0	26.5	42.5	29.2	18.8	16.8	5.0	4417938
Chromium (Cr)	ug	1.03	1.00	1.01	1.08	0.96	1.04	1.08	0.50	4417938
Cobalt (Co)	ug	ND	ND	ND	ND	ND	ND	ND	0.20	4417938
Copper (Cu)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4417938
Iron (Fe)	ug	6.7	6.9	29.6	50.3	24.9	6.1	5.3	5.0	4417938
Lead (Pb)	ug	ND	ND	0.36	0.59	ND	ND	ND	0.30	4417938
Magnesium (Mg)	ug	5.2	ND	9.9	13.8	9.0	ND	ND	5.0	4417938
Manganese (Mn)	ug	0.28	0.29	1.78	2.44	1.14	0.28	0.26	0.10	4417938
Molybdenum (Mo)	ug	ND	ND	ND	ND	ND	ND	ND	0.30	4417938
Nickel (Ni)	ug	ND	ND	ND	ND	ND	ND	ND	0.30	4417938
Phosphorus (P)	ug	10.1	9.3	9.1	12.8	10.5	9.9	9.9	2.5	4417938
Potassium (K)	ug	ND	ND	ND	25	18	ND	ND	10	4417938
Selenium (Se)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4417938
Silicon (Si)	ug	15.8	17.9	32.7	47.1	24.4	122	14.0	1.0	4417938
Silver (Ag)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4417938
Sodium (Na)	ug	30.7	29.1	34.0	39.2	35.6	34.4	38.5	5.0	4417938
Strontium (Sr)	ug	ND	ND	ND	0.23	0.14	ND	ND	0.10	4417938
Sulphur (S)	ug	6.7	30.6	11.2	56.6	56.0	30.4	26.2	2.5	4417938
Thallium (Tl)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4417938
Tin (Sn)	ug	ND	ND	ND	ND	ND	ND	ND	1.0	4417938
Titanium (Ti)	ug	0.27	0.26	1.42	3.04	1.39	0.26	0.29	0.10	4417938
Vanadium (V)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4417938
Zinc (Zn)	ug	ND	ND	1.66	1.37	0.77	ND	ND	0.50	4417938
Zirconium (Zr)	ug	ND	ND	ND	ND	ND	ND	ND	0.50	4417938

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

**MISCELLANEOUS (FILTER)**

<b>Maxxam ID</b>		BZR030		
<b>Sampling Date</b>		2016/02/15		
<b>COC Number</b>		na		
	<b>UNITS</b>	<b>2910-0606</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>				
Aluminum (Al)	ug	ND	5.0	4417938
Antimony (Sb)	ug	ND	1.0	4417938
Arsenic (As)	ug	ND	0.60	4417938
Barium (Ba)	ug	ND	0.10	4417938
Beryllium (Be)	ug	ND	0.10	4417938
Bismuth (Bi)	ug	ND	0.60	4417938
Boron (B)	ug	0.67	0.60	4417938
Cadmium (Cd)	ug	ND	0.20	4417938
Calcium (Ca)	ug	10.4	5.0	4417938
Chromium (Cr)	ug	0.96	0.50	4417938
Cobalt (Co)	ug	ND	0.20	4417938
Copper (Cu)	ug	ND	0.50	4417938
Iron (Fe)	ug	ND	5.0	4417938
Lead (Pb)	ug	ND	0.30	4417938
Magnesium (Mg)	ug	ND	5.0	4417938
Manganese (Mn)	ug	ND	0.10	4417938
Molybdenum (Mo)	ug	ND	0.30	4417938
Nickel (Ni)	ug	ND	0.30	4417938
Phosphorus (P)	ug	9.5	2.5	4417938
Potassium (K)	ug	ND	10	4417938
Selenium (Se)	ug	ND	1.0	4417938
Silicon (Si)	ug	84.3	1.0	4417938
Silver (Ag)	ug	ND	0.50	4417938
Sodium (Na)	ug	29.2	5.0	4417938
Strontium (Sr)	ug	ND	0.10	4417938
Sulphur (S)	ug	ND	2.5	4417938
Thallium (Tl)	ug	ND	1.0	4417938
Tin (Sn)	ug	ND	1.0	4417938
Titanium (Ti)	ug	ND	0.10	4417938
Vanadium (V)	ug	ND	0.50	4417938
Zinc (Zn)	ug	ND	0.50	4417938
Zirconium (Zr)	ug	ND	0.50	4417938
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected				

### TEST SUMMARY

**Maxxam ID:** BZR023  
**Sample ID:** 2909-0505  
**Matrix:** Filter

**Collected:** 2016/02/27  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathipplai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**Maxxam ID:** BZR023 Dup  
**Sample ID:** 2909-0505  
**Matrix:** Filter

**Collected:** 2016/02/27  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**Maxxam ID:** BZR024  
**Sample ID:** 2912-0808  
**Matrix:** Filter

**Collected:** 2016/02/16  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathipplai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**Maxxam ID:** BZR025  
**Sample ID:** 2914-1010  
**Matrix:** Filter

**Collected:** 2016/02/18  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathipplai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**Maxxam ID:** BZR026  
**Sample ID:** 2915-1111  
**Matrix:** Filter

**Collected:** 2016/02/23  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathipplai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**Maxxam ID:** BZR027  
**Sample ID:** 2916-1222  
**Matrix:** Filter

**Collected:** 2016/02/23  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathipplai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**TEST SUMMARY**

**Maxxam ID:** BZR028  
**Sample ID:** 2907-0303  
**Matrix:** Filter

**Collected:** 2016/02/25  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathippilai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**Maxxam ID:** BZR029  
**Sample ID:** 2906-0202  
**Matrix:** Filter

**Collected:** 2016/02/10  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathippilai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

**Maxxam ID:** BZR030  
**Sample ID:** 2910-0606  
**Matrix:** Filter

**Collected:** 2016/02/15  
**Shipped:**  
**Received:** 2016/03/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals (6010Cmod)	ICPX	4417938	2016/03/15	2016/03/15	Suban Kanapathippilai
Total Metals on Small Filter (6020Amod)	ICP1/MS	4417973	2016/03/15	2016/03/22	Nan Raykha

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.0°C
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#### ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Total Metals on Small Filter (6020Amod): Extra 10x dilution was required for all samples due to the matrix (presence of HCL)  
Post digestion duplicate and spike were done on sample BZR023.

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4417938	Aluminum (Al)	2016/03/15			100	85 - 115	ND, RDL=5.0	ug	1.9	20
4417938	Antimony (Sb)	2016/03/15			91	85 - 115	ND, RDL=1.0	ug	2.3	20
4417938	Arsenic (As)	2016/03/15			101	85 - 115	ND, RDL=0.60	ug	0.40	20
4417938	Barium (Ba)	2016/03/15			101	85 - 115	ND, RDL=0.10	ug	0.30	20
4417938	Beryllium (Be)	2016/03/15			101	85 - 115	ND, RDL=0.10	ug	0.30	20
4417938	Bismuth (Bi)	2016/03/15			103	85 - 115	ND, RDL=0.60	ug	0.48	20
4417938	Boron (B)	2016/03/15			100	85 - 115	ND, RDL=0.60	ug	1.5	20
4417938	Cadmium (Cd)	2016/03/15			103	85 - 115	ND, RDL=0.20	ug	0.097	20
4417938	Calcium (Ca)	2016/03/15			100	85 - 115	ND, RDL=5.0	ug	1.1	20
4417938	Chromium (Cr)	2016/03/15			101	85 - 115	ND, RDL=0.50	ug	1.2	20
4417938	Cobalt (Co)	2016/03/15			103	85 - 115	ND, RDL=0.20	ug	0.098	20
4417938	Copper (Cu)	2016/03/15			101	85 - 115	ND, RDL=0.50	ug	1.1	20
4417938	Iron (Fe)	2016/03/15			102	85 - 115	ND, RDL=5.0	ug	1.5	20
4417938	Lead (Pb)	2016/03/15			100	85 - 115	ND, RDL=0.30	ug	0	20
4417938	Magnesium (Mg)	2016/03/15			101	85 - 115	ND, RDL=5.0	ug	1.1	20
4417938	Manganese (Mn)	2016/03/15			101	85 - 115	ND, RDL=0.10	ug	0.60	20
4417938	Molybdenum (Mo)	2016/03/15			104	85 - 115	ND, RDL=0.30	ug	0.29	20
4417938	Nickel (Ni)	2016/03/15			100	85 - 115	ND, RDL=0.30	ug	0.10	20
4417938	Phosphorus (P)	2016/03/15			107	85 - 115	ND, RDL=2.5	ug	0.094	20
4417938	Potassium (K)	2016/03/15			102	85 - 115	ND, RDL=10	ug	0.79	20
4417938	Selenium (Se)	2016/03/15			103	85 - 115	ND, RDL=1.0	ug	0.97	20
4417938	Silicon (Si)	2016/03/15			99	85 - 115	ND, RDL=1.0	ug	0.70	20
4417938	Silver (Ag)	2016/03/15			102	85 - 115	ND, RDL=0.50	ug	0.88	20
4417938	Sodium (Na)	2016/03/15			100	85 - 115	ND, RDL=5.0	ug	1.2	20
4417938	Strontium (Sr)	2016/03/15			100	85 - 115	ND, RDL=0.10	ug	0.20	20
4417938	Sulphur (S)	2016/03/15			105	85 - 115	ND, RDL=2.5	ug	0.57	20
4417938	Thallium (Tl)	2016/03/15			103	85 - 115	ND, RDL=1.0	ug	0.097	20
4417938	Tin (Sn)	2016/03/15			105	85 - 115	ND, RDL=1.0	ug	0.19	20
4417938	Titanium (Ti)	2016/03/15			103	85 - 115	ND, RDL=0.10	ug	0.88	20
4417938	Vanadium (V)	2016/03/15			98	85 - 115	ND, RDL=0.50	ug	1.4	20

**QUALITY ASSURANCE REPORT(CONT'D)**

CTA Consultoría y Tecnología Ambiental México, S.A. de C.V.  
Client Project #: 178-080  
Site Location: MSR  
Your P.O. #: 5752  
Sampler Initials: MSR

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4417938	Zinc (Zn)	2016/03/15			100	85 - 115	ND, RDL=0.50	ug	0.20	20
4417938	Zirconium (Zr)	2016/03/15			102	85 - 115	ND, RDL=0.50	ug	0.79	20
4417973	Total Uranium (U)	2016/03/22	94	70 - 130	99	85 - 115	ND, RDL=0.10	ug	NC	20

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

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

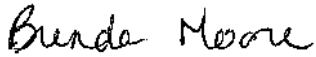
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

**VALIDATION SIGNATURE PAGE**

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



\_\_\_\_\_  
Brenda Moore, Team Lead



\_\_\_\_\_  
Ralph Siebert, Operations Manager - Inorganic Analyses

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



### **11.3.3 Informe sobre PST y Gases de Combustión**



**MONITOREO DE NO<sub>2</sub>, SO<sub>2</sub> Y PARTÍCULAS  
SEDIMENTABLES TOTALES  
EN LA MINA EL ESCOBAL**

Marzo 2016

San Rafael Las Flores, Santa Rosa, Guatemala

Abril de 2016

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Este resumen presenta los resultados del monitoreo de calidad del aire realizado para la Mina El Escobal (**la Mina**). El monitoreo fue realizado por Consultoría y Tecnología Ambiental, S.A. (**CTA**) del 8 al 11 de Marzo de 2016 para gases de combustión y del 8 de Marzo del 2016 al 8 de Abril del 2016 para PST, en San Rafael Las Flores, Santa Rosa, donde se ubica la Mina. El propósito del monitoreo fue determinar la calidad de aire ambiental en comunidades aledañas mediante la medición de la concentración de:

- Gases de combustión (**SO<sub>2</sub>** y **NO<sub>2</sub>**); y
- Partículas Sedimentables Totales (**PST**).

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

Cuadro 1: Estaciones de monitoreo de SO<sub>2</sub> y NO<sub>2</sub> y PST

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

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

Cuadro 2: Metodologías utilizadas para SO<sub>2</sub> y NO<sub>2</sub> y PST

<b>Gases de Combustión</b>	<p><b>SO<sub>2</sub></b>: Se utilizó el análisis espectrofotométrico, descrito en el Título 40, Parte 50, Apéndice A de USEPA.</p> <p><b>NO<sub>2</sub></b>: Se utilizó el análisis espectrofotométrico. Método de referencia designado por USEPA: No. EQN-1277-026.</p>
<b>PST</b>	ASTM D 1739-98 (re-aprobación 2004).

Fuente: CTA, 2016

Los resultados obtenidos para los gases de combustión se compararon con los valores guía reportados en: Calidad de Aire Ambiental: Guías del Banco Mundial (**el Banco**)<sup>1</sup> para SO<sub>2</sub> y NO<sub>2</sub>, tomadas de International Finance Corporation (**IFC**) Industry Sector Guidelines for Mining, December 10, 2007 y General Environment Health and Safety Guidelines, December 19/2008.

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

En el Cuadro 3 se presentan los resultados obtenidos de la medición de gases de combustión realizada en Marzo de 2016; y en el Cuadro 4 se presentan los resultados de la medición de PST (realizada del 08 de Marzo al 08 de Abril de 2016).

Cuadro 3: Resultados de la medición de gases de combustión en µg/m<sup>3</sup>

Estaciones de Muestreo	LDM <sup>1</sup>	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guías del Banco
<b>SO<sub>2</sub></b>	13.0	14	15	15	<13	14	13	<13	20 µg/m <sup>3</sup>
<b>NO<sub>2</sub></b>	9.0	< 9	< 9	< 9	< 9	< 9	< 9	< 9	*40µg/m <sup>3</sup>

SO<sub>2</sub>: dióxido de azufre. NO<sub>2</sub>: dióxido de nitrógeno. \*: Promedio anual.<sup>1</sup>: LDM: Límite de detección del método. µg/m<sup>3</sup>: microgramos sobre metros cúbicos. Fuente: Laboratorio Ambiental, S. A., 2016.

<sup>1</sup>Guías del Banco Mundial: [www.ifc.org/ifcext/EnvironmentalGuidelines](http://www.ifc.org/ifcext/EnvironmentalGuidelines)

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

Cuadro 4: Resultados de la medición de PST g/(m<sup>2</sup> x 30 días)

Estaciones de Muestreo	Unidad	LDM	EA-1C	EA-2B	EA-3B	EA-4A	EA-5A	EA-6	EA-7A	Guía
Sólidos Insolubles	g/(m <sup>2</sup> x 30 días)	0.0019	14.38	12.89	13.94	32.59	19.32	2.51	8.08	
Sólidos Solubles	g/(m <sup>2</sup> x 30 días)	0.017	0.96	1.54	0.66	1.95	0.64	0.50	0.60	
Sólidos Totales	g/(m <sup>2</sup> x 30 días)	0.019	15.35	14.43	14.59	34.54	19.96	3.01	8.68	
<b>Sólidos Totales</b>	<b>(mg/dm<sup>2</sup> X día)</b>	0.0063	5.12	4.81	4.86	11.51	6.65	1.00	2.89	2.9

g: gramos. m<sup>2</sup>: metro cuadrado. mg: miligramos. dm<sup>2</sup>: decímetro cuadrado. <sup>1</sup>: valor referido para un período promedio de un mes. Fuente: Laboratorio Ambiental, S. A., 2016

#### Gases de Combustión

##### **SO<sub>2</sub>:**

- Para las estaciones de muestreo evaluadas durante la visita a la mina, el resultado obtenido de SO<sub>2</sub> en laboratorio para cada una es menor al límite establecido por El Banco (**20 µg/m<sup>3</sup>**).

##### **NO<sub>2</sub>:**

- En todas las estaciones de muestreo se obtuvieron resultados menores al límite de detección y al establecido por el Banco (**40 µg/m<sup>3</sup>**).

#### Partículas Sedimentables Totales

- Las estaciones EA-4A y EA-5A presentan la mayor cantidad de sólidos totales, con concentraciones de 11.51 y 6.65 (mg/(dm<sup>2</sup> x día)) respectivamente. La estación EA-6 presentó la menor cantidad de sólidos totales obteniéndose un valor de 1.00 mg / (dm<sup>2</sup> x día). Todas las estaciones excepto EA-6 se encuentran por arriba del valor de la guía utilizada de **2.9 mg/dm<sup>2</sup>X día**.



## **Anexos**

Anexo 1-1: Reportes analíticos

**Cliete:** Minera San Rafael, S.A.  
**Dirección:** Boulevard Los Próceres, 18 calle 24-69 z. 10, Centro Empresarial Zona Pradera, Oficina 1406 torre IV  
**Proyecto:** 178-082 (CTA)  
**Fecha de muestreo:** Marzo, 08 al 10 de 2016  
**Fecha de análisis:** Abril, 04 de 2016  
**Emisión del reporte:** Abril, 06 de 2016

**Tipo de muestras:** Soluciones absorbentes para análisis de dióxido de azufre (SO<sub>2</sub>) y dióxido de nitrógeno (NO<sub>2</sub>).

**Análisis:** Determinación espectrofotométrica de SO<sub>2</sub> y de NO<sub>2</sub> en la atmósfera.

**Métodos analíticos:**

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

Cuadro 1: Ubicación de estaciones de muestreo

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-1C	Frente a Escuela San Rafael	N: 1,601,801 E: 803,887		Casa dentro del pueblo, caminos pavimentados, vientos fuertes. Campo de foot ball de tierra frente a la casa.

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-2B	Aldea La Cuchilla	N: 1,601,796 E: 806,470		Camino de terracería poco tráfico vehicular, transitan especialmente motos. Construcción de casas con adobe en los alrededores. Se observó evidencia de que el camino de terracería recibió mantenimiento.
EA-3B	Aldea El Fucio	N: 1,600,367 E: 806,538		Camino de terracería cercano al terreno, tráfico vehicular moderado.
EA-4A	Aldea La Puerta de Los Ángeles	N: 1,599,903 E: 805,142		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan cantidades considerables de polvo. Evidencia de quema de leña para cocinar, se estaban realizando trabajos de construcción.
EA-5A	Aldea Sabana Redonda	N: 1,600,404 E: 804,352		El terreno está cerca de la carretera principal (asfaltada), está en campo abierto y cercano a una fábrica de block.



Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales *
EA-6	Norte del proyecto, ruta a Mataquesuintla	N: 1,603,247 E: 805,168		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno.
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	N: 1,601,523 E: 805,425		Camino de terracería, tráfico vehicular alto por trabajos de dragado de piletas, eventualmente pasan caballos por el camino.

Coordenadas en metros (m). Datum: NAD27 UTM zona 16 N. Fuente: CTA, 2016.\*: Factores ambientales que pueden influir en los resultados.

Cuadro 2: Resultados gases de combustión SO<sub>2</sub> y NO<sub>2</sub>

Parámetro	Unidades	LDM	Identificación de las muestras						
			EA-2B	EA-5A	EA-7A	EA-3A	EA-4A	EA-1C	EA-6
Fecha de muestreo (Mar, 2016)			09 a 10	08 a 09	10 a 11	09 a 10	08 a 09	08 a 09	09 a 10
SO <sub>2</sub>	µg/m <sup>3</sup>	13	15	14	< 13	15	< 13	14	13
	ppm	0.005	0.006	0.006	< 0.005	0.006	< 0.005	0.005	0.005
NO <sub>2</sub>	µg/m <sup>3</sup>	9	< 9	< 9	< 9	< 9	< 9	< 9	< 9
	ppm	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

LDM: límite de detección del método, µg/m<sup>3</sup>: microgramos por metro cúbico, ppm: partes por millón.

Cuadro 3: Concentraciones de SO<sub>2</sub> y NO<sub>2</sub> en controles de laboratorio

Parámetro	Control con duplicado			CDL		
	Unidades	DEA-2B	DEA-3A	Unidades	Teórica	Real
SO <sub>2</sub>	µg/m <sup>3</sup>	15	NA	µg	15.2	15.6
	ppm	0.006	NA			
NO <sub>2</sub>	µg/m <sup>3</sup>	NA	< 9	µg/mL	0.99	1.00
	ppm	NA	< 0.005			

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 SO<sub>2</sub> y a 0.1µg/mL de NO<sub>2</sub>, respectivamente. NA: No Aplica.

**Anexos:**

- Anexo 1. Cadena de custodia R-02-000773
- Anexo 2. Cadena de custodia R-02-000774
- Anexo 3. Cadena de custodia R-02-000775

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.



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



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Lic. Eddy Mendoza  
Director de Laboratorio  
Colegiado 2442

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
D.S.	Abril, 06/16	L.D.	Abril, 06/16	E.M.	Abril, 06/16	<b>01</b>







**Cliente:** Minera San Rafael, S.A.  
**Dirección:** San Rafael, Las Flores, Santa Rosa, Guatemala  
**Proyecto:** 178-082 (CTA)  
**Fecha de muestreo:** Marzo 10 a Abril 11, de 2016  
**Fecha de análisis:** 12 de Abril 2016  
**Emisión del reporte:** 18 de Abril 2016

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

Cuadro 1: Ubicación de estaciones de muestreo

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

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

Estación	Ubicación	Coordenadas	Fotografía	Factores ambientales
EA-3B	Aldea El Fucío	N: 1,600,367 E: 806,538		Camino de terracería cercano al terreno, tráfico vehicular moderado.
EA-4A	Aldea La Puerta de Los Ángeles	N: 1,599,903 E: 805,142		Camino de terracería cercano al terreno, tráfico vehicular alto, los vehículos levantan polvo. Evidencia de quema de leña para cocinar, se estaban realizando trabajos de construcción.
EA-5A	Aldea Sabana Redonda	N: 1,600,404 E: 804,352		El terreno está cerca de la carretera principal (asfaltada), está en campo abierto y cercano a una fábrica de block.
EA-6	Norte del proyecto, ruta a Mataquesuintla	N: 1,603,247 E: 805,168		Camino de terracería, poco tráfico vehicular, presencia de ganado vacuno en el terreno.
EA-7A	Perímetro del Proyecto colindante con aldea Los Planes	N: 1,601,523 E: 805,425		Camino de terracería, poco tráfico vehicular, eventualmente pasan caballos por el camino.

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



Cuadro 2: Resultados Partículas Sedimentables Totales (PST)

No.	Identificación de la muestra	Tasa de sedimentación			
		Material insoluble en agua [g/(m <sup>2</sup> ·30 días)]	Material soluble en agua [g/(m <sup>2</sup> ·30 días)]	Total* para un periodo de 30 días [g/(m <sup>2</sup> ·30 días)].	Total* para un periodo de 1 día [mg/(dm <sup>2</sup> · día)].
<b>LDM</b>		<b>0.0019</b>	<b>0.017</b>	<b>0.019</b>	<b>0.006</b>
1	EA-1C	14.38	0.96	15.35	5.12
2	EA-2B	12.89	1.54	14.43	4.81
3	EA-3B	13.94	0.66	14.59	4.86
4	EA-4A	32.59	1.95	34.54	11.51
5	EA-5A	19.32	0.64	19.96	6.65
6	EA-6	2.51	0.50	3.01	1.00
7	EA-7A	8.08	0.60	8.68	2.89

LDM: límite de detección del método. g: gramos; mg: miligramos. m<sup>2</sup>: metros cuadrados. dm<sup>2</sup>: decímetro cuadrado

**Anexos:**

Anexo 1. Cadena de Custodia R-02-000776

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



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



MSc. Ana Gabriela Juárez  
Especialista en Ambiente, Director de Laboratorio

Redacción:	Fecha:	Revisión:	Fecha:	Aprobación:	Fecha:	Versión cliente:
J.J.	Abril, 18/16	D.S.	Abril, 18/16	A.G.J.	Abril, 19/16	<b>01</b>



### **11.3.4 Presión Sonora**

# ER-1

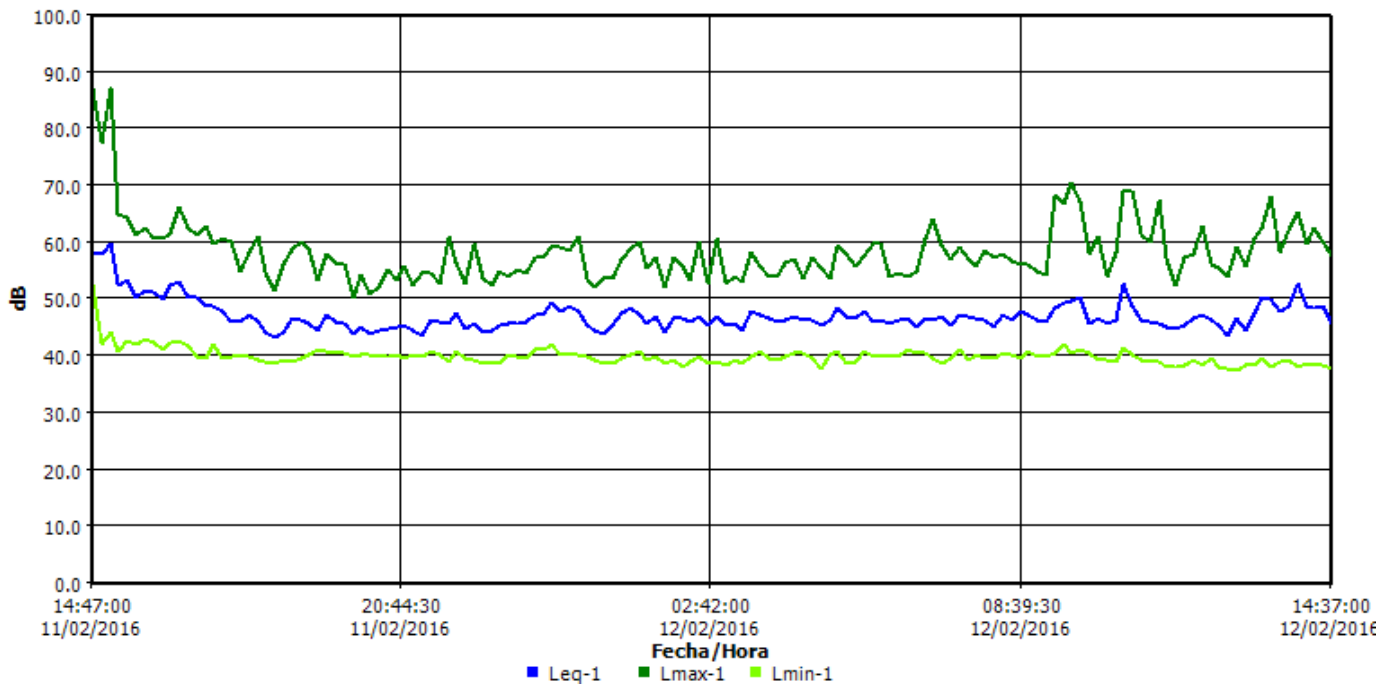
## Panel de información

**Ubicación** Depósito de suelos norte, a inmediaciones de Aldea Los Planes  
**Nombre** ER-1  
**Sesión padre** S125  
**Hora de inicio** Jueves, 11 de Febrero de 2016 14:37:00  
**Hora de paro** Viernes, 12 de Febrero de 2016 14:37:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	37.4 dB	Lmax	1	87.2 dB
Lpk	1	109.9 dB	Leq	1	48.4 dB

## Gráfica de datos de registro



# ER-1A

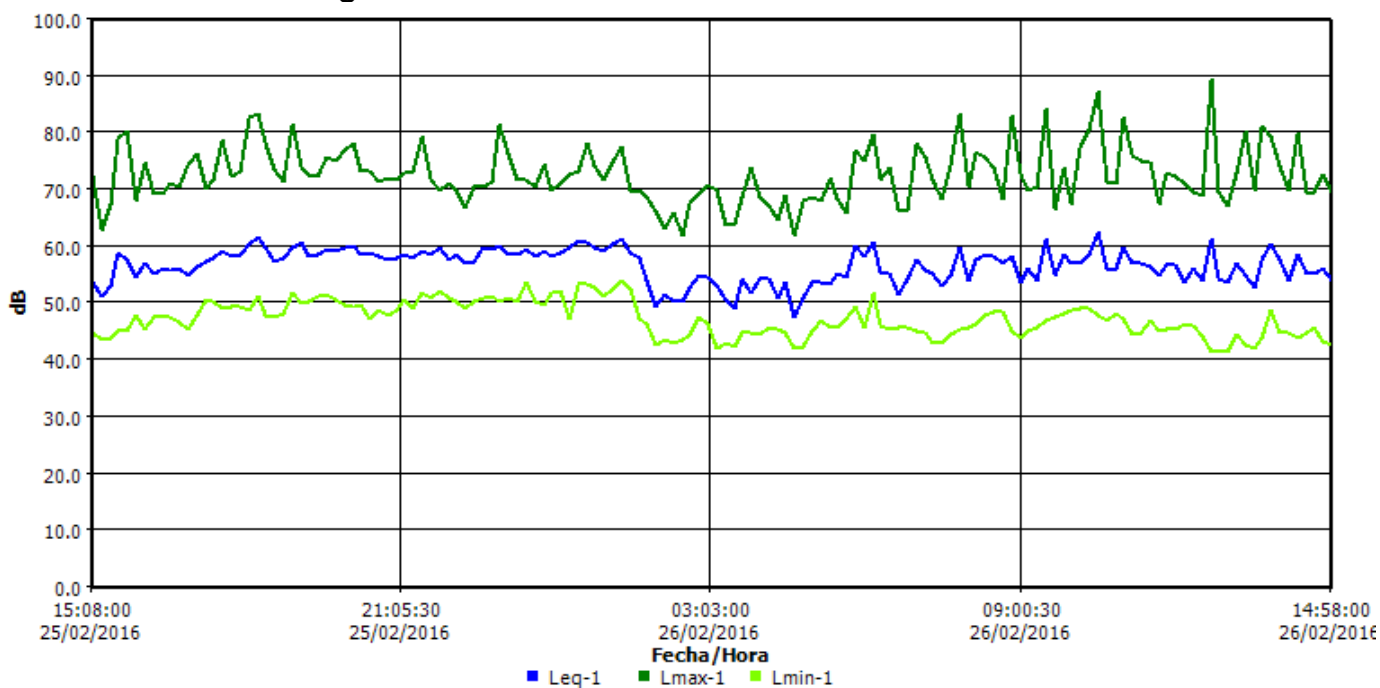
## Panel de información

**Ubicación** San Rafael las Flores  
**Nombre** ER-1A  
**Sesión padre** S224  
**Hora de inicio** Jueves, 25 de Febrero de 2016 14:58:00  
**Hora de paro** Viernes, 26 de Febrero de 2016 14:58:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	41.3 dB	Lmax	1	89.6 dB
Lpk	1	103.7 dB	Leq	1	57.5 dB

## Gráfica de datos de registro



# ER-2

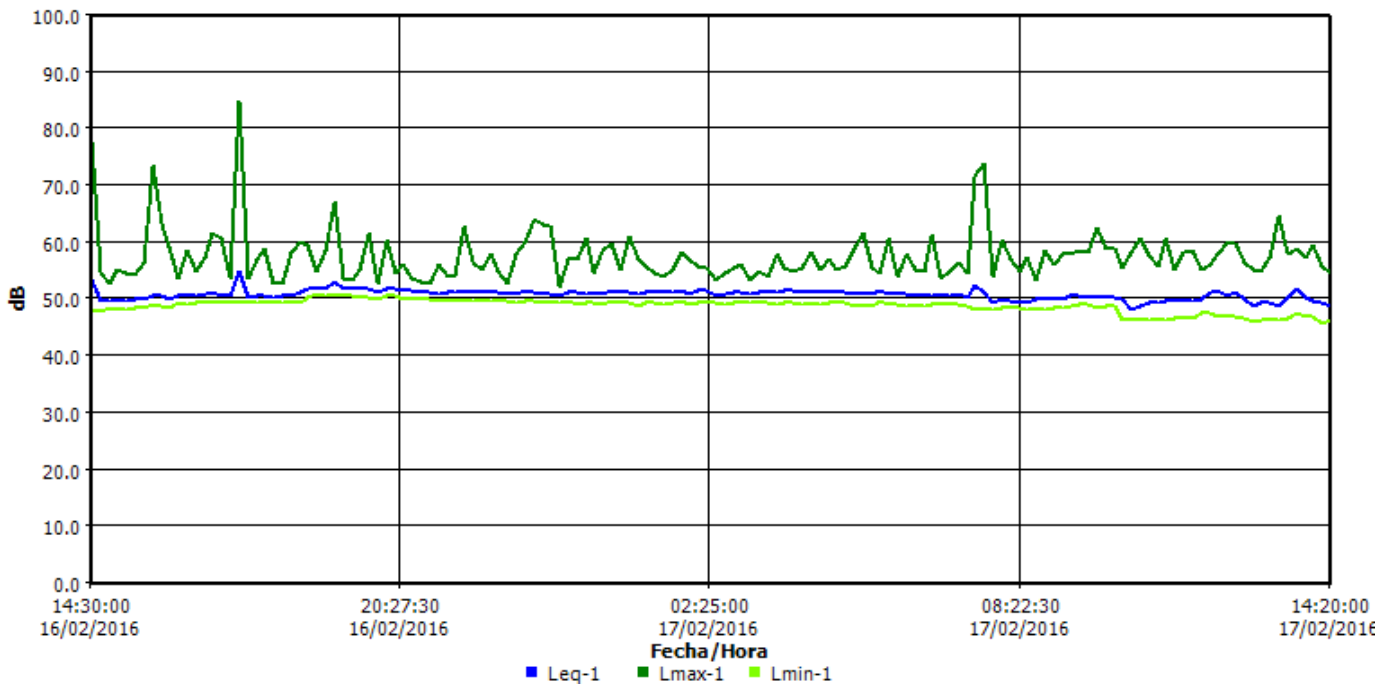
## Panel de información

**Ubicación** Aldea la Cuchilla  
**Nombre** ER-2  
**Sesión padre** S015  
**Hora de inicio** Martes, 16 de Febrero de 2016 14:20:00  
**Hora de paro** Miércoles, 17 de Febrero de 2016 14:20:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	45.7 dB	Lmax	1	84.9 dB
Lpk	1	104.5 dB	Leq	1	50.8 dB

## Gráfica de datos de registro



# ER-3

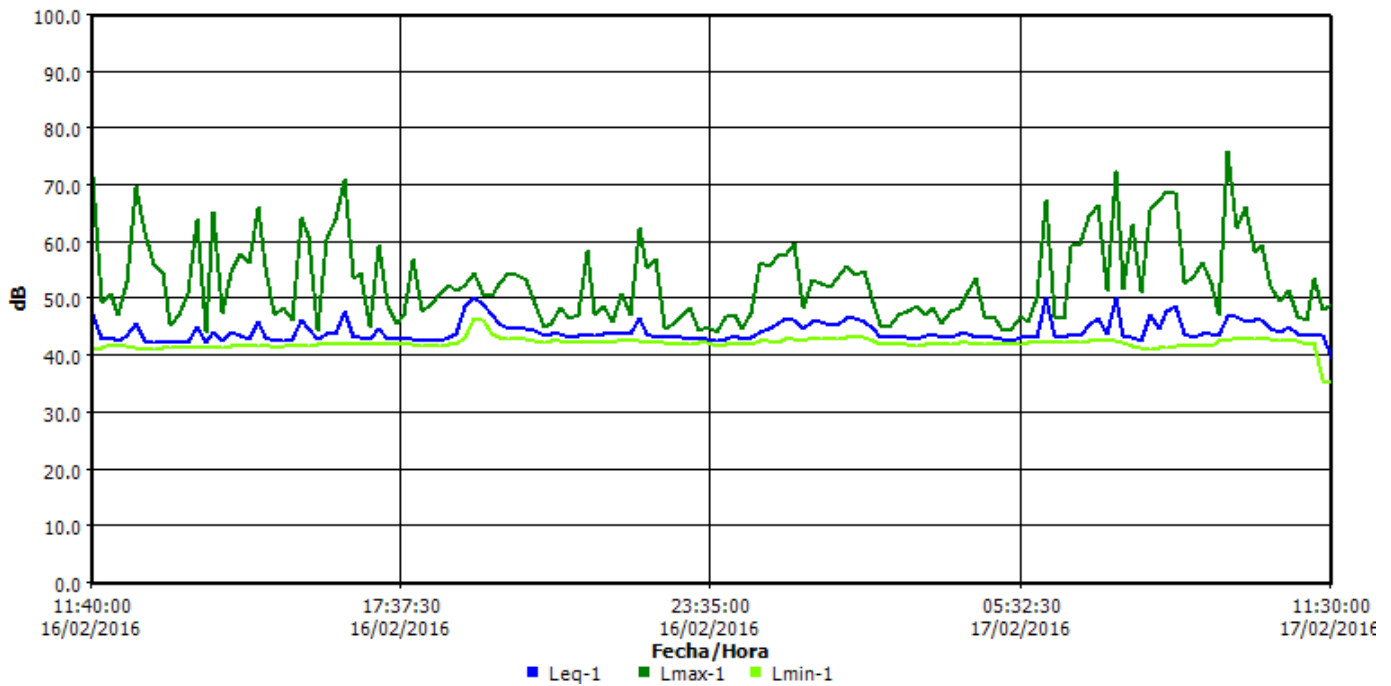
## Panel de información

**Ubicación** Aledaño a Aldea El Fucio  
**Nombre** ER-3  
**Sesión padre** S222  
**Hora de inicio** Martes, 16 de Febrero de 2016 11:30:00  
**Hora de paro** Miércoles, 17 de Febrero de 2016 11:30:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	35.2 dB	Lmax	1	76 dB
Lpk	1	94.7 dB	Leq	1	44.6 dB

## Gráfica de datos de registro





# ER-3A

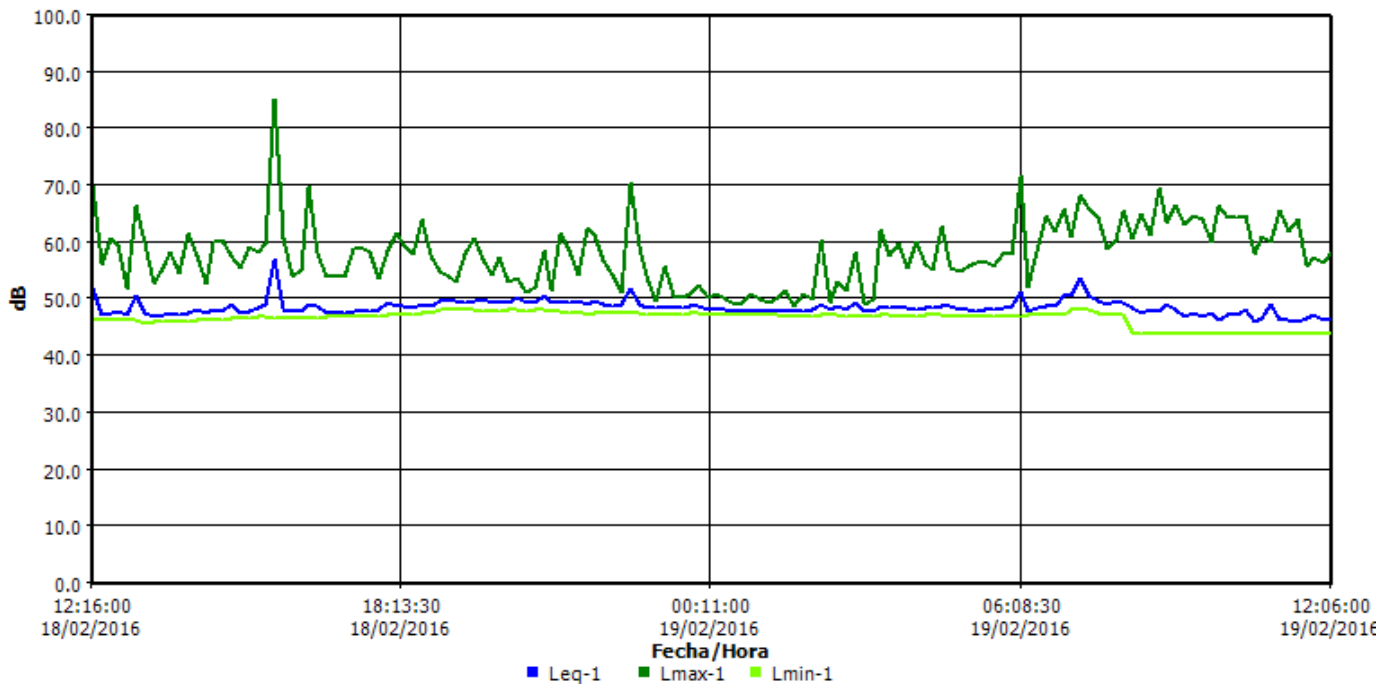
## Panel de información

**Ubicación** Aldea Sabana Redonda  
**Nombre** ER-3A  
**Sesión padre** S016  
**Hora de inicio** Jueves, 18 de Febrero de 2016 12:06:00  
**Hora de paro** Viernes, 19 de Febrero de 2016 12:06:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	43.8 dB	Lmax	1	85.3 dB
Lpk	1	93.8 dB	Leq	1	48.8 dB

## Gráfica de datos de registro



# ER-4A

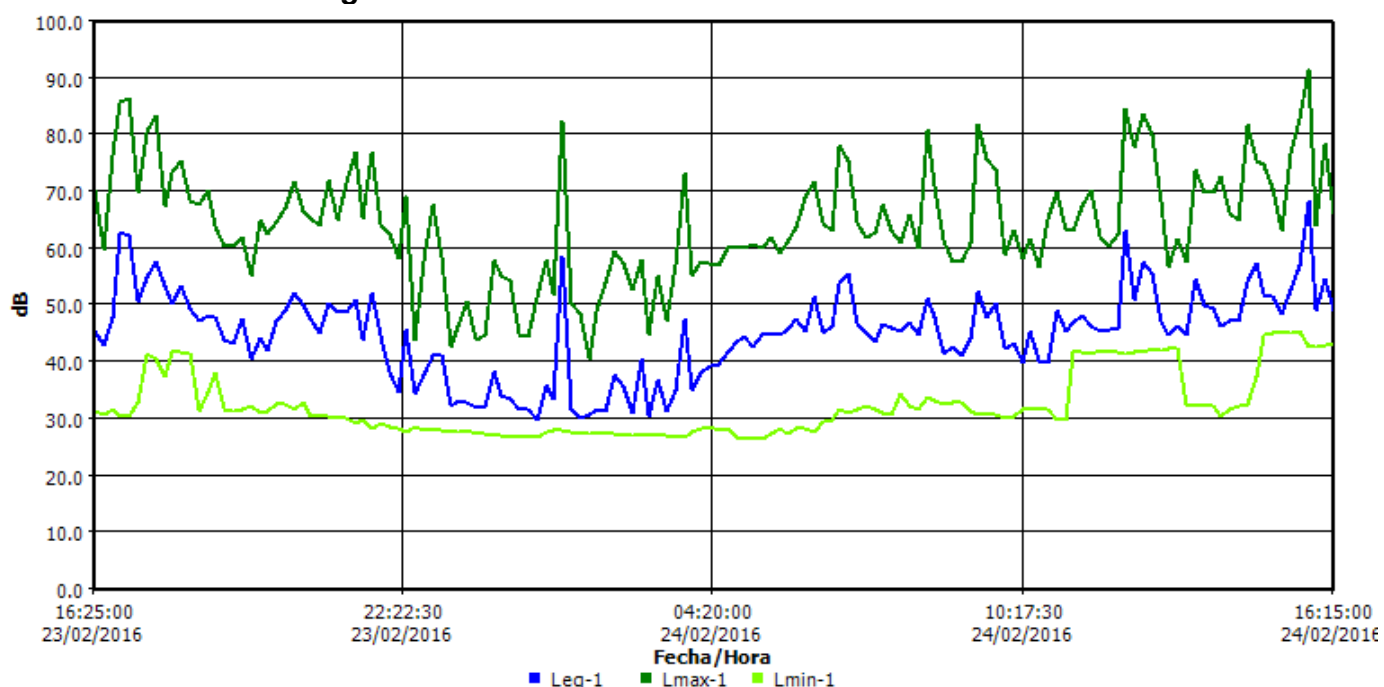
## Panel de información

**Ubicación** Caserío El Portón de los Ángeles  
**Nombre** ER-4A  
**Sesión padre** S223  
**Hora de inicio** Martes, 23 de Febrero de 2016 16:15:00  
**Hora de paro** Miércoles, 24 de Febrero de 2016 16:15:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	26.4 dB	Lmax	1	91.6 dB
Lpk	1	113.5 dB	Leq	1	52 dB

## Gráfica de datos de registro



# ER-5A

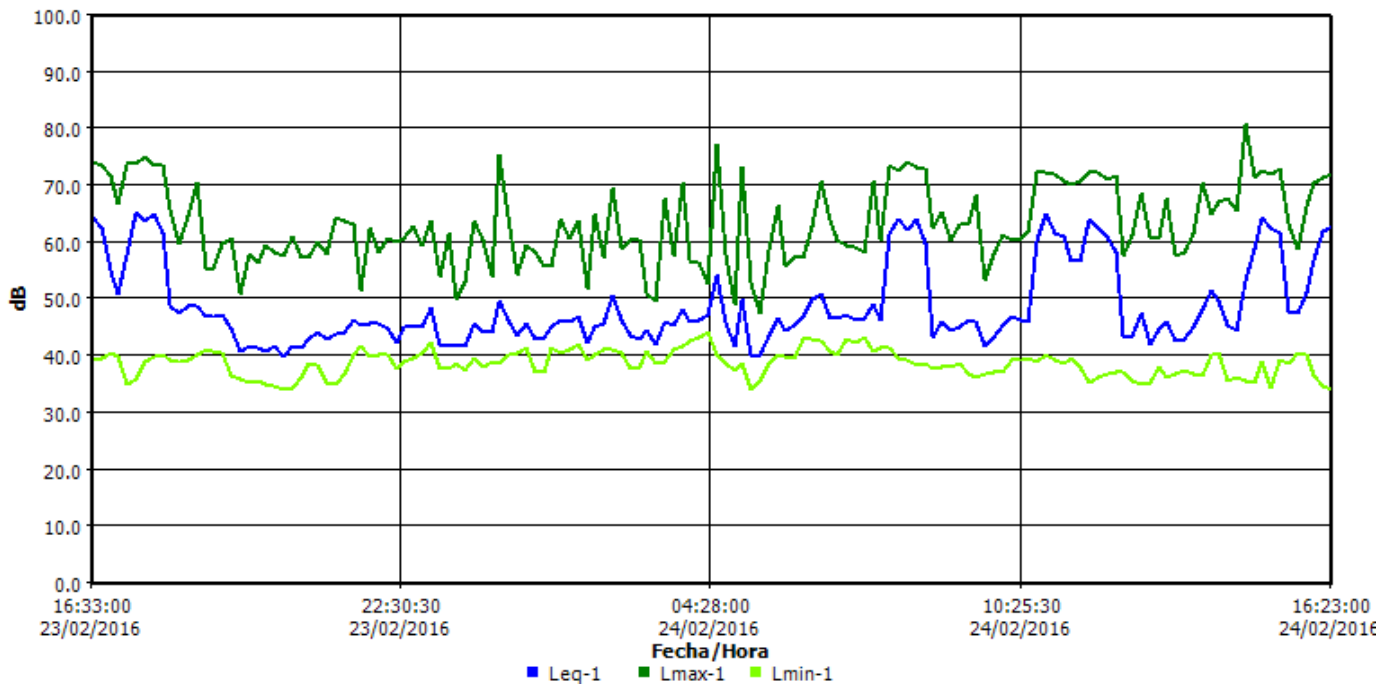
## Panel de información

**Ubicación** Aldea Sabana Redonda  
**Nombre** ER-5A  
**Sesión padre** S127  
**Hora de inicio** Martes, 23 de Febrero de 2016 16:23:00  
**Hora de paro** Miércoles, 24 de Febrero de 2016 16:23:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	34 dB	Lmax	1	80.9 dB
Lpk	1	98.2 dB	Leq	1	55.8 dB

## Gráfica de datos de registro



# ER-6

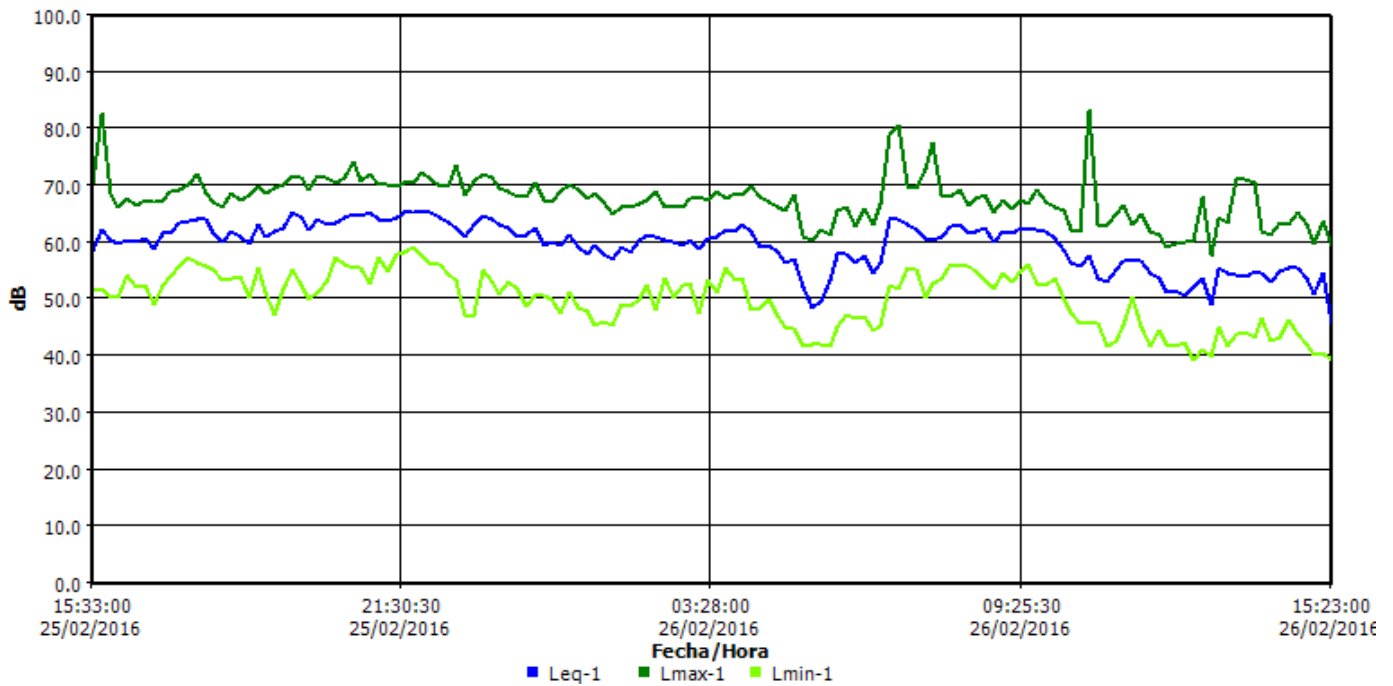
## Panel de información

**Ubicación** Al norte del Proyecto, ruta a Mataquesuintla  
**Nombre** ER-6  
**Sesión padre** S128  
**Hora de inicio** Jueves, 25 de Febrero de 2016 15:23:00  
**Hora de paro** Viernes, 26 de Febrero de 2016 15:23:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.3 dB	Lmax	1	83.2 dB
Lpk	1	97.7 dB	Leq	1	61 dB

## Gráfica de datos de registro



# ER-7A

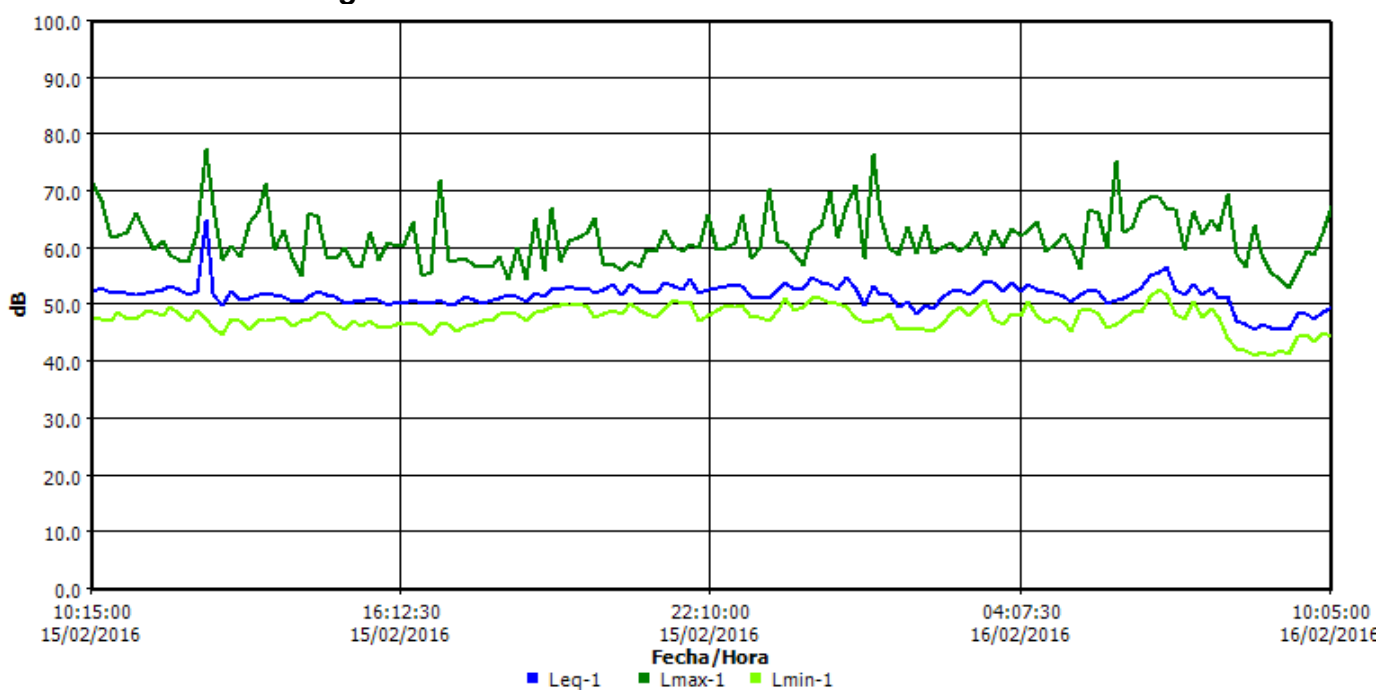
## Panel de información

**Ubicación** Aledaño a Aldea Los Planes  
**Nombre** ER-7A  
**Sesión padre** S126  
**Hora de inicio** Lunes, 15 de Febrero de 2016 10:05:00  
**Hora de paro** Martes, 16 de Febrero de 2016 10:05:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	41.2 dB	Lmax	1	77.5 dB
Lpk	1	95.7 dB	Leq	1	52.5 dB

## Gráfica de datos de registro



# ER-7A

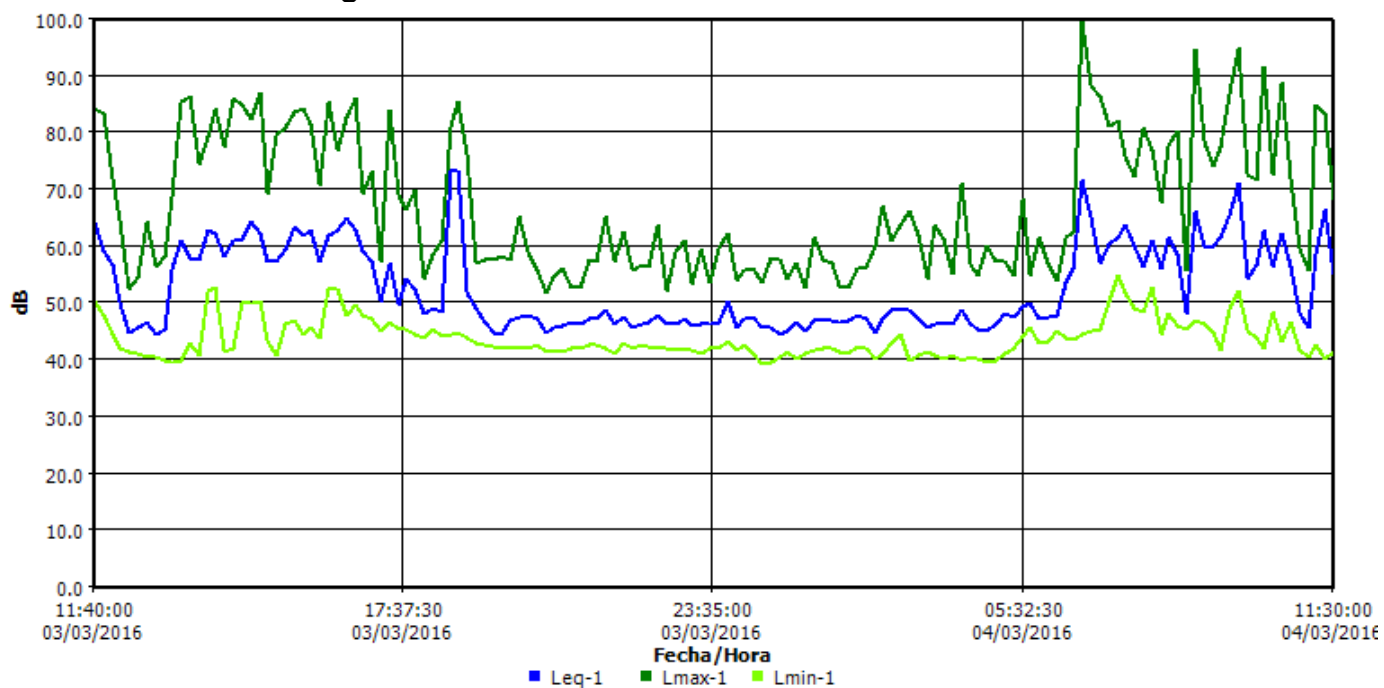
## Panel de información

**Ubicación** Aledaño a Aldea Los Planes  
**Nombre** ER-7A  
**Sesión padre** S225  
**Hora de inicio** Jueves, 03 de Marzo de 2016 11:30:00  
**Hora de paro** Viernes, 04 de Marzo de 2016 11:30:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.3 dB	Lmax	1	99.5 dB
Lpk	1	116.4 dB	Leq	1	60 dB

## Gráfica de datos de registro



# ER-3

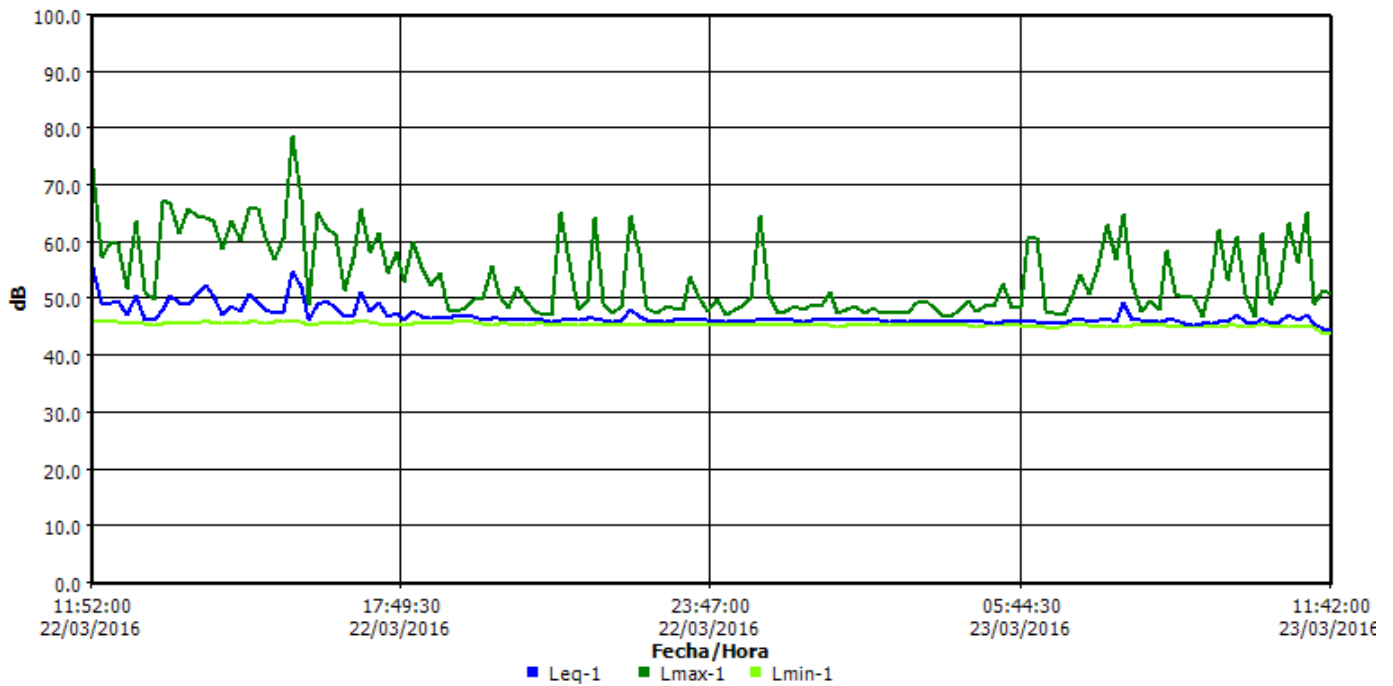
## Panel de información

**Ubicación** Aledaño a Aldea El Fucio  
**Nombre** ER-3  
**Sesión padre** S017  
**Hora de inicio** Martes, 22 de Marzo de 2016 11:42:00  
**Hora de paro** Miércoles, 23 de Marzo de 2016 11:42:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	43.8 dB	Lmax	1	78.6 dB
Lpk	1	97.6 dB	Leq	1	47.4 dB

## Gráfica de datos de registro



# ER-2

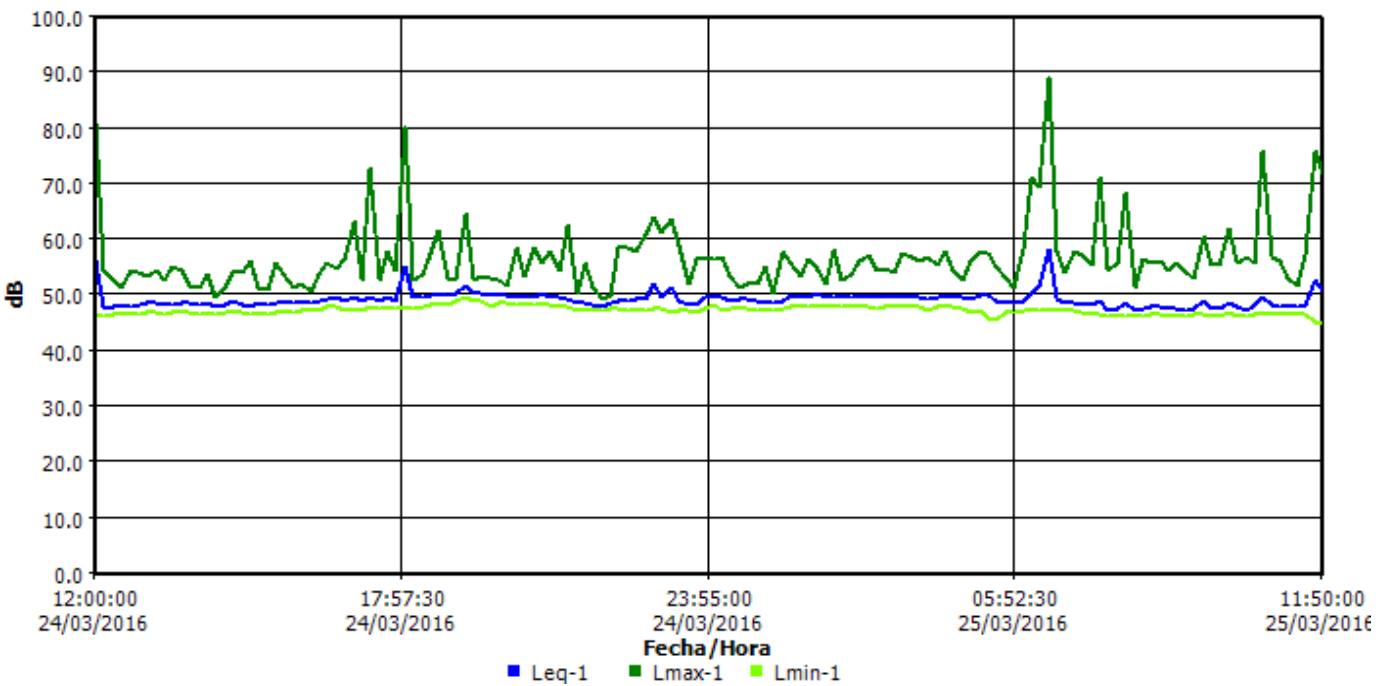
## Panel de información

**Ubicación** Aldea La Cuchilla  
**Nombre** ER-2  
**Sesión padre** S018  
**Hora de inicio** Jueves, 24 de Marzo de 2016 11:50:00  
**Hora de paro** Viernes, 25 de Marzo de 2016 11:50:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	44.9 dB	Lmax	1	89.2 dB
Lpk	1	105.5 dB	Leq	1	49.5 dB

## Gráfica de datos de registro





# ER-1

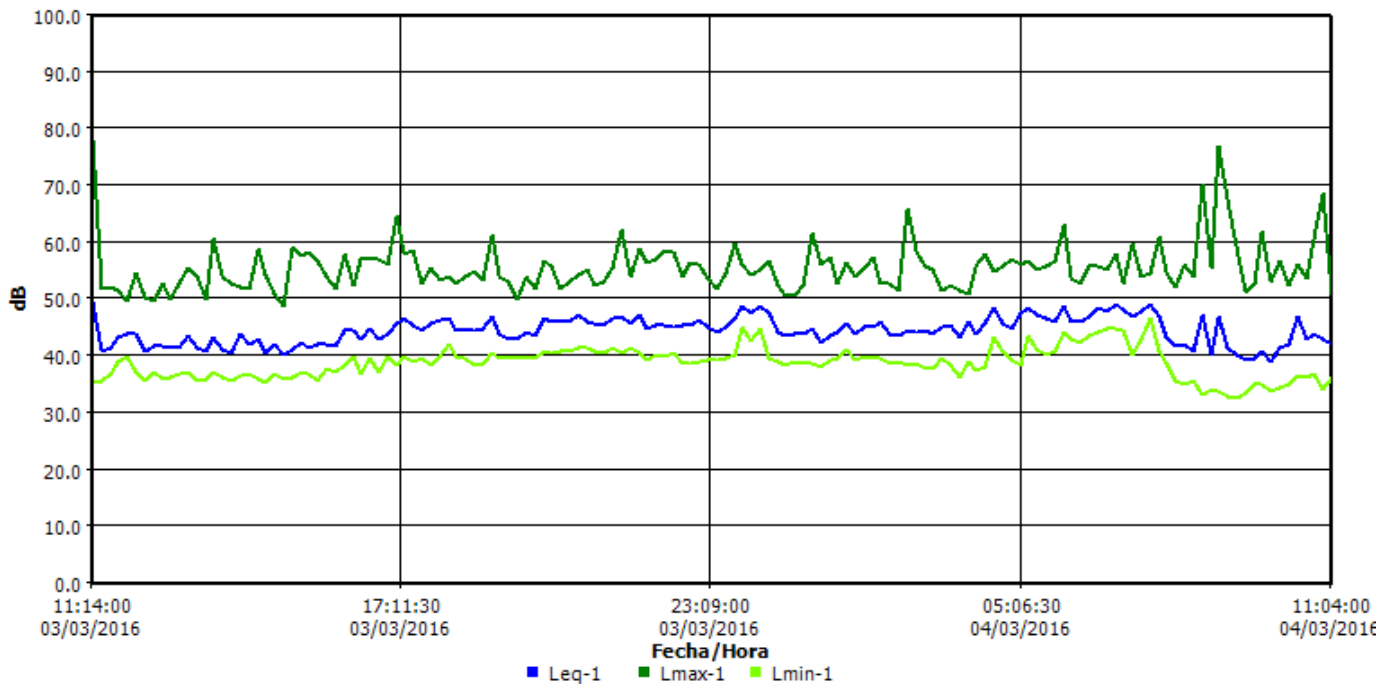
## Panel de información

**Ubicación** Depósito de Suelos norte, a inmediaciones de Aldea Los Planes  
**Nombre** ER-1  
**Sesión padre** S129  
**Hora de inicio** Jueves, 03 de Marzo de 2016 11:04:00  
**Hora de paro** Viernes, 04 de Marzo de 2016 11:04:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	32.7 dB	Lmax	1	78.2 dB
Lpk	1	97.9 dB	Leq	1	45 dB

## Gráfica de datos de registro



# ER-1

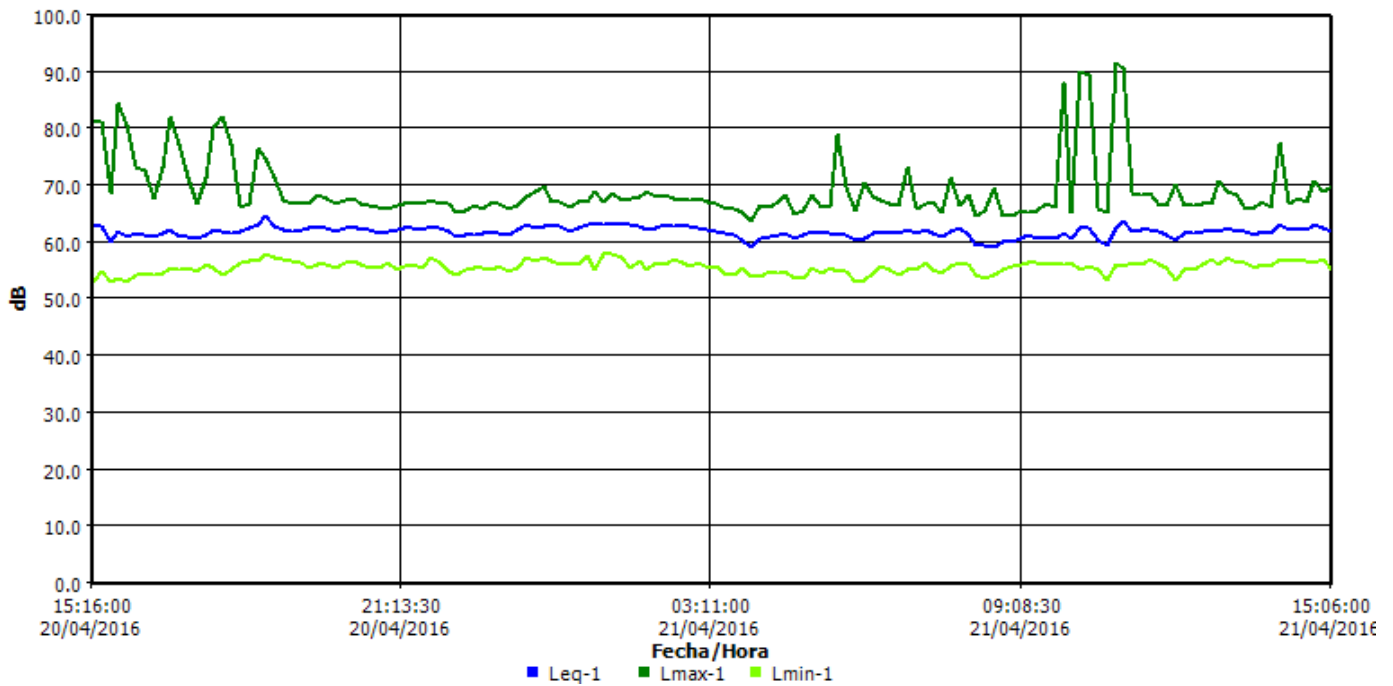
## Panel de información

**Ubicación** Depósito de Suelos Norte, a inmediaciones de Aldea Los Planes  
**Nombre** ER-1  
**Sesión padre** S228  
**Hora de inicio** Miércoles, 20 de Abril de 2016 15:06:00  
**Hora de paro** Jueves, 21 de Abril de 2016 15:06:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	C	Respuesta	1	FAST
Lmin	1	53 dB	Lmax	1	91.5 dB
Lpk	1	115 dB	Leq	1	61.9 dB

## Gráfica de datos de registro



# ER-7A

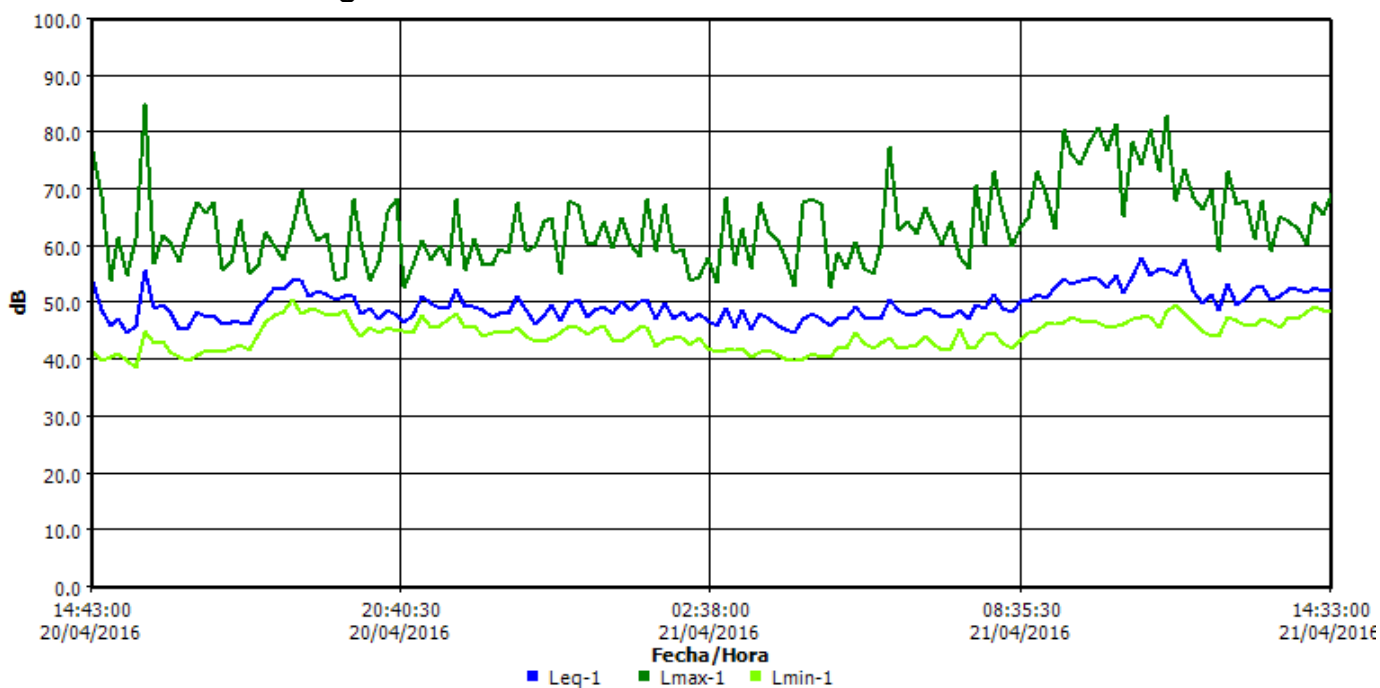
## Panel de información

**Ubicación** Aledaño a Aldea Los Planes  
**Nombre** ER-7A  
**Sesión padre** S133  
**Hora de inicio** Miércoles, 20 de Abril de 2016 14:33:00  
**Hora de paro** Jueves, 21 de Abril de 2016 14:33:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	38.8 dB	Lmax	1	85.3 dB
Lpk	1	106.5 dB	Leq	1	50.7 dB

## Gráfica de datos de registro



# ER-3

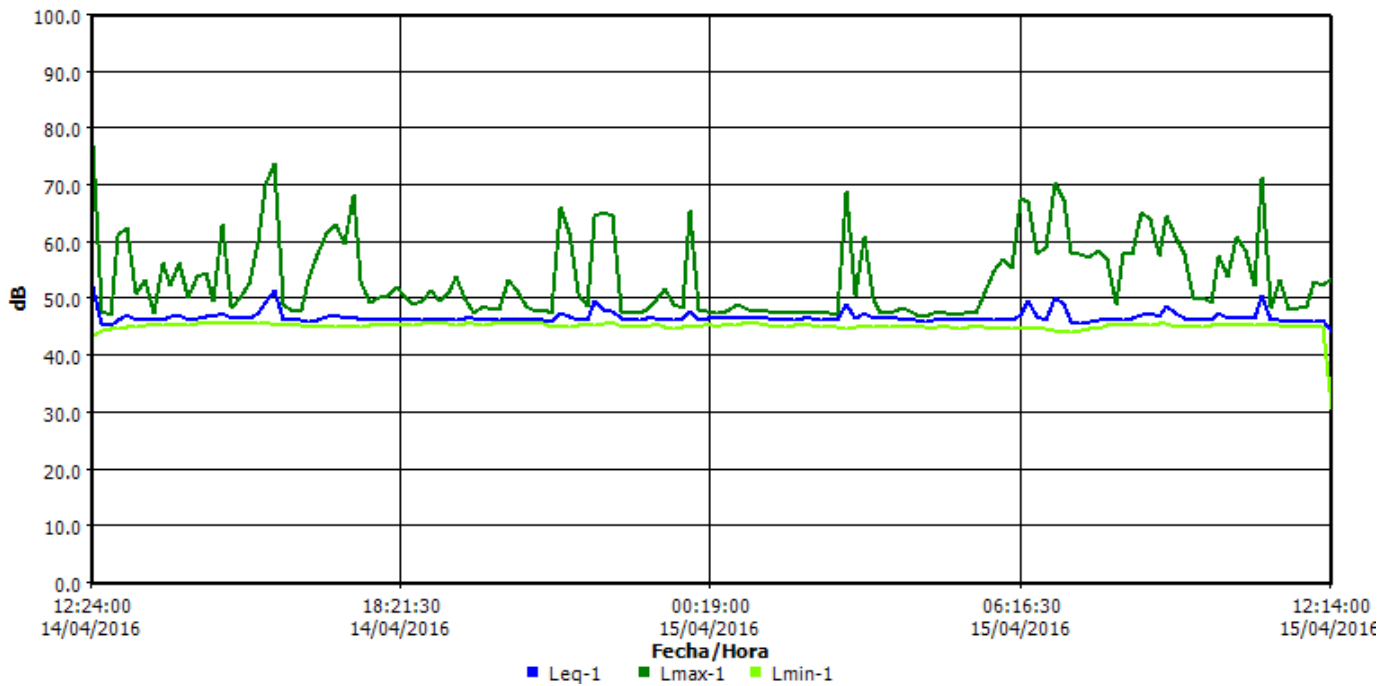
## Panel de información

**Ubicación** Aledaño a Aldea El Fucio  
**Nombre** ER-3  
**Sesión padre** S132  
**Hora de inicio** Jueves, 14 de Abril de 2016 12:14:00  
**Hora de paro** Viernes, 15 de Abril de 2016 12:14:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	100 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	30.3 dB	Lmax	1	77.3 dB
Lpk	1	101 dB	Leq	1	46.9 dB

## Gráfica de datos de registro



# ER-2

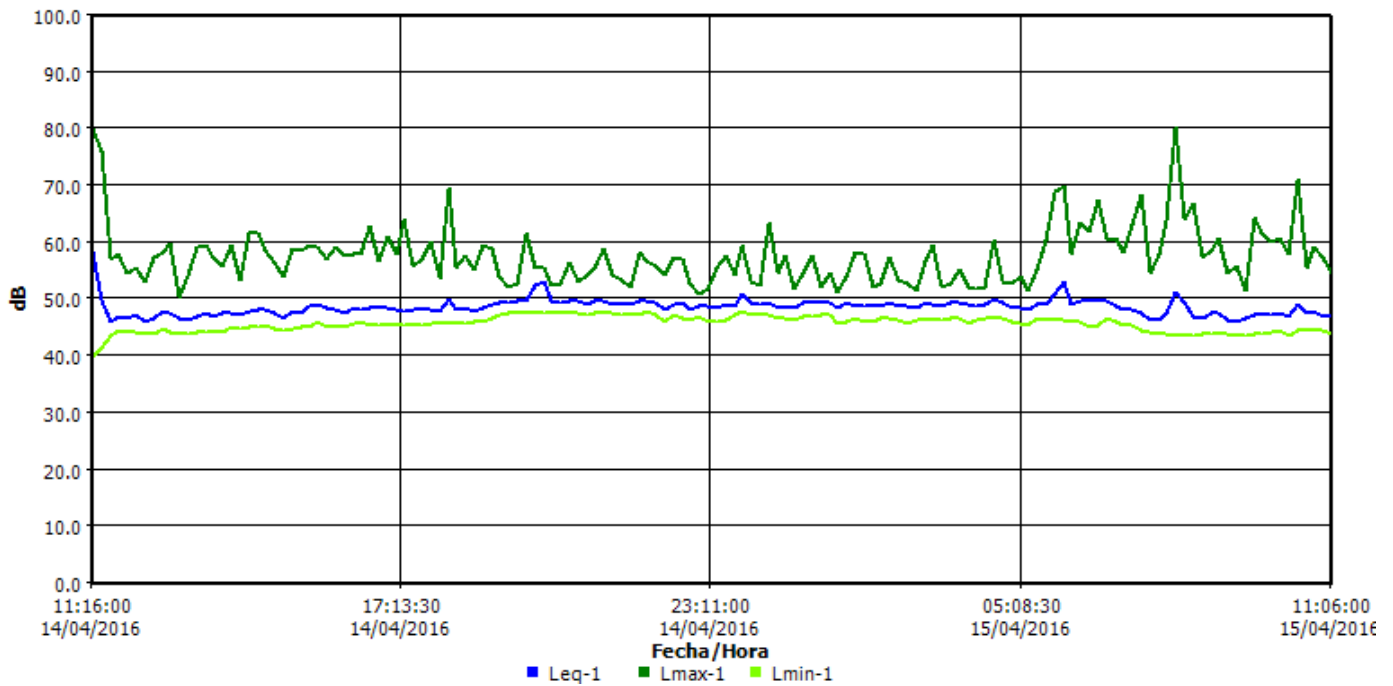
## Panel de información

**Ubicación** Aldea la Cuchilla  
**Nombre** ER-2  
**Sesión padre** S227  
**Hora de inicio** Jueves, 14 de Abril de 2016 11:06:00  
**Hora de paro** Viernes, 15 de Abril de 2016 11:06:00  
**Nombre del usuario**

## Panel general de datos

<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>	<u>Descripción</u>	<u>Medidor/Sensor</u>	<u>Valor</u>
Índice de intercambio	1	3 dB	Umbral int.	1	80 dB
Ponderación	1	A	Respuesta	1	FAST
Lmin	1	39.9 dB	Lmax	1	80.4 dB
Lpk	1	97 dB	Leq	1	48.9 dB

## Gráfica de datos de registro



## **11.4 Certificados de verificación de los equipos utilizados**

### **11.4.1 Material Particulado (PM<sub>10</sub>) y Presión Sonora**

**CERTIFICADO DE VERIFICACIÓN DE CALIBRACIÓN DE  
SONÓMETROS  
mar-16**

Certificado Numero: 1812

**Características del Equipo**

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



**Información de la Calibración**

<b>Equipo No.:</b>	2	<b>Fecha de Verificación de Calibración:</b>	21/03/2016	m/d/a
<b>Número de Serie :</b>	BGJ100009	<b>Vigencia:</b>	30 Días	

Valores Ambientales	
<b>Temperatura °C</b>	18.12
<b>Presion (Pulg. Hg)</b>	24.48
<b>Humedad Relativa (%):</b>	60.00

<b>Lectura de Calibración</b>	114.00	dB
<b>Relectura</b>	114.00	dB

**Estado del Equipo: CALIBRADO**

**Características del Equipo de Calibración**

**Equipo:** QC-10 Calibrator  
**Numero Serie:** QIC100169  
**Fabricante:** Quest Technologies  
**Rango:** 94-114 dB  
**Fecha Emisión:** 26/08/2014  
**Certificado No.:** ICA- 4863114

**Responsables**



  
**Luis Rey**  
 Responsable

  
**Ing. Hasan Zolata**  
 Supervisor

#### **Falla reportada**

Cliente solicita revisión y mantenimiento general.

#### **Observaciones**

Mantenimiento

#### **Diagnostico**

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

#### **Trabajos realizados**

##### **Mantenimiento de los siguientes componentes:**

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

##### **Al finalizar el mantenimiento se efectuaron las siguientes verificaciones:**

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



#### **Repuestos utilizados**

- Ninguno

#### **Responsables:**

**Luis Rey**  
Responsable

**Ing. Hasan Zolata**  
Supervisor



# Reporte de sesión

21/03/2016

## Información general

Nombre S226\_BGJ100009\_21032016\_164828  
Comentarios  
Hora de inicio 16/03/2016 05:45:00 p.m.  
Hora de paro 17/03/2016 05:45:00 p.m.  
Duración: 1.00:00:00  
Tipo de modelo SoundPro DL  
Número de serie BGJ100009  
Revisión del firmware del dispositivo R.13F  
Nombre de la compañía  
Descripción  
Ubicación  
Nombre del usuario

## Datos de resumen

Descripción	Medidor	Valor	Descripción	Medidor	Valor
Dosis	1	0 %	Pdose (8:00)	1	0 %
Lavg	1	--	Lpk	1	108.1 dB
Leq	1	51.7 dB	Promedio ponderado de tiempo (TWA)	1	56.5 dB
UL, tiempo límite superior	1	00:00:00	SEL	1	101.1 dB
Segundos de exp.	1	5.2 Pa <sup>2</sup> -Sec	ProjectedTWA (8:00)	1	51.7 dB
Mntime	1	17/03/2016 12:13:19 a.m.	Mxtime	1	16/03/2016 05:51:40 p.m.
PKtime	1	17/03/2016 10:50:06 a.m.			
Weighting	1	--	Range Ceiling	1	--
Criterion Level	1	--	ULL	1	--
Dynamic Range	1	--	Exchange Rate	1	--
Response	1	--	Int Threshold	1	--
Alarm Level 1	1	--	AlarmLevel2	1	--
Dosimeter Name	1	--			
Dosis	2	1.9 %	Pdose (8:00)	2	0.6 %
Lavg	2	53.6 dB	Lpk	2	106.7 dB
Leq	2	--	Promedio ponderado	2	61.5 dB

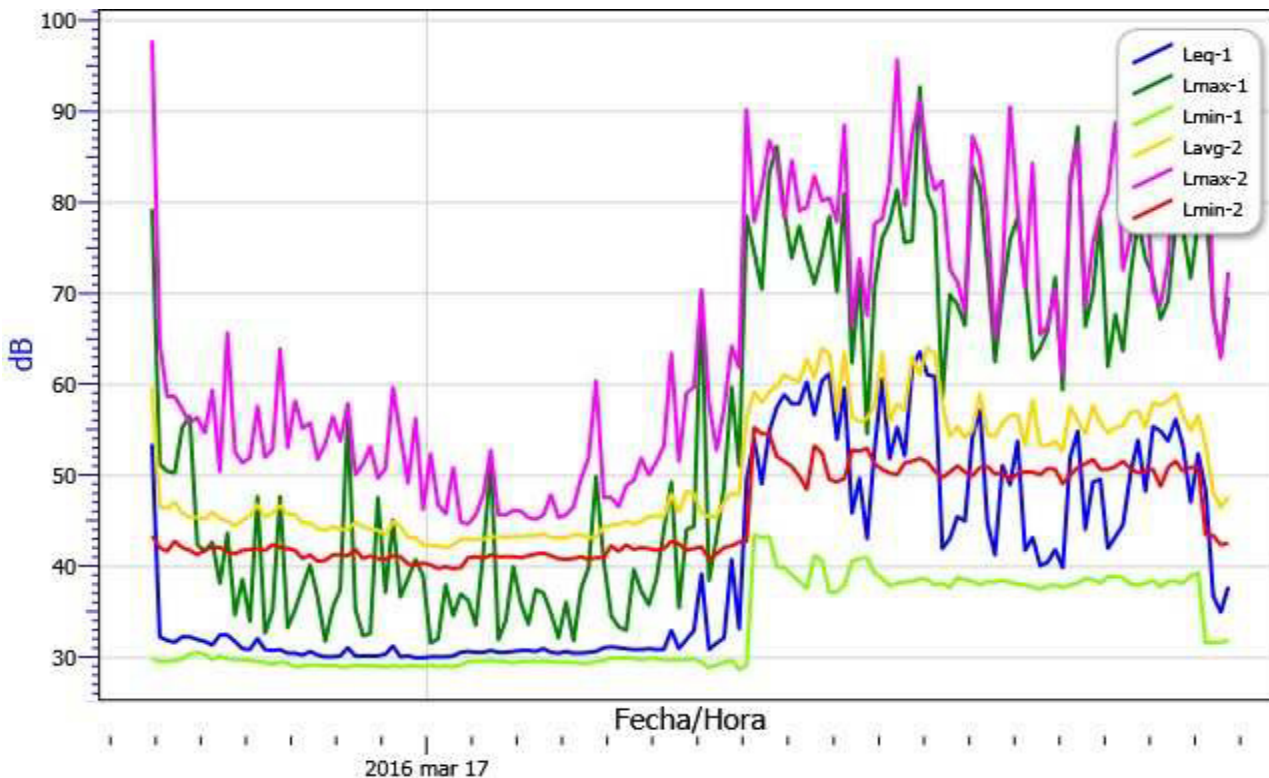
Descripción	Medidor	Valor	Descripción	Medidor	Valor
UL, tiempo superior	límite 2	00:00:00	de tiempo (TWA)		
Exp Sec	2	--	SEL	2	135.6 dB
Mntime	2	17/03/2016 06:54:09 a.m.	ProjectedTWA (8:00)	2	53.6 dB
PKtime	2	17/03/2016 10:50:06 a.m.	Mxtime	2	17/03/2016 10:50:06 a.m.
Ponderación	2	C	Range Ceiling	2	--
Nivel de criterio	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Índice de intercambio	2	5 dB
Respuesta	2	FAST	Umbral de integración	2	80 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	--			

### Historial de calibración

Fecha	Acción de calibración	Nivel	Tipo de modelo del calibrador	Número de serie	Fecha de certificación
16/03/2016 p.m.	05:40:12 Calibración	114.0	QC-10	QIC100169	26/08/2016

### Gráfica de datos de registro

S226\_BGJ100009\_21032016\_164828: Gráfica de datos de registro - Read Only



**CERTIFICADO DE VERIFICACIÓN DE CALIBRACIÓN DE EQUIPOS  
PARA MEDICIÓN DE TSP, PM<sub>2.5</sub> Y PM<sub>10</sub>**

mar-16

Certificado Numero: 1809

**Características del Equipo**

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



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

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

**Información de la Calibración**

<b>Equipo No.:</b> 1	<b>Fecha de Verificación de Calibración:</b> 18/03/2016
<b>Número de Serie :</b> 938	<b>Vigencia:</b> 30 Días

Valores Ambientales	
Temperatura (°C)	17.10
Presión (Pulg.Hg)	24.48
Humedad Relativa ( %)	60.00

Parámetro	Lectura Calibración PQ200	Lectura Patrón
Flujo (LPM)	16.71	16.70*
Temperatura Ambiente (°C)	17.10	17.06*
Temperatura Filtro (°C)	17.10	17.06*
Barómetro (Pulg.Hg)	24.48	24.48*

Test de vacio		
SP (cm H <sub>2</sub> O) <sub>z</sub>	30.00	SP < 33
Pi - Vacio inicial (cm H O)	99.00	ΔP < 5
Pf - Vacio final (cm H O)	98.00	

**Estado del Equipo: CALIBRADO**

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

**Patrón Utilizado**

**Nombre el Equipo:** TriCal Nist  
**No. Serie** 000103-3  
**Rango de Flujo:** 0.1-30 LPM  
**Rango de Temperatura:** -40 a 50 °C  
**Rango de Presión Barométrica:** 400-800 mm Hg  
**No. Método:** RFPS-1298-124  
**Fecha de Calibración del Patrón Utilizado:** 27/01/2014

**Responsables:**

**Luis Rey**  
Responsable

**Ing. Hasan Zolata**  
Supervisor

#### Falla reportada

Ciente solicita revisión y mantenimiento general.

#### Observaciones

1 empaque del impactor dañado  
Bateria presenta desgaste significativo a la fecha del 12/05/2016.

#### Diagnostico

Después de cargar al 100% los equipos, se procedió a correr una prueba de 24 hrs. configurado a 16.7 LPM, encontrando que el equipo funciona correctamente, un empaque del impactor será reemplazado.

#### Trabajos realizados

##### Mantenimiento de los siguientes componentes:

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

##### Al finalizar el mantenimiento se efectuaron las siguientes verificaciones:

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

#### Repuestos utilizados

1 empaque área de impactor  
1 Bateria PS 12V 18 Ah instalada en fecha 26/05/2016.

#### Responsables:



**Luis Rey**  
Responsable



**Ing. Hasan Zolata**  
Supervisor



CONSULTORIA Y TECNOLOGIA AMBIENTAL, S.A.

# BGI PQ200 Air Sampling System

Downloaded 2016 28 mar 10:44:50

## Job Details:

Job Name:  
Version: 5.62  
Serial No: 938  
Pump Time: 3938:40  
Flags:

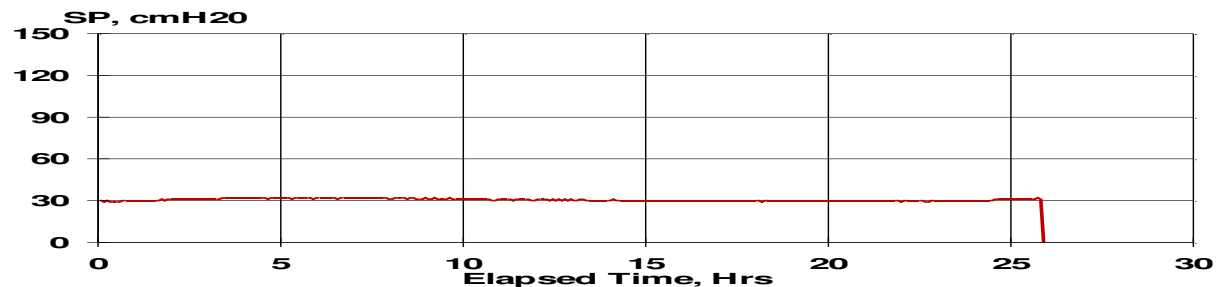
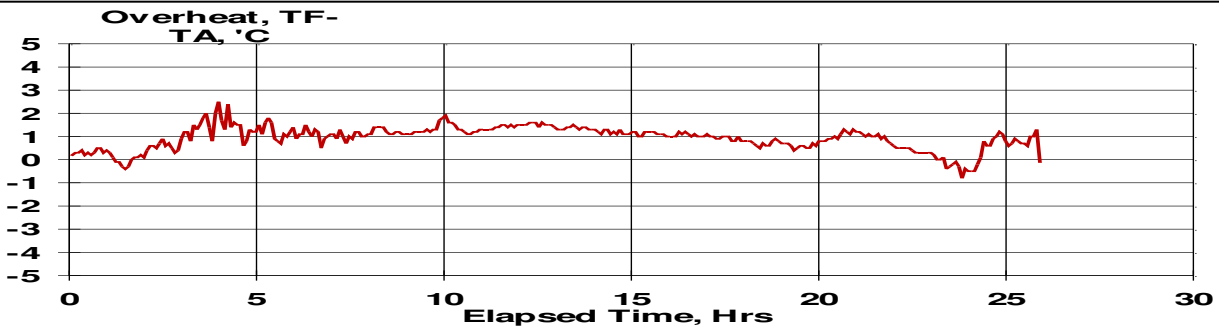
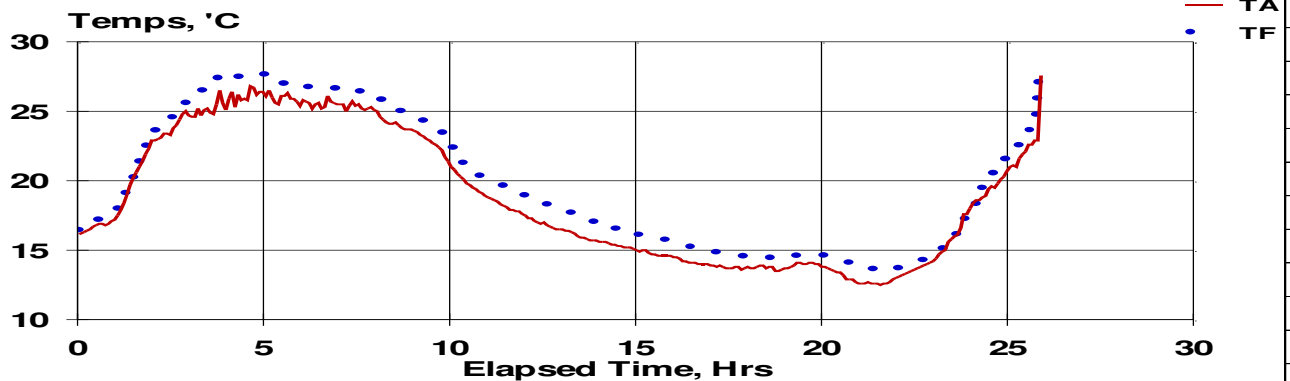
Job Code: 5  
Site Name: CTA  
Station Code: LABEL  
Operators: LREY  
User1:  
User2:

	Max	Min	Avg	Units
BP	623	618	620	mmHg
TA	27.1	12.5	18.8	°C
Q	---	---	16.71	Lpm
QCV			0.66	%
Max overheat			2.8	°C
occured	24-mar	13:21:10		

Timer Information:	
Date	Time
dd-mmm	hh:mm:ss
Start: 16-23-mar	08:15:08
Stop: 16-24-mar	10:15:05
ET: 25:59:00	

Mass Concentration Data:	
Filter ID:	
Final Wt:	mg
Initial Wt:	mg
Delta Wt:	0.000 mg
Total Vol:	26.049 m <sup>3</sup>
Mass Conc:	0 µg/m <sup>3</sup>

Notes 1: Ok  
Notes 2:



<b>Hourly Averaged Data</b>							
Date	Start Hour	BP	AmbT	Filt T	Delta T	SP	Flow
yy-dd-mmm	hh:mm:ss	mmHg	°C	°C	°C	cmH2O	aLpm
16-23-mar	08:20:08	622	16.7	17.1	0.3	30	16.72
16-23-mar	09:20:08	622	20.2	20.2	0.0	30	16.71
16-23-mar	10:20:08	622	23.8	24.4	0.6	31	16.72
16-23-mar	11:20:08	621	25.2	26.7	1.5	32	16.72
16-23-mar	12:20:08	621	26.2	27.5	1.4	32	16.71
16-23-mar	13:20:08	620	25.9	27.2	1.2	32	16.72
16-23-mar	14:20:08	619	25.6	26.6	1.1	32	16.72
16-23-mar	15:20:08	619	25.3	26.4	1.0	32	16.72
16-23-mar	16:20:08	619	24.1	25.4	1.2	32	16.71
16-23-mar	17:20:08	619	22.7	24.0	1.3	31	16.72
16-23-mar	18:20:08	620	19.9	21.2	1.4	31	16.72
16-23-mar	19:20:08	620	18.2	19.6	1.4	31	16.72
16-23-mar	20:20:08	621	16.9	18.5	1.5	31	16.72
16-23-mar	21:20:08	621	16.0	17.4	1.4	30	16.72
16-23-mar	22:20:08	621	15.4	16.6	1.2	30	16.71
16-23-mar	23:20:08	621	14.8	15.9	1.1	30	16.72
16-24-mar	00:20:08	620	14.2	15.2	1.1	30	16.71
16-24-mar	01:20:08	620	13.8	14.7	0.9	30	16.71
16-24-mar	02:20:08	620	13.7	14.4	0.7	30	16.72
16-24-mar	03:20:08	619	14.0	14.6	0.6	30	16.72
16-24-mar	04:20:08	619	13.3	14.3	1.0	30	16.72
16-24-mar	05:20:08	620	12.6	13.6	1.0	30	16.72
16-24-mar	06:20:08	620	13.6	14.0	0.4	30	16.72
16-24-mar	07:20:08	620	15.7	15.6	-0.2	30	16.70
16-24-mar	08:20:08	620	19.2	19.6	0.4	30	16.71
16-24-mar	09:20:08	620	21.9	22.7	0.8	31	16.72

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

**11.5.1 Muestras de Agua Superficial (SW)**

December 30, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28173

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 11, 2015. This project has been assigned to ACZ's project number, L28173. 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 L28173. 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.

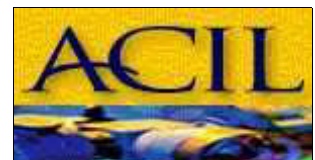
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 29, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.





Tahoe Resources, Inc.

December 30, 2015

Project ID: Escobal

ACZ Project ID: L28173

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 8 miscellaneous samples from Tahoe Resources, Inc. on December 11, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28173. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

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

**Sample Analysis**

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

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

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW1-E

ACZ Sample ID: **L28173-01**  
Date Sampled: 12/09/15 11:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 17:51	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 11:50	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 11:59	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/21/15 19:07	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 17:39	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 21:12	scp
Total Hot Plate Digestion	M200.2 ICP								12/14/15 14:12	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW1-E

ACZ Sample ID: **L28173-01**  
Date Sampled: 12/09/15 11:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 16:26	gss
Aluminum, total	M200.7 ICP	1	0.59			mg/L	0.03	0.2	12/15/15 22:52	gss
Antimony, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0004	0.002	12/18/15 14:55	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/21/15 20:08	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0019			mg/L	0.0002	0.001	12/22/15 20:47	msh
Arsenic, total	M200.8 ICP-MS	1	0.0019			mg/L	0.0002	0.001	12/21/15 20:08	msh
Barium, dissolved	M200.7 ICP	1	0.087			mg/L	0.003	0.02	12/17/15 16:41	gss
Barium, total	M200.7 ICP	1	0.091			mg/L	0.003	0.02	12/15/15 22:52	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:41	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:52	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 16:41	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 22:52	gss
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/17/15 16:41	gss
Boron, total	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/15/15 22:52	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/18/15 14:55	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 20:08	msh
Calcium, dissolved	M200.7 ICP	1	22.8			mg/L	0.1	0.5	12/17/15 16:41	gss
Calcium, total	M200.7 ICP	1	24.2			mg/L	0.1	0.5	12/15/15 22:52	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:41	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:52	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:41	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 17:51	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:41	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:52	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 16:41	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 22:52	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 16:41	gss
Iron, total	M200.7 ICP	1	0.25			mg/L	0.02	0.05	12/15/15 22:52	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/18/15 14:55	mfm
Lead, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/21/15 20:08	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 16:41	gss
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:52	gss
Magnesium, dissolved	M200.7 ICP	1	3			mg/L	0.2	1	12/17/15 16:41	gss
Magnesium, total	M200.7 ICP	1	3.1			mg/L	0.2	1	12/15/15 22:52	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/17/15 16:41	gss
Manganese, total	M200.7 ICP	1	0.014	B		mg/L	0.005	0.03	12/15/15 22:52	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 14:37	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 12:23	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 16:41	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 22:52	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 16:41	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:52	gss
Potassium, dissolved	M200.7 ICP	1	3.9			mg/L	0.2	1	12/18/15 16:26	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW1-E

ACZ Sample ID: **L28173-01**  
Date Sampled: 12/09/15 11:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	4.2		mg/L	0.2	1	12/15/15 22:52	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 16:41	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 22:52	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	12/18/15 14:55	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/21/15 20:08	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/18/15 14:55	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 12:36	mfm
Sodium, dissolved	M200.7 ICP	1	7.9		mg/L	0.2	1	12/17/15 16:41	gss
Sodium, total	M200.7 ICP	1	8		mg/L	0.2	1	12/17/15 11:27	gss
Strontium, dissolved	M200.7 ICP	1	0.115		mg/L	0.005	0.03	12/17/15 16:41	gss
Strontium, total	M200.7 ICP	1	0.115		mg/L	0.005	0.03	12/15/15 22:52	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/18/15 14:55	mfm
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:08	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 16:26	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 22:52	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 16:41	gss
Titanium, total	M200.7 ICP	1	0.021	B	mg/L	0.005	0.03	12/15/15 22:52	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/18/15 14:55	mfm
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:08	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 16:41	gss
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/15/15 22:52	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 16:41	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 22:52	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW1-E

ACZ Sample ID: **L28173-01**

Date Sampled: 12/09/15 11:00

Date Received: 12/11/15

Sample Matrix: *Surface Water*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	58.6		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	58.6		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/30/15 11:29	calc
Sum of Anions			1.8			meq/L			12/30/15 11:29	calc
Sum of Cations			1.8			meq/L			12/30/15 11:29	calc
Chemical Oxygen Demand	M410.4	1	11	B	*	mg/L	10	20	12/17/15 14:05	sck
Chloride	SM4500Cl-E	1	7		*	mg/L	0.5	2	12/23/15 14:25	krh/ms s
Conductivity @25C	SM2510B	1	200		*	umhos/cm	1	10	12/12/15 22:23	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 23:06	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 18:51	pjb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	12/15/15 16:18	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		69.3			mg/L			12/30/15 11:29	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.10		*	mg/L	0.02	0.1	12/22/15 23:46	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/29/15 13:15	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	12/18/15 22:35	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	23.1		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.16	B		mg/L	0.06	0.2	12/30/15 11:29	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.02	0.05	12/23/15 19:16	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	12/11/15 20:19	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.02	0.05	12/19/15 1:04	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	170		*	mg/L	10	20	12/15/15 12:41	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/15 14:01	enb
Residue, Total (TS) @ 105C	SM2540B	1	182		*	mg/L	10	20	12/11/15 17:53	sck
Sulfate	D516-02/-07 - Turbidimetric	1	20.6		*	mg/L	1	5	12/17/15 17:36	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:19	enb
TDS (calculated)	Calculation		101			mg/L			12/30/15 11:29	calc
TDS (ratio - measured/calculated)	Calculation		1.68						12/30/15 11:29	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2-E

ACZ Sample ID: **L28173-02**  
Date Sampled: 12/09/15 10:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 17:58	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 12:01	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 12:13	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/21/15 19:14	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 17:49	mss2
Total Hot Plate Digestion	M200.2 ICP								12/14/15 14:33	gss
Total Hot Plate Digestion	M200.2 ICP-MS				*				12/22/15 21:24	scp

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2-E

ACZ Sample ID: **L28173-02**  
Date Sampled: 12/09/15 10:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 16:29	gss
Aluminum, total	M200.7 ICP	1	0.16	B		mg/L	0.03	0.2	12/15/15 22:56	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0153			mg/L	0.0004	0.002	12/22/15 20:49	msh
Antimony, total	M200.8 ICP-MS	1	0.0150			mg/L	0.0004	0.002	12/21/15 20:15	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0112			mg/L	0.0002	0.001	12/22/15 20:49	msh
Arsenic, total	M200.8 ICP-MS	1	0.0114			mg/L	0.0002	0.001	12/21/15 20:15	msh
Barium, dissolved	M200.7 ICP	1	0.046			mg/L	0.003	0.02	12/17/15 16:44	gss
Barium, total	M200.7 ICP	1	0.045			mg/L	0.003	0.02	12/15/15 22:56	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:44	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:56	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 16:44	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 22:56	gss
Boron, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	12/17/15 16:44	gss
Boron, total	M200.7 ICP	1	0.12			mg/L	0.01	0.05	12/15/15 22:56	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 20:49	msh
Cadmium, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/21/15 20:15	msh
Calcium, dissolved	M200.7 ICP	1	342			mg/L	0.1	0.5	12/17/15 16:44	gss
Calcium, total	M200.7 ICP	1	348			mg/L	0.1	0.5	12/15/15 22:56	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:44	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:56	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:44	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 17:54	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:44	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:56	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 16:44	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 22:56	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 16:44	gss
Iron, total	M200.7 ICP	1	0.07			mg/L	0.02	0.05	12/15/15 22:56	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	12/22/15 20:49	msh
Lead, total	M200.8 ICP-MS	1	0.0062			mg/L	0.0001	0.0005	12/21/15 20:15	msh
Lithium, dissolved	M200.7 ICP	1	0.086			mg/L	0.008	0.04	12/17/15 16:44	gss
Lithium, total	M200.7 ICP	1	0.088			mg/L	0.008	0.04	12/15/15 22:56	gss
Magnesium, dissolved	M200.7 ICP	1	21.7			mg/L	0.2	1	12/17/15 16:44	gss
Magnesium, total	M200.7 ICP	1	22.6			mg/L	0.2	1	12/15/15 22:56	gss
Manganese, dissolved	M200.7 ICP	1	0.058			mg/L	0.005	0.03	12/17/15 16:44	gss
Manganese, total	M200.7 ICP	1	0.074			mg/L	0.005	0.03	12/15/15 22:56	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 14:39	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 12:25	pta
Molybdenum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.1	12/17/15 16:44	gss
Molybdenum, total	M200.7 ICP	1	0.05	B		mg/L	0.02	0.1	12/15/15 22:56	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 16:44	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:56	gss
Potassium, dissolved	M200.7 ICP	1	9.2			mg/L	0.2	1	12/18/15 16:29	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2-E

ACZ Sample ID: **L28173-02**  
Date Sampled: 12/09/15 10:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	9.7		mg/L	0.2	1	12/15/15 22:56	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 16:44	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 22:56	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0012		mg/L	0.0001	0.0003	12/22/15 20:49	msh
Selenium, total	M200.8 ICP-MS	1	0.0013		mg/L	0.0001	0.0003	12/21/15 20:15	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 20:49	msh
Silver, total	M200.8 ICP-MS	2	0.0001	B	mg/L	0.0001	0.0005	12/28/15 12:39	mfm
Sodium, dissolved	M200.7 ICP	1	67.4		mg/L	0.2	1	12/17/15 16:44	gss
Sodium, total	M200.7 ICP	1	69.7		mg/L	0.2	1	12/17/15 11:30	gss
Strontium, dissolved	M200.7 ICP	1	3.740		mg/L	0.005	0.03	12/17/15 16:44	gss
Strontium, total	M200.7 ICP	1	3.750		mg/L	0.005	0.03	12/15/15 22:56	gss
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/22/15 20:49	msh
Thallium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	12/21/15 20:15	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 16:29	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 22:56	gss
Titanium, dissolved	M200.7 ICP	1	0.013	B	mg/L	0.005	0.03	12/17/15 16:44	gss
Titanium, total	M200.7 ICP	1	0.015	B	mg/L	0.005	0.03	12/15/15 22:56	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	12/22/15 20:49	msh
Uranium, total	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0005	12/21/15 20:15	msh
Vanadium, dissolved	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	12/17/15 16:44	gss
Vanadium, total	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/15/15 22:56	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 16:44	gss
Zinc, total	M200.7 ICP	1	0.02	B	mg/L	0.01	0.05	12/15/15 22:56	gss



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2-E

ACZ Sample ID: **L28173-02**  
Date Sampled: 12/09/15 10:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	83.7		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1	3.9	B	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	87.6		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/30/15 11:29	calc
Sum of Anions			22			meq/L			12/30/15 11:29	calc
Sum of Cations			22			meq/L			12/30/15 11:29	calc
Chemical Oxygen Demand	M410.4	1	32		*	mg/L	10	20	12/17/15 14:14	sck
Chloride	SM4500Cl-E	1	64.5		*	mg/L	0.5	2	12/23/15 14:25	krh/ms s
Conductivity @25C	SM2510B	1	1790		*	umhos/cm	1	10	12/12/15 22:33	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 23:07	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 18:52	pjb
Fluoride	SM4500F-C	1	1.23		*	mg/L	0.05	0.3	12/15/15 16:26	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		943			mg/L			12/30/15 11:29	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.33		*	mg/L	0.02	0.1	12/22/15 23:47	pjb
Nitrogen, ammonia	M350.1	1	0.11	B	*	mg/L	0.05	0.2	12/29/15 13:16	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	12/18/15 22:37	pjb
pH (lab)	SM4500H+ B									
pH		1	8.4	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	22.9		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/30/15 11:29	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/23/15 19:18	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.02	0.05	12/11/15 20:22	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.02	0.05	12/19/15 1:05	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1500		*	mg/L	10	20	12/15/15 12:44	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/15 14:03	enb
Residue, Total (TS) @ 105C	SM2540B	1	1580		*	mg/L	10	20	12/11/15 17:54	sck
Sulfate	D516-02/-07 - Turbidimetric	50	882		*	mg/L	50	250	12/17/15 17:46	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:28	enb
TDS (calculated)	Calculation		1450			mg/L			12/30/15 11:29	calc
TDS (ratio - measured/calculated)	Calculation		1.03						12/30/15 11:29	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2B-E

ACZ Sample ID: **L28173-03**  
Date Sampled: 12/09/15 09:10  
Date Received: 12/11/15  
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/15 12:30	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 12:13	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 12:21	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/21/15 19:21	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 14:05	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 22:00	scp
Total Hot Plate Digestion	M200.2 ICP								12/14/15 14:54	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2B-E

ACZ Sample ID: **L28173-03**  
Date Sampled: 12/09/15 09:10  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 16:32	gss
Aluminum, total	M200.7 ICP	1	0.06	B	*	mg/L	0.03	0.2	12/15/15 22:59	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0181			mg/L	0.0004	0.002	12/23/15 20:35	mfm
Antimony, total	M200.8 ICP-MS	1	0.0161			mg/L	0.0004	0.002	12/21/15 20:17	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0095			mg/L	0.0002	0.001	12/22/15 20:56	msh
Arsenic, total	M200.8 ICP-MS	1	0.0098			mg/L	0.0002	0.001	12/21/15 20:17	msh
Barium, dissolved	M200.7 ICP	1	0.059			mg/L	0.003	0.02	12/17/15 16:48	gss
Barium, total	M200.7 ICP	1	0.057			mg/L	0.003	0.02	12/15/15 22:59	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:48	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:59	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 16:48	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 22:59	gss
Boron, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	12/17/15 16:48	gss
Boron, total	M200.7 ICP	1	0.13			mg/L	0.01	0.05	12/15/15 22:59	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 20:56	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 20:17	msh
Calcium, dissolved	M200.7 ICP	1	356		*	mg/L	0.1	0.5	12/17/15 16:48	gss
Calcium, total	M200.7 ICP	1	360			mg/L	0.1	0.5	12/15/15 22:59	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:48	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:59	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:48	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 17:57	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:48	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:59	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 16:48	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 22:59	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 16:48	gss
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	12/15/15 22:59	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/22/15 20:56	msh
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	12/21/15 20:17	msh
Lithium, dissolved	M200.7 ICP	1	0.089			mg/L	0.008	0.04	12/17/15 16:48	gss
Lithium, total	M200.7 ICP	1	0.092			mg/L	0.008	0.04	12/15/15 22:59	gss
Magnesium, dissolved	M200.7 ICP	1	22.2			mg/L	0.2	1	12/17/15 16:48	gss
Magnesium, total	M200.7 ICP	1	22.9			mg/L	0.2	1	12/15/15 22:59	gss
Manganese, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.005	0.03	12/17/15 16:48	gss
Manganese, total	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	12/15/15 22:59	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 14:41	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 12:27	pta
Molybdenum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.02	0.1	12/17/15 16:48	gss
Molybdenum, total	M200.7 ICP	1	0.06	B		mg/L	0.02	0.1	12/15/15 22:59	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 16:48	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:59	gss
Potassium, dissolved	M200.7 ICP	1	11.5			mg/L	0.2	1	12/18/15 16:32	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2B-E

ACZ Sample ID: **L28173-03**  
Date Sampled: 12/09/15 09:10  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	11.8		mg/L	0.2	1	12/15/15 22:59	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 16:48	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 22:59	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0015		mg/L	0.0001	0.0003	12/22/15 20:56	msh
Selenium, total	M200.8 ICP-MS	1	0.0015		mg/L	0.0001	0.0003	12/21/15 20:17	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 20:56	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 12:54	mfm
Sodium, dissolved	M200.7 ICP	1	74		mg/L	0.2	1	12/17/15 16:48	gss
Sodium, total	M200.7 ICP	1	75.5		mg/L	0.2	1	12/17/15 13:39	gss
Strontium, dissolved	M200.7 ICP	1	3.890	*	mg/L	0.005	0.03	12/17/15 16:48	gss
Strontium, total	M200.7 ICP	1	3.880		mg/L	0.005	0.03	12/15/15 22:59	gss
Thallium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/22/15 20:56	msh
Thallium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/21/15 20:17	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 16:32	gss
Tin, total	M200.7 ICP	1	0.06	B	mg/L	0.04	0.2	12/15/15 22:59	gss
Titanium, dissolved	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/17/15 16:48	gss
Titanium, total	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/15/15 22:59	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0005	12/22/15 20:56	msh
Uranium, total	M200.8 ICP-MS	1	0.0006		mg/L	0.0001	0.0005	12/21/15 20:17	msh
Vanadium, dissolved	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	12/17/15 16:48	gss
Vanadium, total	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	12/15/15 22:59	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 16:48	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 22:59	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2B-E

ACZ Sample ID: **L28173-03**  
Date Sampled: 12/09/15 09:10  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	70.0		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	70.0		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.5			%			12/30/15 11:30	calc
Sum of Anions			21			meq/L			12/30/15 11:30	calc
Sum of Cations			23			meq/L			12/30/15 11:30	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 14:23	sck
Chloride	SM4500Cl-E	1	69.8		*	mg/L	0.5	2	12/23/15 14:25	krh/ms s
Conductivity @25C	SM2510B	1	1870		*	umhos/cm	1	10	12/12/15 22:42	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 19:16	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 18:53	pjb
Fluoride	SM4500F-C	1	1.33		*	mg/L	0.05	0.3	12/15/15 16:30	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		980			mg/L			12/30/15 11:30	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	4.51		*	mg/L	0.06	0.3	12/23/15 0:18	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/29/15 13:18	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	12/18/15 22:38	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	22.8		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.47			mg/L	0.06	0.2	12/30/15 11:30	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.02	0.05	12/23/15 19:20	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.02	0.05	12/11/15 20:24	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.02	0.05	12/19/15 1:38	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1580		*	mg/L	10	20	12/15/15 12:47	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/15 14:04	enb
Residue, Total (TS) @ 105C	SM2540B	1	1670		*	mg/L	10	20	12/11/15 17:56	sck
Sulfate	D516-02/-07 - Turbidimetric	100	853		*	mg/L	100	500	12/17/15 17:47	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:31	enb
TDS (calculated)	Calculation		1430			mg/L			12/30/15 11:30	calc
TDS (ratio - measured/calculated)	Calculation		1.10						12/30/15 11:30	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L28173-04**  
Date Sampled: 12/09/15 08:40  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/15 12:46	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 12:24	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 12:28	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/21/15 19:25	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 14:25	mss2
Total Hot Plate Digestion	M200.2 ICP								12/14/15 15:15	gss
Total Hot Plate Digestion	M200.2 ICP-MS				*				12/22/15 22:12	scp

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L28173-04**  
Date Sampled: 12/09/15 08:40  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 16:42	gss
Aluminum, total	M200.7 ICP	1	2.60		*	mg/L	0.03	0.2	12/15/15 23:02	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0027			mg/L	0.0004	0.002	12/22/15 20:58	msh
Antimony, total	M200.8 ICP-MS	1	0.0025			mg/L	0.0004	0.002	12/21/15 20:19	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0043			mg/L	0.0002	0.001	12/22/15 20:58	msh
Arsenic, total	M200.8 ICP-MS	1	0.0071			mg/L	0.0002	0.001	12/21/15 20:19	msh
Barium, dissolved	M200.7 ICP	1	0.166			mg/L	0.003	0.02	12/17/15 16:58	gss
Barium, total	M200.7 ICP	1	0.190			mg/L	0.003	0.02	12/15/15 23:02	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:58	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:02	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 16:58	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 23:02	gss
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/17/15 16:58	gss
Boron, total	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/15/15 23:02	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 20:58	msh
Cadmium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/21/15 20:19	msh
Calcium, dissolved	M200.7 ICP	1	95.2		*	mg/L	0.1	0.5	12/17/15 16:58	gss
Calcium, total	M200.7 ICP	1	99.5			mg/L	0.1	0.5	12/15/15 23:02	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:58	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:02	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:58	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 18:00	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 16:58	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:02	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 16:58	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 23:02	gss
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	12/17/15 16:58	gss
Iron, total	M200.7 ICP	1	1.93			mg/L	0.02	0.05	12/15/15 23:02	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/22/15 20:58	msh
Lead, total	M200.8 ICP-MS	1	0.0072			mg/L	0.0001	0.0005	12/21/15 20:19	msh
Lithium, dissolved	M200.7 ICP	1	0.014	B		mg/L	0.008	0.04	12/17/15 16:58	gss
Lithium, total	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/15/15 23:02	gss
Magnesium, dissolved	M200.7 ICP	1	8.4			mg/L	0.2	1	12/17/15 16:58	gss
Magnesium, total	M200.7 ICP	1	8.8			mg/L	0.2	1	12/15/15 23:02	gss
Manganese, dissolved	M200.7 ICP	1	0.175			mg/L	0.005	0.03	12/17/15 16:58	gss
Manganese, total	M200.7 ICP	1	0.305			mg/L	0.005	0.03	12/15/15 23:02	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 14:43	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 12:29	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 16:58	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 23:02	gss
Nickel, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.008	0.04	12/17/15 16:58	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 23:02	gss
Potassium, dissolved	M200.7 ICP	1	7.5			mg/L	0.2	1	12/18/15 16:42	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L28173-04**  
Date Sampled: 12/09/15 08:40  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	8		mg/L	0.2	1	12/15/15 23:02	gss
Scandium, dissolved	M200.7 ICP	1		U	mg/L	0.1	0.5	12/17/15 16:58	gss
Scandium, total	M200.7 ICP	1		U	mg/L	0.1	0.5	12/15/15 23:02	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	12/22/15 20:58	msh
Selenium, total	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	12/21/15 20:19	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 20:58	msh
Silver, total	M200.8 ICP-MS	2	0.0002	B	mg/L	0.0001	0.0005	12/28/15 12:57	mfm
Sodium, dissolved	M200.7 ICP	1	23.7		mg/L	0.2	1	12/17/15 16:58	gss
Sodium, total	M200.7 ICP	1	23.2		mg/L	0.2	1	12/17/15 13:43	gss
Strontium, dissolved	M200.7 ICP	1	0.783		mg/L	0.005	0.03	12/17/15 16:58	gss
Strontium, total	M200.7 ICP	1	0.784		mg/L	0.005	0.03	12/15/15 23:02	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 20:58	msh
Thallium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/21/15 20:19	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 16:42	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 23:02	gss
Titanium, dissolved	M200.7 ICP	1	0.010	B	mg/L	0.005	0.03	12/17/15 16:58	gss
Titanium, total	M200.7 ICP	1	0.097		mg/L	0.005	0.03	12/15/15 23:02	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/22/15 20:58	msh
Uranium, total	M200.8 ICP-MS	1	0.0004	B	mg/L	0.0001	0.0005	12/21/15 20:19	msh
Vanadium, dissolved	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	12/17/15 16:58	gss
Vanadium, total	M200.7 ICP	1	0.009	B	mg/L	0.005	0.03	12/15/15 23:02	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 16:58	gss
Zinc, total	M200.7 ICP	1	0.02	B	mg/L	0.01	0.05	12/15/15 23:02	gss



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4-E

ACZ Sample ID: **L28173-04**  
Date Sampled: 12/09/15 08:40  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	86.1		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	86.1		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.5			%			12/30/15 11:30	calc
Sum of Anions			6.5			meq/L			12/30/15 11:30	calc
Sum of Cations			6.7			meq/L			12/30/15 11:30	calc
Chemical Oxygen Demand	M410.4	1	14	B	*	mg/L	10	20	12/17/15 11:26	sck
Chloride	SM4500Cl-E	1	22.6		*	mg/L	0.5	2	12/23/15 14:25	krh/ms s
Conductivity @25C	SM2510B	1	672		*	umhos/cm	1	10	12/12/15 22:51	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 19:18	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 18:54	pjb
Fluoride	SM4500F-C	1	0.32		*	mg/L	0.05	0.3	12/15/15 16:36	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		272			mg/L			12/30/15 11:30	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.60		*	mg/L	0.06	0.3	12/23/15 0:19	pjb
Nitrogen, ammonia	M350.1	1	0.16	B	*	mg/L	0.05	0.2	12/29/15 13:22	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	1.4		*	mg/L	0.1	0.5	12/18/15 22:39	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	22.8		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.06	0.2	12/30/15 11:30	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	12/23/15 19:21	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.16	H	*	mg/L	0.02	0.05	12/11/15 20:25	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.25		*	mg/L	0.02	0.05	12/19/15 1:41	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	496		*	mg/L	10	20	12/15/15 12:49	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	95.0		*	mg/L	5	20	12/15/15 14:05	enb
Residue, Total (TS) @ 105C	SM2540B	1	624		*	mg/L	10	20	12/11/15 17:57	sck
Sulfate	D516-02/-07 - Turbidimetric	20	197		*	mg/L	20	100	12/17/15 17:57	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:33	enb
TDS (calculated)	Calculation		408			mg/L			12/30/15 11:30	calc
TDS (ratio - measured/calculated)	Calculation		1.22						12/30/15 11:30	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: SW5-E

ACZ Sample ID: **L28173-05**  
 Date Sampled: 12/09/15 07:59  
 Date Received: 12/11/15  
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/15 13:01	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 12:47	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 12:35	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/21/15 19:28	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 14:46	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 22:24	scp
Total Hot Plate Digestion	M200.2 ICP								12/14/15 16:18	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW5-E

ACZ Sample ID: **L28173-05**  
Date Sampled: 12/09/15 07:59  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 16:45	gss
Aluminum, total	M200.7 ICP	1	0.56		*	mg/L	0.03	0.2	12/15/15 23:11	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/22/15 21:00	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/21/15 20:21	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0015			mg/L	0.0002	0.001	12/22/15 21:00	msh
Arsenic, total	M200.8 ICP-MS	1	0.0018			mg/L	0.0002	0.001	12/21/15 20:21	msh
Barium, dissolved	M200.7 ICP	1	0.040			mg/L	0.003	0.02	12/17/15 17:01	gss
Barium, total	M200.7 ICP	1	0.044			mg/L	0.003	0.02	12/15/15 23:11	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:01	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:11	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 17:01	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 23:11	gss
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/17/15 17:01	gss
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:11	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:00	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 20:21	msh
Calcium, dissolved	M200.7 ICP	1	6		*	mg/L	0.1	0.5	12/17/15 17:01	gss
Calcium, total	M200.7 ICP	1	6.2			mg/L	0.1	0.5	12/15/15 23:11	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:01	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:11	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:01	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 18:09	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:01	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:11	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 17:01	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 23:11	gss
Iron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.02	0.05	12/17/15 17:01	gss
Iron, total	M200.7 ICP	1	0.37			mg/L	0.02	0.05	12/15/15 23:11	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:00	msh
Lead, total	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/21/15 20:21	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 17:01	gss
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 23:11	gss
Magnesium, dissolved	M200.7 ICP	1	1.4			mg/L	0.2	1	12/17/15 17:01	gss
Magnesium, total	M200.7 ICP	1	1.4			mg/L	0.2	1	12/15/15 23:11	gss
Manganese, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	12/17/15 17:01	gss
Manganese, total	M200.7 ICP	1	0.016	B		mg/L	0.005	0.03	12/15/15 23:11	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 14:46	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 12:39	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 17:01	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 23:11	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 17:01	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 23:11	gss
Potassium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	12/18/15 16:45	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW5-E

ACZ Sample ID: **L28173-05**  
Date Sampled: 12/09/15 07:59  
Date Received: 12/11/15  
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	2.6		mg/L	0.2	1	12/15/15 23:11	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 17:01	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 23:11	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/22/15 21:00	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/21/15 20:21	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 21:00	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 13:00	mfm
Sodium, dissolved	M200.7 ICP	1	4.4		mg/L	0.2	1	12/17/15 17:01	gss
Sodium, total	M200.7 ICP	1	4.3		mg/L	0.2	1	12/17/15 13:52	gss
Strontium, dissolved	M200.7 ICP	1	0.050		mg/L	0.005	0.03	12/17/15 17:01	gss
Strontium, total	M200.7 ICP	1	0.048		mg/L	0.005	0.03	12/15/15 23:11	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:00	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:21	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 16:45	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 23:11	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 17:01	gss
Titanium, total	M200.7 ICP	1	0.014	B	mg/L	0.005	0.03	12/15/15 23:11	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:00	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:21	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 17:01	gss
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/15/15 23:11	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 17:01	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 23:11	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW5-E

ACZ Sample ID: **L28173-05**

Date Sampled: 12/09/15 07:59

Date Received: 12/11/15

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	22.1		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	22.1		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.4			%			12/30/15 11:31	calc
Sum of Anions			0.722			meq/L			12/30/15 11:31	calc
Sum of Cations			0.674			meq/L			12/30/15 11:31	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 11:42	sck
Chloride	SM4500Cl-E	1	2.3		*	mg/L	0.5	2	12/23/15 14:25	krh/ms s
Conductivity @25C	SM2510B	1	74.6		*	umhos/cm	1	10	12/12/15 22:58	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 19:20	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 18:55	pjb
Fluoride	SM4500F-C	1	0.07	B	*	mg/L	0.05	0.3	12/15/15 16:44	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		20.7			mg/L			12/30/15 11:31	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.17		*	mg/L	0.02	0.1	12/22/15 23:55	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/29/15 13:23	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/18/15 22:41	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	22.7		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/30/15 11:31	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/23/15 19:22	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.02	0.05	12/11/15 20:26	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/19/15 1:44	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	74		*	mg/L	10	20	12/15/15 12:52	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/15 15:52	sck
Residue, Total (TS) @ 105C	SM2540B	1	80		*	mg/L	10	20	12/14/15 15:02	abd
Sulfate	D516-02/-07 - Turbidimetric	1	10.1		*	mg/L	1	5	12/17/15 17:36	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:03	enb
TDS (calculated)	Calculation		40.2			mg/L			12/30/15 11:31	calc
TDS (ratio - measured/calculated)	Calculation		1.84						12/30/15 11:31	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW7-E

ACZ Sample ID: **L28173-06**  
Date Sampled: 12/09/15 08:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/15 13:09	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 13:10	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 12:43	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/21/15 19:32	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 14:56	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 22:36	scp
Total Hot Plate Digestion	M200.2 ICP								12/14/15 16:39	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW7-E

ACZ Sample ID: **L28173-06**  
Date Sampled: 12/09/15 08:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 16:48	gss
Aluminum, total	M200.7 ICP	1	2.28		*	mg/L	0.03	0.2	12/15/15 23:14	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	12/22/15 21:02	msh
Antimony, total	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	12/21/15 20:23	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0033			mg/L	0.0002	0.001	12/22/15 21:02	msh
Arsenic, total	M200.8 ICP-MS	1	0.0036			mg/L	0.0002	0.001	12/21/15 20:23	msh
Barium, dissolved	M200.7 ICP	1	0.064			mg/L	0.003	0.02	12/17/15 17:04	gss
Barium, total	M200.7 ICP	1	0.079			mg/L	0.003	0.02	12/15/15 23:14	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:04	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:14	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 17:04	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 23:14	gss
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/17/15 17:04	gss
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:14	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/18/15 15:24	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 20:23	msh
Calcium, dissolved	M200.7 ICP	1	12.5		*	mg/L	0.1	0.5	12/17/15 17:04	gss
Calcium, total	M200.7 ICP	1	13.4			mg/L	0.1	0.5	12/15/15 23:14	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:04	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:14	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:04	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 18:13	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:04	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:14	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 17:04	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 23:14	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 17:04	gss
Iron, total	M200.7 ICP	1	0.77			mg/L	0.02	0.05	12/15/15 23:14	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:02	msh
Lead, total	M200.8 ICP-MS	1	0.0008			mg/L	0.0001	0.0005	12/21/15 20:23	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 17:04	gss
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 23:14	gss
Magnesium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	12/17/15 17:04	gss
Magnesium, total	M200.7 ICP	1	2.6			mg/L	0.2	1	12/15/15 23:14	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/17/15 17:04	gss
Manganese, total	M200.7 ICP	1	0.019	B		mg/L	0.005	0.03	12/15/15 23:14	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 14:48	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 12:41	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 17:04	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 23:14	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 17:04	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 23:14	gss
Potassium, dissolved	M200.7 ICP	1	3.2			mg/L	0.2	1	12/18/15 16:48	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW7-E

ACZ Sample ID: **L28173-06**  
Date Sampled: 12/09/15 08:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	3.4		mg/L	0.2	1	12/15/15 23:14	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 17:04	gss
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 23:14	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	12/18/15 15:24	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/21/15 20:23	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/18/15 15:24	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 13:03	mfm
Sodium, dissolved	M200.7 ICP	1	7.3		mg/L	0.2	1	12/17/15 17:04	gss
Sodium, total	M200.7 ICP	1	7.2		mg/L	0.2	1	12/17/15 14:01	gss
Strontium, dissolved	M200.7 ICP	1	0.090		mg/L	0.005	0.03	12/17/15 17:04	gss
Strontium, total	M200.7 ICP	1	0.092		mg/L	0.005	0.03	12/15/15 23:14	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:02	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:23	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 16:48	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 23:14	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 17:04	gss
Titanium, total	M200.7 ICP	1	0.054		mg/L	0.005	0.03	12/15/15 23:14	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:02	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:23	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 17:04	gss
Vanadium, total	M200.7 ICP	1	0.007	B	mg/L	0.005	0.03	12/15/15 23:14	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 17:04	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 23:14	gss



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW7-E

ACZ Sample ID: **L28173-06**

Date Sampled: 12/09/15 08:00

Date Received: 12/11/15

Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	45.1		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	45.1		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-4.0			%			12/30/15 11:31	calc
Sum of Anions			1.3			meq/L			12/30/15 11:31	calc
Sum of Cations			1.2			meq/L			12/30/15 11:31	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 11:58	sck
Chloride	SM4500Cl-E	1	3.9		*	mg/L	0.5	2	12/23/15 14:25	krh/ms s
Conductivity @25C	SM2510B	1	136		*	umhos/cm	1	10	12/12/15 23:07	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 19:21	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 18:57	pjb
Fluoride	SM4500F-C	1	0.14	B	*	mg/L	0.05	0.3	12/15/15 16:51	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		41.5			mg/L			12/30/15 11:31	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.83		*	mg/L	0.02	0.1	12/22/15 23:56	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/29/15 13:25	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	12/18/15 22:44	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	22.8		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.06	0.2	12/30/15 11:31	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	12/23/15 19:23	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.02	0.05	12/11/15 20:28	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.02	0.05	12/19/15 1:45	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	134		*	mg/L	10	20	12/16/15 16:52	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/15 15:54	sck
Residue, Total (TS) @ 105C	SM2540B	1	162		*	mg/L	10	20	12/14/15 15:03	abd
Sulfate	D516-02/-07 - Turbidimetric	1	11.3		*	mg/L	1	5	12/17/15 17:37	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:09	enb
TDS (calculated)	Calculation		68.4			mg/L			12/30/15 11:31	calc
TDS (ratio - measured/calculated)	Calculation		1.96						12/30/15 11:31	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L28173-08**  
Date Sampled: 12/09/15 12:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/18/15 13:17	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 13:33	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 12:57	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/21/15 19:36	mss2
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 15:06	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 22:48	scp
Total Hot Plate Digestion	M200.2 ICP								12/14/15 17:00	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L28173-08**

Date Sampled: 12/09/15 12:00

Date Received: 12/11/15

Sample Matrix: *Surface Water*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 17:01	gss
Aluminum, total	M200.7 ICP	1		U	*	mg/L	0.03	0.2	12/15/15 23:24	gss
Antimony, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0004	0.002	12/18/15 15:27	mfm
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/21/15 20:25	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U	*	mg/L	0.0002	0.001	12/18/15 15:27	mfm
Arsenic, total	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	12/21/15 20:25	msh
Barium, dissolved	M200.7 ICP	1		U		mg/L	0.003	0.02	12/17/15 17:16	gss
Barium, total	M200.7 ICP	1		U		mg/L	0.003	0.02	12/15/15 23:24	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:16	gss
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:24	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 17:16	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 23:24	gss
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/17/15 17:16	gss
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:24	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/18/15 15:27	mfm
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 20:25	msh
Calcium, dissolved	M200.7 ICP	1	0.2	B	*	mg/L	0.1	0.5	12/17/15 17:16	gss
Calcium, total	M200.7 ICP	1	0.1	B		mg/L	0.1	0.5	12/15/15 23:24	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:16	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:24	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:16	gss
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 18:16	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:16	gss
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 23:24	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 17:16	gss
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 23:24	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 17:16	gss
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	12/15/15 23:24	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:09	msh
Lead, total	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/21/15 20:25	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 17:16	gss
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 23:24	gss
Magnesium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	12/17/15 17:16	gss
Magnesium, total	M200.7 ICP	1	0.2	B		mg/L	0.2	1	12/15/15 23:24	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/17/15 17:16	gss
Manganese, total	M200.7 ICP	1		U		mg/L	0.005	0.03	12/15/15 23:24	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 14:57	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 12:43	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 17:16	gss
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 23:24	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 17:16	gss
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 23:24	gss
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/18/15 17:01	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L28173-08**  
Date Sampled: 12/09/15 12:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1		U	mg/L	0.2	1	12/15/15 23:24	gss
Scandium, dissolved	M200.7 ICP	1		U	mg/L	0.1	0.5	12/17/15 17:16	gss
Scandium, total	M200.7 ICP	1		U	mg/L	0.1	0.5	12/15/15 23:24	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/18/15 15:27	mfm
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/21/15 20:25	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/18/15 15:27	mfm
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 13:06	mfm
Sodium, dissolved	M200.7 ICP	1		U	mg/L	0.2	1	12/17/15 17:16	gss
Sodium, total	M200.7 ICP	1		U	mg/L	0.2	1	12/17/15 14:04	gss
Strontium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 17:16	gss
Strontium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/15/15 23:24	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:09	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:25	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 17:01	gss
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 23:24	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 17:16	gss
Titanium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/15/15 23:24	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:09	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:25	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 17:16	gss
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/15/15 23:24	gss
Zinc, dissolved	M200.7 ICP	1	0.05		mg/L	0.01	0.05	12/18/15 17:01	gss
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 23:24	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L28173-08**  
Date Sampled: 12/09/15 12:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U		mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U		mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U		mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1		U		mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/30/15 11:32	calc
Sum of Anions				U		meq/L			12/30/15 11:32	calc
Sum of Cations				U		meq/L			12/30/15 11:32	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 12:13	sck
Chloride	SM4500Cl-E	1	0.5	B		mg/L	0.5	2	12/23/15 14:27	krh/ms s
Conductivity @25C	SM2510B	1	1.2	B		umhos/cm	1	10	12/12/15 23:57	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 19:22	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 19:01	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	12/15/15 17:03	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		1.73			mg/L			12/30/15 11:32	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U		mg/L	0.02	0.1	12/22/15 23:59	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/22/15 16:53	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/18/15 22:46	pjb
pH (lab)	SM4500H+ B									
pH		1	6.5	H		units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	23.0			C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/30/15 11:32	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/23/15 19:27	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.02	0.05	12/11/15 20:31	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/19/15 1:46	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	12/15/15 12:57	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/15 15:57	sck
Residue, Total (TS) @ 105C	SM2540B	1		U		mg/L	10	20	12/14/15 15:04	abd
Sulfate	D516-02/-07 - Turbidimetric	1	1.0	B		mg/L	1	5	12/17/15 17:37	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:21	enb
TDS (calculated)	Calculation		2.05			mg/L			12/30/15 11:32	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/30/15 11:32	calc

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28173-01	WG396121	Antimony, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [ $<$ MDL].
	WG395768	Bicarbonate as CaCO <sub>3</sub>	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO <sub>3</sub>	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396003	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG396307	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396082	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).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO <sub>3</sub>	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H <sub>2</sub> SO <sub>4</sub> preserved	Q6	Sample was received above recommended temperature.
	WG396426	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG396147	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).
	WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG396342	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).
	WG395747	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).
	WG396149	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
	WG395838	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG395868	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395736	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG396061	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG395808	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.



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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28173-02</b>	WG396279	Total Hot Plate Digestion	M200.2 ICP-MS	DJ	Sample dilution required due to insufficient sample.
	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396003	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396307	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396082	Cyanide, total	M335.4 - Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396426	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395768	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG396342	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).
WG395747	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).	
WG396149	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG395838	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
		SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG395868	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).	
WG395736	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG396061	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395808	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28173-03	WG395861	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396035	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396003	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396307	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396277	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).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396426	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG396342	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).
	WG395747	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).
	WG396150	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).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395838	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395868	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).
	WG395736	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG396061	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG395808	Sulfide as S	SM4500S2-D	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28173-04</b>	WG396279	Total Hot Plate Digestion	M200.2 ICP-MS	DJ	Sample dilution required due to insufficient sample.
	WG395861	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396035	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396004	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).
	WG396307	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396277	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).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396426	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG396342	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).
	WG395747	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).
	WG396150	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).	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395838	Residue, Filterable (TDS) @180C	SM2540C SM2540C	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395868	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395736	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG396061	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG395808	Sulfide as S	SM4500S2-D SM4500S2-D SM4500S2-D SM4500S2-D	M2 Q6 QD RA	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable. Sample was received above recommended temperature. Reported value is the background-corrected concentration, as described by the method. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28173-05	WG395861	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396035	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396004	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).
	WG396307	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396277	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).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396426	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG396342	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).
	WG395747	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).	
WG396150	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).	
WG395838	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395877		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).
WG395815		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG396061		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG395814		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).
WG395768		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.



Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28173-06</b>	WG395861	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396035	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396004	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).
	WG396307	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396277	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).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396426	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG396342	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).
	WG395747	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).	
WG396150	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).	
WG395989	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395877	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395815	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG396061	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG395814	Sulfide as S	SM4500S2-D SM4500S2-D SM4500S2-D	Q6 QD RA	Sample was received above recommended temperature. Reported value is the background-corrected concentration, as described by the method. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
<b>L28173-07</b>	WG396035	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396082	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG396253	Nitrogen, ammonia	M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395911	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).
	WG395747	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid M365.1 - Automated Ascorbic Acid	H3 RA	Sample was received and analyzed past holding time. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395868	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).
	WG395814	Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28173-08	WG395861	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396121	Antimony, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [ $<$ MDL].
		Arsenic, dissolved	M200.8 ICP-MS	VC	CCV recovery was above the acceptance limits. Target analyte was not detected in the sample [ $<$ MDL].
	WG396035	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396004	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).
	WG396277	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG395836	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).
	WG396253	Nitrogen, ammonia	M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG396147	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).
	WG396342	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).
	WG395747	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).
	WG396150	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).
	WG395838	Residue, Filterable (TDS) @180C	SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation ( $<$ 10x MDL).
	WG395877	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).
	WG395814	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: SW1-EACZ Sample ID: **L28173-01**  
Date Sampled: 12/09/15 11:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395974Analyst: mmn  
Extract Date: 12/14/15 12:32  
Analysis Date: 12/16/15 1:02

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85.5		1.02	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW1-EACZ Sample ID: **L28173-01**  
Date Sampled: 12/09/15 11:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 10:57

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.03	*	mg/L	2.1	10.3

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW2-EACZ Sample ID: **L28173-02**  
Date Sampled: 12/09/15 10:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395974Analyst: mmn  
Extract Date: 12/14/15 12:34  
Analysis Date: 12/16/15 1:30

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.06	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.5		1.06	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW2-EACZ Sample ID: **L28173-02**  
Date Sampled: 12/09/15 10:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 11:16

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

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW2B-EACZ Sample ID: **L28173-03**  
Date Sampled: 12/09/15 9:10  
Date Received: 12/11/15  
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup: WG395974**Analyst: mmn  
Extract Date: 12/14/15 12:36  
Analysis Date: 12/16/15 2:25

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.18	*	mg/L	0.1	0.6
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	87.8		1.18	*	%	70	130



**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW2B-EACZ Sample ID: **L28173-03**  
Date Sampled: 12/09/15 9:10  
Date Received: 12/11/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 11:36

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

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW4-EACZ Sample ID: **L28173-04**

Date Sampled: 12/09/15 8:40

Date Received: 12/11/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG395974

Analyst: mmn

Extract Date: 12/14/15 12:38

Analysis Date: 12/16/15 2:53

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	62.5		1.02	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW4-EACZ Sample ID: **L28173-04**  
Date Sampled: 12/09/15 8:40  
Date Received: 12/11/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 11:56

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.09	*	mg/L	2.2	10.9

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW5-EACZ Sample ID: **L28173-05**

Date Sampled: 12/09/15 7:59

Date Received: 12/11/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG395974

Analyst: mmn

Extract Date: 12/14/15 12:40

Analysis Date: 12/16/15 3:20

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	69.1		1.01	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW5-EACZ Sample ID: **L28173-05**

Date Sampled: 12/09/15 7:59

Date Received: 12/11/15

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

Extract Method:

**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 12:15

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: **L28173-06**

Date Sampled: 12/09/15 8:00

Date Received: 12/11/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG395974

Analyst: mmn

Extract Date: 12/14/15 12:42

Analysis Date: 12/16/15 3:48

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.03	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85.5		1.03	*	%	70	130

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW10-E

ACZ Sample ID: **L28173-08**  
Date Sampled: 12/09/15 12:00  
Date Received: 12/11/15  
Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395974**

Analyst: mmn  
Extract Date: 12/14/15 12:47  
Analysis Date: 12/16/15 4:44

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	0.99	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	89.3		0.99	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW10-EACZ Sample ID: **L28173-08**  
Date Sampled: 12/09/15 12:00  
Date Received: 12/11/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 12:35

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



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28173-01	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-02	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-03	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-04	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			OTP	S7	Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-05	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			OTP	S7	Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-06	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28173-07	WG395974	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28173-08	WG395974	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

**Tahoe Resources, Inc.**

ACZ Project ID: **L28173**

**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: L28173  
 Date Received: 12/11/2015 10:32  
 Received By: ddp  
 Date Printed: 12/11/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks? L28173-06 Container B1667726 (ORANGE): This container was received broken and the associated analysis were removed from the project.		X	
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
2328	8	<=6.0	13	N/A
2519	3.2	<=6.0	13	N/A
2905	6.2	<=6.0	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.

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L28173  
Date Received: 12/11/2015 10:32  
Received By: ddp  
Date Printed: 12/11/2015

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

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



# Laboratories, Inc.

28173

## CHAIN of CUSTODY

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

### Report to:

Name: Miguel Berganza	Address: Boulevard los piñeros, 18 calle 24-69 zona 10
Company: Tahoe Resources Inc.	Empresarial, Zona Pradera, Torre IV Oficina 1406
E-mail: M.Berganza@santafacel.com.gt	Telephone: (502) 5951 5248

### Copy of Report to:

Name:	E-mail:
Company:	Telephone:

### Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

### PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #:	PO#:	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	ANALYSES REQUESTED								
water quality	Escobal						10	SW								
				SW1-E	09/12/15 11:00	SW	10	SW								
				SW2-E	09/12/15 10:00	SW	10	SW								
				SW2B-E	09/12/15 09:10	SW	10	SW								

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
	15:00	Concepcion	9.12.15 15:00
	09-12-2015	WPL	12/15/15
			12/15/15

28173 Chain of Custody



Laboratories, Inc. *28173*

CHAIN of CUSTODY

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

Report to:

Name: <i>Miguel Berganza</i>	Address: <i>Bulevar Los Páceres 12 calle 24-69 zona 15</i>
Company: <i>Tahoe Resources Inc.</i>	<i>Empresarial Zona Pradera Torre IV oficina 1406</i>
E-mail: <i>MBerganza@sanrafael.com.gt</i>	Telephone: <i>(502) 5951-5248</i>

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: <i>Miguel Berganza</i>	Address:
Company: <i>Tahoe Resources Inc.</i>	
E-mail: <i>MBerganza@sanrafael.com.gt</i>	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	ANALYSES REQUESTED								
<i>4. SW4-E</i>	<i>09/12/15 08:40</i>	<i>SW</i>	<i>10</i>	<i>SW</i>	<i>/</i>							
<i>5. SWS-F</i>	<i>09/12/15 07:59</i>	<i>SW</i>	<i>10</i>	<i>SW</i>	<i>/</i>							
<i>6. SW7-F</i>	<i>09/12/15 08:00</i>	<i>SW</i>	<i>10</i>	<i>SW</i>	<i>/</i>							

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

REMARKS

*COC# 2*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>09-12-2015 15:00</i>	<i>[Signature]</i>	<i>9.12.15 15:00</i>
		<i>[Signature]</i>	<i>12-11-15 10:00</i>



# Laboratories, Inc.

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

28173

## CHAIN of CUSTODY

### Report to:

Name: Miguel Berganza	Address: Bulevar Los Proceres 1 <sup>a</sup> Calle 24-69 zona 16
Company: Tahoe Resources inc.	Empresarial, Zona Pradera, Torre IV Oficina 1406
E-mail: MBerganza@sonrafael.com.gt	Telephone: (502) 5951-5248

### Copy of Report to:

Name:	E-mail:
Company:	Telephone:

### Invoice to:

Name: Miguel Berganza	Address:
Company: Tahoe Resources inc.	
E-mail: MBerganza@sonrafael.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: LE Sampler's Site Information State \_\_\_\_\_ Zip code \_\_\_\_\_ Time Zone \_\_\_\_\_

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

### PROJECT INFORMATION:

ANALYSES REQUESTED (attach list or use quote number)

Quote #:	PO#:	Reporting state for compliance testing:	Check box if samples include NRC licensed material?	SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	GW+TPH	CN	TPH	SW							
Water Quality	Escobal			PSA-SR	08/12/15 10:55	GW	8	/										
				Fosa API	08/12/15 13:55	WW	2		/	/								
				SW10-E	09/12/15 12:00	SW	10				/							

2.  
\*  
8.

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

### REMARKS

# COC 3 Report all COC in the same document, excluding "Fosa API" (please present this 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
	09.12.2015 15:00		9.12.15 15:00
		MPL	12/11/15 10:32





Guatemala December 9th, 2015

To whom it may concern:

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

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

Sincerely yours,

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

January 04, 2016

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28184

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 14, 2015. This project has been assigned to ACZ's project number, L28184. 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 L28184. 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.

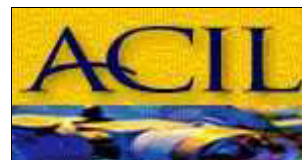
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after February 03, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

December 31, 2015

Project ID: Escobal

ACZ Project ID: L28184

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 3 miscellaneous samples from Tahoe Resources, Inc. on December 14, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28184. 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: SW2A-E

ACZ Sample ID: **L28184-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 18:14	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 14:52	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 13:04	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 7:11	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 15:27	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/21/15 13:48	scp
Total Hot Plate Digestion	M200.2 ICP								12/17/15 13:58	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2A-E

ACZ Sample ID: **L28184-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 20:43	gss
Aluminum, total	M200.7 ICP	1	0.07	B	*	mg/L	0.03	0.2	12/18/15 13:30	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0225			mg/L	0.0004	0.002	12/28/15 15:17	mfm
Antimony, total	M200.8 ICP-MS	1	0.0201			mg/L	0.0004	0.002	12/22/15 19:36	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0084			mg/L	0.0002	0.001	12/22/15 21:13	msh
Arsenic, total	M200.8 ICP-MS	1	0.0085			mg/L	0.0002	0.001	12/22/15 19:36	msh
Barium, dissolved	M200.7 ICP	1	0.072			mg/L	0.003	0.02	12/18/15 20:43	gss
Barium, total	M200.7 ICP	1	0.070			mg/L	0.003	0.02	12/18/15 13:30	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:25	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:30	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/18/15 20:43	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/18/15 19:03	aeb
Boron, dissolved	M200.7 ICP	1	0.09			mg/L	0.01	0.05	12/18/15 20:43	gss
Boron, total	M200.7 ICP	1	0.09			mg/L	0.01	0.05	12/18/15 13:30	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:13	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 19:36	msh
Calcium, dissolved	M200.7 ICP	1	309			mg/L	0.1	0.5	12/17/15 19:25	aeb
Calcium, total	M200.7 ICP	1	303			mg/L	0.1	0.5	12/18/15 13:30	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 20:43	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:30	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:25	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:30	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:25	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:30	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 19:25	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/18/15 13:30	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/18/15 20:43	gss
Iron, total	M200.7 ICP	1		U	*	mg/L	0.02	0.05	12/18/15 13:30	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/22/15 21:13	msh
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	12/22/15 19:36	msh
Lithium, dissolved	M200.7 ICP	1	0.063			mg/L	0.008	0.04	12/17/15 19:25	aeb
Lithium, total	M200.7 ICP	1	0.087			mg/L	0.008	0.04	12/18/15 13:30	aeb
Magnesium, dissolved	M200.7 ICP	1	15.1			mg/L	0.2	1	12/17/15 19:25	aeb
Magnesium, total	M200.7 ICP	1	15.2			mg/L	0.2	1	12/18/15 13:30	aeb
Manganese, dissolved	M200.7 ICP	1	0.026	B		mg/L	0.005	0.03	12/18/15 20:43	gss
Manganese, total	M200.7 ICP	1	0.031			mg/L	0.005	0.03	12/18/15 13:30	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:32	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 13:08	pta
Molybdenum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.02	0.1	12/17/15 19:25	aeb
Molybdenum, total	M200.7 ICP	1	0.05	B		mg/L	0.02	0.1	12/18/15 13:30	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 19:25	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/18/15 13:30	aeb
Potassium, dissolved	M200.7 ICP	1	14.1			mg/L	0.2	1	12/17/15 19:25	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW2A-E

ACZ Sample ID: **L28184-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	13.5		mg/L	0.2	1	12/18/15 13:30	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 19:25	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/18/15 13:30	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0022		mg/L	0.0001	0.0003	12/22/15 21:13	msh
Selenium, total	M200.8 ICP-MS	1	0.0020		mg/L	0.0001	0.0003	12/22/15 19:36	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 21:13	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 19:36	msh
Sodium, dissolved	M200.7 ICP	1	66.9		mg/L	0.2	1	12/17/15 19:25	aeb
Sodium, total	M200.7 ICP	1	66.9		mg/L	0.2	1	12/18/15 13:30	aeb
Strontium, dissolved	M200.7 ICP	1	3.220	*	mg/L	0.005	0.03	12/18/15 20:43	gss
Strontium, total	M200.7 ICP	1	3.190		mg/L	0.005	0.03	12/18/15 13:30	aeb
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	12/22/15 21:13	msh
Thallium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	12/22/15 19:36	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/17/15 19:25	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 13:30	aeb
Titanium, dissolved	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	12/17/15 19:25	aeb
Titanium, total	M200.7 ICP	1	0.015	B	mg/L	0.005	0.03	12/18/15 13:30	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/22/15 21:13	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/22/15 19:36	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 19:25	aeb
Vanadium, total	M200.7 ICP	1	0.011	B	mg/L	0.005	0.03	12/18/15 13:30	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 19:25	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/18/15 13:30	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: SW2A-E

ACZ Sample ID: **L28184-01**  
 Date Sampled: 12/07/15 13:05  
 Date Received: 12/14/15  
 Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.5		*	mg/L	2	20	12/16/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/15 0:00	abd
Total Alkalinity		1	39.5		*	mg/L	2	20	12/16/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.6			%			12/31/15 11:04	calc
Sum of Anions			19			meq/L			12/31/15 11:04	calc
Sum of Cations			20			meq/L			12/31/15 11:04	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 12:29	sck
Chloride	SM4500Cl-E	1	61		*	mg/L	0.5	2	12/23/15 14:29	krh/ms s
Conductivity @25C	SM2510B	1	1640		*	umhos/cm	1	10	12/16/15 22:47	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 23:09	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:19	pjb
Fluoride	SM4500F-C	1	1.11		*	mg/L	0.05	0.3	12/15/15 17:46	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		834			mg/L			12/31/15 11:04	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.52		*	mg/L	0.02	0.1	12/23/15 0:04	pjb
Nitrogen, ammonia	M350.1	1	0.05	B	*	mg/L	0.05	0.2	12/22/15 16:59	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.3	B	*	mg/L	0.1	0.5	12/18/15 22:47	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	12/16/15 0:00	abd
pH measured at		1	22.1		*	C	0.1	0.1	12/16/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/31/15 11:04	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/15/15 23:33	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.02	0.05	12/15/15 19:10	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.02	0.05	12/19/15 1:51	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1390		*	mg/L	10	20	12/14/15 14:03	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		UH	*	mg/L	5	20	12/15/15 14:08	enb
Residue, Total (TS) @ 105C	SM2540B	1	1440		*	mg/L	10	20	12/14/15 15:05	abd
Sulfate	D516-02/-07 - Turbidimetric	20	792		*	mg/L	20	100	12/30/15 15:22	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 14:13	enb
TDS (calculated)	Calculation		1290			mg/L			12/31/15 11:04	calc
TDS (ratio - measured/calculated)	Calculation		1.08						12/31/15 11:04	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L28184-02**  
Date Sampled: 12/07/15 11:35  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 18:22	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 15:02	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 13:12	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 7:16	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 15:37	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/21/15 14:00	scp
Total Hot Plate Digestion	M200.2 ICP								12/17/15 14:16	gss



### Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L28184-02**

Date Sampled: 12/07/15 11:35

Date Received: 12/14/15

Sample Matrix: Surface Water

#### Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 20:46	gss
Aluminum, total	M200.7 ICP	1	1.02		*	mg/L	0.03	0.2	12/18/15 13:33	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/22/15 21:15	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/22/15 19:38	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0095			mg/L	0.0002	0.001	12/22/15 21:15	msh
Arsenic, total	M200.8 ICP-MS	1	0.0098			mg/L	0.0002	0.001	12/22/15 19:38	msh
Barium, dissolved	M200.7 ICP	1	0.089			mg/L	0.003	0.02	12/18/15 20:46	gss
Barium, total	M200.7 ICP	1	0.096			mg/L	0.003	0.02	12/18/15 13:33	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:28	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:33	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/18/15 20:46	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/18/15 19:06	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 20:46	gss
Boron, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:33	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:15	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 19:38	msh
Calcium, dissolved	M200.7 ICP	1	27.1			mg/L	0.1	0.5	12/17/15 19:28	aeb
Calcium, total	M200.7 ICP	1	27.9			mg/L	0.1	0.5	12/18/15 13:33	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 20:46	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:33	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:28	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:33	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:28	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:33	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 19:28	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/18/15 13:33	aeb
Iron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	12/18/15 20:46	gss
Iron, total	M200.7 ICP	1	0.43		*	mg/L	0.02	0.05	12/18/15 13:33	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:15	msh
Lead, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	12/22/15 19:38	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 19:28	aeb
Lithium, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/18/15 13:33	aeb
Magnesium, dissolved	M200.7 ICP	1	2.5			mg/L	0.2	1	12/17/15 19:28	aeb
Magnesium, total	M200.7 ICP	1	2.5			mg/L	0.2	1	12/18/15 13:33	aeb
Manganese, dissolved	M200.7 ICP	1	0.044			mg/L	0.005	0.03	12/18/15 20:46	gss
Manganese, total	M200.7 ICP	1	0.052			mg/L	0.005	0.03	12/18/15 13:33	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:34	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 13:14	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 19:28	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/18/15 13:33	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 19:28	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/18/15 13:33	aeb
Potassium, dissolved	M200.7 ICP	1	3.8			mg/L	0.2	1	12/17/15 19:28	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L28184-02**  
Date Sampled: 12/07/15 11:35  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3.8		mg/L	0.2	1	12/18/15 13:33	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 19:28	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/18/15 13:33	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/22/15 21:15	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/22/15 19:38	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 21:15	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 19:38	msh
Sodium, dissolved	M200.7 ICP	1	10		mg/L	0.2	1	12/17/15 19:28	aeb
Sodium, total	M200.7 ICP	1	10.4		mg/L	0.2	1	12/18/15 13:33	aeb
Strontium, dissolved	M200.7 ICP	1	0.183		mg/L	0.005	0.03	12/18/15 20:46	gss
Strontium, total	M200.7 ICP	1	0.183		mg/L	0.005	0.03	12/18/15 13:33	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:15	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 19:38	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/17/15 19:28	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 13:33	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 19:28	aeb
Titanium, total	M200.7 ICP	1	0.025	B	mg/L	0.005	0.03	12/18/15 13:33	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/22/15 21:15	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/22/15 19:38	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 19:28	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/18/15 13:33	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 19:28	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/18/15 13:33	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L28184-02**  
Date Sampled: 12/07/15 11:35  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	84.0		*	mg/L	2	20	12/16/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/15 0:00	abd
Total Alkalinity		1	84.0		*	mg/L	2	20	12/16/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.3			%			12/31/15 11:05	calc
Sum of Anions			2.2			meq/L			12/31/15 11:05	calc
Sum of Cations			2.1			meq/L			12/31/15 11:05	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 12:45	sck
Chloride	SM4500Cl-E	1	3.8		*	mg/L	0.5	2	12/23/15 14:29	krh/ms s
Conductivity @25C	SM2510B	1	211		*	umhos/cm	1	10	12/16/15 22:56	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 23:10	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:20	pjb
Fluoride	SM4500F-C	1	0.18	B	*	mg/L	0.05	0.3	12/15/15 17:54	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		78			mg/L			12/31/15 11:05	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.50		*	mg/L	0.02	0.1	12/23/15 0:11	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/22/15 17:03	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/18/15 22:48	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	12/16/15 0:00	abd
pH measured at		1	22.2		*	C	0.1	0.1	12/16/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.06	0.2	12/31/15 11:05	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.02	0.05	12/15/15 23:34	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.02	0.05	12/15/15 19:12	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	12/19/15 1:52	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	184		*	mg/L	10	20	12/14/15 14:04	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		UH	*	mg/L	5	20	12/15/15 14:09	enb
Residue, Total (TS) @ 105C	SM2540B	1	188		*	mg/L	10	20	12/14/15 15:06	abd
Sulfate	D516-02/-07 - Turbidimetric	1	17.9		*	mg/L	1	5	12/30/15 15:04	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 14:16	enb
TDS (calculated)	Calculation		117			mg/L			12/31/15 11:05	calc
TDS (ratio - measured/calculated)	Calculation		1.57						12/31/15 11:05	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L28184-03**  
Date Sampled: 12/07/15 12:35  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 18:30	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 15:12	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 13:26	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 7:20	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 15:47	mss2
Total Hot Plate Digestion	M200.2 ICP-MS								12/21/15 14:36	scp
Total Hot Plate Digestion	M200.2 ICP								12/17/15 14:35	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L28184-03**  
Date Sampled: 12/07/15 12:35  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 20:50	gss
Aluminum, total	M200.7 ICP	1	0.61			mg/L	0.03	0.2	12/18/15 13:36	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0047			mg/L	0.0004	0.002	12/22/15 21:21	msh
Antimony, total	M200.8 ICP-MS	1	0.0047			mg/L	0.0004	0.002	12/22/15 19:44	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0054			mg/L	0.0002	0.001	12/22/15 21:21	msh
Arsenic, total	M200.8 ICP-MS	1	0.0066			mg/L	0.0002	0.001	12/22/15 19:44	msh
Barium, dissolved	M200.7 ICP	1	0.147			mg/L	0.003	0.02	12/18/15 20:50	gss
Barium, total	M200.7 ICP	1	0.158			mg/L	0.003	0.02	12/18/15 13:36	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:31	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:36	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/18/15 20:50	gss
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/18/15 19:09	aeb
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/18/15 20:50	gss
Boron, total	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/18/15 13:36	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:21	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 19:44	msh
Calcium, dissolved	M200.7 ICP	1	115			mg/L	0.1	0.5	12/17/15 19:31	aeb
Calcium, total	M200.7 ICP	1	122			mg/L	0.1	0.5	12/18/15 13:36	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 20:50	gss
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:36	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:31	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:36	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 19:31	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/18/15 13:36	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 19:31	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/18/15 13:36	aeb
Iron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.02	0.05	12/18/15 20:50	gss
Iron, total	M200.7 ICP	1	0.55			mg/L	0.02	0.05	12/18/15 13:36	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/22/15 21:21	msh
Lead, total	M200.8 ICP-MS	1	0.0029			mg/L	0.0001	0.0005	12/22/15 19:44	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 19:31	aeb
Lithium, total	M200.7 ICP	1	0.025	B		mg/L	0.008	0.04	12/18/15 13:36	aeb
Magnesium, dissolved	M200.7 ICP	1	9.1			mg/L	0.2	1	12/17/15 19:31	aeb
Magnesium, total	M200.7 ICP	1	9.7			mg/L	0.2	1	12/18/15 13:36	aeb
Manganese, dissolved	M200.7 ICP	1	0.131			mg/L	0.005	0.03	12/18/15 20:50	gss
Manganese, total	M200.7 ICP	1	0.175			mg/L	0.005	0.03	12/18/15 13:36	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:36	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/22/15 13:15	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 19:31	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/18/15 13:36	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 19:31	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/18/15 13:36	aeb
Potassium, dissolved	M200.7 ICP	1	8.8			mg/L	0.2	1	12/17/15 19:31	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L28184-03**  
Date Sampled: 12/07/15 12:35  
Date Received: 12/14/15  
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	9.2		mg/L	0.2	1	12/18/15 13:36	aeb
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 19:31	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/18/15 13:36	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0004		mg/L	0.0001	0.0003	12/22/15 21:21	msh
Selenium, total	M200.8 ICP-MS	1	0.0005		mg/L	0.0001	0.0003	12/22/15 19:44	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/22/15 21:21	msh
Silver, total	M200.8 ICP-MS	1	0.00010	B	mg/L	0.00005	0.0003	12/22/15 19:44	msh
Sodium, dissolved	M200.7 ICP	1	27.1		mg/L	0.2	1	12/17/15 19:31	aeb
Sodium, total	M200.7 ICP	1	28.6		mg/L	0.2	1	12/18/15 13:36	aeb
Strontium, dissolved	M200.7 ICP	1	0.998		mg/L	0.005	0.03	12/18/15 20:50	gss
Strontium, total	M200.7 ICP	1	1.040		mg/L	0.005	0.03	12/18/15 13:36	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 21:21	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/22/15 19:44	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/17/15 19:31	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/18/15 13:36	aeb
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 19:31	aeb
Titanium, total	M200.7 ICP	1	0.029	B	mg/L	0.005	0.03	12/18/15 13:36	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/22/15 21:21	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/22/15 19:44	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 19:31	aeb
Vanadium, total	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	12/18/15 13:36	aeb
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 19:31	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/18/15 13:36	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L28184-03**  
Date Sampled: 12/07/15 12:35  
Date Received: 12/14/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	86.0		*	mg/L	2	20	12/16/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/15 0:00	abd
Total Alkalinity		1	86.0		*	mg/L	2	20	12/16/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.6			%			12/31/15 11:05	calc
Sum of Anions			7.9			meq/L			12/31/15 11:05	calc
Sum of Cations			8			meq/L			12/31/15 11:05	calc
Chemical Oxygen Demand	M410.4	1	11	B	*	mg/L	10	20	12/17/15 13:01	sck
Chloride	SM4500Cl-E	1	27.5		*	mg/L	0.5	2	12/23/15 14:29	krh/ms s
Conductivity @25C	SM2510B	1	789		*	umhos/cm	1	10	12/16/15 23:05	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 23:11	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:23	pjb
Fluoride	SM4500F-C	1	0.41		*	mg/L	0.05	0.3	12/15/15 17:57	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		325			mg/L			12/31/15 11:05	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.83		*	mg/L	0.06	0.3	12/23/15 0:21	pjb
Nitrogen, ammonia	M350.1	1	0.21		*	mg/L	0.05	0.2	12/22/15 17:05	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.8		*	mg/L	0.1	0.5	12/18/15 22:51	pjb
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	12/16/15 0:00	abd
pH measured at		1	22.4		*	C	0.1	0.1	12/16/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.47			mg/L	0.06	0.2	12/31/15 11:05	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.02	0.05	12/15/15 23:35	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.17	H	*	mg/L	0.02	0.05	12/15/15 19:14	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.23		*	mg/L	0.02	0.05	12/19/15 1:53	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	610		*	mg/L	10	20	12/14/15 14:06	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1	20.0	H	*	mg/L	5	20	12/15/15 14:11	enb
Residue, Total (TS) @ 105C	SM2540B	1	648		*	mg/L	10	20	12/14/15 15:07	abd
Sulfate	D516-02/-07 - Turbidimetric	10	254		*	mg/L	10	50	12/30/15 15:22	krh
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 14:18	enb
TDS (calculated)	Calculation		496			mg/L			12/31/15 11:05	calc
TDS (ratio - measured/calculated)	Calculation		1.23						12/31/15 11:05	calc

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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



Tahoe Resources, Inc.

ACZ Project ID: **L28184**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28184-01	WG396111	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Iron, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396098	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.
	WG395966	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396004	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).
	WG396308	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395966	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396082	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).
	WG395999	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395966	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396253	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395966	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395911	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).
	WG395907	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).
	WG396150	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).
	WG395806	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28184**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG395868		Residue, Non-Filterable (TSS) @105C	SM2540D	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).
			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).
WG395815		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG396503		Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
WG395800		Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			SM4500S2-D	Q6	Sample was received above recommended temperature.
WG395966		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28184**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28184-02	WG396111	Aluminum, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Iron, total	M200.7 ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396098	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.
	WG395966	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396004	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).
	WG396308	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395966	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396082	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).
	WG395999	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395966	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396253	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395966	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395911	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).
	WG395907	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).
	WG396150	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).
	WG395806	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28184**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
WG395868		Residue, Non-Filterable (TSS) @105C	SM2540D	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).
			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).
WG395815		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG396503		Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
WG395800		Sulfide as S	SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			SM4500S2-D	Q6	Sample was received above recommended temperature.
WG395966		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28184**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28184-03	WG395966	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396004	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).
	WG396308	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395966	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396082	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).
	WG395999	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395966	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396285	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396253	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395966	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395911	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).
	WG395907	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).
	WG396150	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).
	WG395806	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395868	Residue, Non-Filterable (TSS) @105C	SM2540D	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).
			SM2540D	Q6	Sample was received above recommended temperature.
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L28184**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395815	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG396503	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.
	WG395800	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395966	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW2A-EACZ Sample ID: **L28184-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/14/15  
Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395974Analyst: mmn  
Extract Date: 12/14/15 16:55  
Analysis Date: 12/16/15 5:39

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.11	*	mg/L	0.1	0.6
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85.5		1.11	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW2A-EACZ Sample ID: **L28184-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/14/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 13:14

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



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW3-E

ACZ Sample ID: **L28184-02**  
Date Sampled: 12/07/15 11:35  
Date Received: 12/14/15  
Sample Matrix: *Surface Water*

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395974**

Analyst: mmn  
Extract Date: 12/14/15 16:56  
Analysis Date: 12/16/15 6:07

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86		1.01	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW3-EACZ Sample ID: **L28184-02**  
Date Sampled: 12/07/15 11:35  
Date Received: 12/14/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 13:33

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.09	*	mg/L	2.2	10.9

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW4A-E

ACZ Sample ID: **L28184-03**  
Date Sampled: 12/07/15 12:35  
Date Received: 12/14/15  
Sample Matrix: *Surface Water*

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395974**

Analyst: mmn  
Extract Date: 12/14/15 16:57  
Analysis Date: 12/16/15 6:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.2		1.01	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW4A-EACZ Sample ID: **L28184-03**  
Date Sampled: 12/07/15 12:35  
Date Received: 12/14/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396089

Analyst: id

Extract Date:

Analysis Date: 12/18/15 13:53

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

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28184**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28184-01</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
<b>L28184-02</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
<b>L28184-03</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.

**Tahoe Resources, Inc.**

ACZ Project ID: **L28184**

**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: L28184  
 Date Received: 12/14/2015 09:43  
 Received By: ddp  
 Date Printed: 12/14/2015

**Receipt Verification**

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

**Samples/Containers**

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

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
4502	8.7	<=6.0	14	N/A

Was ice present in the shipment container(s)?

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

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



Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L28184  
Date Received: 12/14/2015 09:43  
Received By: ddp  
Date Printed: 12/14/2015

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



# Laboratories, Inc. *18184*

## CHAIN of CUSTODY

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

### Report to:

Name: Miguel Berganza	Address: <i>Av. de los Proceres, 18 Calle 24-69 zona 10</i>
Company: Tahoe Resources Inc.	Empresarial, zona Pradera, Torre IVaf. Cima 1906
E-mail: <i>M.Berganza@sanrafael.com.gt</i>	Telephone: <i>(502) 5951 5248</i>

### Copy of Report to:

Name:	E-mail:
Company:	Telephone:

### Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

### PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <i>water quality</i>	# of Containers <i>SW</i>													
PO#: <i>Escobal</i>														
Reporting state for compliance testing:														
Check box if samples include NRC licensed material? <input type="checkbox"/>														
SAMPLE IDENTIFICATION	DATE:TIME	Matrix												
<i>SW2A-E</i>	<i>07/12/15 13:05</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>										
<i>SW3-E</i>	<i>07/12/15 11:35</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>										
<i>SW4A-E</i>	<i>07/12/15 12:35</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>										

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

### REMARKS

*col # 1*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>10:27 07-12-2015</i>	<i>[Signature]</i>	<i>10:27 7/12/15</i>
		<i>[Signature]</i>	<i>12-14-15 10:00</i>



MINERA   
**SAN RAFAEL**

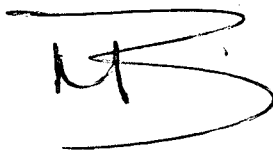
Guatemala December 7th, 2015

To whom it may concern:

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

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

Sincerely yours,



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

December 29, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28147

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 10, 2015. This project has been assigned to ACZ's project number, L28147. 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 L28147. 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.

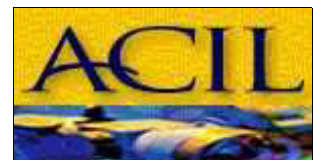
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 28, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

December 29, 2015

Project ID: Escobal

ACZ Project ID: L28147

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 5 miscellaneous samples from Tahoe Resources, Inc. on December 10, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28147. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses were performed within EPA recommended holding times except for parameters flagged with "H" flags (H3, HC), received either after the hold time expired or requiring re-analysis after the hold time had expired.

**Sample Analysis**

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

1. For 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: SW11-EACZ Sample ID: **L28147-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/10/15  
Sample Matrix: *Surface Water*

## Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 16:09	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 13:45	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/15 17:04	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 6:30	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 18:03	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 20:24	scp
Total Hot Plate Digestion	M200.2 ICP								12/14/15 12:48	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW11-E

ACZ Sample ID: **L28147-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/17/15 14:57	aeb
Aluminum, total	M200.7 ICP	1	0.07	B		mg/L	0.03	0.2	12/15/15 22:34	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0219			mg/L	0.0004	0.002	12/17/15 19:24	msh
Antimony, total	M200.8 ICP-MS	1	0.0197			mg/L	0.0004	0.002	12/21/15 19:55	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0085			mg/L	0.0002	0.001	12/17/15 19:24	msh
Arsenic, total	M200.8 ICP-MS	1	0.0087			mg/L	0.0002	0.001	12/21/15 19:55	msh
Barium, dissolved	M200.7 ICP	1	0.070			mg/L	0.003	0.02	12/17/15 14:57	aeb
Barium, total	M200.7 ICP	1	0.072			mg/L	0.003	0.02	12/15/15 22:34	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 14:57	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:34	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 14:57	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 22:34	gss
Boron, dissolved	M200.7 ICP	1	0.08			mg/L	0.01	0.05	12/17/15 14:57	aeb
Boron, total	M200.7 ICP	1	0.10			mg/L	0.01	0.05	12/15/15 22:34	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:24	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 19:55	msh
Calcium, dissolved	M200.7 ICP	1	297			mg/L	0.1	0.5	12/17/15 14:57	aeb
Calcium, total	M200.7 ICP	1	317			mg/L	0.1	0.5	12/15/15 22:34	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 14:57	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:34	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 14:57	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 17:32	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 14:57	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:34	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 14:57	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 22:34	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 14:57	aeb
Iron, total	M200.7 ICP	1		U		mg/L	0.02	0.05	12/15/15 22:34	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/17/15 19:24	msh
Lead, total	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	12/21/15 19:55	msh
Lithium, dissolved	M200.7 ICP	1	0.083			mg/L	0.008	0.04	12/17/15 14:57	aeb
Lithium, total	M200.7 ICP	1	0.080			mg/L	0.008	0.04	12/15/15 22:34	gss
Magnesium, dissolved	M200.7 ICP	1	14.9			mg/L	0.2	1	12/17/15 14:57	aeb
Magnesium, total	M200.7 ICP	1	15.8			mg/L	0.2	1	12/15/15 22:34	gss
Manganese, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	12/17/15 14:57	aeb
Manganese, total	M200.7 ICP	1	0.036			mg/L	0.005	0.03	12/15/15 22:34	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:13	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/15 11:11	ptta
Molybdenum, dissolved	M200.7 ICP	1	0.06	B		mg/L	0.02	0.1	12/17/15 14:57	aeb
Molybdenum, total	M200.7 ICP	1	0.08	B		mg/L	0.02	0.1	12/15/15 22:34	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 14:57	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:34	gss
Potassium, dissolved	M200.7 ICP	1	14			mg/L	0.2	1	12/18/15 17:48	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW11-E

ACZ Sample ID: **L28147-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/10/15  
Sample Matrix: *Surface Water*

Potassium, total	M200.7 ICP	1	14.4		mg/L	0.2	1	12/15/15 22:34	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 14:57	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 22:34	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0022		mg/L	0.0001	0.0003	12/17/15 19:24	msh
Selenium, total	M200.8 ICP-MS	1	0.0021		mg/L	0.0001	0.0003	12/21/15 19:55	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/17/15 19:24	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 12:24	mfm
Sodium, dissolved	M200.7 ICP	1	67		mg/L	0.2	1	12/17/15 14:57	aeb
Sodium, total	M200.7 ICP	1	68.9		mg/L	0.2	1	12/17/15 11:08	gss
Strontium, dissolved	M200.7 ICP	1	3.220		mg/L	0.005	0.03	12/17/15 14:57	aeb
Strontium, total	M200.7 ICP	1	3.260		mg/L	0.005	0.03	12/15/15 22:34	gss
Thallium, dissolved	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	12/17/15 19:24	msh
Thallium, total	M200.8 ICP-MS	1	0.0003	B	mg/L	0.0001	0.0005	12/21/15 19:55	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/17/15 14:57	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 22:34	gss
Titanium, dissolved	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/17/15 14:57	aeb
Titanium, total	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/15/15 22:34	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/17/15 19:24	msh
Uranium, total	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0005	12/21/15 19:55	msh
Vanadium, dissolved	M200.7 ICP	1	0.008	B	mg/L	0.005	0.03	12/17/15 14:57	aeb
Vanadium, total	M200.7 ICP	1	0.014	B	mg/L	0.005	0.03	12/15/15 22:34	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 14:57	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 22:34	gss



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW11-E

ACZ Sample ID: **L28147-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.6		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	39.6		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/29/15 14:52	calc
Sum of Anions			20			meq/L			12/29/15 14:52	calc
Sum of Cations			20			meq/L			12/29/15 14:52	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 12:43	sck
Chloride	SM4500Cl-E	1	59.7		*	mg/L	0.5	2	12/22/15 13:42	krh/ms s
Conductivity @25C	SM2510B	1	1650		*	umhos/cm	1	10	12/12/15 17:15	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 22:51	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:13	pjb
Fluoride	SM4500F-C	1	1.16		*	mg/L	0.05	0.3	12/15/15 14:55	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		803			mg/L			12/29/15 14:52	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.53		*	mg/L	0.02	0.1	12/18/15 22:56	pjb
Nitrogen, ammonia	M350.1	1	0.08	B	*	mg/L	0.05	0.2	12/22/15 13:38	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/18/15 22:03	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	22.1		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/29/15 14:52	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/15/15 23:20	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	12/10/15 21:27	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.02	0.05	12/16/15 0:39	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1390		*	mg/L	10	20	12/11/15 16:04	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/14/15 11:54	abd
Residue, Total (TS) @ 105C	SM2540B	1	1450		*	mg/L	10	20	12/11/15 17:46	sck
Sulfate	D516-02/-07 - Turbidimetric	50	840		*	mg/L	50	250	12/17/15 17:39	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 13:53	enb
TDS (calculated)	Calculation		1320			mg/L			12/29/15 14:52	calc
TDS (ratio - measured/calculated)	Calculation		1.05						12/29/15 14:52	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW6-E

ACZ Sample ID: **L28147-03**  
Date Sampled: 12/07/15 08:50  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 16:25	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 14:04	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/15 17:13	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 6:39	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 18:13	bsu
Total Hot Plate Digestion	M200.2 ICP								12/14/15 13:09	gss
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 20:36	scp

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW6-E

ACZ Sample ID: **L28147-03**  
Date Sampled: 12/07/15 08:50  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.03	0.2	12/17/15 15:03	aeb
Aluminum, total	M200.7 ICP	1	0.75			mg/L	0.03	0.2	12/15/15 22:37	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/15 19:28	msh
Antimony, total	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/21/15 19:58	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0016			mg/L	0.0002	0.001	12/17/15 19:28	msh
Arsenic, total	M200.8 ICP-MS	1	0.0020			mg/L	0.0002	0.001	12/21/15 19:58	msh
Barium, dissolved	M200.7 ICP	1	0.041			mg/L	0.003	0.02	12/17/15 15:03	aeb
Barium, total	M200.7 ICP	1	0.048			mg/L	0.003	0.02	12/15/15 22:37	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:03	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:37	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 15:03	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 22:37	gss
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/17/15 15:03	aeb
Boron, total	M200.7 ICP	1	0.05			mg/L	0.01	0.05	12/15/15 22:37	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:28	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 19:58	msh
Calcium, dissolved	M200.7 ICP	1	8.4			mg/L	0.1	0.5	12/17/15 15:03	aeb
Calcium, total	M200.7 ICP	1	8.6			mg/L	0.1	0.5	12/15/15 22:37	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:03	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:37	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:03	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 17:35	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:03	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:37	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 15:03	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 22:37	gss
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	12/17/15 15:03	aeb
Iron, total	M200.7 ICP	1	0.41			mg/L	0.02	0.05	12/15/15 22:37	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:28	msh
Lead, total	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	12/21/15 19:58	msh
Lithium, dissolved	M200.7 ICP	1	0.015	B		mg/L	0.008	0.04	12/17/15 15:03	aeb
Lithium, total	M200.7 ICP	1	0.020	B		mg/L	0.008	0.04	12/15/15 22:37	gss
Magnesium, dissolved	M200.7 ICP	1	1.8			mg/L	0.2	1	12/17/15 15:03	aeb
Magnesium, total	M200.7 ICP	1	2			mg/L	0.2	1	12/15/15 22:37	gss
Manganese, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	12/17/15 15:03	aeb
Manganese, total	M200.7 ICP	1	0.019	B		mg/L	0.005	0.03	12/15/15 22:37	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:17	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/15 11:13	ptta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 15:03	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 22:37	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 15:03	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:37	gss
Potassium, dissolved	M200.7 ICP	1	2.8			mg/L	0.2	1	12/18/15 18:01	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW6-E

ACZ Sample ID: **L28147-03**  
Date Sampled: 12/07/15 08:50  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	3		mg/L	0.2	1	12/15/15 22:37	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 15:03	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 22:37	gss
Selenium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/17/15 19:28	msh
Selenium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0003	12/21/15 19:58	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/17/15 19:28	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 12:27	mfm
Sodium, dissolved	M200.7 ICP	1	8		mg/L	0.2	1	12/17/15 15:03	aeb
Sodium, total	M200.7 ICP	1	8.1		mg/L	0.2	1	12/17/15 11:12	gss
Strontium, dissolved	M200.7 ICP	1	0.063		mg/L	0.005	0.03	12/17/15 15:03	aeb
Strontium, total	M200.7 ICP	1	0.062		mg/L	0.005	0.03	12/15/15 22:37	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/17/15 19:28	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 19:58	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/17/15 15:03	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 22:37	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 15:03	aeb
Titanium, total	M200.7 ICP	1	0.020	B	mg/L	0.005	0.03	12/15/15 22:37	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/17/15 19:28	msh
Uranium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 19:58	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 15:03	aeb
Vanadium, total	M200.7 ICP	1	0.005	B	mg/L	0.005	0.03	12/15/15 22:37	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 15:03	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 22:37	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW6-E

ACZ Sample ID: **L28147-03**  
Date Sampled: 12/07/15 08:50  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	29.9		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	29.9		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/29/15 14:53	calc
Sum of Anions			1.0			meq/L			12/29/15 14:53	calc
Sum of Cations			1			meq/L			12/29/15 14:53	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 12:52	sck
Chloride	SM4500Cl-E	1	6.8		*	mg/L	0.5	2	12/22/15 13:42	krh/ms s
Conductivity @25C	SM2510B	1	109		*	umhos/cm	1	10	12/12/15 17:32	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 22:53	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:15	pjb
Fluoride	SM4500F-C	1	0.09	B	*	mg/L	0.05	0.3	12/15/15 15:11	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		28.4			mg/L			12/29/15 14:53	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.31		*	mg/L	0.02	0.1	12/18/15 22:59	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/22/15 13:41	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/18/15 22:04	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	21.9		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/29/15 14:53	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/15/15 23:22	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.03	BH	*	mg/L	0.01	0.05	12/10/15 21:32	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.02	0.05	12/16/15 0:41	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	100		*	mg/L	10	20	12/11/15 16:09	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		UH	*	mg/L	5	20	12/15/15 13:55	enb
Residue, Total (TS) @ 105C	SM2540B	1	120		*	mg/L	10	20	12/11/15 17:49	sck
Sulfate	D516-02/-07 - Turbidimetric	1	10.3		*	mg/L	1	5	12/17/15 17:36	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 13:59	enb
TDS (calculated)	Calculation		56.6			mg/L			12/29/15 14:53	calc
TDS (ratio - measured/calculated)	Calculation		1.77						12/29/15 14:53	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW8-E

ACZ Sample ID: **L28147-04**  
Date Sampled: 12/07/15 10:43  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 16:33	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 14:14	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/15 17:21	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 6:48	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 18:19	bsu
Total Hot Plate Digestion	M200.2 ICP								12/14/15 13:30	gss
Total Hot Plate Digestion	M200.2 ICP-MS								12/22/15 20:48	scp

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW8-E

ACZ Sample ID: **L28147-04**

Date Sampled: 12/07/15 10:43

Date Received: 12/10/15

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/17/15 15:06	aeb
Aluminum, total	M200.7 ICP	1	0.17	B		mg/L	0.03	0.2	12/15/15 22:46	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0018	B		mg/L	0.0004	0.002	12/17/15 19:35	msh
Antimony, total	M200.8 ICP-MS	1	0.0015	B		mg/L	0.0004	0.002	12/21/15 20:00	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0039			mg/L	0.0002	0.001	12/17/15 19:35	msh
Arsenic, total	M200.8 ICP-MS	1	0.0043			mg/L	0.0002	0.001	12/21/15 20:00	msh
Barium, dissolved	M200.7 ICP	1	0.119			mg/L	0.003	0.02	12/17/15 15:06	aeb
Barium, total	M200.7 ICP	1	0.132			mg/L	0.003	0.02	12/15/15 22:46	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:06	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:46	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 15:06	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 22:46	gss
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/17/15 15:06	aeb
Boron, total	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/15/15 22:46	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:35	msh
Cadmium, total	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/21/15 20:00	msh
Calcium, dissolved	M200.7 ICP	1	56.6			mg/L	0.1	0.5	12/17/15 15:06	aeb
Calcium, total	M200.7 ICP	1	58.9			mg/L	0.1	0.5	12/15/15 22:46	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:06	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:46	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:06	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 17:38	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:06	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:46	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 15:06	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 22:46	gss
Iron, dissolved	M200.7 ICP	1	0.17			mg/L	0.02	0.05	12/17/15 15:06	aeb
Iron, total	M200.7 ICP	1	0.52			mg/L	0.02	0.05	12/15/15 22:46	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/17/15 19:35	msh
Lead, total	M200.8 ICP-MS	1	0.0012			mg/L	0.0001	0.0005	12/21/15 20:00	msh
Lithium, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.008	0.04	12/17/15 15:06	aeb
Lithium, total	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/15/15 22:46	gss
Magnesium, dissolved	M200.7 ICP	1	6.1			mg/L	0.2	1	12/17/15 15:06	aeb
Magnesium, total	M200.7 ICP	1	6.3			mg/L	0.2	1	12/15/15 22:46	gss
Manganese, dissolved	M200.7 ICP	1	0.133			mg/L	0.005	0.03	12/17/15 15:06	aeb
Manganese, total	M200.7 ICP	1	0.187			mg/L	0.005	0.03	12/15/15 22:46	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:19	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/15 11:19	ptta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 15:06	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 22:46	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 15:06	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:46	gss
Potassium, dissolved	M200.7 ICP	1	8.3			mg/L	0.2	1	12/18/15 18:04	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW8-E

ACZ Sample ID: **L28147-04**  
Date Sampled: 12/07/15 10:43  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	8.8		mg/L	0.2	1	12/15/15 22:46	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 15:06	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 22:46	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0002	B	mg/L	0.0001	0.0003	12/17/15 19:35	msh
Selenium, total	M200.8 ICP-MS	1	0.0003		mg/L	0.0001	0.0003	12/21/15 20:00	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/17/15 19:35	msh
Silver, total	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/28/15 12:30	mfm
Sodium, dissolved	M200.7 ICP	1	24.5		mg/L	0.2	1	12/17/15 15:06	aeb
Sodium, total	M200.7 ICP	1	25.2		mg/L	0.2	1	12/17/15 11:15	gss
Strontium, dissolved	M200.7 ICP	1	0.563		mg/L	0.005	0.03	12/17/15 15:06	aeb
Strontium, total	M200.7 ICP	1	0.573		mg/L	0.005	0.03	12/15/15 22:46	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/17/15 19:35	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:00	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/17/15 15:06	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 22:46	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 15:06	aeb
Titanium, total	M200.7 ICP	1	0.012	B	mg/L	0.005	0.03	12/15/15 22:46	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/17/15 19:35	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/21/15 20:00	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 15:06	aeb
Vanadium, total	M200.7 ICP	1	0.006	B	mg/L	0.005	0.03	12/15/15 22:46	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 15:06	aeb
Zinc, total	M200.7 ICP	1	0.03	B	mg/L	0.01	0.05	12/15/15 22:46	gss



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW8-E

ACZ Sample ID: **L28147-04**  
Date Sampled: 12/07/15 10:43  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	84.6		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	84.6		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.1			%			12/29/15 14:53	calc
Sum of Anions			4.7			meq/L			12/29/15 14:53	calc
Sum of Cations			4.8			meq/L			12/29/15 14:53	calc
Chemical Oxygen Demand	M410.4	1	27		*	mg/L	10	20	12/17/15 13:01	sck
Chloride	SM4500Cl-E	1	17.2		*	mg/L	0.5	2	12/22/15 13:42	krh/ms s
Conductivity @25C	SM2510B	1	480		*	umhos/cm	1	10	12/12/15 17:40	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 22:56	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:16	pjb
Fluoride	SM4500F-C	1	0.25	B	*	mg/L	0.05	0.3	12/15/15 15:19	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		166			mg/L			12/29/15 14:53	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.90		*	mg/L	0.02	0.1	12/18/15 23:00	pjb
Nitrogen, ammonia	M350.1	1	1.27		*	mg/L	0.05	0.2	12/22/15 13:42	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	2.1		*	mg/L	0.1	0.5	12/18/15 22:05	pjb
pH (lab)	SM4500H+ B									
pH		1	7.8	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	21.9		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.78			mg/L	0.06	0.2	12/29/15 14:53	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.25		*	mg/L	0.02	0.05	12/15/15 23:25	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.23	H	*	mg/L	0.01	0.05	12/10/15 21:33	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.35		*	mg/L	0.02	0.05	12/16/15 0:42	pjb
Residue, Filterable (TDS) @180C	SM2540C	2	328		*	mg/L	20	40	12/11/15 16:11	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	BH	*	mg/L	5	20	12/15/15 13:56	enb
Residue, Total (TS) @ 105C	SM2540B	2	364		*	mg/L	20	40	12/11/15 17:50	sck
Sulfate	D516-02/-07 - Turbidimetric	5	118		*	mg/L	5	25	12/17/15 17:42	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 14:01	enb
TDS (calculated)	Calculation		285			mg/L			12/29/15 14:53	calc
TDS (ratio - measured/calculated)	Calculation		1.15						12/29/15 14:53	calc

### Tahoe Resources, Inc.

Project ID: Escobal  
 Sample ID: SW9-E

ACZ Sample ID: **L28147-05**  
 Date Sampled: 12/07/15 09:40  
 Date Received: 12/10/15  
 Sample Matrix: Surface Water

#### Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 16:40	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 14:33	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/16/15 17:30	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 6:57	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 18:24	bsu
Total Hot Plate Digestion	M200.2 ICP-MS				*				12/22/15 21:00	scp
Total Hot Plate Digestion	M200.2 ICP								12/14/15 13:51	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW9-E

ACZ Sample ID: **L28147-05**  
Date Sampled: 12/07/15 09:40  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/17/15 15:09	aeb
Aluminum, total	M200.7 ICP	1	0.39			mg/L	0.03	0.2	12/15/15 22:49	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0008	B		mg/L	0.0004	0.002	12/17/15 19:37	msh
Antimony, total	M200.8 ICP-MS	1	0.0007	B		mg/L	0.0004	0.002	12/21/15 20:02	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0030			mg/L	0.0002	0.001	12/17/15 19:37	msh
Arsenic, total	M200.8 ICP-MS	1	0.0034			mg/L	0.0002	0.001	12/21/15 20:02	msh
Barium, dissolved	M200.7 ICP	1	0.072			mg/L	0.003	0.02	12/17/15 15:09	aeb
Barium, total	M200.7 ICP	1	0.075			mg/L	0.003	0.02	12/15/15 22:49	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:09	aeb
Beryllium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:49	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 15:09	aeb
Bismuth, total	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/15/15 22:49	gss
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	12/17/15 15:09	aeb
Boron, total	M200.7 ICP	1	0.07			mg/L	0.01	0.05	12/15/15 22:49	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:37	msh
Cadmium, total	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/21/15 20:02	msh
Calcium, dissolved	M200.7 ICP	1	32.2			mg/L	0.1	0.5	12/17/15 15:09	aeb
Calcium, total	M200.7 ICP	1	30.4			mg/L	0.1	0.5	12/15/15 22:49	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:09	aeb
Chromium, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:49	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:09	aeb
Cobalt, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/16/15 17:48	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:09	aeb
Copper, total	M200.7 ICP	1		U		mg/L	0.01	0.05	12/15/15 22:49	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 15:09	aeb
Gallium, total	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/15/15 22:49	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 15:09	aeb
Iron, total	M200.7 ICP	1	0.34			mg/L	0.02	0.05	12/15/15 22:49	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:37	msh
Lead, total	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	12/21/15 20:02	msh
Lithium, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.008	0.04	12/17/15 15:09	aeb
Lithium, total	M200.7 ICP	1	0.025	B		mg/L	0.008	0.04	12/15/15 22:49	gss
Magnesium, dissolved	M200.7 ICP	1	4.9			mg/L	0.2	1	12/17/15 15:09	aeb
Magnesium, total	M200.7 ICP	1	4.7			mg/L	0.2	1	12/15/15 22:49	gss
Manganese, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	12/17/15 15:09	aeb
Manganese, total	M200.7 ICP	1	0.035			mg/L	0.005	0.03	12/15/15 22:49	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:20	pta
Mercury, total	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/18/15 11:25	ptta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 15:09	aeb
Molybdenum, total	M200.7 ICP	1		U		mg/L	0.02	0.1	12/15/15 22:49	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 15:09	aeb
Nickel, total	M200.7 ICP	1		U		mg/L	0.008	0.04	12/15/15 22:49	gss
Potassium, dissolved	M200.7 ICP	1	5.4			mg/L	0.2	1	12/18/15 18:07	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW9-E

ACZ Sample ID: **L28147-05**  
Date Sampled: 12/07/15 09:40  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Potassium, total	M200.7 ICP	1	5.4		mg/L	0.2	1	12/15/15 22:49	gss
Scandium, dissolved	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/17/15 15:09	aeb
Scandium, total	M200.7 ICP	1		U *	mg/L	0.1	0.5	12/15/15 22:49	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	12/17/15 19:37	msh
Selenium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0003	12/21/15 20:02	msh
Silver, dissolved	M200.8 ICP-MS	1		U	mg/L	0.00005	0.0003	12/17/15 19:37	msh
Silver, total	M200.8 ICP-MS	2		U	mg/L	0.0001	0.0005	12/28/15 12:33	mfm
Sodium, dissolved	M200.7 ICP	1	16.9		mg/L	0.2	1	12/17/15 15:09	aeb
Sodium, total	M200.7 ICP	1	16.5		mg/L	0.2	1	12/17/15 11:24	gss
Strontium, dissolved	M200.7 ICP	1	0.279		mg/L	0.005	0.03	12/17/15 15:09	aeb
Strontium, total	M200.7 ICP	1	0.255		mg/L	0.005	0.03	12/15/15 22:49	gss
Thallium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/17/15 19:37	msh
Thallium, total	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/21/15 20:02	msh
Tin, dissolved	M200.7 ICP	1		U	mg/L	0.04	0.2	12/17/15 15:09	aeb
Tin, total	M200.7 ICP	1		U	mg/L	0.04	0.2	12/15/15 22:49	gss
Titanium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 15:09	aeb
Titanium, total	M200.7 ICP	1	0.016	B	mg/L	0.005	0.03	12/15/15 22:49	gss
Uranium, dissolved	M200.8 ICP-MS	1		U	mg/L	0.0001	0.0005	12/17/15 19:37	msh
Uranium, total	M200.8 ICP-MS	1	0.0001	B	mg/L	0.0001	0.0005	12/21/15 20:02	msh
Vanadium, dissolved	M200.7 ICP	1		U	mg/L	0.005	0.03	12/17/15 15:09	aeb
Vanadium, total	M200.7 ICP	1		U	mg/L	0.005	0.03	12/15/15 22:49	gss
Zinc, dissolved	M200.7 ICP	1		U	mg/L	0.01	0.05	12/17/15 15:09	aeb
Zinc, total	M200.7 ICP	1		U	mg/L	0.01	0.05	12/15/15 22:49	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW9-E

ACZ Sample ID: **L28147-05**  
Date Sampled: 12/07/15 09:40  
Date Received: 12/10/15  
Sample Matrix: Surface Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	57.8		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	57.8		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.8			%			12/29/15 14:54	calc
Sum of Anions			2.8			meq/L			12/29/15 14:54	calc
Sum of Cations			2.9			meq/L			12/29/15 14:54	calc
Chemical Oxygen Demand	M410.4	1		U	*	mg/L	10	20	12/17/15 13:10	sck
Chloride	SM4500Cl-E	1	14.3		*	mg/L	0.5	2	12/22/15 13:43	krh/ms s
Conductivity @25C	SM2510B	1	287		*	umhos/cm	1	10	12/12/15 17:49	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 22:57	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:17	pjb
Fluoride	SM4500F-C	1	0.20	B	*	mg/L	0.05	0.3	12/15/15 15:35	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		101			mg/L			12/29/15 14:54	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.03	B	*	mg/L	0.02	0.1	12/18/15 23:01	pjb
Nitrogen, ammonia	M350.1	1	0.11	B	*	mg/L	0.05	0.2	12/22/15 13:44	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/18/15 22:07	pjb
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	21.9		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.25			mg/L	0.06	0.2	12/29/15 14:54	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.08		*	mg/L	0.02	0.05	12/15/15 23:27	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	12/10/15 21:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.09		*	mg/L	0.02	0.05	12/16/15 0:44	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	230		*	mg/L	10	20	12/11/15 16:14	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	BH	*	mg/L	5	20	12/15/15 13:58	enb
Residue, Total (TS) @ 105C	SM2540B	1	242		*	mg/L	10	20	12/11/15 17:52	sck
Sulfate	D516-02/-07 - Turbidimetric	5	57.0		*	mg/L	5	25	12/17/15 17:43	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 14:04	enb
TDS (calculated)	Calculation		167			mg/L			12/29/15 14:54	calc
TDS (ratio - measured/calculated)	Calculation		1.38						12/29/15 14:54	calc

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28147-01	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG396003		Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG396249	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.	
WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.	
WG396082	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).	
WG395999	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.	
		SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG395836	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).	
WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
WG396146	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.	
WG396248	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.	
		M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG396144	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).	
WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG395911	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).	
WG395692	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).	
WG395912	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).	
WG395738	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395801	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).	
WG395736	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG396061	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	

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					or LFB) was acceptable.
	WG395800	Sulfide as S	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.



Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28147-03	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG396003		Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG396249	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.	
WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.	
WG396082		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).
WG395999		Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395836		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).
WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
WG396146	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.	
WG396248		Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG396144		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).
WG395768	pH	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
WG395911		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).
WG395692		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).
WG395912		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).
WG395738	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395868		Residue, Non-Filterable (TSS) @105C	SM2540D	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			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).
WG395736	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG396061	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.
	WG395800	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).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28147-04	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
WG396003		Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG396249	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.	
WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.	
WG396082	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).	
WG395999	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.	
		SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG395836	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).	
WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.	
WG396146	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.	
WG396248	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.	
		M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG396144	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).	
WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
		SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG395911	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).	
WG395692	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).	
WG395912	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).	
WG395738	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395868	Residue, Non-Filterable (TSS) @105C	SM2540D	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.	
		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	

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG395736		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG396061		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG395800		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395768		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28147-05</b>	WG396279	Total Hot Plate Digestion	M200.2 ICP-MS	DJ	Sample dilution required due to insufficient sample.
	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396003	Chemical Oxygen Demand	M410.4	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M410.4	Q6	Sample was received above recommended temperature.
			M410.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396249	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396082	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).
	WG395999	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396146	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396248	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396144	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).	
WG395768	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.	
	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG395911	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).	
WG395692	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).	
WG395912	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).	
WG395738	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395868	Residue, Non-Filterable (TSS) @105C	SM2540D	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.	
		SM2540D	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395736		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG396061		Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
WG395800		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).
WG395768		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SW11-E

ACZ Sample ID: **L28147-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/10/15  
Sample Matrix: Surface Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395974**

Analyst: mmn  
Extract Date: 12/14/15 12:21  
Analysis Date: 12/15/15 22:43

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86		1.02	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW11-EACZ Sample ID: **L28147-01**  
Date Sampled: 12/07/15 13:05  
Date Received: 12/10/15  
Sample Matrix: *Surface Water***Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396038

Analyst: id

Extract Date:

Analysis Date: 12/18/15 10:50

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		2.3	B	1.05	*	mg/L	2.1	10.5



**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW6-EACZ Sample ID: **L28147-03**

Date Sampled: 12/07/15 8:50

Date Received: 12/10/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG395974

Analyst: mmn

Extract Date: 12/14/15 12:25

Analysis Date: 12/15/15 23:39

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.05	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.8		1.05	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW6-EACZ Sample ID: **L28147-03**

Date Sampled: 12/07/15 8:50

Date Received: 12/10/15

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

Extract Method:

**Workgroup:** WG396038

Analyst: id

Extract Date:

Analysis Date: 12/18/15 11:09

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease		2.9	B	1.11	*	mg/L	2.2	11.1

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW8-EACZ Sample ID: **L28147-04**  
Date Sampled: 12/07/15 10:43  
Date Received: 12/10/15  
Sample Matrix: Surface Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395974Analyst: mmn  
Extract Date: 12/14/15 12:27  
Analysis Date: 12/16/15 0:07

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.03	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	80.8		1.03	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW8-EACZ Sample ID: **L28147-04**  
Date Sampled: 12/07/15 10:43  
Date Received: 12/10/15  
Sample Matrix: Surface Water**Oil & Grease, Total Recoverable**Analysis Method: **1664A - Gravimetric**  
Extract Method:**Workgroup:** WG396038

Analyst: id

Extract Date:

Analysis Date: 12/18/15 11:27

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.12	*	mg/L	2.2	11.2

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW9-EACZ Sample ID: **L28147-05**

Date Sampled: 12/07/15 9:40

Date Received: 12/10/15

Sample Matrix: *Surface Water***Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG395974

Analyst: mmn

Extract Date: 12/14/15 12:30

Analysis Date: 12/16/15 0:34

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.09	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	76.9		1.09	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: SW9-EACZ Sample ID: **L28147-05**

Date Sampled: 12/07/15 9:40

Date Received: 12/10/15

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

Extract Method:

**Workgroup:** WG396038

Analyst: id

Extract Date:

Analysis Date: 12/18/15 11:46

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Oil and Grease			U	1.06	*	mg/L	2.1	10.6

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28147-01</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-02</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-03</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-04</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-05</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.



**Tahoe Resources, Inc.**

ACZ Project ID: **L28147**

**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: L28147  
 Date Received: 12/10/2015 09:47  
 Received By: ddp  
 Date Printed: 12/10/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	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? L28147-02 : A Orange container not received and the associated analysis could not be run.		X	
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
2540	10.5	<=6.0	13	N/A
4413	13.1	<=6.0	14	N/A

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

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L28147  
Date Received: 12/10/2015 09:47  
Received By: ddp  
Date Printed: 12/10/2015

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

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. *L28147*

CHAIN of CUSTODY

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

Report to:

Name: <i>Miguel Berganza</i>	Address: <i>Ruinas los procesos 18 calle 24-69 zona 10</i>
Company: <i>Tahoe Resources Inc.</i>	<i>Empresarial, zona pradera, fase oficina 1406</i>
E-mail: <i>m.berganza@santafael.com.gt</i>	Telephone: <i>(507) 5951 5248</i>

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: <i>Miguel Berganza</i>	Address:
Company: <i>Tahoe Resources Inc.</i>	
E-mail: <i>m.berganza@santafael.com.gt</i>	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <i>water quality</i>																			
PO#: <i>Escobal</i>																			
Reporting state for compliance testing:																			
Check box if samples include NRC licensed material?																			
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SW	GW+TRH	WW	DW	SL	SO	OL	Other								
<i>1. SW11-E</i>	<i>07/12/15 13:05</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>															
<i>2. GW-1A</i>	<i>07/12/15 05:27</i>	<i>GW</i>	<i>8</i>		<input checked="" type="checkbox"/>														
<i>Pileta 1</i>	<i>03/12/15 09:25</i>	<i>SW</i>	<i>1</i>							<input checked="" type="checkbox"/>									
<i>Pileta 2</i>	<i>03/12/15 09:10</i>	<i>SW</i>	<i>1</i>							<input checked="" type="checkbox"/>									
<i>Pileta de proceso</i>	<i>03/12/15 10:15</i>	<i>WW</i>	<i>1</i>							<input checked="" type="checkbox"/>									
<i>Agua de proceso</i>	<i>03/12/15 11:40</i>	<i>WW</i>	<i>1</i>							<input checked="" type="checkbox"/>									
<i>WW9</i>	<i>04/12/15 09:36</i>	<i>WW</i>	<i>1</i>							<input checked="" type="checkbox"/>									
<i>Pileta 3</i>	<i>04/12/15 08:00</i>	<i>SW</i>	<i>1</i>							<input checked="" type="checkbox"/>									
<i>Pozo PP</i>	<i>06/12/15 08:30</i>	<i>GW</i>	<i>1</i>							<input checked="" type="checkbox"/>									
<i>WW9</i>	<i>06/12/15 09:25</i>	<i>WW</i>	<i>1</i>							<input checked="" type="checkbox"/>									

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

REMARKS

*COC #3 present samples SW11-E and GW-1A with COC #1 and 2*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>16:28 07-17-2015</i>	<i>[Signature]</i>	<i>16:28 7/12/15</i>
		<i>[Signature]</i>	<i>11/04/15 09:40</i>

L28147 Chain of Custody



# Laboratories, Inc.

28147

## CHAIN of CUSTODY

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

### Report to:

Name: Miguel Berganza	Address: Bulevar los Proceres, 18 calle 24-69 zona 10
Company: Tahoe Resources Inc.	Empresarial Zona Pradera, Torre IV oficina 1406
E-mail: mBerganza@sanrafael.com.gt	Telephone: (502) 5951 5248

### Copy of Report to:

Name:	E-mail:
Company:	Telephone:

### Invoice to:

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

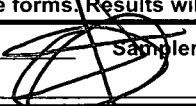
If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

### PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

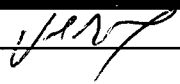

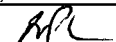
Quote #: water quality	# of Containers	3																				
PO#: Escobal																						
Reporting state for compliance testing:																						
Check box if samples include NRC licensed material?																						
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																				
3. SW6-E	07/12/15 08:50	SW	10	/																		
4. SW8-E	07/12/15 10:43	SW	10	/																		
5. SW9-E	07/12/15 09:40	SW	10	/																		

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

### REMARKS

COC # 2

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
	07-12-2015 16:30		16:30 7/12/15
			12/16/15 08:47



Guatemala December 7th, 2015

To whom it may concern:

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

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

Sincerely yours,

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

REG 016 Resultados de Análisis

Muestra: 7 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de muestreo: 091215  
Fecha de ingreso de muestras: 091215  
Fecha de análisis: 091215-221215  
Fecha de informe: 221215

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 <sub>5</sub> mg/l	* Demanda Química de Oxígeno DQO mg/l	Cromo Hexavalente Cr(VI) mg/l	** Coliformes Fecales (NMP/100ml)
3323	SW1-E	31	< 1	< 10	< 25	N.D.	3.1 x 10 <sup>2</sup>
3324	SW2-E	< 1	< 1	< 10	< 25	N.D.	23
3325	SW2B-E	< 1	< 1	< 10	< 25	N.D.	1.6 x 10 <sup>4</sup>
3326	SW4-E	165	< 1	< 10	< 25	N.D.	1.6 x 10 <sup>4</sup>
3327	SW5-E	21	< 1	< 10	< 25	N.D.	1.6 x 10 <sup>3</sup>
3328	SW7-E	96	< 1	< 10	< 25	N.D.	9.4 x 10 <sup>2</sup>
3329	SW10-E	< 1	< 1	< 10	< 25	N.D.	< 2

Notas:

Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas Proyectos Ambientales.

Transporte y preservación de la muestra: Refrigeración.

Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.

Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.

Fotométricos Merck. NMP: Número más Probable.

N.D. No detectable. Debajo del límite de detección.

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

Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.

Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.

\* Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04

\*\* Análisis referido.



Ing. Oscar Páez  
Gerente Técnico



VóBo Ing. Silvia Argueta  
Directora

REG 016 Resultados de Análisis

Muestra: 8 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de muestreo: 071215  
Fecha de ingreso de muestras: 071215  
Fecha de análisis: 071215-171215  
Fecha de informe: 171215

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 <sub>5</sub> mg/l	* Demanda Química de Oxígeno DQO mg/l	Cromo Hexavalente Cr(VI) mg/l	** Coliformes Fecales (NMP/100ml)
3272	SW2A-E	< 1	< 1	< 10	< 25	N.D.	540
3273	SW3-E	48	< 1	< 10	< 25	N.D.	9.2 x 10 <sup>3</sup>
3274	SW4A-E	46	< 1	< 10	< 25	N.D.	5.4 x 10 <sup>3</sup>
3275	SW6-E	40	< 1	< 10	< 25	N.D.	2.2 x 10 <sup>3</sup>
3276	SW9-E	37	< 1	< 10	< 25	N.D.	3.5 x 10 <sup>3</sup>
3277	SW8-E	54	< 1	< 10	31	N.D.	5.4 x 10 <sup>4</sup>
3278	SW11-E	< 1	< 1	< 10	< 25	N.D.	240
3279	GW1-A	21	< 1	---	---	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 más Probable.*

*N.D. No detectable. Debajo del limite de detección.*


*Limites de detección: Cromo hexavalente (0.05 mg/l)*

*Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

\* Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04

\*\* Análisis referido.



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad



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

December 29, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28147

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 10, 2015. This project has been assigned to ACZ's project number, L28147. 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 L28147. 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.

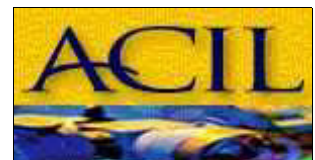
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 28, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

December 29, 2015

Project ID: Escobal

ACZ Project ID: L28147

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 5 miscellaneous samples from Tahoe Resources, Inc. on December 10, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28147. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses were performed within EPA recommended holding times except for parameters flagged with "H" flags (H3, HC), received either after the hold time expired or requiring re-analysis after the hold time had expired.

**Sample Analysis**

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

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

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-1A

ACZ Sample ID: **L28147-02**  
Date Sampled: 12/07/15 05:27  
Date Received: 12/10/15  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 16:17	spl
Cyanide, WAD	SM4500-CN I- distillation								12/16/15 13:55	mss2
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 11:44	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 6:34	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 18:08	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	12/17/15 15:00	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/15 19:26	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	12/17/15 19:26	msh
Barium, dissolved	M200.7 ICP	1	0.058			mg/L	0.003	0.02	12/17/15 15:00	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:00	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 15:00	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:00	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:26	msh
Calcium, dissolved	M200.7 ICP	1	6.2			mg/L	0.1	0.5	12/17/15 15:00	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:00	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:00	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:00	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 15:00	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 15:00	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:26	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 15:00	aeb
Magnesium, dissolved	M200.7 ICP	1	2.4			mg/L	0.2	1	12/17/15 15:00	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/17/15 15:00	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:15	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 15:00	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 15:00	aeb
Potassium, dissolved	M200.7 ICP	1	4.6			mg/L	0.2	1	12/18/15 17:52	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 15:00	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	12/17/15 19:26	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/15 19:26	msh
Sodium, dissolved	M200.7 ICP	1	7.4			mg/L	0.2	1	12/17/15 15:00	aeb
Strontium, dissolved	M200.7 ICP	1	0.057			mg/L	0.005	0.03	12/17/15 15:00	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:26	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/17/15 15:00	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/17/15 15:00	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:26	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/17/15 15:00	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 15:00	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: GW-1A

ACZ Sample ID: **L28147-02**  
 Date Sampled: 12/07/15 05:27  
 Date Received: 12/10/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	30.6		*	mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	30.6		*	mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			6.2			%			12/29/15 14:52	calc
Sum of Anions			0.842			meq/L			12/29/15 14:52	calc
Sum of Cations			0.953			meq/L			12/29/15 14:52	calc
Chloride	SM4500Cl-E	1	4.7		*	mg/L	0.5	2	12/22/15 13:42	krh/ms s
Conductivity @25C	SM2510B	1	107		*	umhos/cm	1	10	12/12/15 17:23	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 22:52	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 21:14	pjb
Fluoride	SM4500F-C	1	0.11	B	*	mg/L	0.05	0.3	12/15/15 15:03	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		25.4			mg/L			12/29/15 14:52	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.26		*	mg/L	0.02	0.1	12/18/15 22:58	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/22/15 13:39	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/18/15 22:33	pjb
pH (lab)	SM4500H+ B									
pH		1	7.4	H	*	units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	21.9		*	C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.06	0.2	12/29/15 14:52	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	12/15/15 23:21	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.08	H	*	mg/L	0.01	0.05	12/10/15 21:28	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.05		*	mg/L	0.02	0.05	12/16/15 0:40	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	158		*	mg/L	10	20	12/11/15 16:06	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		UH	*	mg/L	5	20	12/15/15 13:54	enb
Residue, Total (TS) @105C	SM2540B	1	166		*	mg/L	10	20	12/11/15 17:48	sck
Sulfate	D516-02/-07 - Turbidimetric	1	4.4	B	*	mg/L	1	5	12/17/15 17:36	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 13:56	enb
TDS (calculated)	Calculation		48.5			mg/L			12/29/15 14:52	calc
TDS (ratio - measured/calculated)	Calculation		3.26						12/29/15 14:52	calc

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28147-02	WG395768	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396249	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395768	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG396082	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).
	WG395999	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG395768	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396146	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG396248	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395768	pH pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
			SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395911	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).
	WG395692	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).
	WG395912	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).
	WG395738	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
WG395868	Residue, Non-Filterable (TSS) @105C	SM2540D	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.	
		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).	
WG395736	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG396061	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: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395800	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).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.



**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: GW-1AACZ Sample ID: **L28147-02**  
Date Sampled: 12/07/15 5:27  
Date Received: 12/10/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395974Analyst: mmn  
Extract Date: 12/14/15 12:23  
Analysis Date: 12/15/15 23:11

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

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28147**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28147-01</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-02</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-03</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-04</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.
<b>L28147-05</b>	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396038	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
			1664A - Gravimetric	Q9	Insufficient sample received to meet method QC requirements.

**Tahoe Resources, Inc.**

ACZ Project ID: **L28147**

**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: L28147  
 Date Received: 12/10/2015 09:47  
 Received By: ddp  
 Date Printed: 12/10/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	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? L28147-02 : A Orange container not received and the associated analysis could not be run.		X	
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
2540	10.5	<=6.0	13	N/A
4413	13.1	<=6.0	14	N/A

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

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L28147  
Date Received: 12/10/2015 09:47  
Received By: ddp  
Date Printed: 12/10/2015

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

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. *L28147*

CHAIN of CUSTODY

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

Report to:

Name: <i>Miguel Berganza</i>	Address: <i>Ruinas los procesos 18 calle 24-69 zona 10</i>
Company: <i>Tahoe Resources Inc.</i>	EMPRESARIAL, zona pradera, fase oficina 1406
E-mail: <i>m.berganza@santafael.com.gt</i>	Telephone: <i>(507) 5951 5248</i>

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: <i>Miguel Berganza</i>	Address:
Company: <i>Tahoe Resources Inc.</i>	
E-mail: <i>m.berganza@santafael.com.gt</i>	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <i>water quality</i>	# of Containers	<i>SW</i>	<i>GW+TPH</i>	<i>OW</i>												
PO#: <i>Escobal</i>																
Reporting state for compliance testing:																
Check box if samples include NRC licensed material?																
SAMPLE IDENTIFICATION	DATE:TIME	Matrix														
<i>1. SW11-E</i>	<i>07/12/15 13:05</i>	<i>SW</i>	<i>10</i>	<input checked="" type="checkbox"/>												
<i>2. GW-1A</i>	<i>07/12/15 05:27</i>	<i>GW</i>	<i>8</i>		<input checked="" type="checkbox"/>											
<i>Pileta 1</i>	<i>03/12/15 09:25</i>	<i>SW</i>	<i>1</i>			<input checked="" type="checkbox"/>										
<i>Pileta 2</i>	<i>03/12/15 09:10</i>	<i>SW</i>	<i>1</i>			<input checked="" type="checkbox"/>										
<i>Pileta de proceso</i>	<i>03/12/15 10:15</i>	<i>WW</i>	<i>1</i>			<input checked="" type="checkbox"/>										
<i>Agua de proceso</i>	<i>03/12/15 11:40</i>	<i>WW</i>	<i>1</i>			<input checked="" type="checkbox"/>										
<i>WW9</i>	<i>04/12/15 09:36</i>	<i>WW</i>	<i>1</i>			<input checked="" type="checkbox"/>										
<i>Pileta 3</i>	<i>04/12/15 08:00</i>	<i>SW</i>	<i>1</i>			<input checked="" type="checkbox"/>										
<i>Pozo PP</i>	<i>06/12/15 08:30</i>	<i>GW</i>	<i>1</i>			<input checked="" type="checkbox"/>										
<i>WW9</i>	<i>06/12/15 09:25</i>	<i>WW</i>	<i>1</i>			<input checked="" type="checkbox"/>										

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

REMARKS

*COC #3 present samples SW11-E and GW-1A with COC #1 and 2*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>16:28 07-17-2015</i>	<i>[Signature]</i>	<i>16:28 7/12/15</i>
		<i>[Signature]</i>	<i>11/04/15 09:40</i>

L28147 Chain of Custody



# Laboratories, Inc.

28147

## CHAIN of CUSTODY

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

### Report to:

Name: Miguel Berganza	Address: Bulevar los Proceres, 18 calle 24-69 zona 10
Company: Tahoe Resources Inc.	Empresarial Zona Pradera, Torre IV oficina 1406
E-mail: mBerganza@sanrafael.com.gt	Telephone: (502) 5951 5248

### Copy of Report to:

Name:	E-mail:
Company:	Telephone:

### Invoice to:

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

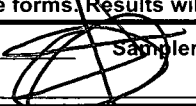
If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES  NO

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

### PROJECT INFORMATION

### ANALYSES REQUESTED (attach list or use quote number)

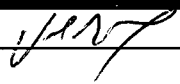

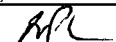
Quote #: water quality	# of Containers	3																					
PO#: Escobal																							
Reporting state for compliance testing:																							
Check box if samples include NRC licensed material?																							
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers																				
3. SW6-E	07/12/15 08:50	SW	10	/																			
4. SW8-E	07/12/15 10:43	SW	10	/																			
5. SW9-E	07/12/15 09:40	SW	10	/																			

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

### REMARKS

COC # 2

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
	07-12-2015 16:30		16:30 7/12/15
			12/16/15 08:47





Guatemala December 7th, 2015

To whom it may concern:

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

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

Sincerely yours,

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

December 18, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L27992

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 03, 2015. This project has been assigned to ACZ's project number, L27992. 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 L27992. 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.

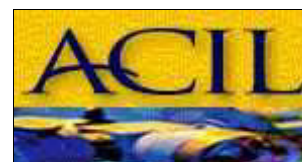
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 17, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

December 18, 2015

Project ID: Escobal

ACZ Project ID: L27992

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 6 ground water samples from Tahoe Resources, Inc. on December 3, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L27992. 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.

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-11

ACZ Sample ID: **L27992-01**  
Date Sampled: 12/01/15 12:30  
Date Received: 12/03/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 17:01	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 13:21	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/04/15 15:35	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/04/15 15:48	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/03/15 18:15	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/10/15 22:24	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	12/09/15 17:47	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	12/09/15 17:47	msh
Barium, dissolved	M200.7 ICP	1	0.083			mg/L	0.003	0.02	12/10/15 12:51	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:51	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/10/15 22:24	gss
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/10/15 12:51	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:47	msh
Calcium, dissolved	M200.7 ICP	1	49.2			mg/L	0.1	0.5	12/10/15 12:51	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:51	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:51	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:51	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 12:51	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/10/15 12:51	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:47	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 12:51	gss
Magnesium, dissolved	M200.7 ICP	1	10.6			mg/L	0.2	1	12/10/15 12:51	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 12:51	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:38	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/10/15 12:51	gss
Nickel, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.008	0.04	12/10/15 12:51	gss
Potassium, dissolved	M200.7 ICP	1	8			mg/L	0.2	1	12/10/15 22:24	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 12:51	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/09/15 17:47	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 17:47	msh
Sodium, dissolved	M200.7 ICP	1	19.6			mg/L	0.2	1	12/10/15 12:51	gss
Strontium, dissolved	M200.7 ICP	1	0.269			mg/L	0.005	0.03	12/10/15 12:51	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:47	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/10/15 12:51	gss
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	12/10/15 12:51	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:47	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 12:51	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:51	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: GW-11

ACZ Sample ID: **L27992-01**  
 Date Sampled: 12/01/15 12:30  
 Date Received: 12/03/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	68.9		*	mg/L	2	20	12/03/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Total Alkalinity		1	68.9		*	mg/L	2	20	12/03/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.5			%			12/18/15 9:42	calc
Sum of Anions			4.1			meq/L			12/18/15 9:42	calc
Sum of Cations			4.4			meq/L			12/18/15 9:42	calc
Chloride	SM4500Cl-E	1	9.7		*	mg/L	0.5	2	12/08/15 18:25	spl
Conductivity @25C	SM2510B	1	432		*	umhos/cm	1	10	12/03/15 17:56	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:02	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:23	pjb
Fluoride	SM4500F-C	1	0.19	B	*	mg/L	0.05	0.3	12/08/15 12:08	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		167			mg/L			12/18/15 9:42	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.32		*	mg/L	0.02	0.1	12/10/15 23:20	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/11/15 11:44	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/04/15 23:17	pjb
pH (lab)	SM4500H+ B									
pH		1	7.3	H	*	units	0.1	0.1	12/03/15 0:00	abd
pH measured at		1	22.3		*	C	0.1	0.1	12/03/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.06	B		mg/L	0.03	0.2	12/18/15 9:42	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/04/15 20:56	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/03/15 19:46	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/04/15 19:55	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	360		*	mg/L	10	20	12/03/15 15:11	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/15 16:39	sck
Residue, Total (TS) @ 105C	SM2540B	1	368		*	mg/L	10	20	12/03/15 17:49	sck
Sulfate	D516-02/-07 - Turbidimetric	5	118		*	mg/L	5	25	12/14/15 13:16	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/03/15 15:38	enb
TDS (calculated)	Calculation		258			mg/L			12/18/15 9:42	calc
TDS (ratio - measured/calculated)	Calculation		1.40						12/18/15 9:42	calc

### Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: RW-1

ACZ Sample ID: **L27992-02**  
Date Sampled: 12/01/15 11:00  
Date Received: 12/03/15  
Sample Matrix: Ground Water

#### Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 17:09	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 13:43	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/04/15 15:45	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/04/15 15:54	spl
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/03/15 18:23	spl

#### Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/10/15 22:27	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 17:53	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	12/09/15 17:53	msh
Barium, dissolved	M200.7 ICP	1	0.138			mg/L	0.003	0.02	12/10/15 12:55	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:55	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/10/15 22:27	gss
Boron, dissolved	M200.7 ICP	1	0.13			mg/L	0.01	0.05	12/10/15 12:55	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:53	msh
Calcium, dissolved	M200.7 ICP	1	205			mg/L	0.1	0.5	12/10/15 12:55	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:55	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:55	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:55	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 12:55	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/10/15 12:55	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:53	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 12:55	gss
Magnesium, dissolved	M200.7 ICP	1	34.2			mg/L	0.2	1	12/10/15 12:55	gss
Manganese, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.005	0.03	12/10/15 12:55	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:40	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/10/15 12:55	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 12:55	gss
Potassium, dissolved	M200.7 ICP	1	13.5			mg/L	0.2	1	12/10/15 22:27	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 12:55	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 17:53	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 17:53	msh
Sodium, dissolved	M200.7 ICP	1	54.2			mg/L	0.2	1	12/10/15 12:55	gss
Strontium, dissolved	M200.7 ICP	1	1.680			mg/L	0.005	0.03	12/10/15 12:55	gss
Thallium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/09/15 17:53	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/10/15 12:55	gss
Titanium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	12/10/15 12:55	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0056			mg/L	0.0001	0.0005	12/09/15 17:53	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 12:55	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 12:55	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: RW-1

ACZ Sample ID: **L27992-02**  
 Date Sampled: 12/01/15 11:00  
 Date Received: 12/03/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	136		*	mg/L	2	20	12/03/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Total Alkalinity		1	136		*	mg/L	2	20	12/03/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/18/15 9:42	calc
Sum of Anions			16			meq/L			12/18/15 9:42	calc
Sum of Cations			16			meq/L			12/18/15 9:42	calc
Chloride	SM4500Cl-E	1	48.9		*	mg/L	0.5	2	12/12/15 10:19	mss2
Conductivity @25C	SM2510B	1	1320		*	umhos/cm	1	10	12/03/15 18:04	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:03	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:25	pjb
Fluoride	SM4500F-C	1	0.78		*	mg/L	0.05	0.3	12/08/15 12:22	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		653			mg/L			12/18/15 9:42	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.31		*	mg/L	0.02	0.1	12/10/15 23:22	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/11/15 11:46	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/04/15 23:18	pjb
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	12/03/15 0:00	abd
pH measured at		1	22.4		*	C	0.1	0.1	12/03/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.03	0.2	12/18/15 9:42	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/04/15 20:57	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	12/03/15 19:47	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/04/15 19:56	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1050		*	mg/L	10	20	12/03/15 15:14	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/15 16:41	sck
Residue, Total (TS) @ 105C	SM2540B	1	1110		*	mg/L	10	20	12/03/15 17:51	sck
Sulfate	D516-02/-07 - Turbidimetric	20	556		*	mg/L	20	100	12/14/15 13:33	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/03/15 15:45	enb
TDS (calculated)	Calculation		997			mg/L			12/18/15 9:42	calc
TDS (ratio - measured/calculated)	Calculation		1.05						12/18/15 9:42	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-2

ACZ Sample ID: **L27992-03**  
Date Sampled: 12/01/15 10:00  
Date Received: 12/03/15  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 17:17	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 14:04	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/04/15 15:55	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 10:14	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/03/15 18:40	spl

**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	12/10/15 22:37	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 17:55	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0031			mg/L	0.0002	0.001	12/09/15 17:55	msh
Barium, dissolved	M200.7 ICP	1	0.070			mg/L	0.003	0.02	12/10/15 13:10	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:10	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/10/15 22:37	gss
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/10/15 13:10	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:55	msh
Calcium, dissolved	M200.7 ICP	1	11.9			mg/L	0.1	0.5	12/10/15 13:10	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:10	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:10	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:10	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:10	gss
Iron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.02	0.05	12/10/15 13:10	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/09/15 17:55	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:10	gss
Magnesium, dissolved	M200.7 ICP	1	2.2			mg/L	0.2	1	12/10/15 13:10	gss
Manganese, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.005	0.03	12/10/15 13:10	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:46	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/10/15 13:10	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:10	gss
Potassium, dissolved	M200.7 ICP	1	2.2			mg/L	0.2	1	12/10/15 22:37	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:10	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 17:55	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 17:55	msh
Sodium, dissolved	M200.7 ICP	1	7.4			mg/L	0.2	1	12/10/15 13:10	gss
Strontium, dissolved	M200.7 ICP	1	0.101			mg/L	0.005	0.03	12/10/15 13:10	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:55	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/10/15 13:10	gss
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:10	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:55	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:10	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:10	gss



**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: GW-2

ACZ Sample ID: **L27992-03**  
 Date Sampled: 12/01/15 10:00  
 Date Received: 12/03/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	46.4		*	mg/L	2	20	12/03/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Total Alkalinity		1	46.4		*	mg/L	2	20	12/03/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/18/15 9:42	calc
Sum of Anions			1.2			meq/L			12/18/15 9:42	calc
Sum of Cations			1.2			meq/L			12/18/15 9:42	calc
Chloride	SM4500Cl-E	1	2		*	mg/L	0.5	2	12/12/15 10:19	mss2
Conductivity @25C	SM2510B	1	117		*	umhos/cm	1	10	12/03/15 18:13	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:04	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:27	pjb
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	12/08/15 12:26	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		38.8			mg/L			12/18/15 9:42	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.44		*	mg/L	0.02	0.1	12/10/15 23:24	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/11/15 11:32	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.4	B	*	mg/L	0.1	0.5	12/04/15 23:33	pjb
pH (lab)	SM4500H+ B									
pH		1	7.7	H	*	units	0.1	0.1	12/03/15 0:00	abd
pH measured at		1	22.8		*	C	0.1	0.1	12/03/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	12/18/15 9:42	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	12/11/15 23:03	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/03/15 19:49	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.01	0.05	12/04/15 19:58	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	184		*	mg/L	10	20	12/03/15 15:17	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	31.0		*	mg/L	5	20	12/03/15 16:44	sck
Residue, Total (TS) @ 105C	SM2540B	1	244		*	mg/L	10	20	12/03/15 17:52	sck
Sulfate	D516-02/-07 - Turbidimetric	1	9.1		*	mg/L	1	5	12/14/15 13:09	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/03/15 15:53	enb
TDS (calculated)	Calculation		63.5			mg/L			12/18/15 9:42	calc
TDS (ratio - measured/calculated)	Calculation		2.90						12/18/15 9:42	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-3

ACZ Sample ID: **L27992-04**  
Date Sampled: 12/01/15 12:30  
Date Received: 12/03/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 17:25	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 14:15	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/04/15 16:05	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 10:28	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/03/15 18:56	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/10/15 22:40	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	12/09/15 17:58	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0023			mg/L	0.0002	0.001	12/09/15 17:58	msh
Barium, dissolved	M200.7 ICP	1	0.083			mg/L	0.003	0.02	12/10/15 13:13	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:13	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/10/15 22:40	gss
Boron, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/10/15 13:13	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:58	msh
Calcium, dissolved	M200.7 ICP	1	48.7			mg/L	0.1	0.5	12/10/15 13:13	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:13	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:13	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:13	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:13	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/10/15 13:13	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:58	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:13	gss
Magnesium, dissolved	M200.7 ICP	1	10.6			mg/L	0.2	1	12/10/15 13:13	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:13	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:48	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/10/15 13:13	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:13	gss
Potassium, dissolved	M200.7 ICP	1	7.7			mg/L	0.2	1	12/10/15 22:40	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:13	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/09/15 17:58	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 17:58	msh
Sodium, dissolved	M200.7 ICP	1	19.9			mg/L	0.2	1	12/10/15 13:13	gss
Strontium, dissolved	M200.7 ICP	1	0.267			mg/L	0.005	0.03	12/10/15 13:13	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:58	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/10/15 13:13	gss
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	12/10/15 13:13	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 17:58	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:13	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:13	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: GW-3

ACZ Sample ID: **L27992-04**  
 Date Sampled: 12/01/15 12:30  
 Date Received: 12/03/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	69.3		*	mg/L	2	20	12/03/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Total Alkalinity		1	69.3		*	mg/L	2	20	12/03/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.5			%			12/18/15 9:43	calc
Sum of Anions			4.1			meq/L			12/18/15 9:43	calc
Sum of Cations			4.4			meq/L			12/18/15 9:43	calc
Chloride	SM4500Cl-E	1	9.4		*	mg/L	0.5	2	12/12/15 10:19	mss2
Conductivity @25C	SM2510B	1	436		*	umhos/cm	1	10	12/03/15 18:21	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:05	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:28	pjb
Fluoride	SM4500F-C	1	0.19	B	*	mg/L	0.05	0.3	12/08/15 12:29	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		165			mg/L			12/18/15 9:43	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	3.27		*	mg/L	0.02	0.1	12/10/15 23:27	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/11/15 11:33	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.1	B	*	mg/L	0.1	0.5	12/04/15 23:34	pjb
pH (lab)	SM4500H+ B									
pH		1	7.3	H	*	units	0.1	0.1	12/03/15 0:00	abd
pH measured at		1	23.0		*	C	0.1	0.1	12/03/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/18/15 9:43	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/11/15 23:05	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/03/15 19:50	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/08/15 22:57	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	354		*	mg/L	10	20	12/03/15 15:19	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/15 16:47	sck
Residue, Total (TS) @ 105C	SM2540B	1	376		*	mg/L	10	20	12/03/15 17:54	sck
Sulfate	D516-02/-07 - Turbidimetric	5	117		*	mg/L	5	25	12/14/15 13:16	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/03/15 16:01	enb
TDS (calculated)	Calculation		256			mg/L			12/18/15 9:43	calc
TDS (ratio - measured/calculated)	Calculation		1.38						12/18/15 9:43	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-4

ACZ Sample ID: **L27992-05**  
Date Sampled: 12/01/15 11:40  
Date Received: 12/03/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 17:33	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 14:26	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/04/15 16:15	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 10:43	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/03/15 19:04	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1	0.61			mg/L	0.03	0.2	12/11/15 14:24	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 18:00	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0002	0.001	12/09/15 18:00	msh
Barium, dissolved	M200.7 ICP	1	0.144			mg/L	0.003	0.02	12/10/15 13:16	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:16	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/11/15 14:24	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:16	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 18:00	msh
Calcium, dissolved	M200.7 ICP	1	4.8			mg/L	0.1	0.5	12/10/15 13:16	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:16	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:16	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:16	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:16	gss
Iron, dissolved	M200.7 ICP	1	0.60			mg/L	0.02	0.05	12/10/15 13:16	gss
Lead, dissolved	M200.8 ICP-MS	1	0.0008			mg/L	0.0001	0.0005	12/09/15 18:00	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:16	gss
Magnesium, dissolved	M200.7 ICP	1	3.1			mg/L	0.2	1	12/10/15 13:16	gss
Manganese, dissolved	M200.7 ICP	1	0.100			mg/L	0.005	0.03	12/10/15 13:16	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:50	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/10/15 13:16	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:16	gss
Potassium, dissolved	M200.7 ICP	1	4.7			mg/L	0.2	1	12/11/15 14:24	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:16	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 18:00	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 18:00	msh
Sodium, dissolved	M200.7 ICP	1	10.2			mg/L	0.2	1	12/10/15 13:16	gss
Strontium, dissolved	M200.7 ICP	1	0.054			mg/L	0.005	0.03	12/10/15 13:16	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 18:00	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/10/15 13:16	gss
Titanium, dissolved	M200.7 ICP	1	0.045			mg/L	0.005	0.03	12/10/15 13:16	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	12/09/15 18:00	msh
Vanadium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	12/10/15 13:16	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:16	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: GW-4

ACZ Sample ID: **L27992-05**  
 Date Sampled: 12/01/15 11:40  
 Date Received: 12/03/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.9		*	mg/L	2	20	12/03/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Total Alkalinity		1	39.9		*	mg/L	2	20	12/03/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/18/15 9:43	calc
Sum of Anions			1.2			meq/L			12/18/15 9:43	calc
Sum of Cations			1.2			meq/L			12/18/15 9:43	calc
Chloride	SM4500Cl-E	1	2.3		*	mg/L	0.5	2	12/12/15 10:19	mss2
Conductivity @25C	SM2510B	1	112		*	umhos/cm	1	10	12/03/15 18:30	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:07	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:29	pjb
Fluoride	SM4500F-C	1	0.09	B	*	mg/L	0.05	0.3	12/08/15 12:32	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		24.8			mg/L			12/18/15 9:43	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/10/15 23:28	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/11/15 11:34	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.2	B	*	mg/L	0.1	0.5	12/04/15 23:35	pjb
pH (lab)	SM4500H+ B									
pH		1	7.0	H	*	units	0.1	0.1	12/03/15 0:00	abd
pH measured at		1	22.8		*	C	0.1	0.1	12/03/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/18/15 9:43	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/11/15 23:08	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.05	H	*	mg/L	0.01	0.05	12/03/15 19:51	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	12/04/15 20:02	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	554		*	mg/L	10	20	12/03/15 15:22	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/15 16:49	sck
Residue, Total (TS) @ 105C	SM2540B	1	572		*	mg/L	10	20	12/03/15 17:56	sck
Sulfate	D516-02/-07 - Turbidimetric	1	14.1		*	mg/L	1	5	12/14/15 13:09	mss2
Sulfide as S	SM4500S2-D	3.75		U	*	mg/L	0.08	0.4	12/03/15 16:25	enb
TDS (calculated)	Calculation		65			mg/L			12/18/15 9:43	calc
TDS (ratio - measured/calculated)	Calculation		8.52						12/18/15 9:43	calc

### Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: GW-10

ACZ Sample ID: **L27992-06**  
Date Sampled: 12/01/15 12:00  
Date Received: 12/03/15  
Sample Matrix: Ground Water

#### Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 17:40	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 14:37	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/04/15 16:34	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 10:50	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/03/15 19:12	spl

#### Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/10/15 22:52	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 18:02	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	12/09/15 18:02	msh
Barium, dissolved	M200.7 ICP	1	0.004	B		mg/L	0.003	0.02	12/10/15 13:19	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:19	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/10/15 22:52	gss
Boron, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/10/15 13:19	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 18:02	msh
Calcium, dissolved	M200.7 ICP	1	0.1	B		mg/L	0.1	0.5	12/10/15 13:19	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:19	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:19	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:19	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:19	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/10/15 13:19	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 18:02	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:19	gss
Magnesium, dissolved	M200.7 ICP	1	0.3	B		mg/L	0.2	1	12/10/15 13:19	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:19	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:52	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/10/15 13:19	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/10/15 13:19	gss
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/10/15 22:52	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/10/15 13:19	gss
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 18:02	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 18:02	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/10/15 13:19	gss
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:19	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 18:02	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/10/15 13:19	gss
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:19	gss
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 18:02	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/10/15 13:19	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 13:19	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: GW-10

ACZ Sample ID: **L27992-06**  
 Date Sampled: 12/01/15 12:00  
 Date Received: 12/03/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Total Alkalinity		1		U	*	mg/L	2	20	12/03/15 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/18/15 9:43	calc
Sum of Anions			N/A			meq/L			12/18/15 9:43	calc
Sum of Cations				U		meq/L			12/18/15 9:43	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	12/12/15 10:19	mss2
Conductivity @25C	SM2510B	1	1.4	B	*	umhos/cm	1	10	12/03/15 19:11	abd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:08	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:30	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	12/07/15 17:38	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		1.49			mg/L			12/18/15 9:43	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/10/15 23:29	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/11/15 11:36	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/04/15 23:37	pjb
pH (lab)	SM4500H+ B									
pH		1	6.7	H	*	units	0.1	0.1	12/03/15 0:00	abd
pH measured at		1	22.8		*	C	0.1	0.1	12/03/15 0:00	abd
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/18/15 9:43	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/11/15 23:09	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	12/03/15 19:52	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/04/15 20:05	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	10	B	*	mg/L	10	20	12/03/15 15:24	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/03/15 16:52	sck
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	12/03/15 17:58	sck
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	12/14/15 13:09	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/03/15 16:33	enb
TDS (calculated)	Calculation		0.4			mg/L			12/18/15 9:43	calc
TDS (ratio - measured/calculated)	Calculation		25.00						12/18/15 9:43	calc

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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



Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L27992-01	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395248	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395486	Chloride	SM4500CI-E	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395248	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395434	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395248	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395695	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).
	WG395697	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395346	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).
	WG395248	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
	pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.	
WG395344	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).	
WG395280	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).	
WG395341	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.	
WG395255	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	

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Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395270	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395271	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395803	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.
	WG395240	Sulfide as S	SM4500S2-D SM4500S2-D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395248	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L27992-02	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395248	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395248	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395434	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395248	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395695	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395697	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395346	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).
	WG395248	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395344	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).
	WG395280	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).
	WG395341	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).
	WG395255	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395270	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

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG395271		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
WG395803		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.
WG395240		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).
WG395248		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L27992-03</b>	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395248	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395248	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395434	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395248	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395695	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395697	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395346	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).
	WG395248	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395280	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).
	WG395341	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).
WG395255	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395270	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395271	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395803	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.
	WG395240	Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395248	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L27992-04	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395248	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395248	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395434	Fluoride	SM4500F-C	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500F-C	Q6	Sample was received above recommended temperature.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395248	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395695	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395697	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395346	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).
	WG395248	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395280	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).	
WG395496	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).	
WG395255	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395270	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.	

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395271	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395803	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.
	WG395240	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).
	WG395248	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.



Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L27992-05	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395248	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395248	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395434	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).
	WG395248	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395695	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395697	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395346	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).
	WG395248	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	
WG395280	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).	
WG395341	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).	
WG395255	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395270	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	

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG395271		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395803		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.
WG395240		Sulfide as S	SM4500S2-D	Q6	Sample was received above recommended temperature.
			SM4500S2-D	QD	Reported value is the background-corrected concentration, as described by the method.
			SM4500S2-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395248		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L27992-06</b>	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395248	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395248	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395248	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395695	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395697	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395346	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).
	WG395248	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395280	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).
WG395341	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).	
WG395255	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.	
WG395270	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	

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
WG395271		Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
			SM2540B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395803		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.
WG395240		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).
WG395248		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-11

ACZ Sample ID: **L27992-01**  
Date Sampled: 12/01/15 12:30  
Date Received: 12/03/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395435**

Analyst: mmn  
Extract Date: 12/04/15 11:22  
Analysis Date: 12/08/15 0:19

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	86.4		1	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: RW-1ACZ Sample ID: **L27992-02**  
Date Sampled: 12/01/15 11:00  
Date Received: 12/03/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395435Analyst: mmn  
Extract Date: 12/04/15 11:24  
Analysis Date: 12/08/15 0:47

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.9		1	*	%	70	130

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-2

ACZ Sample ID: **L27992-03**  
Date Sampled: 12/01/15 10:00  
Date Received: 12/03/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395435**

Analyst: mmn  
Extract Date: 12/04/15 11:26  
Analysis Date: 12/08/15 1:14

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.2		1.02	*	%	70	130

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-3

ACZ Sample ID: **L27992-04**  
Date Sampled: 12/01/15 12:30  
Date Received: 12/03/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395435**

Analyst: mmn  
Extract Date: 12/04/15 11:28  
Analysis Date: 12/08/15 1:42

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.7		1.02	*	%	70	130



**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: GW-4ACZ Sample ID: **L27992-05**  
Date Sampled: 12/01/15 11:40  
Date Received: 12/03/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395435Analyst: mmn  
Extract Date: 12/04/15 11:30  
Analysis Date: 12/08/15 2:09

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.2	J	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	87.3		1.02	*	%	70	130

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: GW-10

ACZ Sample ID: **L27992-06**  
Date Sampled: 12/01/15 12:00  
Date Received: 12/03/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395435**

Analyst: mmn  
Extract Date: 12/04/15 11:32  
Analysis Date: 12/08/15 2:37

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.01	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.9		1.01	*	%	70	130

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L27992**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L27992-01	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L27992-02	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L27992-03	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L27992-04	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L27992-05	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L27992-06	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

**Tahoe Resources, Inc.**

ACZ Project ID: **L27992**

**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: L27992  
 Date Received: 12/03/2015 09:27  
 Received By: ddp  
 Date Printed: 12/3/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	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	
L27992-01 : A Orange container not received and the associated analysis could not be run.			
L27992-02 : A Orange container not received and the associated analysis could not be run.			
L27992-03 : A Orange container not received and the associated analysis could not be run.			
L27992-04 : A Orange container not received and the associated analysis could not be run.			
L27992-05 : A Orange container not received and the associated analysis could not be run.			
L27992-06 : A Orange container not received and the associated analysis could not be run.			
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**

REPAD LP11 2012-03

Tahoe Resources, Inc.  
 Escobal

ACZ Project ID: L27992  
 Date Received: 12/03/2015 09:27  
 Received By: ddp  
 Date Printed: 12/3/2015

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
3511	8.6	<=6.0	17	N/A
4581	10	<=6.0	15	N/A

Was ice present in the shipment container(s)?

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

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

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

L27992

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza, Company: Tahoe Resources Inc, E-mail: m.berganza@sanrafael.com.gt, Address: Boulevard los Próceres 18 Calle 24-69 Zona 16, Telephone: (502) 5951 5248

Copy of Report to:

Name: , Company: , E-mail: , Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results. Includes handwritten entries for GW-11, RW-1, Pozo PP, EP-10 and a large 'COPY' watermark.

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

REMARKS

COC #112 Please report with COC #2
\* Present both samples 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.







Laboratories, Inc.

L27992

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: Bulevar 105 procesos 18 calle 24-69 zona 10
Company: Tahoe Resources Inc.	Empresarial, zona Pradera, torre IV oficina 1106
E-mail: M.Berganza@sanrafael.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Water Quality	# of Containers	GW+TPH																				
PO#: Escobal																						
Reporting state for compliance testing:																						
Check box if samples include NRC licensed material?																						
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	GW+TPH																		
3. GW-2	01/12/15 10:00	GW	8	✓																		
4. GW-3	01/12/15 12:30	GW	8	✓																		
5. GW-4	01/12/15 11:40	GW	8	✓																		
6. GW-10	01/12/15 12:00 12:30	GW	8	✓																		

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

REMARKS

COC # 2/2 Please report with 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]	01-12-2015 17:00	[Signature]	1-12-15 17:50
			123456789

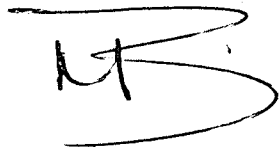
Guatemala December 1st, 2015

To whom it may concern:

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

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

Best regards,

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

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

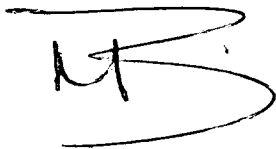
Guatemala December 1st, 2015

To whom it may concern:

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

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

Best regards,

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

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

December 18, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28008

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 04, 2015. This project has been assigned to ACZ's project number, L28008. 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 L28008. 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.

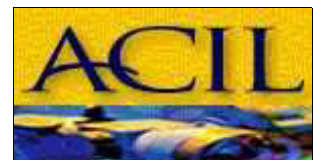
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 17, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

December 18, 2015

Project ID: Escobal

ACZ Project ID: L28008

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on December 4, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28008. 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: MW-3

ACZ Sample ID: **L28008-01**  
Date Sampled: 12/02/15 09:00  
Date Received: 12/04/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 19:14	spl
Cyanide, WAD	SM4500-CN I- distillation								12/11/15 13:36	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 13:41	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 11:55	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 16:13	spl

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	12/10/15 20:32	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 20:06	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0022			mg/L	0.0002	0.001	12/10/15 17:08	msh
Barium, dissolved	M200.7 ICP	1	0.034			mg/L	0.003	0.02	12/09/15 17:25	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:25	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 17:25	gss
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	12/09/15 17:25	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:06	msh
Calcium, dissolved	M200.7 ICP	1	79.7			mg/L	0.1	0.5	12/09/15 17:25	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:25	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:25	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:25	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:25	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/09/15 17:25	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:06	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/09/15 17:25	gss
Magnesium, dissolved	M200.7 ICP	1	9.4			mg/L	0.2	1	12/09/15 17:25	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 17:25	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:54	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 17:25	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 17:25	gss
Potassium, dissolved	M200.7 ICP	1	4.1			mg/L	0.2	1	12/09/15 17:25	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:25	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/09/15 20:06	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 20:06	msh
Sodium, dissolved	M200.7 ICP	1	27.5			mg/L	0.2	1	12/09/15 17:25	gss
Strontium, dissolved	M200.7 ICP	1	0.747			mg/L	0.005	0.03	12/09/15 17:25	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:06	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 17:25	gss
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	12/09/15 17:25	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/09/15 20:06	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	12/09/15 17:25	gss
Zinc, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/09/15 17:25	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-3

ACZ Sample ID: **L28008-01**  
 Date Sampled: 12/02/15 09:00  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	81.6		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	81.6		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.8			%			12/18/15 9:58	calc
Sum of Anions			6			meq/L			12/18/15 9:58	calc
Sum of Cations			6.1			meq/L			12/18/15 9:58	calc
Chloride	SM4500Cl-E	1	16.9		*	mg/L	0.5	2	12/12/15 10:27	mss2
Conductivity @25C	SM2510B	1	557		*	umhos/cm	1	10	12/04/15 19:49	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:20	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 14:33	spl
Fluoride	SM4500F-C	1	0.74		*	mg/L	0.05	0.3	12/07/15 18:35	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		238			mg/L			12/18/15 9:58	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.61		*	mg/L	0.02	0.1	12/11/15 23:16	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 10:02	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:40	pjb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.7		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.22			mg/L	0.06	0.2	12/18/15 9:58	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	12/11/15 23:21	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.11	H	*	mg/L	0.01	0.05	12/08/15 21:41	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	12/11/15 21:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	436		*	mg/L	10	20	12/04/15 12:31	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/08/15 9:54	enb
Residue, Total (TS) @ 105C	SM2540B	1	490		*	mg/L	10	20	12/04/15 15:12	sck
Sulfate	D516-02/-07 - Turbidimetric	5	183		*	mg/L	5	25	12/14/15 15:18	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 15:50	enb
TDS (calculated)	Calculation		372			mg/L			12/18/15 9:58	calc
TDS (ratio - measured/calculated)	Calculation		1.17						12/18/15 9:58	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-4

ACZ Sample ID: **L28008-02**  
Date Sampled: 12/02/15 11:55  
Date Received: 12/04/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 19:22	spl
Cyanide, WAD	SM4500-CN I- distillation								12/11/15 13:48	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 13:50	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 12:09	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 16:20	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/10/15 20:35	gss
Antimony, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0004	0.002	12/09/15 20:13	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0024			mg/L	0.0002	0.001	12/10/15 17:18	msh
Barium, dissolved	M200.7 ICP	1	0.023			mg/L	0.003	0.02	12/09/15 17:28	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:28	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 17:28	gss
Boron, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	12/09/15 17:28	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:13	msh
Calcium, dissolved	M200.7 ICP	1	76.8			mg/L	0.1	0.5	12/09/15 17:28	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:28	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:28	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:28	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:28	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/09/15 17:28	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:13	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/09/15 17:28	gss
Magnesium, dissolved	M200.7 ICP	1	8.3			mg/L	0.2	1	12/09/15 17:28	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 17:28	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:56	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 17:28	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 17:28	gss
Potassium, dissolved	M200.7 ICP	1	4.1			mg/L	0.2	1	12/09/15 17:28	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:28	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/09/15 20:13	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 20:13	msh
Sodium, dissolved	M200.7 ICP	1	26.3			mg/L	0.2	1	12/09/15 17:28	gss
Strontium, dissolved	M200.7 ICP	1	0.698			mg/L	0.005	0.03	12/09/15 17:28	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:13	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 17:28	gss
Titanium, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	12/09/15 17:28	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/09/15 20:13	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 17:28	gss
Zinc, dissolved	M200.7 ICP	1	0.02	B		mg/L	0.01	0.05	12/09/15 17:28	gss



**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-4

ACZ Sample ID: **L28008-02**  
 Date Sampled: 12/02/15 11:55  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	85.4		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	85.4		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.8			%			12/18/15 9:59	calc
Sum of Anions			5.6			meq/L			12/18/15 9:59	calc
Sum of Cations			5.8			meq/L			12/18/15 9:59	calc
Chloride	SM4500Cl-E	1	15.1		*	mg/L	0.5	2	12/12/15 10:27	mss2
Conductivity @25C	SM2510B	1	526		*	umhos/cm	1	10	12/04/15 19:57	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:21	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 14:34	spl
Fluoride	SM4500F-C	1	0.88		*	mg/L	0.05	0.3	12/07/15 18:38	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		226			mg/L			12/18/15 9:59	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.68		*	mg/L	0.02	0.1	12/11/15 23:21	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 10:04	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:41	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.2		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.19	B		mg/L	0.06	0.2	12/18/15 9:59	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.06		*	mg/L	0.02	0.05	12/11/15 23:24	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.10	H	*	mg/L	0.01	0.05	12/08/15 21:43	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.07		*	mg/L	0.02	0.05	12/11/15 21:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	450		*	mg/L	10	20	12/04/15 12:36	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/08/15 9:55	enb
Residue, Total (TS) @ 105C	SM2540B	1	472		*	mg/L	10	20	12/04/15 15:15	sck
Sulfate	D516-02/-07 - Turbidimetric	5	163		*	mg/L	5	25	12/14/15 15:18	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 15:55	enb
TDS (calculated)	Calculation		347			mg/L			12/18/15 9:59	calc
TDS (ratio - measured/calculated)	Calculation		1.30						12/18/15 9:59	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-5

ACZ Sample ID: **L28008-03**  
Date Sampled: 12/02/15 11:00  
Date Received: 12/04/15  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/12/15 13:07	spl
Cyanide, WAD	SM4500-CN I- distillation								12/11/15 14:00	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 14:00	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 12:16	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 16:23	spl

**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	12/10/15 20:44	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 20:15	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	12/10/15 17:20	msh
Barium, dissolved	M200.7 ICP	1	0.040			mg/L	0.003	0.02	12/09/15 17:37	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:37	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 17:37	gss
Boron, dissolved	M200.7 ICP	1	0.05			mg/L	0.01	0.05	12/09/15 17:37	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:15	msh
Calcium, dissolved	M200.7 ICP	1	172			mg/L	0.1	0.5	12/09/15 17:37	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:37	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:37	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:37	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:37	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/09/15 17:37	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:15	msh
Lithium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.008	0.04	12/09/15 17:37	gss
Magnesium, dissolved	M200.7 ICP	1	21.6			mg/L	0.2	1	12/09/15 17:37	gss
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 17:37	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 12:58	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 17:37	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 17:37	gss
Potassium, dissolved	M200.7 ICP	1	8.9			mg/L	0.2	1	12/09/15 17:37	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:37	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0003	12/09/15 20:15	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 20:15	msh
Sodium, dissolved	M200.7 ICP	1	35.3			mg/L	0.2	1	12/09/15 17:37	gss
Strontium, dissolved	M200.7 ICP	1	0.611			mg/L	0.005	0.03	12/09/15 17:37	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:15	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 17:37	gss
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	12/09/15 17:37	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	12/09/15 20:15	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 17:37	gss
Zinc, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/09/15 17:37	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-5

ACZ Sample ID: **L28008-03**  
 Date Sampled: 12/02/15 11:00  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	89.7		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	89.7		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/18/15 9:59	calc
Sum of Anions			12			meq/L			12/18/15 9:59	calc
Sum of Cations			12			meq/L			12/18/15 9:59	calc
Chloride	SM4500Cl-E	1	31.4		*	mg/L	0.5	2	12/12/15 10:27	mss2
Conductivity @25C	SM2510B	1	988		*	umhos/cm	1	10	12/04/15 20:05	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 17:26	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 14:37	spl
Fluoride	SM4500F-C	1	0.20	B	*	mg/L	0.05	0.3	12/07/15 18:53	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		518			mg/L			12/18/15 9:59	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	5	6.5		*	mg/L	0.1	0.5	12/11/15 23:31	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 10:06	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:42	pjb
pH (lab)	SM4500H+ B									
pH		1	7.2	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.0		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	12/18/15 9:59	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	12/11/15 23:25	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	12/08/15 21:44	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	12/11/15 21:26	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	880		*	mg/L	10	20	12/04/15 12:39	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/08/15 9:56	enb
Residue, Total (TS) @ 105C	SM2540B	1	912		*	mg/L	10	20	12/04/15 15:16	sck
Sulfate	D516-02/-07 - Turbidimetric	20	435		*	mg/L	20	100	12/14/15 15:26	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 15:59	enb
TDS (calculated)	Calculation		760			mg/L			12/18/15 9:59	calc
TDS (ratio - measured/calculated)	Calculation		1.16						12/18/15 9:59	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-6

ACZ Sample ID: **L28008-04**

Date Sampled: 12/02/15 09:40

Date Received: 12/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/12/15 13:22	spl
Cyanide, WAD	SM4500-CN I- distillation								12/11/15 14:12	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 14:09	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 12:24	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 16:27	spl

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	12/10/15 20:48	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 20:17	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0024			mg/L	0.0002	0.001	12/10/15 17:23	msh
Barium, dissolved	M200.7 ICP	1	0.142			mg/L	0.003	0.02	12/09/15 17:40	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:40	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 17:40	gss
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/09/15 17:40	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:17	msh
Calcium, dissolved	M200.7 ICP	1	144			mg/L	0.1	0.5	12/09/15 17:40	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:40	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:40	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 17:40	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:40	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/09/15 17:40	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:17	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 17:40	gss
Magnesium, dissolved	M200.7 ICP	1	18.1			mg/L	0.2	1	12/09/15 17:40	gss
Manganese, dissolved	M200.7 ICP	1	0.006	B		mg/L	0.005	0.03	12/09/15 17:40	gss
Mercury, dissolved	M245.1 CVAA	1		U	*	mg/L	0.0002	0.001	12/17/15 13:00	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 17:40	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 17:40	gss
Potassium, dissolved	M200.7 ICP	1	9.4			mg/L	0.2	1	12/09/15 17:40	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 17:40	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	12/09/15 20:17	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 20:17	msh
Sodium, dissolved	M200.7 ICP	1	31.7			mg/L	0.2	1	12/09/15 17:40	gss
Strontium, dissolved	M200.7 ICP	1	0.676			mg/L	0.005	0.03	12/09/15 17:40	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:17	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 17:40	gss
Titanium, dissolved	M200.7 ICP	1	0.008	B		mg/L	0.005	0.03	12/09/15 17:40	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0005	12/09/15 20:17	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 17:40	gss
Zinc, dissolved	M200.7 ICP	1	0.12			mg/L	0.01	0.05	12/09/15 17:40	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-6

ACZ Sample ID: **L28008-04**  
 Date Sampled: 12/02/15 09:40  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	100.0		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	100.0		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.0			%			12/18/15 9:59	calc
Sum of Anions			9.8			meq/L			12/18/15 9:59	calc
Sum of Cations			10			meq/L			12/18/15 9:59	calc
Chloride	SM4500Cl-E	1	23		*	mg/L	0.5	2	12/12/15 10:27	mss2
Conductivity @25C	SM2510B	1	877		*	umhos/cm	1	10	12/04/15 20:13	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 17:28	spl
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 14:38	spl
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	12/08/15 12:57	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		434			mg/L			12/18/15 9:59	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	10	10.3		*	mg/L	0.2	1	12/15/15 23:22	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 10:07	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:43	pjb
pH (lab)	SM4500H+ B									
pH		1	7.1	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	21.8		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.06	0.2	12/18/15 9:59	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	12/11/15 23:28	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	12/10/15 21:06	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	12/11/15 21:27	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	774		*	mg/L	10	20	12/04/15 12:41	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/08/15 9:58	enb
Residue, Total (TS) @ 105C	SM2540B	1	794		*	mg/L	10	20	12/04/15 15:17	sck
Sulfate	D516-02/-07 - Turbidimetric	20	340		*	mg/L	20	100	12/14/15 15:26	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 16:04	enb
TDS (calculated)	Calculation		628			mg/L			12/18/15 9:59	calc
TDS (ratio - measured/calculated)	Calculation		1.23						12/18/15 9:59	calc



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28008**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28008-01	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395869	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	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).
	WG395495	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).
	WG395749	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395432	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).
WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG395811	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: **L28008**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			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).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.



Tahoe Resources, Inc.

ACZ Project ID: **L28008**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28008-02	WG395867	Mercury, dissolved	M245.1 CVA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395869	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	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).
	WG395495	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).
	WG395749	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395432	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	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: **L28008**

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.
			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).
WG395333		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).
WG395338		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28008**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28008-03	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395876	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).
	WG395869	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	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).
	WG395495	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).
	WG395749	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395432	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).
WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.	
WG395811	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: **L28008**

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.
			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).
WG395333		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).
WG395338		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28008**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28008-04</b>	WG395867	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500Cl-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395876	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).
	WG395869	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395434	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395910	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).
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	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).
	WG395692	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).
	WG395749	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395432	Residue, Non-Filterable (TSS) @105C	SM2540D	Q6	Sample was received above recommended temperature.
		SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28008**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: MW-3

ACZ Sample ID: **L28008-01**

Date Sampled: 12/02/15 9:00

Date Received: 12/04/15

Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**Extract Method: **M3520****Workgroup:** WG395724

Analyst: mmn

Extract Date: 12/08/15 14:53

Analysis Date: 12/10/15 21:27

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.5		1.08	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	84.2		1.08	*	%	70	130

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-4

ACZ Sample ID: **L28008-02**  
Date Sampled: 12/02/15 11:55  
Date Received: 12/04/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395724**

Analyst: mmn  
Extract Date: 12/08/15 14:55  
Analysis Date: 12/10/15 21:55

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.4	J	1.04	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	85.1		1.04	*	%	70	130



**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: MW-5ACZ Sample ID: **L28008-03**  
Date Sampled: 12/02/15 11:00  
Date Received: 12/04/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395724Analyst: mmn  
Extract Date: 12/08/15 14:57  
Analysis Date: 12/10/15 22:23

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.4	J	1.04	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	89.3		1.04	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: MW-6ACZ Sample ID: **L28008-04**  
Date Sampled: 12/02/15 9:40  
Date Received: 12/04/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395724Analyst: mmn  
Extract Date: 12/08/15 14:59  
Analysis Date: 12/10/15 22:51

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.5		1.04	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	87.6		1.04	*	%	70	130

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28008**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28008-01	WG395724	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28008-02	WG395724	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28008-03	WG395724	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28008-04	WG395724	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

**Tahoe Resources, Inc.**

ACZ Project ID: **L28008**

**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: L28008  
 Date Received: 12/04/2015 09:28  
 Received By: ddp  
 Date Printed: 12/4/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	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? L28008-01 : A Orange container not received and the associated analysis could not be run. L28008-02 : A Orange container not received and the associated analysis could not be run. L28008-03 : A Orange container not received and the associated analysis could not be run. L28008-04 : A Orange container not received and the associated analysis could not be run.		X	
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

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

ACZ Project ID: L28008  
Date Received: 12/04/2015 09:28  
Received By: ddp  
Date Printed: 12/4/2015

-----  
4354      7.5      <=6.0      13      N/A  
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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.

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

28008

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza	Address: Boulevard los Próceres 18 calle 24-69 zona 10
Company: Tahoe Resources inc.	Empresarial, zona Pradera, torre IV oficina 1406
E-mail: m.berganza@sanrafael.com.gt	Telephone: (502) 5951 5248

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: Miguel Berganza	Address:
Company: Tahoe Resources inc.	
E-mail: m.berganza@sanrafael.com.gt	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

Sampler's Name: L.F. Sampler's Site Information State Zip code Time Zone

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: water Quality	# of Containers	GW+TPH																					
PO#: ESCOBAL																							
Reporting state for compliance testing:																							
Check box if samples include NRC licensed material?																							
SAMPLE IDENTIFICATION	DATE:TIME	Matrix	#																				
MW-3	02/12/15 09:00	GW	8	✓																			
MW-4	02/12/15 11:55	GW	8	✓																			
MW-5	02/12/15 11:00	GW	8	✓																			
MW-6	02/12/15 09:40	GW	8	✓																			

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

REMARKS

Present all results of this shipment (Dec 2nd) in the same report.

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[Signature]	15:40 02-12-2015	[Signature]	2.12.15 15:40 12415920

L28008 Chain of Custody





Guatemala December 2nd, 2015

To whom it may concern:

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

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

Sincerely yours,

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

December 17, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28007

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 04, 2015. This project has been assigned to ACZ's project number, L28007. 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 L28007. 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.

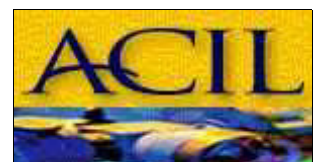
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 16, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

December 17, 2015

Project ID: Escobal

ACZ Project ID: L28007

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 4 ground water samples from Tahoe Resources, Inc. on December 4, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28007. 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.

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-7

ACZ Sample ID: **L28007-01**  
Date Sampled: 12/02/15 10:00  
Date Received: 12/04/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 18:43	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 15:31	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 13:04	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 11:19	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/15 12:52	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/09/15 23:17	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	12/09/15 19:58	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0020			mg/L	0.0002	0.001	12/10/15 16:59	msh
Barium, dissolved	M200.7 ICP	1	0.378			mg/L	0.003	0.02	12/09/15 23:17	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:17	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 23:17	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:17	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:58	msh
Calcium, dissolved	M200.7 ICP	1	27.3			mg/L	0.1	0.5	12/09/15 23:17	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:17	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 14:52	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:17	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:17	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/09/15 23:17	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	12/09/15 19:58	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:17	aeb
Magnesium, dissolved	M200.7 ICP	1	8.4			mg/L	0.2	1	12/09/15 23:17	aeb
Manganese, dissolved	M200.7 ICP	1	0.025	B		mg/L	0.005	0.03	12/09/15 23:17	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/15 17:24	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 23:17	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:17	aeb
Potassium, dissolved	M200.7 ICP	1	8.2			mg/L	0.2	1	12/09/15 23:17	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:17	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 19:58	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 19:58	msh
Sodium, dissolved	M200.7 ICP	1	17.3			mg/L	0.2	1	12/09/15 23:17	aeb
Strontium, dissolved	M200.7 ICP	1	0.191			mg/L	0.005	0.03	12/09/15 23:17	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:58	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 23:17	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:17	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:58	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:17	aeb
Zinc, dissolved	M200.7 ICP	1	0.35			mg/L	0.01	0.05	12/09/15 23:17	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-7

ACZ Sample ID: **L28007-01**  
 Date Sampled: 12/02/15 10:00  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	83.9		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	83.9		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.3			%			12/17/15 11:11	calc
Sum of Anions			2.9			meq/L			12/17/15 11:11	calc
Sum of Cations			3.1			meq/L			12/17/15 11:11	calc
Chloride	SM4500Cl-E	1	11.9		*	mg/L	0.5	2	12/12/15 10:20	mss2
Conductivity @25C	SM2510B	1	286		*	umhos/cm	1	10	12/04/15 19:15	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:15	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:36	pjb
Fluoride	SM4500F-C	1	0.12	B	*	mg/L	0.05	0.3	12/07/15 18:20	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		103			mg/L			12/17/15 11:11	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	2.45		*	mg/L	0.06	0.3	12/11/15 23:25	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 9:54	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1	0.5		*	mg/L	0.1	0.5	12/10/15 22:33	pjb
pH (lab)	SM4500H+ B									
pH		1	7.0	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.0		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.09	B		mg/L	0.06	0.2	12/17/15 11:11	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.02	0.05	12/11/15 23:16	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	12/08/15 21:35	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/08/15 23:19	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	256		*	mg/L	10	20	12/04/15 12:20	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/04/15 11:34	sck
Residue, Total (TS) @ 105C	SM2540B	1	276		*	mg/L	10	20	12/04/15 15:06	sck
Sulfate	D516-02/-07 - Turbidimetric	5	40.4		*	mg/L	5	25	12/14/15 15:04	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 15:23	enb
TDS (calculated)	Calculation		165			mg/L			12/17/15 11:11	calc
TDS (ratio - measured/calculated)	Calculation		1.55						12/17/15 11:11	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-8

ACZ Sample ID: **L28007-02**

Date Sampled: 12/02/15 10:50

Date Received: 12/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 18:51	spl
Cyanide, WAD	SM4500-CN I- distillation								12/11/15 12:48	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 13:13	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 11:26	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/15 13:00	spl

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	12/09/15 23:27	aeb
Antimony, dissolved	M200.8 ICP-MS	1	0.0006	B		mg/L	0.0004	0.002	12/09/15 20:00	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0012			mg/L	0.0002	0.001	12/10/15 17:01	msh
Barium, dissolved	M200.7 ICP	1	0.089			mg/L	0.003	0.02	12/09/15 23:27	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:27	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 23:27	aeb
Boron, dissolved	M200.7 ICP	1	0.04	B		mg/L	0.01	0.05	12/09/15 23:27	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:00	msh
Calcium, dissolved	M200.7 ICP	1	147			mg/L	0.1	0.5	12/09/15 23:27	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:27	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 15:01	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:27	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:27	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/09/15 23:27	aeb
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/09/15 20:00	msh
Lithium, dissolved	M200.7 ICP	1	0.019	B		mg/L	0.008	0.04	12/09/15 23:27	aeb
Magnesium, dissolved	M200.7 ICP	1	22.2			mg/L	0.2	1	12/09/15 23:27	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:27	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/15 17:26	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 23:27	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:27	aeb
Potassium, dissolved	M200.7 ICP	1	7.5			mg/L	0.2	1	12/09/15 23:27	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:27	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0007			mg/L	0.0001	0.0003	12/09/15 20:00	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 20:00	msh
Sodium, dissolved	M200.7 ICP	1	29.5			mg/L	0.2	1	12/09/15 23:27	aeb
Strontium, dissolved	M200.7 ICP	1	0.509			mg/L	0.005	0.03	12/09/15 23:27	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:00	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 23:27	aeb
Titanium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	12/09/15 23:27	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/09/15 20:00	msh
Vanadium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	12/09/15 23:27	aeb
Zinc, dissolved	M200.7 ICP	1	0.01	B		mg/L	0.01	0.05	12/09/15 23:27	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-8

ACZ Sample ID: **L28007-02**  
 Date Sampled: 12/02/15 10:50  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	75.4		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	75.4		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			5.8			%			12/17/15 11:12	calc
Sum of Anions			9.8			meq/L			12/17/15 11:12	calc
Sum of Cations			11			meq/L			12/17/15 11:12	calc
Chloride	SM4500Cl-E	1	29.6		*	mg/L	0.5	2	12/12/15 10:27	mss2
Conductivity @25C	SM2510B	1	897		*	umhos/cm	1	10	12/04/15 19:23	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:18	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 14:30	spl
Fluoride	SM4500F-C	1	0.13	B	*	mg/L	0.05	0.3	12/07/15 18:24	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		458			mg/L			12/17/15 11:12	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.14		*	mg/L	0.06	0.3	12/11/15 23:27	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 9:56	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:34	pjb
pH (lab)	SM4500H+ B									
pH		1	7.3	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.0		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.12	B		mg/L	0.06	0.2	12/17/15 11:12	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.02	0.05	12/11/15 23:17	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.07	H	*	mg/L	0.01	0.05	12/08/15 21:36	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.04	B	*	mg/L	0.01	0.05	12/08/15 23:21	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	796		*	mg/L	10	20	12/04/15 12:23	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	37.0		*	mg/L	5	20	12/04/15 11:36	sck
Residue, Total (TS) @ 105C	SM2540B	1	870		*	mg/L	10	20	12/04/15 15:08	sck
Sulfate	D516-02/-07 - Turbidimetric	20	354		*	mg/L	20	100	12/14/15 15:26	mss2
Sulfide as S	SM4500S2-D	1	0.05	B	*	mg/L	0.02	0.1	12/04/15 15:28	enb
TDS (calculated)	Calculation		636			mg/L			12/17/15 11:12	calc
TDS (ratio - measured/calculated)	Calculation		1.25						12/17/15 11:12	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-9

ACZ Sample ID: **L28007-03**

Date Sampled: 12/02/15 12:30

Date Received: 12/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 18:58	spl
Cyanide, WAD	SM4500-CN I- distillation								12/11/15 13:12	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 13:23	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 11:33	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/15 13:04	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/09/15 23:36	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 20:02	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	12/10/15 17:03	msh
Barium, dissolved	M200.7 ICP	1	0.060			mg/L	0.003	0.02	12/09/15 23:36	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:36	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 23:36	aeb
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/09/15 23:36	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:02	msh
Calcium, dissolved	M200.7 ICP	1	47.8			mg/L	0.1	0.5	12/09/15 23:36	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:36	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 15:04	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:36	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:36	aeb
Iron, dissolved	M200.7 ICP	1	8.88			mg/L	0.02	0.05	12/09/15 23:36	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:02	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/09/15 23:36	aeb
Magnesium, dissolved	M200.7 ICP	1	8			mg/L	0.2	1	12/09/15 23:36	aeb
Manganese, dissolved	M200.7 ICP	1	0.110			mg/L	0.005	0.03	12/09/15 23:36	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/15 17:28	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 23:36	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:36	aeb
Potassium, dissolved	M200.7 ICP	1	4.1			mg/L	0.2	1	12/09/15 23:36	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:36	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 20:02	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 20:02	msh
Sodium, dissolved	M200.7 ICP	1	25.9			mg/L	0.2	1	12/09/15 23:36	aeb
Strontium, dissolved	M200.7 ICP	1	0.344			mg/L	0.005	0.03	12/09/15 23:36	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:02	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 23:36	aeb
Titanium, dissolved	M200.7 ICP	1	0.005	B		mg/L	0.005	0.03	12/09/15 23:36	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:02	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:36	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:36	aeb



**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-9

ACZ Sample ID: **L28007-03**  
 Date Sampled: 12/02/15 12:30  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	122		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	122		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			5.5			%			12/17/15 0:00	calc
Sum of Anions			4.3			meq/L			12/17/15 0:00	calc
Sum of Cations			4.8			meq/L			12/17/15 0:00	calc
Chloride	SM4500Cl-E	1	7		*	mg/L	0.5	2	12/12/15 10:27	mss2
Conductivity @25C	SM2510B	1	381		*	umhos/cm	1	10	12/04/15 19:31	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:19	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 14:32	spl
Fluoride	SM4500F-C	1	0.53		*	mg/L	0.05	0.3	12/07/15 18:28	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		152			mg/L			12/17/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/11/15 23:13	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 9:57	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:35	pjb
pH (lab)	SM4500H+ B									
pH		1	7.6	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.2		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.43			mg/L	0.06	0.2	12/17/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.14		*	mg/L	0.02	0.05	12/11/15 23:18	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	12/08/15 21:37	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.01	0.05	12/08/15 23:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	314		*	mg/L	10	20	12/04/15 12:26	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	5.0	B	*	mg/L	5	20	12/04/15 11:39	sck
Residue, Total (TS) @ 105C	SM2540B	1	342		*	mg/L	10	20	12/04/15 15:09	sck
Sulfate	D516-02/-07 - Turbidimetric	5	77.6		*	mg/L	5	25	12/14/15 15:18	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 15:32	enb
TDS (calculated)	Calculation		255			mg/L			12/17/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.23						12/17/15 0:00	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-11

ACZ Sample ID: **L28007-04**

Date Sampled: 12/01/15 15:55

Date Received: 12/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 19:06	spl
Cyanide, WAD	SM4500-CN I- distillation								12/11/15 13:24	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 13:32	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 11:40	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 16:06	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/09/15 23:39	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 20:04	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0028			mg/L	0.0002	0.001	12/10/15 17:06	msh
Barium, dissolved	M200.7 ICP	1	0.032			mg/L	0.003	0.02	12/09/15 23:39	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:39	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 23:39	aeb
Boron, dissolved	M200.7 ICP	1	0.19			mg/L	0.01	0.05	12/09/15 23:39	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:04	msh
Calcium, dissolved	M200.7 ICP	1	258			mg/L	0.1	0.5	12/09/15 23:39	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:39	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 15:07	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:39	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:39	aeb
Iron, dissolved	M200.7 ICP	1	1.74			mg/L	0.02	0.05	12/09/15 23:39	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:04	msh
Lithium, dissolved	M200.7 ICP	1	0.096			mg/L	0.008	0.04	12/09/15 23:39	aeb
Magnesium, dissolved	M200.7 ICP	1	38.4			mg/L	0.2	1	12/09/15 23:39	aeb
Manganese, dissolved	M200.7 ICP	1	0.030			mg/L	0.005	0.03	12/09/15 23:39	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/15 17:30	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 23:39	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:39	aeb
Potassium, dissolved	M200.7 ICP	1	4.5			mg/L	0.2	1	12/09/15 23:39	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:39	aeb
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	12/09/15 20:04	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 20:04	msh
Sodium, dissolved	M200.7 ICP	1	73.7			mg/L	0.2	1	12/09/15 23:39	aeb
Strontium, dissolved	M200.7 ICP	1	2.480			mg/L	0.005	0.03	12/09/15 23:39	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 20:04	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 23:39	aeb
Titanium, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.005	0.03	12/09/15 23:39	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	12/09/15 20:04	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:39	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:39	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-11

ACZ Sample ID: **L28007-04**  
 Date Sampled: 12/01/15 15:55  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	134		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	134		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.6			%			12/17/15 11:12	calc
Sum of Anions			19			meq/L			12/17/15 11:12	calc
Sum of Cations			20			meq/L			12/17/15 11:12	calc
Chloride	SM4500Cl-E	1	65.5		*	mg/L	0.5	2	12/12/15 10:27	mss2
Conductivity @25C	SM2510B	1	1420		*	umhos/cm	1	10	12/04/15 19:40	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:20	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/15/15 14:33	spl
Fluoride	SM4500F-C	1	2.66		*	mg/L	0.05	0.3	12/07/15 18:31	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		802			mg/L			12/17/15 11:12	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/11/15 23:14	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/14/15 9:59	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:38	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.4		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/17/15 11:12	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/11/15 23:19	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	12/08/15 21:38	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.02	0.05	12/11/15 21:20	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1230		*	mg/L	10	20	12/04/15 12:28	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/04/15 11:41	sck
Residue, Total (TS) @ 105C	SM2540B	1	1270		*	mg/L	10	20	12/04/15 15:10	sck
Sulfate	D516-02/-07 - Turbidimetric	20	697		*	mg/L	20	100	12/14/15 15:20	mss2
Sulfide as S	SM4500S2-D	1	0.06	B	*	mg/L	0.02	0.1	12/04/15 15:37	enb
TDS (calculated)	Calculation		1230			mg/L			12/17/15 11:12	calc
TDS (ratio - measured/calculated)	Calculation		1.00						12/17/15 11:12	calc

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28007-01	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395495	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).
	WG395496	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395304	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	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: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28007-02	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395869	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395495	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).
	WG395496	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395304	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	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

Tahoe Resources, Inc.

ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.



Tahoe Resources, Inc.

ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28007-03	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395869	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395495	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).
	WG395496	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395304	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS

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ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
WG395333		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).
WG395338		Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28007-04	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395869	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395754	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
			M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG395751	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).
	WG395495	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).
	WG395749	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395304	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	Sulfate	D516-02/-07 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
			D516-02/-07 - Turbidimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for

Tahoe Resources, Inc.

ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: MW-7ACZ Sample ID: **L28007-01**  
Date Sampled: 12/02/15 10:00  
Date Received: 12/04/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395435Analyst: mmn  
Extract Date: 12/04/15 11:38  
Analysis Date: 12/08/15 4:00

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.5		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: MW-8ACZ Sample ID: **L28007-02**  
Date Sampled: 12/02/15 10:50  
Date Received: 12/04/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup: WG395435**Analyst: mmn  
Extract Date: 12/04/15 11:41  
Analysis Date: 12/08/15 4:55

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83.5		1.02	*	%	70	130

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-9

ACZ Sample ID: **L28007-03**  
Date Sampled: 12/02/15 12:30  
Date Received: 12/04/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395435**

Analyst: mmn  
Extract Date: 12/04/15 11:43  
Analysis Date: 12/08/15 5:23

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1.08	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	83		1.08	*	%	70	130

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: MW-11ACZ Sample ID: **L28007-04**  
Date Sampled: 12/01/15 15:55  
Date Received: 12/04/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395435Analyst: mmn  
Extract Date: 12/04/15 11:45  
Analysis Date: 12/08/15 5:50

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.04	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	86.4		1.04	*	%	70	130



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28007**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28007-01	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28007-02	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28007-03	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28007-04	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

**Tahoe Resources, Inc.**

ACZ Project ID: **L28007**

**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: L28007  
 Date Received: 12/04/2015 09:28  
 Received By: ddp  
 Date Printed: 12/4/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	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? L28007-01 : A Orange container not received and the associated analysis could not be run. L28007-02 : A Orange container not received and the associated analysis could not be run. L28007-03 : A Orange container not received and the associated analysis could not be run. L28007-04 : A Orange container not received and the associated analysis could not be run.		X	
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

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

ACZ Project ID: L28007  
Date Received: 12/04/2015 09:28  
Received By: ddp  
Date Printed: 12/4/2015

4243      9.7      <=6.0      13      N/A

Was ice present in the shipment container(s)?

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

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

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

L28007

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: 13412var los pices 18 calle 24-69 zona 10, Telephone: (502) 5951 5248

Copy of Report to:

Name: , Company: , E-mail: , Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis results. Includes entries for MW-7, MW-8, MW-9, MW-11.

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

REMARKS

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 02/12/15 15:40 and 02/12/2015.

L28007 Chain of Custody



Guatemala December 2nd, 2015

To whom it may concern:

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

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

Sincerely yours,

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

December 18, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28006

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 04, 2015. This project has been assigned to ACZ's project number, L28006. 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 L28006. 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.

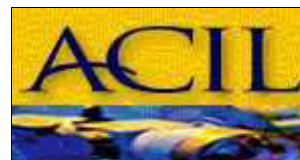
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 17, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.





Tahoe Resources, Inc.

December 18, 2015

Project ID: Escobal

ACZ Project ID: L28006

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 3 ground water samples from Tahoe Resources, Inc. on December 4, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28006. 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 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: MW-20

ACZ Sample ID: **L28006-01**  
Date Sampled: 12/02/15 12:00  
Date Received: 12/04/15  
Sample Matrix: Ground Water

**Inorganic Prep**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 18:04	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 14:58	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 12:18	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 10:57	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/15 12:35	spl

**Metals Analysis**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/09/15 23:08	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 19:47	msh
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	12/10/15 16:53	msh
Barium, dissolved	M200.7 ICP	1	0.003	B		mg/L	0.003	0.02	12/09/15 23:08	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:08	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 23:08	aeb
Boron, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:08	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:47	msh
Calcium, dissolved	M200.7 ICP	1	0.1	B		mg/L	0.1	0.5	12/09/15 23:08	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:08	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 14:43	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:08	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:08	aeb
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/09/15 23:08	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:47	msh
Lithium, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:08	aeb
Magnesium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/09/15 23:08	aeb
Manganese, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:08	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/15 17:17	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 23:08	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:08	aeb
Potassium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/09/15 23:08	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:08	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 19:47	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 19:47	msh
Sodium, dissolved	M200.7 ICP	1		U		mg/L	0.2	1	12/09/15 23:08	aeb
Strontium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:08	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:47	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 23:08	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:08	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:47	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:08	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:08	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-20

ACZ Sample ID: **L28006-01**  
 Date Sampled: 12/02/15 12:00  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/18/15 15:01	calc
Sum of Anions			N/A			meq/L			12/18/15 15:01	calc
Sum of Cations				U		meq/L			12/18/15 15:01	calc
Chloride	SM4500Cl-E	1		U	*	mg/L	0.5	2	12/12/15 10:20	mss2
Conductivity @25C	SM2510B	1		U	*	umhos/cm	1	10	12/04/15 18:42	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:11	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:33	pjb
Fluoride	SM4500F-C	1		U	*	mg/L	0.05	0.3	12/07/15 18:09	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		0.25			mg/L			12/18/15 15:01	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/17/15 22:35	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/10/15 16:57	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:27	pjb
pH (lab)	SM4500H+ B									
pH		1	6.4	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	22.3		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/18/15 15:01	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/11/15 23:10	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1		UH	*	mg/L	0.01	0.05	12/08/15 21:29	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/08/15 23:14	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	12/04/15 12:13	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/08/15 9:50	enb
Residue, Total (TS) @ 105C	SM2540B	1		U	*	mg/L	10	20	12/04/15 15:02	sck
Sulfate	D516-02/-07 - Turbidimetric	1		U	*	mg/L	1	5	12/14/15 14:58	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 15:01	enb
TDS (calculated)	Calculation		0.1			mg/L			12/18/15 15:01	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/18/15 15:01	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-21

ACZ Sample ID: **L28006-02**  
Date Sampled: 12/02/15 12:30  
Date Received: 12/04/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 18:19	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 15:09	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 12:36	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 11:04	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/15 12:39	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/09/15 23:11	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 19:49	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0017			mg/L	0.0002	0.001	12/10/15 16:55	msh
Barium, dissolved	M200.7 ICP	1	0.060			mg/L	0.003	0.02	12/09/15 23:11	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:11	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 23:11	aeb
Boron, dissolved	M200.7 ICP	1	0.03	B		mg/L	0.01	0.05	12/09/15 23:11	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:49	msh
Calcium, dissolved	M200.7 ICP	1	47.9			mg/L	0.1	0.5	12/09/15 23:11	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:11	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 14:46	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:11	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:11	aeb
Iron, dissolved	M200.7 ICP	1	8.91			mg/L	0.02	0.05	12/09/15 23:11	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:49	msh
Lithium, dissolved	M200.7 ICP	1	0.016	B		mg/L	0.008	0.04	12/09/15 23:11	aeb
Magnesium, dissolved	M200.7 ICP	1	8.1			mg/L	0.2	1	12/09/15 23:11	aeb
Manganese, dissolved	M200.7 ICP	1	0.111			mg/L	0.005	0.03	12/09/15 23:11	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/15 17:19	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 23:11	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:11	aeb
Potassium, dissolved	M200.7 ICP	1	4.1			mg/L	0.2	1	12/09/15 23:11	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:11	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 19:49	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 19:49	msh
Sodium, dissolved	M200.7 ICP	1	25.9			mg/L	0.2	1	12/09/15 23:11	aeb
Strontium, dissolved	M200.7 ICP	1	0.343			mg/L	0.005	0.03	12/09/15 23:11	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:49	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 23:11	aeb
Titanium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:11	aeb
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:49	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:11	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:11	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: MW-21

ACZ Sample ID: **L28006-02**  
 Date Sampled: 12/02/15 12:30  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	124		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	124		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			5.5			%			12/18/15 0:00	calc
Sum of Anions			4.3			meq/L			12/18/15 0:00	calc
Sum of Cations			4.8			meq/L			12/18/15 0:00	calc
Chloride	SM4500Cl-E	1	7.7		*	mg/L	0.5	2	12/12/15 10:20	mss2
Conductivity @25C	SM2510B	1	380		*	umhos/cm	1	10	12/04/15 18:57	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:13	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:34	pjb
Fluoride	SM4500F-C	1	0.52		*	mg/L	0.05	0.3	12/07/15 18:14	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		153			mg/L			12/18/15 0:00	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/11/15 23:05	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/10/15 16:59	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:29	pjb
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	21.9		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus		0.43			mg/L	0.06	0.2	12/18/15 0:00	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1	0.14		*	mg/L	0.02	0.05	12/11/15 23:11	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.06	H	*	mg/L	0.01	0.05	12/08/15 21:31	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.15		*	mg/L	0.01	0.05	12/08/15 23:15	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	312		*	mg/L	10	20	12/04/15 12:15	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1	8.0	B	*	mg/L	5	20	12/08/15 9:51	enb
Residue, Total (TS) @ 105C	SM2540B	1	332		*	mg/L	10	20	12/04/15 15:04	sck
Sulfate	D516-02/-07 - Turbidimetric	5	74.4		*	mg/L	5	25	12/14/15 15:04	mss2
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/04/15 15:14	enb
TDS (calculated)	Calculation		254			mg/L			12/18/15 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.23						12/18/15 0:00	calc

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: PSA-1

ACZ Sample ID: **L28006-03**

Date Sampled: 12/02/15 12:18

Date Received: 12/04/15

Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/09/15 18:35	spl
Cyanide, WAD	SM4500-CN I- distillation								12/09/15 15:20	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/10/15 12:55	mss2
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/11/15 11:12	bsu
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/08/15 12:43	spl

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/09/15 23:14	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/09/15 19:52	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0065			mg/L	0.0002	0.001	12/10/15 16:57	msh
Barium, dissolved	M200.7 ICP	1	0.024			mg/L	0.003	0.02	12/09/15 23:14	aeb
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:14	aeb
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/09/15 23:14	aeb
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	12/09/15 23:14	aeb
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:52	msh
Calcium, dissolved	M200.7 ICP	1	201			mg/L	0.1	0.5	12/09/15 23:14	aeb
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:14	aeb
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/10/15 14:49	aeb
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/09/15 23:14	aeb
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:14	aeb
Iron, dissolved	M200.7 ICP	1	2.41			mg/L	0.02	0.05	12/09/15 23:14	aeb
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:52	msh
Lithium, dissolved	M200.7 ICP	1	0.100			mg/L	0.008	0.04	12/09/15 23:14	aeb
Magnesium, dissolved	M200.7 ICP	1	36.1			mg/L	0.2	1	12/09/15 23:14	aeb
Manganese, dissolved	M200.7 ICP	1	0.056			mg/L	0.005	0.03	12/09/15 23:14	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/15/15 17:22	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/09/15 23:14	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/09/15 23:14	aeb
Potassium, dissolved	M200.7 ICP	1	4.6			mg/L	0.2	1	12/09/15 23:14	aeb
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/09/15 23:14	aeb
Selenium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0003	12/09/15 19:52	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/09/15 19:52	msh
Sodium, dissolved	M200.7 ICP	1	47.6			mg/L	0.2	1	12/09/15 23:14	aeb
Strontium, dissolved	M200.7 ICP	1	1.960			mg/L	0.005	0.03	12/09/15 23:14	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/09/15 19:52	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/09/15 23:14	aeb
Titanium, dissolved	M200.7 ICP	1	0.011	B		mg/L	0.005	0.03	12/09/15 23:14	aeb
Uranium, dissolved	M200.8 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	12/09/15 19:52	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/09/15 23:14	aeb
Zinc, dissolved	M200.7 ICP	1	0.06			mg/L	0.01	0.05	12/09/15 23:14	aeb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: PSA-1

ACZ Sample ID: **L28006-03**  
 Date Sampled: 12/02/15 12:18  
 Date Received: 12/04/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	166		*	mg/L	2	20	12/04/15 0:00	sck
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/04/15 0:00	sck
Total Alkalinity		1	166		*	mg/L	2	20	12/04/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/18/15 15:02	calc
Sum of Anions			15			meq/L			12/18/15 15:02	calc
Sum of Cations			15			meq/L			12/18/15 15:02	calc
Chloride	SM4500Cl-E	1	42.7		*	mg/L	0.5	2	12/12/15 10:20	mss2
Conductivity @25C	SM2510B	1	1180		*	umhos/cm	1	10	12/04/15 19:07	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 23:14	pjb
Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/09/15 22:35	pjb
Fluoride	SM4500F-C	1	2.63		*	mg/L	0.05	0.3	12/07/15 18:17	enb
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		651			mg/L			12/18/15 15:02	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	12/11/15 23:07	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/10/15 17:00	krh
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/10/15 22:32	pjb
pH (lab)	SM4500H+ B									
pH		1	8.0	H	*	units	0.1	0.1	12/04/15 0:00	sck
pH measured at		1	21.9		*	C	0.1	0.1	12/04/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/18/15 15:02	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/11/15 23:14	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.01	0.05	12/08/15 21:34	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/08/15 23:17	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	982		*	mg/L	10	20	12/04/15 12:18	sck
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/08/15 9:52	enb
Residue, Total (TS) @ 105C	SM2540B	1	1030		*	mg/L	10	20	12/04/15 15:05	sck
Sulfate	D516-02/-07 - Turbidimetric	20	513		*	mg/L	20	100	12/14/15 15:08	mss2
Sulfide as S	SM4500S2-D	1	0.14		*	mg/L	0.02	0.1	12/04/15 15:19	enb
TDS (calculated)	Calculation		953			mg/L			12/18/15 15:02	calc
TDS (ratio - measured/calculated)	Calculation		1.03						12/18/15 15:02	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 unless omitted or equal to the PQL (see comment #5). Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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



Tahoe Resources, Inc.

ACZ Project ID: **L28006**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28006-01	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
			SM2510B	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG396080	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	Q6	Sample was received above recommended temperature.
	WG395636	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395495	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).
	WG395496	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395432	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	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

Tahoe Resources, Inc.

ACZ Project ID: **L28006**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L28006**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28006-02	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	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).
	WG395636	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
			pH measured at	SM4500H+ B	Q6
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395495	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).
	WG395496	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395432	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	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

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L28006**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

Tahoe Resources, Inc.

ACZ Project ID: **L28006**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28006-03	WG395338	Bicarbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
		Carbonate as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395756	Chloride	SM4500CI-E	Q6	Sample was received above recommended temperature.
	WG395338	Conductivity @25C	SM2510B	Q6	Sample was received above recommended temperature.
	WG395600	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).
	WG395598	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500-CN I,E-Colorimetric w/ distillation	Q6	Sample was received above recommended temperature.
			SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395383	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).
	WG395338	Hydroxide as CaCO3	SM2320B - Titration	Q6	Sample was received above recommended temperature.
	WG395748	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).
	WG395636	Nitrogen, ammonia	M350.1	Q6	Sample was received above recommended temperature.
	WG395694	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).
	WG395338	pH	SM4500H+ B	Q6	Sample was received above recommended temperature.
		pH measured at	SM4500H+ B	Q6	Sample was received above recommended temperature.
	WG395751	Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M365.1 - Auto Ascorbic Acid (digest)	Q6	Sample was received above recommended temperature.
			M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395495	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).
	WG395496	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).
	WG395305	Residue, Filterable (TDS) @180C	SM2540C	Q6	Sample was received above recommended temperature.
	WG395432	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).
	WG395334	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG395811	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

REPAD.15.06.05.01

Tahoe Resources, Inc.

ACZ Project ID: **L28006**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					accurate evaluation (< 10x MDL).
	WG395333	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).
	WG395338	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.

**Tahoe Resources, Inc.**Project ID: Escobal  
Sample ID: MW-20ACZ Sample ID: **L28006-01**  
Date Sampled: 12/02/15 12:00  
Date Received: 12/04/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395435Analyst: mmn  
Extract Date: 12/04/15 11:34  
Analysis Date: 12/08/15 3:04

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	83.3		1	*	%	70	130

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: MW-21

ACZ Sample ID: **L28006-02**  
Date Sampled: 12/02/15 12:30  
Date Received: 12/04/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395435**

Analyst: mmn  
Extract Date: 12/04/15 11:36  
Analysis Date: 12/08/15 3:32

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		0.7		1.02	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	82		1.02	*	%	70	130



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: PSA-1

ACZ Sample ID: **L28006-03**  
Date Sampled: 12/02/15 12:18  
Date Received: 12/04/15  
Sample Matrix: Ground Water

**Diesel Range Organics (C10-C28)**

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

**Workgroup: WG395724**

Analyst: mmn  
Extract Date: 12/08/15 14:51  
Analysis Date: 12/10/15 20:59

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28			U	1.08	*	mg/L	0.1	0.5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	89.6		1.08	*	%	70	130

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28006**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28006-01	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28006-02	WG395435	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28006-03	WG395724	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

**Tahoe Resources, Inc.**

ACZ Project ID: **L28006**

**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: L28006  
 Date Received: 12/04/2015 09:28  
 Received By: ddp  
 Date Printed: 12/4/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	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? L28006-01 : A Orange container not received and the associated analysis could not be run. L28006-02 : A Orange container not received and the associated analysis could not be run. L28006-03 : A Orange container not received and the associated analysis could not be run.		X	
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
3098	16.9	<=6.0	13	N/A

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L28006  
Date Received: 12/04/2015 09:28  
Received By: ddp  
Date Printed: 12/4/2015

Was ice present in the shipment container(s)?

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

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

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc.

L28006

CHAIN of CUSTODY

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

Report to:

Name: Miguel Berganza, Company: Tahoe Resources Inc., E-mail: M.Berganza@sanrafael.com.gt, Address: Boulevard los Proceres 18 calle 24-69 zona 10, Telephone: (502) 5951 5248

Copy of Report to:

Name: , Company: , E-mail: , Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, ANALYSES REQUESTED. Includes rows for MW-20, MW-21, PSA-1.

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

REMARKS

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

RELINQUISHED BY: [Signature], DATE:TIME: 15:40, RECEIVED BY: [Signature], DATE:TIME: 2.12.15 15:10

L28006 Chain of Custody



Guatemala December 2nd, 2015

To whom it may concern:

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

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

Sincerely yours,

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



December 30, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28173

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 11, 2015. This project has been assigned to ACZ's project number, L28173. 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 L28173. 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.

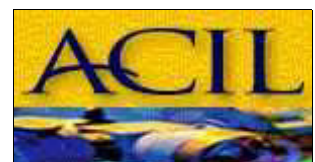
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 29, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



Tahoe Resources, Inc.

December 30, 2015

Project ID: Escobal

ACZ Project ID: L28173

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 8 miscellaneous samples from Tahoe Resources, Inc. on December 11, 2015. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L28173. 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: **L28173-07**  
Date Sampled: 12/08/15 10:55  
Date Received: 12/11/15  
Sample Matrix: Ground Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/17/15 18:06	spl
Cyanide, WAD	SM4500-CN I- distillation								12/18/15 13:21	spl
Nitrogen, total Kjeldahl	M351.2 - Block Digestor								12/18/15 12:50	spl
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid Digestion								12/15/15 7:07	krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/17/15 18:00	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/18/15 16:51	gss
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/15 19:43	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0135			mg/L	0.0002	0.001	12/17/15 19:43	msh
Barium, dissolved	M200.7 ICP	1	0.084			mg/L	0.003	0.02	12/17/15 17:07	gss
Beryllium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:07	gss
Bismuth, dissolved	M200.7 ICP	1		U	*	mg/L	0.04	0.2	12/17/15 17:07	gss
Boron, dissolved	M200.7 ICP	1	0.11			mg/L	0.01	0.05	12/17/15 17:07	gss
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:43	msh
Calcium, dissolved	M200.7 ICP	1	101		*	mg/L	0.1	0.5	12/17/15 17:07	gss
Chromium, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:07	gss
Cobalt, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:07	gss
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:07	gss
Gallium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 17:07	gss
Iron, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.05	12/17/15 17:07	gss
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:43	msh
Lithium, dissolved	M200.7 ICP	1	0.147			mg/L	0.008	0.04	12/17/15 17:07	gss
Magnesium, dissolved	M200.7 ICP	1	6.2			mg/L	0.2	1	12/17/15 17:07	gss
Manganese, dissolved	M200.7 ICP	1	0.024	B		mg/L	0.005	0.03	12/17/15 17:07	gss
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/21/15 16:22	pta
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/17/15 17:07	gss
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.008	0.04	12/17/15 17:07	gss
Potassium, dissolved	M200.7 ICP	1	1.9			mg/L	0.2	1	12/18/15 16:51	gss
Scandium, dissolved	M200.7 ICP	1		U	*	mg/L	0.1	0.5	12/17/15 17:07	gss
Selenium, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0003	12/17/15 19:43	msh
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/15 19:43	msh
Sodium, dissolved	M200.7 ICP	1	78.3			mg/L	0.2	1	12/17/15 17:07	gss
Strontium, dissolved	M200.7 ICP	1	4.650		*	mg/L	0.005	0.03	12/17/15 17:07	gss
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/15 19:43	msh
Tin, dissolved	M200.7 ICP	1		U		mg/L	0.04	0.2	12/18/15 16:51	gss
Titanium, dissolved	M200.7 ICP	1	0.009	B		mg/L	0.005	0.03	12/17/15 17:07	gss
Uranium, dissolved	M200.8 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	12/17/15 19:43	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/17/15 17:07	gss
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/17/15 17:07	gss

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: PSA-SR

ACZ Sample ID: **L28173-07**  
 Date Sampled: 12/08/15 10:55  
 Date Received: 12/11/15  
 Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	170			mg/L	2	20	12/12/15 0:00	sck
Carbonate as CaCO3		1		U		mg/L	2	20	12/12/15 0:00	sck
Hydroxide as CaCO3		1		U		mg/L	2	20	12/12/15 0:00	sck
Total Alkalinity		1	170			mg/L	2	20	12/12/15 0:00	sck
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.1			%			12/30/15 11:32	calc
Sum of Anions			9.6			meq/L			12/30/15 11:32	calc
Sum of Cations			9.2			meq/L			12/30/15 11:32	calc
Chloride	SM4500Cl-E	1	4.2			mg/L	0.5	2	12/23/15 14:25	krh/ms s
Conductivity @25C	SM2510B	1	879			umhos/cm	1	10	12/12/15 23:16	sck
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/17/15 23:08	pjb
Cyanide, WAD	SM4500-CN I,E- Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/22/15 18:58	pjb
Fluoride	SM4500F-C	1	0.89		*	mg/L	0.05	0.3	12/15/15 16:55	abd
Hardness as CaCO3 (dissolved)	SM2340B - Calculation		278			mg/L			12/30/15 11:32	calc
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.15			mg/L	0.02	0.1	12/22/15 23:58	pjb
Nitrogen, ammonia	M350.1	1		U	*	mg/L	0.05	0.2	12/22/15 16:50	mss2
Nitrogen, total Kjeldahl	M351.2 - TKN by Block Digester	1		U	*	mg/L	0.1	0.5	12/18/15 22:45	pjb
pH (lab)	SM4500H+ B									
pH		1	8.3	H		units	0.1	0.1	12/12/15 0:00	sck
pH measured at		1	22.8			C	0.1	0.1	12/12/15 0:00	sck
Phosphate	Calculation based on dissolved Phosphorus			U		mg/L	0.06	0.2	12/30/15 11:32	calc
Phosphorus, dissolved	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.02	0.05	12/15/15 23:32	pjb
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	1	0.02	BH	*	mg/L	0.02	0.05	12/11/15 20:30	pjb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U		mg/L	0.02	0.05	12/19/15 1:06	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	620			mg/L	10	20	12/14/15 14:02	abd
Residue, Non-Filterable (TSS) @105C	SM2540D	1		U	*	mg/L	5	20	12/15/15 14:07	enb
Residue, Total (TS) @ 105C	SM2540B	1	652			mg/L	10	20	12/11/15 17:58	sck
Sulfate	D516-02/-07 - Turbidimetric	20	288			mg/L	20	100	12/17/15 17:57	bsu
Sulfide as S	SM4500S2-D	1		U	*	mg/L	0.02	0.1	12/14/15 15:15	enb
TDS (calculated)	Calculation		589			mg/L			12/30/15 11:32	calc
TDS (ratio - measured/calculated)	Calculation		1.05						12/30/15 11:32	calc



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
	WG395877	Residue, Non-Filterable (TSS) @105C	SM2540D SM2540D	Q6 RA	Sample was received above recommended temperature. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395815	Residue, Total (TS) @ 105C	SM2540B	Q6	Sample was received above recommended temperature.
	WG396061	Sulfate	D516-02/-07 - Turbidimetric	Q6	Sample was received above recommended temperature.
	WG395814	Sulfide as S	SM4500S2-D SM4500S2-D SM4500S2-D	Q6 Q6 QD RA	Sample was received above recommended temperature. Sample was received above recommended temperature. Reported value is the background-corrected concentration, as described by the method. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395768	Total Alkalinity	SM2320B - Titration	Q6	Sample was received above recommended temperature.
<b>L28173-07</b>	WG396035	Calcium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
		Strontium, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG396082	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396275	Cyanide, WAD	SM4500-CN I,E-Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395836	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).
	WG396253	Nitrogen, ammonia	M350.1	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG396147	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).
	WG395911	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).
	WG395747	Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid M365.1 - Automated Ascorbic Acid	H3 RA	Sample was received and analyzed past holding time. Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG395868	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).
	WG395814	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: PSA-SRACZ Sample ID: **L28173-07**  
Date Sampled: 12/08/15 10:55  
Date Received: 12/11/15  
Sample Matrix: Ground Water**Diesel Range Organics (C10-C28)**Analysis Method: **M8015D GC/FID**  
Extract Method: **M3520****Workgroup:** WG395974Analyst: mmn  
Extract Date: 12/14/15 12:45  
Analysis Date: 12/16/15 4:16

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	85.1		1	*	%	70	130

**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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



Tahoe Resources, Inc.

ACZ Project ID: **L28173**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28173-01	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-02	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-03	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-04	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			OTP	S7	Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-05	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
			OTP	S7	Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.
	WG396089	Oil and Grease	1664A - Gravimetric	Q6	Sample was received above recommended temperature.
L28173-06	WG395974	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
			M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28173-07	WG395974	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.
L28173-08	WG395974	*All Compounds*	M8015D GC/FID	Q9	Insufficient sample received to meet method QC requirements.

**Tahoe Resources, Inc.**

ACZ Project ID: **L28173**

**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: L28173  
 Date Received: 12/11/2015 10:32  
 Received By: ddp  
 Date Printed: 12/11/2015

**Receipt Verification**

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

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks? L28173-06 Container B1667726 (ORANGE): This container was received broken and the associated analysis were removed from the project.		X	
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time? Some parameters were received past hold time.		X	

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
2328	8	<=6.0	13	N/A
2519	3.2	<=6.0	13	N/A
2905	6.2	<=6.0	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.

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L28173  
Date Received: 12/11/2015 10:32  
Received By: ddp  
Date Printed: 12/11/2015

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

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. *CJ8173*

CHAIN of CUSTODY

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

Report to:

Name: <i>Miguel Berganza</i>	Address: <i>BULEVAR los pinores, 18 calle 24-69 zona 10</i>
Company: <i>Tahoe Resources Inc.</i>	<i>Empresarial, Zona Pradera, Torre IV Oficina 1406</i>
E-mail: <i>M.Berganza@sanrafael.com.gt</i>	Telephone: <i>(502) 5951 5248</i>

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

Sampler's Name: *LF* ~~Signature~~ Sampler's Site Information State \_\_\_\_\_ Zip code \_\_\_\_\_ Time Zone \_\_\_\_\_

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: <i>water quality</i>				# of Containers	SW																
PO#: <i>Escobal</i>																					
Reporting state for compliance testing:																					
Check box if samples include NRC licensed material?																					
SAMPLE IDENTIFICATION	DATE:TIME	Matrix																			
<i>1. SW1-E</i>	<i>09/11/15 11:00</i>	<i>SW</i>	<i>10</i>																		
<i>2. SW2-E</i>	<i>09/12/15 10:00</i>	<i>SW</i>	<i>10</i>																		
<i>3. SW2B-E</i>	<i>09/12/15 09:10</i>	<i>SW</i>	<i>10</i>																		

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

REMARKS

*COC # 1*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>15:00</i>	<i>[Signature]</i>	<i>9.12.15 15:00</i>
	<i>09-12-2015</i>	<i>[Signature]</i>	<i>12/15/15</i>
			<i>12/11/15 10:00</i>

28173 Chain of Custody



Laboratories, Inc. *28173*

CHAIN of CUSTODY

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

Report to:

Name: <i>Miguel Berganza</i>	Address: <i>Bulevar Los Pirateros 12 calle 24-69 zona 15</i>
Company: <i>Tahoe Resources Inc.</i>	<i>Empresarial Zona Pradera Torre IV Oficina 1406</i>
E-mail: <i>MBerganza@sanrafael.com.gt</i>	Telephone: <i>(502) 5951-5248</i>

Copy of Report to:

Name:	E-mail:
Company:	Telephone:

Invoice to:

Name: <i>Miguel Berganza</i>	Address:
Company: <i>Tahoe Resources Inc.</i>	
E-mail: <i>MBerganza@sanrafael.com.gt</i>	Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers											
<i>4. SW4-E</i>	<i>09/12/15 08:40</i>	<i>SW</i>	<i>10</i>	<i>/</i>										
<i>5. SWS-F</i>	<i>09/12/15 07:59</i>	<i>SW</i>	<i>10</i>	<i>/</i>										
<i>6. SW7-F</i>	<i>09/12/15 08:00</i>	<i>SW</i>	<i>10</i>	<i>/</i>										

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

REMARKS

*COC# 2*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>09-12-2015 15:00</i>	<i>[Signature]</i>	<i>9.12.15 15:00</i>
		<i>[Signature]</i>	<i>12/11/15 10:30</i>



MINERA   
**SAN RAFAEL**

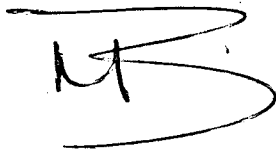
Guatemala December 9th, 2015

To whom it may concern:

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

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

Sincerely yours,



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



REG 016 Resultados de Análisis

Muestra: 8 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquescuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de muestreo: 071215  
Fecha de ingreso de muestras: 071215  
Fecha de análisis: 071215-171215  
Fecha de informe: 171215

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 <sub>5</sub> mg/l	* Demanda Química de Oxígeno DQO mg/l	Cromo Hexavalente Cr(VI) mg/l	** Coliformes Fecales (NMP/100ml)
3272	SW2A-E	< 1	< 1	< 10	< 25	N.D.	540
3273	SW3-E	48	< 1	< 10	< 25	N.D.	9.2 x 10 <sup>3</sup>
3274	SW4A-E	46	< 1	< 10	< 25	N.D.	5.4 x 10 <sup>3</sup>
3275	SW6-E	40	< 1	< 10	< 25	N.D.	2.2 x 10 <sup>3</sup>
3276	SW9-E	37	< 1	< 10	< 25	N.D.	3.5 x 10 <sup>3</sup>
3277	SW8-E	54	< 1	< 10	31	N.D.	5.4 x 10 <sup>4</sup>
3278	SW11-E	< 1	< 1	< 10	< 25	N.D.	240
3279	GW1-A	21	< 1	---	---	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 más Probable.*

*N.D. No detectable. Debajo del limite de detección.*


*Limites de detección: Cromo hexavalente (0.05 mg/l)*

*Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

\* Análisis acreditado COGUANOR NGR/COPANT/ISO/IEC 17025 según OGA LE 006-04

\*\* Análisis referido.



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

REG 016 Resultados de Análisis

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: 011215  
Fecha de ingreso de muestra: 011215  
Fecha de análisis: 011215-111215  
Fecha del informe: 111215

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)
3177	GW-2	739	22	N.D.	94
3178	GW-3	< 1	< 1	N.D.	< 2
3179	GW-4	1200	687	N.D.	4.5
3180	GW-10	< 1	< 1	N.D.	< 2
3181	GW-11	< 1	< 1	N.D.	< 2
3182	RW-1	< 1	< 1	N.D.	49

**Notas:**

*Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración.*

*Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.*

*Fotométricos Merck. NMP: Número más Probable.*

*N.D. No detectable. Debajo del límite de detección.*

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

*Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

*\* Análisis referidos.*



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

REG 016 Resultados de Análisis

Muestras: 10 muestras de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de muestreo: 021215  
Fecha de ingreso de muestra: 021215  
Fecha de análisis: 021215-111215  
Fecha de informe: 111215

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)
3198	MW-3	< 1	< 1	N.D.	< 2
3199	MW-4	< 1	< 1	N.D.	< 2
3200	MW-5	< 1	< 1	N.D.	< 2
3201	MW-6	< 1	< 1	N.D.	4.5
3202	MW-7	45	< 1	N.D.	< 2
3203	MW-8	30	< 1	N.D.	< 2
3204	MW-9	44	< 1	N.D.	< 2
3206	MW-20	< 1	< 1	N.D.	< 2
3207	MW-21	26	< 1	N.D.	< 2
3208	PSA-1	270	< 1	N.D.	< 2

**Notas:**

*Captación de muestras: Las muestras fueron captadas por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración.*

*Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.*

*Fotométricos Merck. NMP: Número más Probable.*

*N.D. No detectable. Debajo del límite de detección.*

*Límites de detección: Cromo hexavalente (0.05 mg/l)*

*Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

*\* Análisis referidos.*



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

REG 016 Resultados de Análisis

Muestras: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de muestreo: 011215  
Fecha de ingreso de muestra: 021215  
Fecha de análisis: 021215-111215  
Fecha de informe: 111215

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)
3205	MW-11	129	< 1	N.D.	< 2

Notas:

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración.*

*Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.*

*Fotométricos Merck. NMP: Número más Probable.*

*N.D. No detectable. Debajo del límite de detección.*

*Límites de detección: Cromo hexavalente (0.05 mg/l)*

*Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

*\* Análisis referidos.*



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

REG 016 Resultados de Análisis

Muestras: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de muestreo: 081215  
Fecha de ingreso de muestra: 091215  
Fecha de análisis: 091215-221215  
Fecha de informe: 221215

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)
3330	PSA-SR	< 1	< 1	N.D.	< 2

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración.*

*Metodología: Espectrofotométricos / SMWW: Standard Methods for water and wastewater APHA, AWWA, 22 edic. Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977.*

*Fotométricos Merck. NMP: Número más Probable.*

*N.D. No detectable. Debajo del límite de detección.*

*Límites de detección: Cromo hexavalente (0.05 mg/l)*

*Los resultados obtenidos corresponden únicamente a las muestras recibidas por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

*\* Análisis referidos.*



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Silvia Argueta  
Directora

## **11.6 Informes originales de los Resultados Analíticos obtenidos del muestreo de sedimentos, Marzo 2016**

February 03, 2016

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28530

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on January 13, 2016. This project has been assigned to ACZ's project number, L28530. 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 L28530. 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.

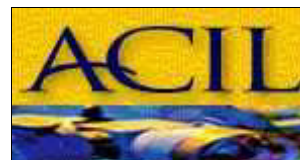
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after March 04, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-3

ACZ Sample ID: **L28530-01**  
Date Sampled: 12/07/15 11:35  
Date Received: 01/13/16  
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 10:24	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 10:57	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50500	5200		*	mg/Kg	50	300	01/29/16 13:40	msh
Antimony, total (3050)	M6020 ICP-MS	505	1		*	mg/Kg	0.2	1	01/27/16 19:51	msh
Arsenic, total (3050)	M6020 ICP-MS	505	20.4		*	mg/Kg	0.1	0.5	01/27/16 19:51	msh
Barium, total (3050)	M6020 ICP-MS	50500	330			mg/Kg	30	100	01/29/16 13:40	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	01/28/16 14:06	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.23	B		mg/Kg	0.05	0.3	01/27/16 19:51	msh
Calcium, total (3050)	M6010B ICP	101	3980			mg/Kg	10	50	01/28/16 1:11	gss
Chromium, total (3050)	M6020 ICP-MS	505	3.2		*	mg/Kg	0.3	1	01/27/16 19:51	msh
Copper, total (3050)	M6020 ICP-MS	505	4.4			mg/Kg	0.3	1	01/27/16 19:51	msh
Iron, total (3050)	M6010B ICP	101	7530		*	mg/Kg	2	5	01/28/16 1:11	gss
Lead, total (3050)	M6020 ICP-MS	505	17.0			mg/Kg	0.05	0.3	01/27/16 19:51	msh
Magnesium, total (3050)	M6010B ICP	101	870			mg/Kg	20	100	01/28/16 1:11	gss
Manganese, total (3050)	M6020 ICP-MS	50500	1920		*	mg/Kg	30	100	01/29/16 13:40	msh
Mercury, total	M7471A CVAA	241	0.09	BH	*	mg/Kg	0.05	0.2	01/18/16 12:10	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/28/16 1:11	gss
Nickel, total (3050)	M6020 ICP-MS	505	2.9		*	mg/Kg	0.3	2	01/27/16 19:51	msh
Potassium, total (3050)	M6010B ICP	101	1390			mg/Kg	20	100	01/28/16 1:11	gss
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	01/27/16 19:51	msh
Silver, total (3050)	M6020 ICP-MS	505	0.05	B		mg/Kg	0.03	0.1	01/27/16 19:51	msh
Zinc, total (3050)	M6020 ICP-MS	505	33		*	mg/Kg	1	3	01/27/16 19:51	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	73.4		*	%	0.1	0.5	01/18/16 10:58	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 9:45	rbt
Digestion - Hot Plate	M3050B ICP								01/26/16 14:08	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/26/16 14:08	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 7:45	rbt



**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-3

ACZ Sample ID: **L28530-01**

Date Sampled: 12/07/15 11:35

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	22.7		UH	*	mg/Kg	0.1	0.5	01/25/16 16:28	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	61.7	0.00870	H	*	%	0.00123	0.00309	01/20/16 11:25	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-4

ACZ Sample ID: **L28530-02**  
Date Sampled: 12/09/15 08:40  
Date Received: 01/13/16  
Sample Matrix: *Sediment*

**Inorganic Prep**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 10:49	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 11:25	mss2

**Metals Analysis**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	5490		*	mg/Kg	10	50	01/29/16 13:42	msh
Antimony, total (3050)	M6020 ICP-MS	505	3.3		*	mg/Kg	0.2	1	01/27/16 19:55	msh
Arsenic, total (3050)	M6020 ICP-MS	505	16.7		*	mg/Kg	0.1	0.5	01/27/16 19:55	msh
Barium, total (3050)	M6020 ICP-MS	505	108			mg/Kg	0.3	1	01/27/16 19:55	msh
Boron, total (3050)	M6010B ICP	101	1	B		mg/Kg	1	5	01/28/16 14:09	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.16	B		mg/Kg	0.05	0.3	01/27/16 19:55	msh
Calcium, total (3050)	M6010B ICP	101	1960			mg/Kg	10	50	01/28/16 1:14	gss
Chromium, total (3050)	M6020 ICP-MS	505	3		*	mg/Kg	0.3	1	01/27/16 19:55	msh
Copper, total (3050)	M6020 ICP-MS	505	5.2			mg/Kg	0.3	1	01/27/16 19:55	msh
Iron, total (3050)	M6010B ICP	101	9960		*	mg/Kg	2	5	01/28/16 1:14	gss
Lead, total (3050)	M6020 ICP-MS	505	9.16			mg/Kg	0.05	0.3	01/27/16 19:55	msh
Magnesium, total (3050)	M6010B ICP	101	880			mg/Kg	20	100	01/28/16 1:14	gss
Manganese, total (3050)	M6020 ICP-MS	10100	517		*	mg/Kg	5	30	01/29/16 13:42	msh
Mercury, total	M7471A CVAA	226		UH	*	mg/Kg	0.05	0.2	01/19/16 12:09	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/28/16 1:14	gss
Nickel, total (3050)	M6020 ICP-MS	505	2.4		*	mg/Kg	0.3	2	01/27/16 19:55	msh
Potassium, total (3050)	M6010B ICP	101	1300			mg/Kg	20	100	01/28/16 1:14	gss
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	01/27/16 19:55	msh
Silver, total (3050)	M6020 ICP-MS	505	0.08	B		mg/Kg	0.03	0.1	01/27/16 19:55	msh
Zinc, total (3050)	M6020 ICP-MS	505	30		*	mg/Kg	1	3	01/27/16 19:55	msh

**Soil Analysis**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	77.2		*	%	0.1	0.5	01/18/16 14:36	rbt

**Soil Preparation**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 9:47	rbt
Digestion - Hot Plate	M3050B ICP								01/26/16 15:25	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/26/16 15:25	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 10:02	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-4

ACZ Sample ID: **L28530-02**

Date Sampled: 12/09/15 08:40

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	23.1		UH	*	mg/Kg	0.1	0.5	01/25/16 16:30	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	62.4	0.0122	H	*	%	0.00125	0.00312	01/20/16 10:10	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-5

ACZ Sample ID: **L28530-03**  
Date Sampled: 12/09/15 07:59  
Date Received: 01/13/16  
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 11:14	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 11:52	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	9580		*	mg/Kg	10	50	01/29/16 13:44	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.5	B	*	mg/Kg	0.2	1	01/27/16 19:58	msh
Arsenic, total (3050)	M6020 ICP-MS	505	10.8		*	mg/Kg	0.1	0.5	01/27/16 19:58	msh
Barium, total (3050)	M6020 ICP-MS	505	140			mg/Kg	0.3	1	01/27/16 19:58	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	01/28/16 14:12	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.19	B		mg/Kg	0.05	0.3	01/27/16 19:58	msh
Calcium, total (3050)	M6010B ICP	101	1440			mg/Kg	10	50	01/28/16 1:17	gss
Chromium, total (3050)	M6020 ICP-MS	505	2.5		*	mg/Kg	0.3	1	01/27/16 19:58	msh
Copper, total (3050)	M6020 ICP-MS	505	5.9			mg/Kg	0.3	1	01/27/16 19:58	msh
Iron, total (3050)	M6010B ICP	101	11000		*	mg/Kg	2	5	01/28/16 1:17	gss
Lead, total (3050)	M6020 ICP-MS	505	15.0			mg/Kg	0.05	0.3	01/27/16 19:58	msh
Magnesium, total (3050)	M6010B ICP	101	630			mg/Kg	20	100	01/28/16 1:17	gss
Manganese, total (3050)	M6020 ICP-MS	10100	579		*	mg/Kg	5	30	01/29/16 13:44	msh
Mercury, total	M7471A CVAA	207	0.05	BH	*	mg/Kg	0.04	0.2	01/19/16 12:11	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/28/16 1:17	gss
Nickel, total (3050)	M6020 ICP-MS	505	1.8	B	*	mg/Kg	0.3	2	01/27/16 19:58	msh
Potassium, total (3050)	M6010B ICP	101	1500			mg/Kg	20	100	01/28/16 1:17	gss
Selenium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.1	01/27/16 19:58	msh
Silver, total (3050)	M6020 ICP-MS	505	0.06	B		mg/Kg	0.03	0.1	01/27/16 19:58	msh
Zinc, total (3050)	M6020 ICP-MS	505	25		*	mg/Kg	1	3	01/27/16 19:58	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	70.8		*	%	0.1	0.5	01/18/16 16:25	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 9:49	rbt
Digestion - Hot Plate	M3050B ICP								01/26/16 16:42	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/26/16 16:42	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 12:20	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-5

ACZ Sample ID: **L28530-03**

Date Sampled: 12/09/15 07:59

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	29.2		UH	*	mg/Kg	0.2	0.6	01/25/16 16:07	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	49.5	0.00738	H	*	%	0.00099	0.00248	01/20/16 10:12	mss2

### Tahoe Resources, Inc.

Project ID: Escobal  
Sample ID: SED-6

ACZ Sample ID: **L28530-04**

Date Sampled: 12/07/15 08:50

Date Received: 01/13/16

Sample Matrix: *Sediment*

#### Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 11:26	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 12:06	mss2

#### Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	5520		*	mg/Kg	10	50	01/29/16 13:46	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.4	B	*	mg/Kg	0.2	1	01/27/16 20:00	msh
Arsenic, total (3050)	M6020 ICP-MS	505	6.5		*	mg/Kg	0.1	0.5	01/27/16 20:00	msh
Barium, total (3050)	M6020 ICP-MS	505	66.7			mg/Kg	0.3	1	01/27/16 20:00	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	01/28/16 14:15	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.13	B		mg/Kg	0.05	0.3	01/27/16 20:00	msh
Calcium, total (3050)	M6010B ICP	101	1050			mg/Kg	10	50	01/28/16 1:20	gss
Chromium, total (3050)	M6020 ICP-MS	505	3.3		*	mg/Kg	0.3	1	01/27/16 20:00	msh
Copper, total (3050)	M6020 ICP-MS	505	6			mg/Kg	0.3	1	01/27/16 20:00	msh
Iron, total (3050)	M6010B ICP	101	10500		*	mg/Kg	2	5	01/28/16 1:20	gss
Lead, total (3050)	M6020 ICP-MS	505	4.93			mg/Kg	0.05	0.3	01/27/16 20:00	msh
Magnesium, total (3050)	M6010B ICP	101	790			mg/Kg	20	100	01/28/16 1:20	gss
Manganese, total (3050)	M6020 ICP-MS	10100	278		*	mg/Kg	5	30	01/29/16 13:46	msh
Mercury, total	M7471A CVAA	232	0.06	BH	*	mg/Kg	0.05	0.2	01/19/16 12:14	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/28/16 1:20	gss
Nickel, total (3050)	M6020 ICP-MS	505	1.6	B	*	mg/Kg	0.3	2	01/27/16 20:00	msh
Potassium, total (3050)	M6010B ICP	101	1210			mg/Kg	20	100	01/28/16 1:20	gss
Selenium, total (3050)	M6020 ICP-MS	505	0.07	B		mg/Kg	0.05	0.1	01/27/16 20:00	msh
Silver, total (3050)	M6020 ICP-MS	505	0.03	B		mg/Kg	0.03	0.1	01/27/16 20:00	msh
Zinc, total (3050)	M6020 ICP-MS	505	23		*	mg/Kg	1	3	01/27/16 20:00	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	01/18/16 18:14	rbt

#### Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 9:51	rbt
Digestion - Hot Plate	M3050B ICP-MS								01/26/16 18:00	bcc
Digestion - Hot Plate	M3050B ICP								01/26/16 18:00	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 14:38	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-6

ACZ Sample ID: **L28530-04**

Date Sampled: 12/07/15 08:50

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	32.5		UH	*	mg/Kg	0.2	0.7	01/25/16 16:08	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	55.9	0.00832	H	*	%	0.00112	0.0028	01/20/16 10:13	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-7

ACZ Sample ID: **L28530-05**  
Date Sampled: 12/09/15 08:00  
Date Received: 01/13/16  
Sample Matrix: *Sediment*

**Inorganic Prep**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 11:39	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 12:20	mss2

**Metals Analysis**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	6190		*	mg/Kg	10	50	01/29/16 13:52	msh
Antimony, total (3050)	M6020 ICP-MS	500	0.6	B	*	mg/Kg	0.2	1	01/27/16 20:06	msh
Arsenic, total (3050)	M6020 ICP-MS	500	5.7		*	mg/Kg	0.1	0.5	01/27/16 20:06	msh
Barium, total (3050)	M6020 ICP-MS	500	83			mg/Kg	0.3	1	01/27/16 20:06	msh
Boron, total (3050)	M6010B ICP	100	1	B		mg/Kg	1	5	01/28/16 15:12	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.16	B		mg/Kg	0.05	0.3	01/27/16 20:06	msh
Calcium, total (3050)	M6010B ICP	100	1300			mg/Kg	10	50	01/28/16 1:36	gss
Chromium, total (3050)	M6020 ICP-MS	500	3.4		*	mg/Kg	0.3	1	01/27/16 20:06	msh
Copper, total (3050)	M6020 ICP-MS	500	6			mg/Kg	0.3	1	01/27/16 20:06	msh
Iron, total (3050)	M6010B ICP	100	7790		*	mg/Kg	2	5	01/28/16 1:36	gss
Lead, total (3050)	M6020 ICP-MS	500	6.49			mg/Kg	0.05	0.3	01/27/16 20:06	msh
Magnesium, total (3050)	M6010B ICP	100	1040			mg/Kg	20	100	01/28/16 1:36	gss
Manganese, total (3050)	M6020 ICP-MS	10000	367		*	mg/Kg	5	30	01/29/16 13:52	msh
Mercury, total	M7471A CVAA	177		UH	*	mg/Kg	0.04	0.2	01/19/16 12:16	pta
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/28/16 1:36	gss
Nickel, total (3050)	M6020 ICP-MS	500	2.8		*	mg/Kg	0.3	2	01/27/16 20:06	msh
Potassium, total (3050)	M6010B ICP	100	1750			mg/Kg	20	100	01/28/16 1:36	gss
Selenium, total (3050)	M6020 ICP-MS	500		U		mg/Kg	0.05	0.1	01/27/16 20:06	msh
Silver, total (3050)	M6020 ICP-MS	500	0.04	B		mg/Kg	0.03	0.1	01/27/16 20:06	msh
Zinc, total (3050)	M6020 ICP-MS	500	27		*	mg/Kg	1	3	01/27/16 20:06	msh

**Soil Analysis**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	72.2		*	%	0.1	0.5	01/18/16 20:03	rbt

**Soil Preparation**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 9:54	rbt
Digestion - Hot Plate	M3050B ICP								01/26/16 21:51	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/26/16 21:51	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 16:55	rbt



**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-7

ACZ Sample ID: **L28530-05**

Date Sampled: 12/09/15 08:00

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	28		UH	*	mg/Kg	0.2	0.6	01/25/16 16:08	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	63.1	0.00765	H	*	%	0.00126	0.00316	01/20/16 10:14	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-8

ACZ Sample ID: **L28530-06**  
Date Sampled: 12/07/15 10:45  
Date Received: 01/13/16  
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 11:51	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 12:34	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	8040		*	mg/Kg	10	50	01/29/16 13:55	msh
Antimony, total (3050)	M6020 ICP-MS	505	1.8		*	mg/Kg	0.2	1	01/27/16 20:08	msh
Arsenic, total (3050)	M6020 ICP-MS	505	10.7		*	mg/Kg	0.1	0.5	01/27/16 20:08	msh
Barium, total (3050)	M6020 ICP-MS	505	132			mg/Kg	0.3	1	01/27/16 20:08	msh
Boron, total (3050)	M6010B ICP	101		U		mg/Kg	1	5	01/28/16 15:16	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.57			mg/Kg	0.05	0.3	01/27/16 20:08	msh
Calcium, total (3050)	M6010B ICP	101	1920			mg/Kg	10	50	01/28/16 1:39	gss
Chromium, total (3050)	M6020 ICP-MS	505	2.9		*	mg/Kg	0.3	1	01/27/16 20:08	msh
Copper, total (3050)	M6020 ICP-MS	505	16.4			mg/Kg	0.3	1	01/27/16 20:08	msh
Iron, total (3050)	M6010B ICP	101	9670		*	mg/Kg	2	5	01/28/16 1:39	gss
Lead, total (3050)	M6020 ICP-MS	505	13.80			mg/Kg	0.05	0.3	01/27/16 20:08	msh
Magnesium, total (3050)	M6010B ICP	101	770			mg/Kg	20	100	01/28/16 1:39	gss
Manganese, total (3050)	M6020 ICP-MS	10100	799		*	mg/Kg	5	30	01/29/16 13:55	msh
Mercury, total	M7471A CVAA	304	0.21	BH	*	mg/Kg	0.06	0.3	01/19/16 12:19	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/28/16 1:39	gss
Nickel, total (3050)	M6020 ICP-MS	505	2		*	mg/Kg	0.3	2	01/27/16 20:08	msh
Potassium, total (3050)	M6010B ICP	101	1530			mg/Kg	20	100	01/28/16 1:39	gss
Selenium, total (3050)	M6020 ICP-MS	505	0.07	B		mg/Kg	0.05	0.1	01/27/16 20:08	msh
Silver, total (3050)	M6020 ICP-MS	505	0.24			mg/Kg	0.03	0.1	01/27/16 20:08	msh
Zinc, total (3050)	M6020 ICP-MS	505	83		*	mg/Kg	1	3	01/27/16 20:08	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	60.9		*	%	0.1	0.5	01/18/16 21:51	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 9:56	rbt
Digestion - Hot Plate	M3050B ICP								01/26/16 23:08	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/26/16 23:08	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 19:13	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-8

ACZ Sample ID: **L28530-06**

Date Sampled: 12/07/15 10:45

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	26.3		UH	*	mg/Kg	0.2	0.5	01/25/16 16:09	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	119	0.0365	H	*	%	0.00238	0.00595	01/20/16 11:29	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-9

ACZ Sample ID: **L28530-07**  
Date Sampled: 12/07/15 09:40  
Date Received: 01/13/16  
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 12:03	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 12:47	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	8720		*	mg/Kg	10	50	01/29/16 13:57	msh
Antimony, total (3050)	M6020 ICP-MS	505	0.8	B	*	mg/Kg	0.2	1	01/27/16 20:10	msh
Arsenic, total (3050)	M6020 ICP-MS	505	6.8		*	mg/Kg	0.1	0.5	01/27/16 20:10	msh
Barium, total (3050)	M6020 ICP-MS	505	122			mg/Kg	0.3	1	01/27/16 20:10	msh
Boron, total (3050)	M6010B ICP	101	1	B		mg/Kg	1	5	01/28/16 14:38	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.46			mg/Kg	0.05	0.3	01/27/16 20:10	msh
Calcium, total (3050)	M6010B ICP	101	1720			mg/Kg	10	50	01/28/16 1:42	gss
Chromium, total (3050)	M6020 ICP-MS	505	5.9		*	mg/Kg	0.3	1	01/27/16 20:10	msh
Copper, total (3050)	M6020 ICP-MS	505	12.3			mg/Kg	0.3	1	01/27/16 20:10	msh
Iron, total (3050)	M6010B ICP	101	15100		*	mg/Kg	2	5	01/28/16 1:42	gss
Lead, total (3050)	M6020 ICP-MS	505	12.30			mg/Kg	0.05	0.3	01/27/16 20:10	msh
Magnesium, total (3050)	M6010B ICP	101	1010			mg/Kg	20	100	01/28/16 1:42	gss
Manganese, total (3050)	M6020 ICP-MS	10100	605		*	mg/Kg	5	30	01/29/16 13:57	msh
Mercury, total	M7471A CVAA	262	0.05	BH	*	mg/Kg	0.05	0.3	01/19/16 12:21	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/28/16 1:42	gss
Nickel, total (3050)	M6020 ICP-MS	505	2.5		*	mg/Kg	0.3	2	01/27/16 20:10	msh
Potassium, total (3050)	M6010B ICP	101	1330			mg/Kg	20	100	01/28/16 1:42	gss
Selenium, total (3050)	M6020 ICP-MS	505	0.08	B		mg/Kg	0.05	0.1	01/27/16 20:10	msh
Silver, total (3050)	M6020 ICP-MS	505	0.26			mg/Kg	0.03	0.1	01/27/16 20:10	msh
Zinc, total (3050)	M6020 ICP-MS	505	71		*	mg/Kg	1	3	01/27/16 20:10	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	56.1		*	%	0.1	0.5	01/18/16 23:40	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 9:58	rbt
Digestion - Hot Plate	M3050B ICP								01/27/16 0:25	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/27/16 0:25	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 21:31	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-9

ACZ Sample ID: **L28530-07**

Date Sampled: 12/07/15 09:40

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	43.6		UH	*	mg/Kg	0.3	0.9	01/25/16 16:12	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	125	0.0198	H	*	%	0.0025	0.00625	01/20/16 10:19	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-1

ACZ Sample ID: **L28530-08**  
Date Sampled: 12/09/15 11:00  
Date Received: 01/13/16  
Sample Matrix: *Sediment*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 12:16	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 13:01	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10100	8770		*	mg/Kg	10	50	01/29/16 14:03	msh
Antimony, total (3050)	M6020 ICP-MS	10100		U		mg/Kg	4	20	01/29/16 14:03	msh
Arsenic, total (3050)	M6020 ICP-MS	10100	8	B		mg/Kg	2	10	01/29/16 14:03	msh
Barium, total (3050)	M6020 ICP-MS	10100	200			mg/Kg	5	30	01/29/16 14:03	msh
Boron, total (3050)	M6010B ICP	101	1	B		mg/Kg	1	5	01/28/16 14:44	aeb
Cadmium, total (3050)	M6020 ICP-MS	10100		U		mg/Kg	1	5	01/29/16 14:03	msh
Calcium, total (3050)	M6010B ICP	101	2900			mg/Kg	10	50	01/28/16 1:49	gss
Chromium, total (3050)	M6020 ICP-MS	10100		U		mg/Kg	5	20	01/29/16 14:03	msh
Copper, total (3050)	M6020 ICP-MS	10100	8	B		mg/Kg	5	30	01/29/16 14:03	msh
Iron, total (3050)	M6010B ICP	101	12400		*	mg/Kg	2	5	01/28/16 1:49	gss
Lead, total (3050)	M6020 ICP-MS	10100	11		*	mg/Kg	1	5	01/29/16 14:03	msh
Magnesium, total (3050)	M6010B ICP	101	1180			mg/Kg	20	100	01/28/16 1:49	gss
Manganese, total (3050)	M6020 ICP-MS	10100	657		*	mg/Kg	5	30	01/29/16 14:03	msh
Mercury, total	M7471A CVAA	211		UH	*	mg/Kg	0.04	0.2	01/19/16 12:27	pta
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	01/28/16 1:49	gss
Nickel, total (3050)	M6020 ICP-MS	10100		U		mg/Kg	6	30	01/29/16 14:03	msh
Potassium, total (3050)	M6010B ICP	101	1620			mg/Kg	20	100	01/28/16 1:49	gss
Selenium, total (3050)	M6020 ICP-MS	10100		U		mg/Kg	1	3	01/29/16 14:03	msh
Silver, total (3050)	M6020 ICP-MS	10100		U		mg/Kg	0.5	3	01/29/16 14:03	msh
Zinc, total (3050)	M6020 ICP-MS	10100	50		*	mg/Kg	20	50	01/29/16 14:03	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	80.1		*	%	0.1	0.5	01/19/16 1:29	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 10:00	rbt
Digestion - Hot Plate	M3050B ICP								01/27/16 4:17	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/27/16 4:17	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/19/16 23:49	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-1

ACZ Sample ID: **L28530-08**

Date Sampled: 12/09/15 11:00

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	27.4		UH	*	mg/Kg	0.2	0.5	01/25/16 16:13	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	72.8	0.0126	H	*	%	0.00146	0.00364	01/20/16 10:20	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-2

ACZ Sample ID: **L28530-09**  
Date Sampled: 12/09/15 10:00  
Date Received: 01/13/16  
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 12:28	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 13:15	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	51000	16000		*	mg/Kg	50	300	02/01/16 21:42	msh
Antimony, total (3050)	M6020 ICP-MS	510	3.2		*	mg/Kg	0.2	1	01/27/16 20:19	msh
Arsenic, total (3050)	M6020 ICP-MS	510	37.7		*	mg/Kg	0.1	0.5	01/27/16 20:19	msh
Barium, total (3050)	M6020 ICP-MS	510	186			mg/Kg	0.3	1	01/27/16 20:19	msh
Boron, total (3050)	M6010B ICP	102	3	B		mg/Kg	1	5	01/28/16 14:47	aeb
Cadmium, total (3050)	M6020 ICP-MS	510	4.72			mg/Kg	0.05	0.3	01/27/16 20:19	msh
Calcium, total (3050)	M6010B ICP	102	17500			mg/Kg	10	50	01/28/16 1:52	gss
Chromium, total (3050)	M6020 ICP-MS	510	5.4		*	mg/Kg	0.3	1	01/27/16 20:19	msh
Copper, total (3050)	M6020 ICP-MS	510	24			mg/Kg	0.3	1	01/27/16 20:19	msh
Iron, total (3050)	M6010B ICP	102	16100		*	mg/Kg	2	5	01/28/16 1:52	gss
Lead, total (3050)	M6020 ICP-MS	510	239			mg/Kg	0.05	0.3	01/27/16 20:19	msh
Magnesium, total (3050)	M6010B ICP	102	3690			mg/Kg	20	100	01/28/16 1:52	gss
Manganese, total (3050)	M6020 ICP-MS	10200	1830		*	mg/Kg	5	30	01/29/16 14:05	msh
Mercury, total	M7471A CVAA	168	0.08	BH	*	mg/Kg	0.03	0.2	01/19/16 12:29	pta
Molybdenum, total (3050)	M6010B ICP	102	2	B		mg/Kg	2	10	01/28/16 1:52	gss
Nickel, total (3050)	M6020 ICP-MS	510	6.5		*	mg/Kg	0.3	2	01/27/16 20:19	msh
Potassium, total (3050)	M6010B ICP	102	1660			mg/Kg	20	100	01/28/16 1:52	gss
Selenium, total (3050)	M6020 ICP-MS	510	0.17			mg/Kg	0.05	0.1	01/27/16 20:19	msh
Silver, total (3050)	M6020 ICP-MS	510	15.10			mg/Kg	0.03	0.1	01/27/16 20:19	msh
Zinc, total (3050)	M6020 ICP-MS	510	407		*	mg/Kg	1	3	01/27/16 20:19	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	54.2		*	%	0.1	0.5	01/19/16 3:18	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 10:03	rbt
Digestion - Hot Plate	M3050B ICP								01/27/16 5:34	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/27/16 5:34	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/20/16 2:06	rbt



**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-2

ACZ Sample ID: **L28530-09**

Date Sampled: 12/09/15 10:00

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	19.2		UH	*	mg/Kg	0.1	0.4	01/25/16 16:14	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	112	0.0302	H	*	%	0.00224	0.0056	01/20/16 11:30	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-2A

ACZ Sample ID: **L28530-10**  
Date Sampled: 12/07/15 13:05  
Date Received: 01/13/16  
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 12:40	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 13:29	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	50000	10100		*	mg/Kg	50	300	02/01/16 21:48	msh
Antimony, total (3050)	M6020 ICP-MS	500	2.2		*	mg/Kg	0.2	1	01/27/16 20:21	msh
Arsenic, total (3050)	M6020 ICP-MS	500	29.8		*	mg/Kg	0.1	0.5	01/27/16 20:21	msh
Barium, total (3050)	M6020 ICP-MS	500	71.1			mg/Kg	0.3	1	01/27/16 20:21	msh
Boron, total (3050)	M6010B ICP	100	2	B		mg/Kg	1	5	01/28/16 14:50	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	1.91			mg/Kg	0.05	0.3	01/27/16 20:21	msh
Calcium, total (3050)	M6010B ICP	100	24500			mg/Kg	10	50	01/28/16 1:55	gss
Chromium, total (3050)	M6020 ICP-MS	500	6		*	mg/Kg	0.3	1	01/27/16 20:21	msh
Copper, total (3050)	M6020 ICP-MS	500	15.8			mg/Kg	0.3	1	01/27/16 20:21	msh
Iron, total (3050)	M6010B ICP	100	14000		*	mg/Kg	2	5	01/28/16 1:55	gss
Lead, total (3050)	M6020 ICP-MS	500	103			mg/Kg	0.05	0.3	01/27/16 20:21	msh
Magnesium, total (3050)	M6010B ICP	100	6290			mg/Kg	20	100	01/28/16 1:55	gss
Manganese, total (3050)	M6020 ICP-MS	50000	2620		*	mg/Kg	30	100	02/01/16 21:48	msh
Mercury, total	M7471A CVAA	227		UH	*	mg/Kg	0.05	0.2	01/19/16 12:31	pta
Molybdenum, total (3050)	M6010B ICP	100	2	B		mg/Kg	2	10	01/28/16 1:55	gss
Nickel, total (3050)	M6020 ICP-MS	500	7.3		*	mg/Kg	0.3	2	01/27/16 20:21	msh
Potassium, total (3050)	M6010B ICP	100	1280			mg/Kg	20	100	01/28/16 1:55	gss
Selenium, total (3050)	M6020 ICP-MS	500	0.11			mg/Kg	0.05	0.1	01/27/16 20:21	msh
Silver, total (3050)	M6020 ICP-MS	500	5.32			mg/Kg	0.03	0.1	01/27/16 20:21	msh
Zinc, total (3050)	M6020 ICP-MS	500	204		*	mg/Kg	1	3	01/27/16 20:21	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	78.7		*	%	0.1	0.5	01/19/16 5:07	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 10:05	rbt
Digestion - Hot Plate	M3050B ICP								01/27/16 6:51	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/27/16 6:51	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/20/16 4:24	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-2A

ACZ Sample ID: **L28530-10**

Date Sampled: 12/07/15 13:05

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	17.9		UH	*	mg/Kg	0.1	0.4	01/25/16 16:15	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	61.9	0.0265	H	*	%	0.00124	0.0031	01/20/16 10:22	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-2B

ACZ Sample ID: **L28530-11**  
Date Sampled: 12/09/15 09:10  
Date Received: 01/13/16  
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 12:53	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 13:42	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	7000		*	mg/Kg	10	50	01/29/16 14:09	msh
Antimony, total (3050)	M6020 ICP-MS	500	3.6		*	mg/Kg	0.2	1	01/27/16 20:23	msh
Arsenic, total (3050)	M6020 ICP-MS	500	38.7		*	mg/Kg	0.1	0.5	01/27/16 20:23	msh
Barium, total (3050)	M6020 ICP-MS	500	31.8			mg/Kg	0.3	1	01/27/16 20:23	msh
Boron, total (3050)	M6010B ICP	100	2	B		mg/Kg	1	5	01/28/16 14:53	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	0.87			mg/Kg	0.05	0.3	01/27/16 20:23	msh
Calcium, total (3050)	M6010B ICP	100	23000			mg/Kg	10	50	01/28/16 1:58	gss
Chromium, total (3050)	M6020 ICP-MS	500	5.4		*	mg/Kg	0.3	1	01/27/16 20:23	msh
Copper, total (3050)	M6020 ICP-MS	500	13.3			mg/Kg	0.3	1	01/27/16 20:23	msh
Iron, total (3050)	M6010B ICP	100	10100		*	mg/Kg	2	5	01/28/16 1:58	gss
Lead, total (3050)	M6020 ICP-MS	500	58.0			mg/Kg	0.05	0.3	01/27/16 20:23	msh
Magnesium, total (3050)	M6010B ICP	100	5120			mg/Kg	20	100	01/28/16 1:58	gss
Manganese, total (3050)	M6020 ICP-MS	10000	1860		*	mg/Kg	5	30	01/29/16 14:09	msh
Mercury, total	M7471A CVAA	204		UH	*	mg/Kg	0.04	0.2	01/19/16 12:34	pta
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/28/16 1:58	gss
Nickel, total (3050)	M6020 ICP-MS	500	7.2		*	mg/Kg	0.3	2	01/27/16 20:23	msh
Potassium, total (3050)	M6010B ICP	100	1220			mg/Kg	20	100	01/28/16 1:58	gss
Selenium, total (3050)	M6020 ICP-MS	500	0.05	B		mg/Kg	0.05	0.1	01/27/16 20:23	msh
Silver, total (3050)	M6020 ICP-MS	500	8.10			mg/Kg	0.03	0.1	01/27/16 20:23	msh
Zinc, total (3050)	M6020 ICP-MS	500	111		*	mg/Kg	1	3	01/27/16 20:23	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	76.6		*	%	0.1	0.5	01/19/16 6:56	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 10:07	rbt
Digestion - Hot Plate	M3050B ICP-MS								01/27/16 8:08	bcc
Digestion - Hot Plate	M3050B ICP								01/27/16 8:08	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/20/16 6:42	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-2B

ACZ Sample ID: **L28530-11**

Date Sampled: 12/09/15 09:10

Date Received: 01/13/16

Sample Matrix: *Sediment*

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9012B - Automated Colorimetric	28.5		UH	*	mg/Kg	0.2	0.6	01/25/16 16:15	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	110	0.0289	H	*	%	0.0022	0.0055	01/20/16 11:32	mss2

**Tahoe Resources, Inc.**

Project ID: Escobal  
Sample ID: SED-4A

ACZ Sample ID: **L28530-12**  
Date Sampled: 12/07/15 12:35  
Date Received: 01/13/16  
Sample Matrix: Sediment

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M9013 - Manual Distillation								01/25/16 13:05	anb/krh
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/19/16 13:56	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6020 ICP-MS	10000	7180		*	mg/Kg	10	50	01/29/16 14:11	msh
Antimony, total (3050)	M6020 ICP-MS	500	3.6		*	mg/Kg	0.2	1	01/27/16 20:25	msh
Arsenic, total (3050)	M6020 ICP-MS	500	34.5		*	mg/Kg	0.1	0.5	01/27/16 20:25	msh
Barium, total (3050)	M6020 ICP-MS	500	44.6			mg/Kg	0.3	1	01/27/16 20:25	msh
Boron, total (3050)	M6010B ICP	100	2	B		mg/Kg	1	5	01/28/16 14:57	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	9.33			mg/Kg	0.05	0.3	01/27/16 20:25	msh
Calcium, total (3050)	M6010B ICP	100	27600			mg/Kg	10	50	01/28/16 2:01	gss
Chromium, total (3050)	M6020 ICP-MS	500	5		*	mg/Kg	0.3	1	01/27/16 20:25	msh
Copper, total (3050)	M6020 ICP-MS	500	14.1			mg/Kg	0.3	1	01/27/16 20:25	msh
Iron, total (3050)	M6010B ICP	100	11300		*	mg/Kg	2	5	01/28/16 2:01	gss
Lead, total (3050)	M6020 ICP-MS	500	191			mg/Kg	0.05	0.3	01/27/16 20:25	msh
Magnesium, total (3050)	M6010B ICP	100	6130			mg/Kg	20	100	01/28/16 2:01	gss
Manganese, total (3050)	M6020 ICP-MS	50000	2280		*	mg/Kg	30	100	02/01/16 21:50	msh
Mercury, total	M7471A CVAA	185	0.11	BH	*	mg/Kg	0.04	0.2	01/19/16 12:36	pta
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	01/28/16 2:01	gss
Nickel, total (3050)	M6020 ICP-MS	500	6.4		*	mg/Kg	0.3	2	01/27/16 20:25	msh
Potassium, total (3050)	M6010B ICP	100	1290			mg/Kg	20	100	01/28/16 2:01	gss
Selenium, total (3050)	M6020 ICP-MS	500	0.09	B		mg/Kg	0.05	0.1	01/27/16 20:25	msh
Silver, total (3050)	M6020 ICP-MS	500	8.06			mg/Kg	0.03	0.1	01/27/16 20:25	msh
Zinc, total (3050)	M6020 ICP-MS	10000	890		*	mg/Kg	20	50	01/29/16 14:11	msh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	D2216-80	1	73		*	%	0.1	0.5	01/19/16 8:45	rbt

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972								01/18/16 10:09	rbt
Digestion - Hot Plate	M3050B ICP								01/27/16 9:25	bcc
Digestion - Hot Plate	M3050B ICP-MS								01/27/16 9:25	bcc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2								01/20/16 9:00	rbt

**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: SED-4A

ACZ Sample ID: **L28530-12**

Date Sampled: 12/07/15 12:35

Date Received: 01/13/16

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	01/25/16 16:16	krh/enb
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	78.2	0.00818	H	*	%	0.00156	0.00391	01/20/16 10:24	mss2



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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



Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28530-01</b>	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397179	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-02	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-03	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-04	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L28530-05</b>	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-06	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-07	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-08	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	Lead, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
		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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG397910	Zinc, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	



Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-09	WG397998	Aluminum, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	WG397796	Nickel, total (3050)	M7471A CVAA	Q6	Sample was received above recommended temperature.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397652	Zinc, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9012B - Automated Colorimetric	H3	Sample was received and analyzed past holding time.
			M9012B - Automated Colorimetric	Q6	Sample was received above recommended temperature.
	WG397383	Cyanide, total	M9012B - Automated Colorimetric	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
M365.1 - Auto Ascorbic Acid (digest)			H3	Sample was received and analyzed past holding time.	
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
		M365.1 - Auto Ascorbic Acid (digest)			

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-10	WG397998	Aluminum, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	Antimony, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397998	Manganese, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
			M7471A CVAA	Q6	Sample was received above recommended temperature.
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-11	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397910	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.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	M7471A CVAA		Q6	Sample was received above recommended temperature.	
	WG397796	Nickel, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
			Zinc, total (3050)	M6020 ICP-MS	M2
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.
M365.1 - Auto Ascorbic Acid (digest)			M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
M365.1 - Auto Ascorbic Acid (digest)			RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

Tahoe Resources, Inc.

ACZ Project ID: **L28530**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28530-12	WG397910	Aluminum, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397796	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	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Chromium, total (3050)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397795	Iron, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG397998	Manganese, total (3050)	M6020 ICP-MS	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
			M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397226	Mercury, total	M7471A CVAA	H3	Sample was received and analyzed past holding time.
	WG397796	Nickel, total (3050)	M7471A CVAA	Q6	Sample was received above recommended temperature.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG397910	Zinc, total (3050)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG397652	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 concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	
WG397383	Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	H3	Sample was received and analyzed past holding time.	
		M365.1 - Auto Ascorbic Acid (digest)	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.	
		M365.1 - Auto Ascorbic Acid (digest)	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).	

**Tahoe Resources, Inc.**

ACZ Project ID: **L28530**

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: L28530  
 Date Received: 01/13/2016 09:43  
 Received By: ddp  
 Date Printed: 1/13/2016

**Receipt Verification**

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

**Samples/Containers**

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

Some parameters were received past hold time.

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA23232	13.6	<=6.0	13	N/A

Was ice present in the shipment container(s)?

No - Wet or gel ice was not present in the shipment container(s).

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

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L28530  
Date Received: 01/13/2016 09:43  
Received By: ddp  
Date Printed: 1/13/2016

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. 028530

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@santafaci.com.gt, Address: Bulvar los Proceros 13 calle 74-69 zona 10, Telephone: (507) 5951 5748

Copy of Report to:

Name: , Company: , E-mail: , Telephone:

Invoice to:

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

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Table with columns: Quote #, PO#, Reporting state, Check box, SAMPLE IDENTIFICATION, DATE:TIME, Matrix, # of Containers, and analysis columns. Includes rows for Sed-3 through Sed-2A.

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

REMARKS

COC# 1/2

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

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

228530 Chain of Custody





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.

<b>PERMITTEE NAME:</b>	Ms. Audrey J Stover	<b>PERMIT NUMBER:</b>	P330-13-00153
<b>COMPANY:</b>	ACZ Laboratories, Inc.	<b>APPLICATION NUMBER:</b>	P525-130418-001
<b>RECEIVING ADDRESS:</b>	2773 Downhill Drive Steamboat Springs, CO 80487	<b>DATE ISSUED:</b>	05/22/2013
<b>MAILING ADDRESS:</b>	2773 Downhill Drive Steamboat Springs, CO 80487		
<b>PHONE:</b>	(970) 879-6590 Ext. 515	<b>EXPIRES:</b>	<b>05/22/2016</b>
<b>FAX:</b>	(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 EPERMITTS.   <b>Osmond Baron</b>	DATE  <b>05/22/2013</b>
---	-------------------------------

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](http://www.aphis.usda.gov/programs/ag_selectagent/index.shtml)). Failure to comply with this requirement is a violation of the Agricultural Bioterrorism Protection Act of 2002.

Permit Number P330-13-00153

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.	DATE
 Osmond Baron	05/22/2013

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to \$250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

19. The soil must not be used in field research or release into the environment before sterilization.

The soil must not be used for isolation or culture of organisms, or for extracting and concentrating organisms from the soil.

The soil must not be used as a growing medium.

20. Further distribution of soil is not allowed without prior approval from Federal officials [State Plant Health Director or designee] (or from Federal officials with State concurrence): Access the website at <http://www.aphis.usda.gov/ppq/sphd/> for a list of State Plant Health Offices. Access the website at <http://nationalplantboard.org/member/index.html> for a list of State Plant Regulatory Officials.

21. While in storage, all soil must be kept locked (e.g. in freezer, cabinet) in the approved lab with access limited to authorized personnel or they will be in a restricted access building that requires a key card entry and access is restricted to authorized personnel only; or it must be in locked room restricted to authorized personnel only.

22. The soil must be handled as quarantined material until sterilized. This will include keeping the soil enclosed in containers when not in use and labeling all containers and/or storage areas: "Quarantine Soil- Sterilize Before Disposal"

23. All packing material, media, substrate, and shipping containers must be sterilized or destroyed as approved and prescribed by the permit conditions after removing the soil.

24. All unconsumed soil, containers and effluent must be autoclaved, incinerated or properly sterilized by the permittee at the conclusion of the project as approved and prescribed by the permit conditions.

25. Any water residues (effluent) from the processing of soil samples must be treated by an approved sterilization procedure such as hydroclave or autoclave.

26. All soil residues must be dry-heated, incinerated, hydroclaved or autoclaved.

Dry Heat Treatment: use one of the following schedules:

- 110- 120.5 degrees C (230-249 F) for 16 hours
- 121-154 degrees C (250-309 F) for 2 hours
- 154.4 - 192.5 degrees C (310-379 F) for 30 minutes
- 193-220 degrees C (380-429 F) for 4 minutes
- 221-232 degrees C (430-450) for 2 minutes

Time starts when the entire sample reaches the required temperature, and a suitable temperature probe must be used for verification.


27. Incineration: With the exception of metal and glass containers, all regulated and associated material must be reduced completely to ash at the end of the incineration cycle.

28. Equipment and supplies used to conduct operations or that have contacted the soil must be decontaminated using one of the following methods:

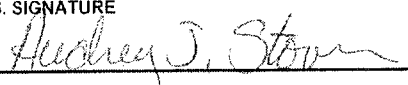
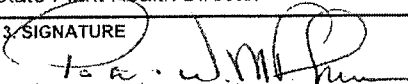

- (a) Material can be soaked in a fresh bleach solution of 10 percent (1:10) for at least 30 minutes. ( 1:10 is a convention that means 1 in 10 or 1 part 9 parts = 10 parts total, which is a 10 percent solution)
- (b) Material can be soaked in 70 percent ethanol
- (c) Flamed with ethanol
- (d) Treated with quaternary ammonium compounds.

Note also that autoclaving, hydroclave, incineration, and dry heat sterilization are also acceptable sterilization/decontamination methods.

Permit Number P330-13-00153

<p>THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.</p>  <p><b>Osmond Baron</b></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)

<b>UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION AND QUARANTINE</b>		<b>COMPLIANCE AGREEMENT</b>	
<b>1. NAME AND MAILING ADDRESS OF PERSON OR FIRM</b>  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		<b>2. LOCATION</b>  Same	
<b>3. REGULATED ARTICLE(S)</b>  Non-sterilized Foreign soil; or Foreign & Regulated Domestic soil; or Domestic soil (HI and/or U.S. territories) - ANALYSIS			
<b>4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS</b>  7 CFR Part 330 and 7 CFR 301			
<b>5. I/WE AGREE TO THE FOLLOWING:</b>  <b>I. Transfer and Noncompliance</b> 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.  <b>II. Procedures, protocols and limitations established in 'General Stipulations' (attached).</b>			
<b>6. SIGNATURE</b> 	<b>7. TITLE</b> President/CEO	<b>8. DATE SIGNED</b> 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.		<b>9. AGREEMENT NO.</b> SP-13 169	
<b>10. DATE OF AGREEMENT</b>			
<b>11. PPQ/CBP OFFICIAL (NAME AND TITLE)</b>  Patrick McPherran State Plant Health Director		<b>12. ADDRESS</b>  USDA APHIS PPQ 3950 N. Lewiston St. Suite 104 Aurora, CO 80011	
<b>13. SIGNATURE</b> 			
<b>14. U.S. GOVERNMENT/STATE AGENCY OFFICIAL (NAME AND TITLE)</b>  Mitch Yergert Director, Division of Plant Industry		<b>15. ADDRESS</b>  Colorado Department of Agriculture 700 Kipling Suite 4000 Lakewood, CO 80215	
<b>16. SIGNATURE</b> 			



**11.7 Informes originales de los Resultados Analíticos obtenidos del Efluente en los meses de Febrero a Abril de 2016**

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 02:00 horas

Alicuota 2: 05:00horas

Alicuota 3: 08:00 horas

Alicuota 4: 11:00 horas

Análisis solicitado por: Ing. Miguel Berganza

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

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 241115

Fecha de ingreso de muestra: 241115

Fecha de análisis: 241115-031215

Fecha del informe: 031215

Identificación de la muestra: WW9

Correlativo Ecosistemas: 3111

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	7.69	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 <sub>5</sub>	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 <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendedos	mg/l	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/l	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/l	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/l	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/l	0.002	0.007	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/l	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/l	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/l	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2



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	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	23	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas*

*Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664*

*N.D. No detectable. Debajo del límite de detección.*

*NMP: Número más probable*

*El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.*

*Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/l (ver Acuerdo Artículo 21).*

*Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

**\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**\*\* Análisis referido.**

**\*\*\* El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio.**

*Comparación de descarga según información del cliente.*



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

**Luis Fernando Fuentes Méndez**  
**Ingeniero Químico**  
**Colegiado 876**

December 04, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L27969

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 02, 2015. This project has been assigned to ACZ's project number, L27969. 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 L27969. 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.

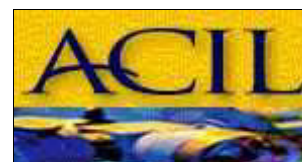
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 03, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L27969-01**

Date Sampled: 11/24/15 11:00

Date Received: 12/02/15

Sample Matrix: Waste Water

## Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/03/15 9:01	krh

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/03/15 14:15	krh



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L27969**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L27969-01	WG395244	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).
L27969-02	WG395244	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: **L27969**

No certification qualifiers associated with this analysis

Tahoe Resources, Inc.  
 Escobal

ACZ Project ID: L27969  
 Date Received: 12/02/2015 09:21  
 Received By: ddp  
 Date Printed: 12/2/2015

**Receipt Verification**

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

**Samples/Containers**

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

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
4063	14.6	<=6.0	13	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L27969  
Date Received: 12/02/2015 09:21  
Received By: ddp  
Date Printed: 12/2/2015

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).





Laboratories, Inc. *027969*

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 PROGRESOS 13 calle 24-69 Zona 10*  
*Empresarial Zona Progreso, Torre IV Oficina 1406*  
Telephone: *(502) 5951 5248*

Copy of Report to:

Name:  
Company:

E-mail:  
Telephone:

Invoice to:

Name: *Miguel Berganza*  
Company: *Tahoe Resources inc.*  
E-mail: *mberganza@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

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 #: *Water Quality*  
PO#: *Escoba 1*  
Reporting state for compliance testing:  
Check box if samples include NRC licensed material?

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SW	CW Total						
<i>WW9</i>	<i>24/11/15 02:00-11:00</i>	<i>WW</i>	<i>10</i>	<i>/</i>							
<i>WW10</i>	<i>24/11/15 12:00-11:00</i>	<i>SW</i>	<i>10</i>	<i>/</i>							
<i>1. * WW9</i>	<i>24/11/15 02:00-11:00</i>	<i>WW</i>	<i>1</i>		<i>/</i>						
<i>2. * WW10</i>	<i>24/11/15 12:00</i>	<i>SW</i>	<i>1</i>		<i>/</i>						
<i>SW2A</i>	<i>24/11/15 12:55</i>	<i>SW</i>	<i>1</i>		<i>/</i>						
<i>SW3A</i>	<i>24/11/15 12:03</i>	<i>SW</i>	<i>1</i>		<i>/</i>						
<i>SW2B</i>	<i>24/11/15 12:35</i>	<i>SW</i>	<i>1</i>		<i>/</i>						
<i>SW4A</i>	<i>24/11/15 12:15</i>	<i>SW</i>	<i>1</i>		<i>/</i>						
<i>WW0</i>	<i>24/11/15 14:55</i>	<i>SW</i>	<i>1</i>		<i>/</i>						
<i>WW6</i>	<i>24/11/15 14:30</i>	<i>WW</i>	<i>1</i>		<i>/</i>						

COPY

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

REMARKS

*\* Please report M a different document.*

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

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	<i>24.11.2015 17:30</i>	<i>[Signature]</i>	<i>24.11.15 17:30</i>
		<i>[Signature]</i>	<i>22/11/2015</i>

127969 Chain of Custody

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 01:00 horas

Alicuota 2: 04:00 horas

Alicuota 3: 07:00 horas

Alicuota 4: 10:00 horas

Análisis solicitado por: Ing. Miguel Berganza

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

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 031215

Fecha de ingreso de muestras: 031215

Fecha de análisis: 031215-141215

Fecha de informe: 141215

Identificación de la muestra: WW9

Correlativo Ecosistemas: 3218

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	7.76	SMWW 4500H-B	6 a 9
* Aceites y Grasas	mg/l	5	N.D.	EPA 1664	10
Materia Flotante	---	---	ausente ***	Visual	ausente
Demanda Bioquímica de Oxígeno DBO <sub>5</sub>	mg/l	10	< 10	Oxítop-Merck Análogo SMWW 5210D	ver nota
* Demanda Química de Oxígeno DQO	mg/l	25	< 25	Reflujo Cerrado, Merck, análogo SMWW 5220D	no especificado
Relación DBO <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* 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	0.007	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/l	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/l	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/l	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2

					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	12	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 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas*

*Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664*

*N.D. No detectable. Debajo del límite de detección.*

*NMP: Número más probable*

*El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.*

*Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/l (ver Acuerdo Artículo 21).*

*Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.*

*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

*\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*\*\* Análisis referido.*

*\*\*\* El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio.*

*Comparación de descarga según información del cliente.*



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

**Luis Fernando Fuentes Méndez**  
**Ingeniero Químico**  
**Colegiado 876**

December 16, 2015

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28143

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 10, 2015. This project has been assigned to ACZ's project number, L28143. 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 L28143. 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.

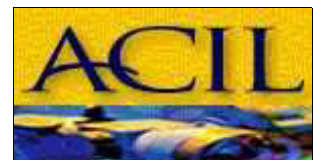
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 15, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L28143-01**

Date Sampled: 12/03/15 10:00

Date Received: 12/10/15

Sample Matrix: Waste Water

## Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								12/14/15 12:32	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	12/15/15 18:08	spl



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28143**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28143-01	WG395905	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).
L28143-02	WG395876	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: **L28143**

No certification qualifiers associated with this analysis



**Tahoe Resources, Inc.**  
 Escobal

ACZ Project ID: L28143  
 Date Received: 12/10/2015 09:46  
 Received By: ddp  
 Date Printed: 12/10/2015

**Receipt Verification**

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

**Samples/Containers**

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

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
3047	12.3	<=6.0	14	N/A

Was ice present in the shipment container(s)?

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

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

Tahoe Resources, Inc.  
Escobal

ACZ Project ID: L28143  
Date Received: 12/10/2015 09:46  
Received By: ddp  
Date Printed: 12/10/2015

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. 28143

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

CHAIN of CUSTODY

Report to:

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

Address: Bienes los Piedras, 18 calle 24-69 zona 10
EMPRESA S.A. Zona Piedra, Torre IV oficina 1406
Telephone: (502) 59 51 52.48

Copy of Report to:

Name:
Company:

E-mail:
Telephone:

Invoice to:

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

Address:
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes No

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

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

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

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

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

Table with columns for # of Containers and analysis results. Includes handwritten numbers 3, 3, 10, 10, 1, 1, 10.

Table with columns: SAMPLE IDENTIFICATION, DATE:TIME, Matrix. Includes handwritten entries for WW9, WW10, WW9, WW10, WW12.

COPY

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

REMARKS

Present results in a different report

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

RELINQUISHED BY:

DATE:TIME

RECEIVED BY:

DATE:TIME

Handwritten signatures and dates: 07:12-2015 16:32, 7/12/15, 12/15/2016



REG 016 Resultados de Análisis

Muestra: 1 muestra de agua compuesta (según información del cliente)

Alicuota 1: 03:00 horas

Alicuota 2: 06:00horas

Alicuota 3: 09:00 horas

Alicuota 4: 12:00 horas

Análisis solicitado por: Ing. Miguel Berganza

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

Procedencia de la muestra: Proyecto Escobal

Fecha de muestreo: 250116

Fecha de ingreso de muestra: 250116

Fecha de análisis: 250116-040216

Fecha del informe: 040216

Identificación de la muestra: WW9

Correlativo Ecosistemas: 3726

Acuerdo Gubernativo 236-2006 (excepto cianuros)					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	8.03	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 <sub>5</sub>	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 <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendidos	mg/l	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/l	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/l	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/l	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/l	0.002	0.008	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/l	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/l	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/l	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Níquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/l	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/l	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	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	23	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas*

*Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664*

*N.D. No detectable. Debajo del límite de detección.*

*NMP: Número más probable*

*El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.*

*Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/l (ver Acuerdo Artículo 21).*

*Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.*

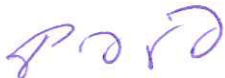
*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

**\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**\*\* Análisis referido.**

**\*\*\*El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio.**

**Comparación de descarga según información del cliente.**



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

*Luis Fernando Fuentes Méndez*  
*Ingeniero Químico*  
*Colegiado 876*

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua  
Análisis solicitado por: Ing. Miguel Berganza  
Dirección: Km. 97.5 carretera Mataquesuintla, Aldea Sabana Redonda, San Rafael Las Flores. Santa Rosa  
Procedencia de la muestra: Proyecto Escobal  
Fecha de muestreo: 250116  
Fecha de ingreso de muestra: 250116  
Fecha de análisis: 250116-040216  
Fecha del informe: 040216

Identificación de la muestra: WW10

Correlativo Ecosistemas: 3727

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	6.57	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 <sub>5</sub>	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 <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendidos	mg/l	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/l	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/l	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/l	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/l	0.002	N.D.	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/l	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/l	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/l	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500- Cr-D	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2

					Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Plomo Pb	mg/l	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/l	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	< 2	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas*

*Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664*

*N.D. No detectable. Debajo del límite de detección.*

*NMP: Número más probable*

*El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.*

*Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento*

*un valor de DBO de 200 mg/l (ver Acuerdo Artículo 21).*

*Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.*

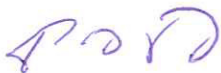
*Se prohíbe la reproducción total o parcial de este informe sin la autorización escrita de Ecosistemas Proyectos Ambientales.*

**\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04**

**\*\* Análisis referido.**

**\*\*\* El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio.**

**Comparación de descarga según información del cliente.**



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

*Luis Fernando Fuentes Méndez*  
*Ingeniero Químico*  
*Colegiado 876*

REG 016 Resultados de Análisis

Muestra: 1 muestra de agua 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: 250116

Fecha de ingreso de muestra: 250116

Fecha de análisis: 250116-040216

Fecha del informe: 040216

Identificación de la muestra: WW11

Correlativo Ecosistemas: 3728

Acuerdo Gubernativo 236-2006 (excepto cianuros)

Límites Máximos Permisibles Entes  
Generadores Nuevos  
Acuerdo 236-2006

PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	descarga a cuerpo receptor
* Potencial de Hidrogeno pH (Laboratorio)	unidades	1	8.03	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 <sub>5</sub>	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 <sub>5</sub> /DQO	---	---	---	---	---
Relación DQO/DBO <sub>5</sub>	---	---	---	---	---
* Sólidos Suspendidos	mg/l	10	< 10	SMWW 2540D	100
* Sólidos Sedimentables	ml/l	0.1	< 0.1	SMWW 2540F	no especificado
Nitrógeno Total	mg/l	10	N.D.	Digestión alcalina persulfato colorimétrico HACH	20
Fósforo Total	mg/l	0.05	N.D.	Spectroquant Merck Análogo EPA 365.2+3, SMWW 4500-P E, ISO 6978/1, DIN EN 1189 D11	10
* Arsénico As	mg/l	0.002	0.008	UNICAM AN40177_E10/03C	0.1
* Cadmio Cd	mg/l	0.02	N.D.	SMWW 3111B	0.1
* Cobre Cu	mg/l	0.03	N.D.	SMWW 3111B	3
Cromo Hexavalente Cr(VI)	mg/l	0.05	N.D.	Colorimétrico Merck, análogo SMWW 3500-Cr-D	0.1
* Mercurio Hg	mg/l	0.004	N.D.	UNICAM AN40181_E10/03C	0.01
* Niquel Ni	mg/l	0.05	N.D.	SMWW 3111B	2



PARAMETRO	DIMENSIONAL	LIMITE DE DETECCION	RESULTADO	METODOLOGIA	Límites Máximos Permisibles Entes Generadores Nuevos Acuerdo 236-2006
					descarga a cuerpo receptor
* Plomo Pb	mg/l	0.05	N.D.	SMWW 3111B	0.4
* Zinc Zn	mg/l	0.01	N.D.	SMWW 3111B	10
Color Aparente	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	500
Color Real	UC HZ equiv. Unid. Pt-Co	1	< 1	Colorimétrico Merck, análogo APHA 2120B, DIN 53409	
** Coliformes Fecales	NMP/100ml	2	23	NMP	< 1 x 10 <sup>4</sup>

**Notas:**

*Captación de muestras: La muestra fue captada por personal ajeno a Ecosistemas.*

*Transporte y preservación de la muestra: Refrigeración. pH < 2 en muestra para análisis de metales y Aceites y Grasas*

*Metodología: Espectrofotométricos / Standard Methods for water and wastewater APHA, AWWA, 22 edic.*

*Organic Reagents for Trace Analysis. J.Fries/H. Getrost. E. Merck Darmstadt. 1977. EPA 1664*

*N.D. No detectable. Debajo del límite de detección.*

*NMP: Número más probable*

*El valor DQO/DBO<sub>5</sub> y DBO<sub>5</sub>/DQO no se ha determinado porque el resultado se encuentra abajo de nuestros límites de detección.*

*Respecto a la DBO el acuerdo 236-2006 la relaciona como "carga" junto al caudal y como meta de cumplimiento un valor de DBO de 200 mg/l (ver Acuerdo Artículo 21).*

*Los resultados obtenidos corresponden únicamente a la muestra recibida por el personal de Ecosistemas Proyectos Ambientales.*


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*\* Análisis acreditado COGUANOR NTG/ISO/IEC 17025:2005 según OGA LE 006-04*

*\*\* Análisis referido.*

*\*\*\* El resultado se basa en el análisis visual de la muestra enviada por el cliente al laboratorio.*

*Comparación de descarga según información del cliente.*



Ing. Oscar Páez  
Gerente Técnico



VoBo Ing. Fernando Fuentes  
Gerente de Calidad

*Luis Fernando Fuentes Méndez*  
*Ingeniero Químico*  
*Colegiado 876*

January 29, 2016

## Report to:

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

## Bill to:

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

Project ID: Escobal

ACZ Project ID: L28703

Miguel Berganza:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on January 27, 2016. This project has been assigned to ACZ's project number, L28703. 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 L28703. 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.

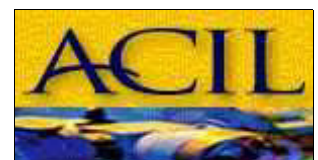
This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after February 28, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

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



Sue Webber has reviewed and approved this report.



**Tahoe Resources, Inc.**

Project ID: Escobal

Sample ID: WW9

ACZ Sample ID: **L28703-01**

Date Sampled: 01/25/16 12:00

Date Received: 01/27/16

Sample Matrix: Waste Water

## Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								01/28/16 14:53	enb

## Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	01/28/16 21:06	pjb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: WW10

ACZ Sample ID: **L28703-02**  
 Date Sampled: 01/25/16 12:00  
 Date Received: 01/27/16  
 Sample Matrix: Surface Water

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								01/28/16 15:01	enb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	01/28/16 21:07	pjb

**Tahoe Resources, Inc.**

Project ID: Escobal  
 Sample ID: WW11

ACZ Sample ID: **L28703-03**  
 Date Sampled: 01/25/16 12:00  
 Date Received: 01/27/16  
 Sample Matrix: Waste Water

**Inorganic Prep**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Manual Distillation								01/28/16 15:10	enb

**Wet Chemistry**

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	01/28/16 21:08	pjb



**Report Header Explanations**

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

**QC Sample Types**

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

**QC Sample Type Explanations**

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

**ACZ Qualifiers (Qual)**

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

**Method References**

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

**Comments**

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

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

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

Tahoe Resources, Inc.

ACZ Project ID: **L28703**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L28703-01	WG397887	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L28703-02	WG397887	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L28703-03	WG397887	Cyanide, total	M335.4 - Colorimetric w/ distillation	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Tahoe Resources, Inc.

ACZ Project ID: **L28703**

No certification qualifiers associated with this analysis



**Tahoe Resources, Inc.**  
 Escobal

ACZ Project ID: L28703  
 Date Received: 01/27/2016 09:36  
 Received By: ddp  
 Date Printed: 1/27/2016

**Receipt Verification**

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

**Samples/Containers**

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

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
4417	2.5	<=6.0	14	N/A

Was ice present in the shipment container(s)?

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

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

**Tahoe Resources, Inc.**  
Escobal

ACZ Project ID: L28703  
Date Received: 01/27/2016 09:36  
Received By: ddp  
Date Printed: 1/27/2016

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).



Laboratories, Inc. 68703

**CHAIN of CUSTODY**

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

**Report to:**

Name: Miguel Regonzo  
Company: Talco Resources Inc.  
E-mail: MRegonzo@steamboat.com.gt

Address: Bunker Low Process Bldg 24-69 Zone 10  
Empire State Zone Project, Twp 10, R10W, N40E  
Telephone: (970) 695-6242

**Copy of Report to:**

Name:  
Company:

E-mail:  
Telephone:

**Invoice to:**

Name: Miguel Regonzo  
Company: Talco Resources Inc.  
E-mail: MRegonzo@steamboat.com.gt

Address:  
Telephone:

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

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

Are samples for SDWA Compliance Monitoring? Yes  No

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

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

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

**PROJECT INFORMATION**

**ANALYSES REQUESTED (attach list or use quote number)**

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

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SW	total CN						
WW9	25/01/16 03:00-12:00	WW	11	/							
WW10	25/01/16 12:00	SW	10	/							
WW9	25/01/16 03:00-12:00	WW	1		/						
WW10	25/01/16 12:00	SW	1		/						
WW11	25/01/16 03:00-12:00	WW	1		/						

COPY

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

**REMARKS**

\*Please present cyanide results in a different report.  
Extra glass bottle is shipped for quality control (sample ww9).

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

**RELINQUISHED BY:**

**DATE:TIME**

**RECEIVED BY:**

**DATE:TIME**

<u>[Signature]</u>	<u>25-01-2016</u>	<u>[Signature]</u>	<u>25-01-2016 16:40</u>
		<u>[Signature]</u>	<u>1-27-16 09:36</u>

